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University of Maryland Environmental Finance Center

Webinar | Reducing Energy Costs for Small Wastewater Treatment Plants

(Tuesday, July 07, 2026)

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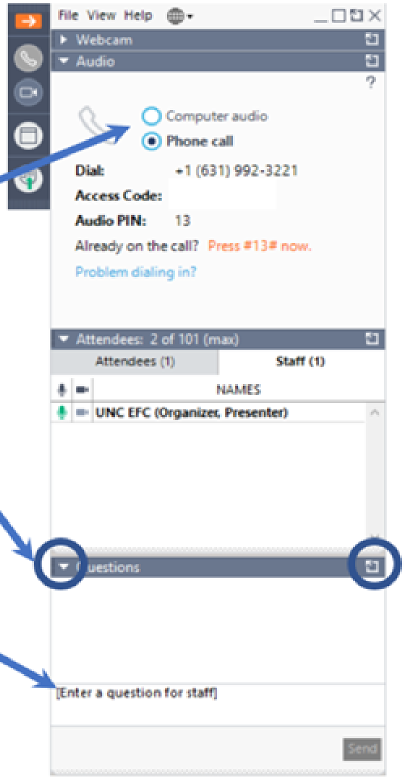

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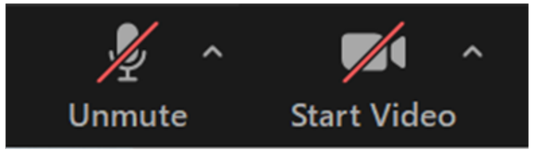

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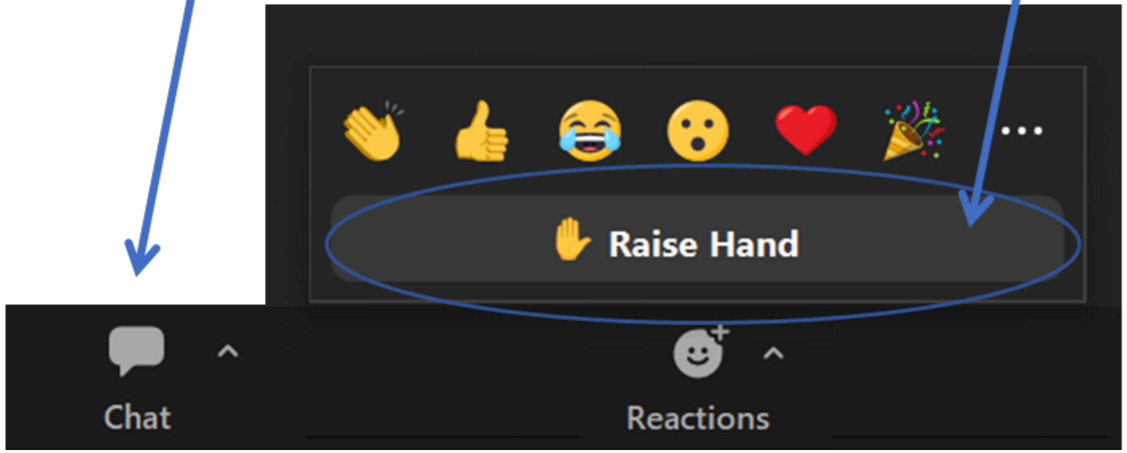

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To receive a certificate:

- You must attend the entire session
- You must register and attend using your real name and unique email address - group viewing credit will not be acceptable
- You must participate in polls
- Certificates will be sent via email within 30 days

If you have questions or need assistance, please contact smallsystems@syr.edu.

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About Us

The **Environmental Finance Center Network (EFCN)** is a university- and non-profit-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and water infrastructure.

The EFCN works collectively and as individual centers to address these issues across the entire U.S, including the 5 territories and the Navajo Nation. The EFCN aims to assist public and private sectors through training, direct professional assistance, production of durable resources, and innovative policy ideas.

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Advancing Finance Solutions | Building Local Capacity | Serving Communities

- Education | Training | Technical Assistance
- Research | Policy Analysis | Financial Assessment
- Community Outreach & Facilitation

Flagship Programs:

most
Municipal Online Stormwater Training Center

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Small Systems Technical Assistance

Drinking water, wastewater, and/or stormwater systems serving <10,000 people. Wider variety of topics and issues covered.

- Educational resources & trainings, plus technical assistance around U.S.: efcnetwork.org
- For technical assistance within Region 3, email or call Danish Kumar dkumar18@umd.edu (301) 405-9945

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Today’s Speakers

Danish Kumar
Climate Change Program Manager
dkumar18@umd.edu

Energy in WWTP

Energy use of WWTP

- WWTPs consume up to 3-4% of U.S. electric load and consume more than 30 billion kWh annually, which equates to about $2 billion in annual electric costs.
- WWTP Energy Use Accounts For 30% To 40% of the total operation and maintenance cost of the facility

Energy use of Small WWTP

Energy Inputs in WWTP

PRELIMINARY TREATMENT

Collection

Pumping

PRIMARY TREATMENT

Screens

Grit

Chemical Treatment

SECONDARY TREATMENT

Activated sludge

Sequencing batch reactors

A/O and A^2/O Systems

Oxidation ditch

Membrane bioreactor

ADVANCED TREATMENT

Disinfection

RO

Ultrafiltration

SLUDGE TREATMENT

Belt process

Dehydration

Return sludge Pumping

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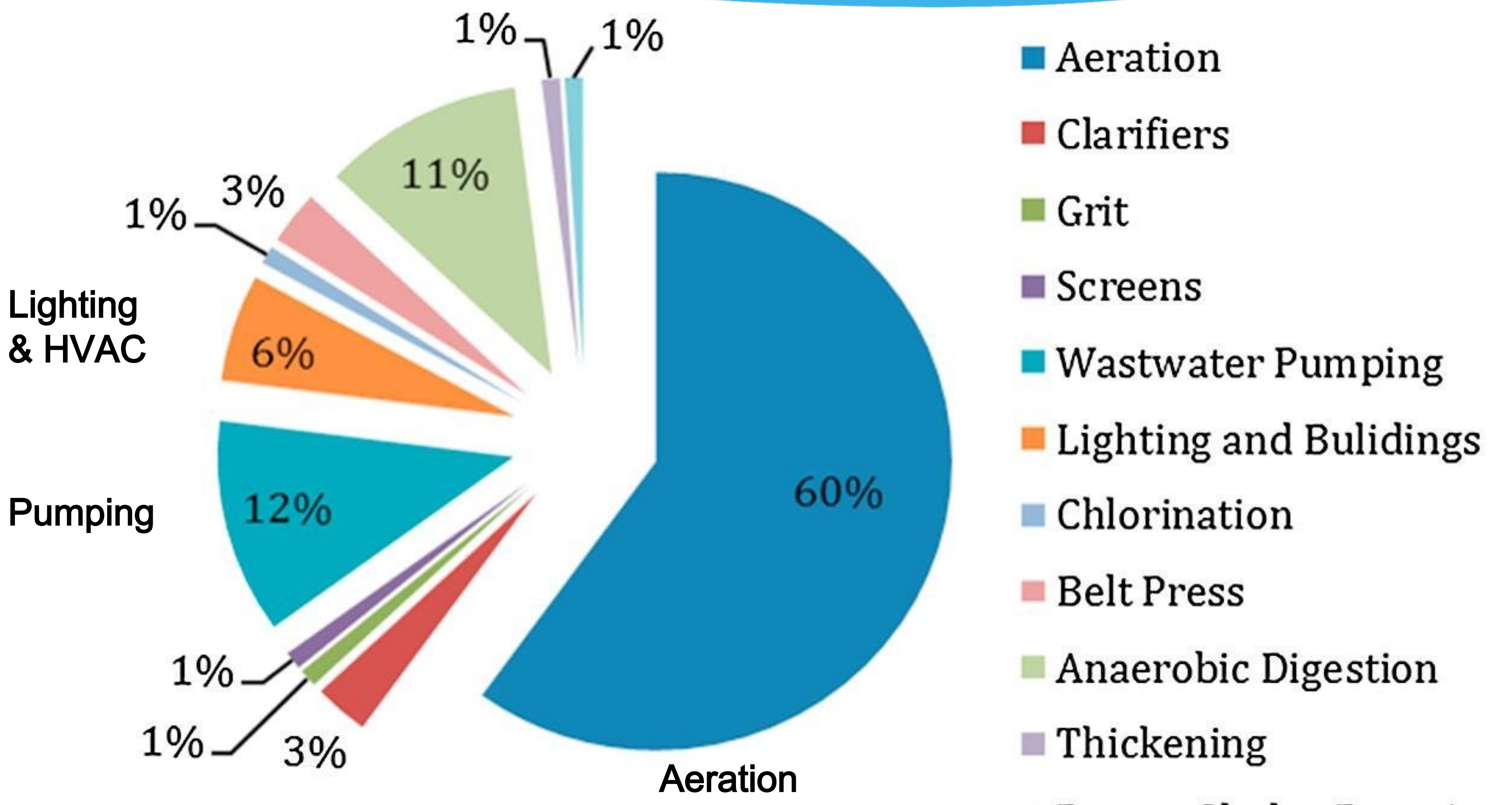
Key Energy Consumption Areas



Why Energy Matters for Small WWTPs

Stringent Requirements

Advanced treatment needs more energy

Resource Recovery

Biosolids treatment adds complexity

Aging Infrastructure

Leads to inefficiency and higher volumes

Electricity Rates

Power cost inflation impacts operations

Budget Impact

30-60% of small system budgets

Resource Challenges

Limited funding, staffing, technical resources

Financial Sustainability

Efficiency critical for long-term viability

Influent Variability

Changes in wastewater composition affect treatment needs

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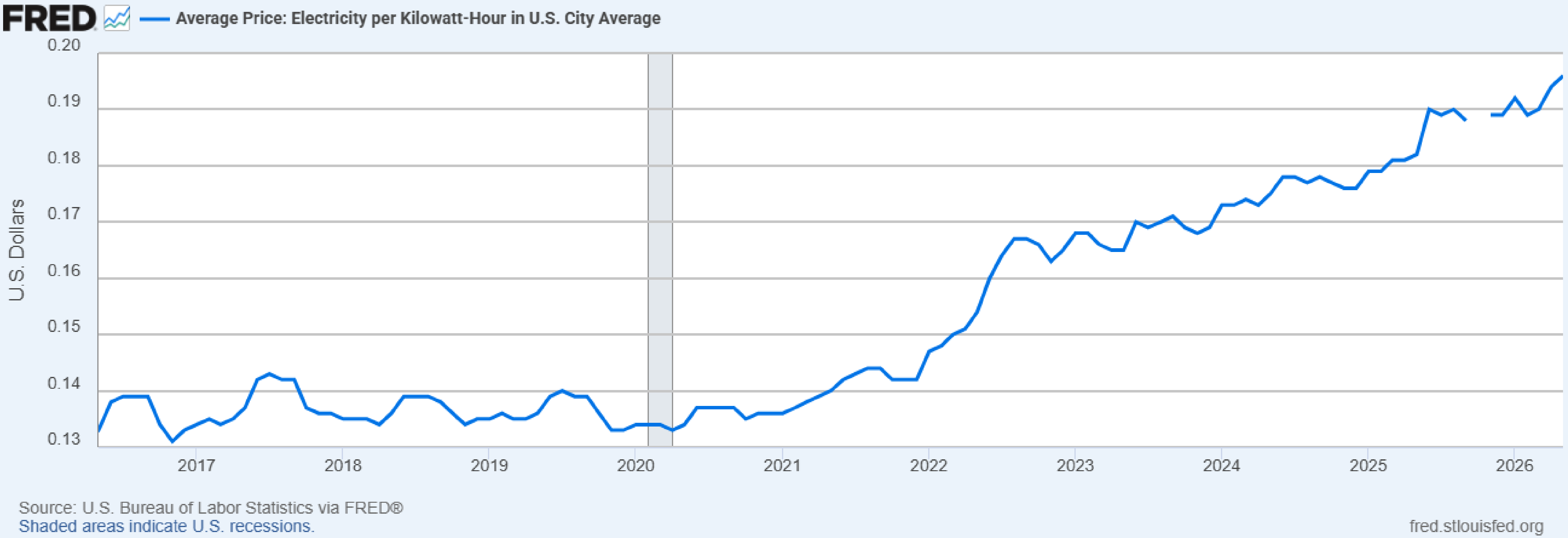
Poll*

How much have your WWTP energy bills/cost increased in past 2 years

Electricity Cost



Energy 101

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Energy Fundamentals

Energy

The capacity to do work, measured in kilowatt-hours (kWh) or British Thermal Units (BTU).

Power

The rate at which energy is used, measured in kilowatts (kW).

Energy Use Intensity (EUI)

It is a metric used to express the energy consumption of the plant relative to the volume of wastewater it treats.

Kilowatt -hour (kWh)

One kilowatt of power used for one hour. A 10-kW pump running for 5 hours uses 50 kWh.

EUI for WWTP

Commonly tracked as energy use per unit of kWh/MGD or kWh per pound of BOD removed.

Understanding your Energy Bill

Get a copy of your monthly bill and review it to understand the information it provides.

Contact and get to know the energy provider account representative for your facility.

Determine what rate schedule your energy provider has applied to your facility.

Meet with your account representative to assess if this rate schedule is the most appropriate for your facility.

Details of your Electric Charges

Small General Service 2 - service numbe
Electricity you used this period

Meter Number	Energy Type	End Date	Start Date	Number Of Days	Total Use
KZD364275840	Use (kWh)	Jul 25	Jun 24	32	22857
		Reading	**Reading**	**Multiplier**	
		020944	020715	100	

Meter Number	Energy Type	End Date	Start Date	Number Of Days	Total Use
KZD364275840	Demand (kW)	Jul 25	Jun 24	32	52.08

Load Factor: 57.23%

Your meter records electric energy use in hourly intervals. Your bill is the total of all hourly intervals recorded during your billing period.
End and start date kWh meter readings are provided for informational purposes only.
Please visit My Account at delmarva.com to view your energy use data.

Your next bill period is scheduled to end on August 23, 2023

Electric Summary

Balance from your last bill	**$1,344.97**
Payment Jul 24	$1,344.97–
Total Payments	**$1,344.97–**
Electric Charges (Small General Service 2)	$1,376.83
New electric charges	**$1,376.83**
Total amount due by Aug 21, 2023	**$1,376.83**

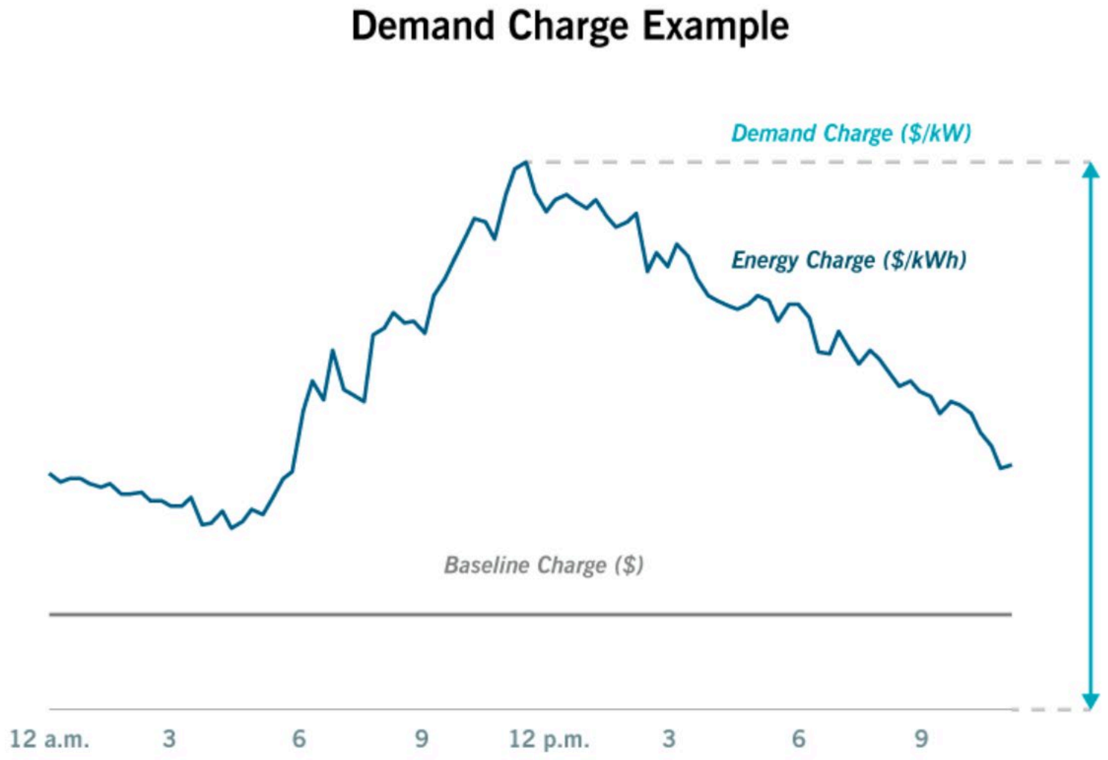
Delivery Charges: These charges reflect the cost of bringing electricity to you.
Current charges for 32 days, **summer rates in effect.**
Capacity/Transmission Peak Load Contribution 32.84 / 31.76

Type of charge	How we calculate this charge	Amount($)
Customer Charge		25.10
Distribution Charge	First 20.00 kW X $4.0135950 per kW	80.27
Distribution Charge	Last 32.00 kW X $4.0135950 per kW	128.44
Distribution Charge	First 3500 kWh X $0.0390320 per kWh	136.61
Distribution Charge	Last 19357 kWh X $0.0390320 per kWh	755.55
Environmental Surcharge	22857 kWh X $0.0001500 per kWh	3.43
EmPOWER Maryland Charge	22857 kWh X $0.0085930 per kWh	196.41
Administrative Credit	22857 kWh X $0.0000000 per kWh	0.00
Universal Service Program		36.85

Demand Charges

Understanding Demand Charges

- Demand Charges are based on maximum power draw (kW) during a billing period — not total energy consumed (kWh).
- WWTPs may be charged based on the highest 15-minute interval of electricity use each month.
- Often range from $5–$15 per kW/month but can be higher depending on the utility.



Efficiency vs. Conservation

Term	Definition	Example
Energy Efficiency	using less energy to accomplish the same task	LED lights, VFDs, high-efficiency blowers
Energy Conservation	practice of using less energy	Turning off lights, reducing run times

Energy Efficiency Strategies

Optimizing Aeration Systems

Real-Time Oxygen Monitoring

- Install sensors with IoT systems to match blower operations with actual oxygen demand, preventing energy waste from over-aeration.

Diffuser Upgrades

- Replace coarse-bubble with fine-bubble diffusers to reduce energy consumption by 30-50% while improving oxygen transfer efficiency.

Aeration Optimization

- Fine-tune dissolved oxygen setpoints and implement automated DO control. Modest adjustments can reduce blower energy use by 10-15% with minimal investment and no impact on treatment quality.

Optimizing Aeration Systems-Solar Aerator

- Uses solar panels to power compressors and diffusers, reducing or eliminating grid electricity costs for aeration.
- Well-suited for wastewater lagoons, oxidation ponds, and small treatment basins.
- Improve dissolved oxygen levels, reduce algae and provide long-term energy cost savings with minimal operating expenses.

Image Credit: Tucker Colvin, Southwest Environmental Finance Center.

High-Efficiency Blower Technologies

Turbo Blowers

Modern high-speed turbo blowers feature advanced magnetic bearings that eliminate friction losses and oil lubrication requirements. These units deliver 20-40% energy savings compared to conventional positive displacement blowers.

Multistage Centrifugal Blowers

These blowers excel in applications requiring consistent airflow at moderate pressure. They feature precision-engineered impellers that minimize turbulence and energy losses throughout the compression cycle.

WWTP replacing conventional blowers with turbo units, can reduce aeration energy consumption by 30% while improving process control capabilities. The project can achieve payback in under 4 years.

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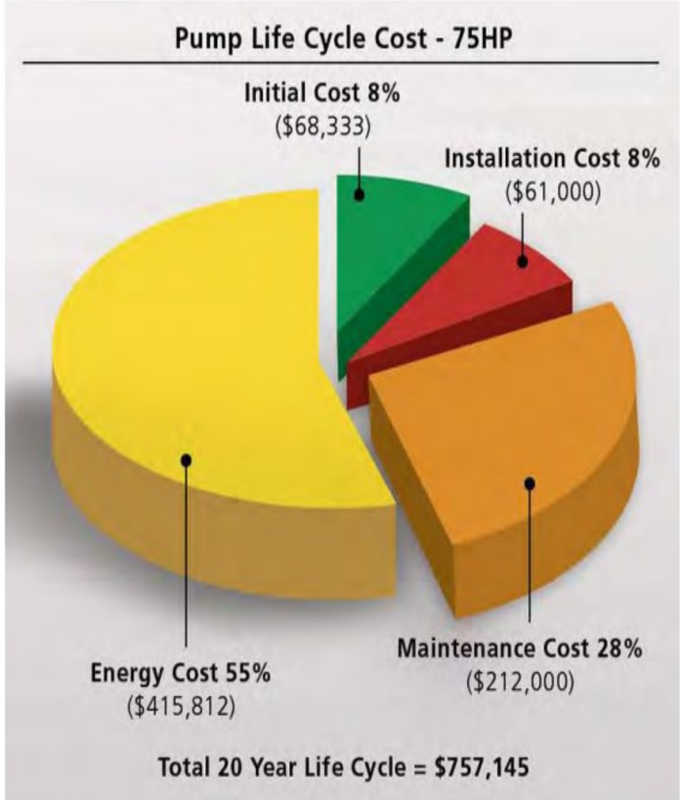
Equipment lifecycle.

Energy Lesson: Life Cycle Cost for a Pump



Energy Lesson

Buy the most energy efficient pump possible.

Energy Lesson: Aeration Design

	Transfer Rate (# O_2/HP·hr)
Coarse Air Bubble	1.5
Fine Air Bubble	3.3
Mechanical Aeration	3.9
Fine Air Bubble w/Full Floor Coverage & High Efficiency Blowers	6.6

Energy Lesson

Dissolved Oxygen (DO) level >1.0 mg/L is wasting energy.

Source: Sate Energy Conservation Office, Texas, 2018

Equipment Upgrade Opportunities

High-Efficiency Motors

- Replace standard motors with NEMA Premium® or IE4-class models to achieve 2-8% energy savings per motor. Focus on continuously running equipment for maximum ROI.

Variable Frequency Drives

- Install VFDs on pumps and blowers to match output with actual demand, reducing energy use by 20-50% depending on load variability and duty cycles.

Right-Sized Pumping Systems

- Replace oversized pumps with properly sized alternatives that achieve wire-to-water efficiency above 80%. Pair with VFDs for maximum operational flexibility.

LED Lighting Retrofits

- Convert to LED lighting throughout the facility to reduce lighting energy consumption by up to 90%. Add motion sensors in low-traffic areas for additional savings.

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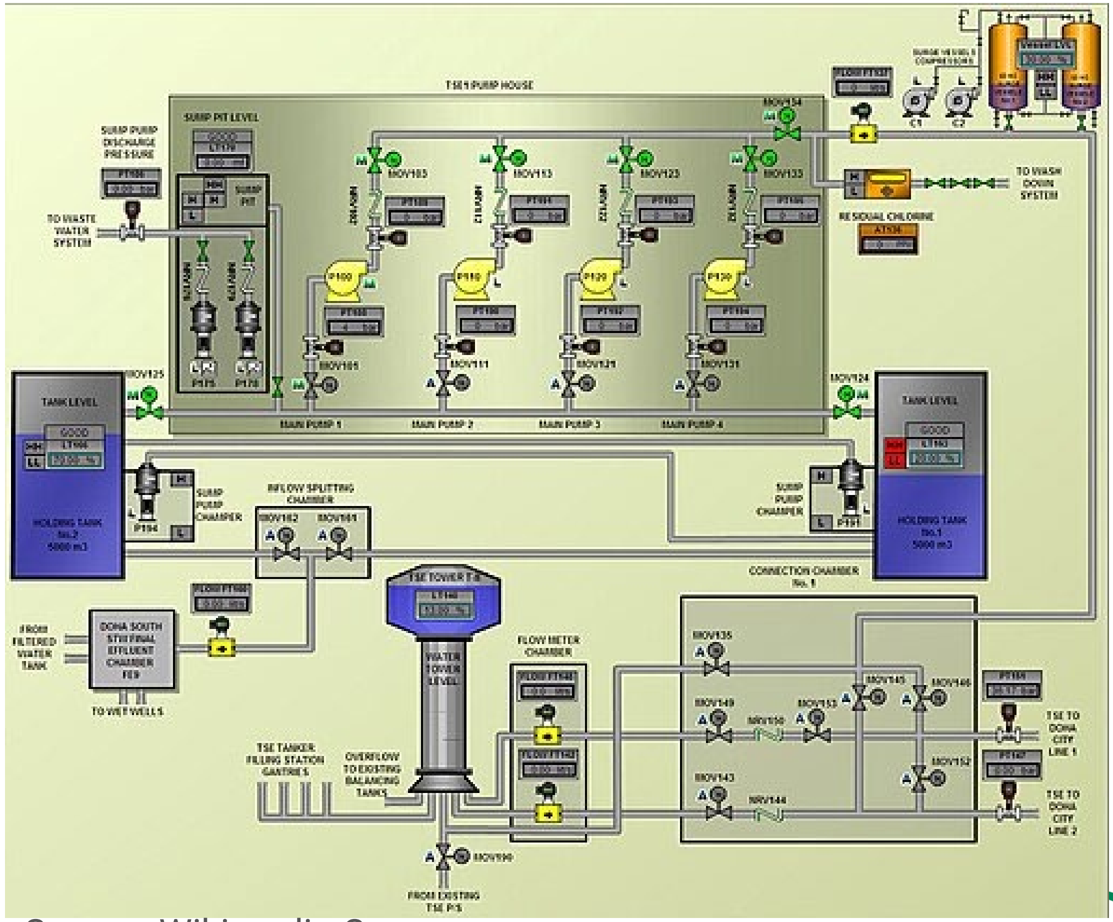
Process Control Improvements

SCADA Implementation

- Modern supervisory control and data acquisition (SCADA) systems provide operators with real-time visibility into plant performance.
- Enable precise control of treatment processes, minimizing energy waste while maintaining compliance with discharge permits.



Source: Wikimedia Commons

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Optimizing Chemical Processes for Energy Savings

UV Disinfection

- More energy-efficient and cost-effective than chlorination/dichlorination over 7 years
- Eliminates safety risks from storing chlorine gas
- Use high-efficiency bulbs to minimize energy consumption

Alkalinity Management

- Lye addition for alkalinity is costly and energy-intensive
- Optimizing denitrification can reduce or eliminate the need for added alkalinity

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Poll*

Which energy-saving solution have you implemented or are you considering?

Equipment Upgrade Opportunities - Lifecycle

Equipment Type	Typical Useful Life
Pumps & Motors	10–15 years
Blowers	10–15 years
Lighting (LED)	10–15 years
HVAC Systems	15–25+ years
Control Systems	10–15 years

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Prioritizing Projects: ROI Analysis

Project Type	Typical Payback	Annual Savings	Key Considerations
LED Lighting	1–5 years	$1K–$3K	Quick ROI; utility rebates often available
VFD Installation	2–5 years	$5K–$20K	Cuts motor energy use by 20–50%
DO Control Systems	3–7 years	$5K–$20K	Optimizes high-energy equipment for smarter operation
Turbo Blowers	3–7 years	$40K–$200K	Major savings, but high capital investment

Simple payback calculation: Payback (years) = Initial Cost ÷ Annual Energy Savings.

Reducing I&I to Lower Energy Costs

Track flow during rain, snowmelt, and high groundwater periods → Inspect and seal leaking manholes → Find improper stormwater connections → Locate cracked pipes, root intrusion, and leaking joints

→ Repair high-priority pipe defects first → Disconnect sump pumps, roof drains, and foundation drains from sanitary sewer → Use pump station run times to identify problem areas

Heat Pumps for Facility Buildings

- Heat pumps are electric space conditioning equipment that provide both heating and cooling in buildings.
- They function at higher efficiencies than conventional space conditioning equipment's, providing the same level of conditioning but using less energy.

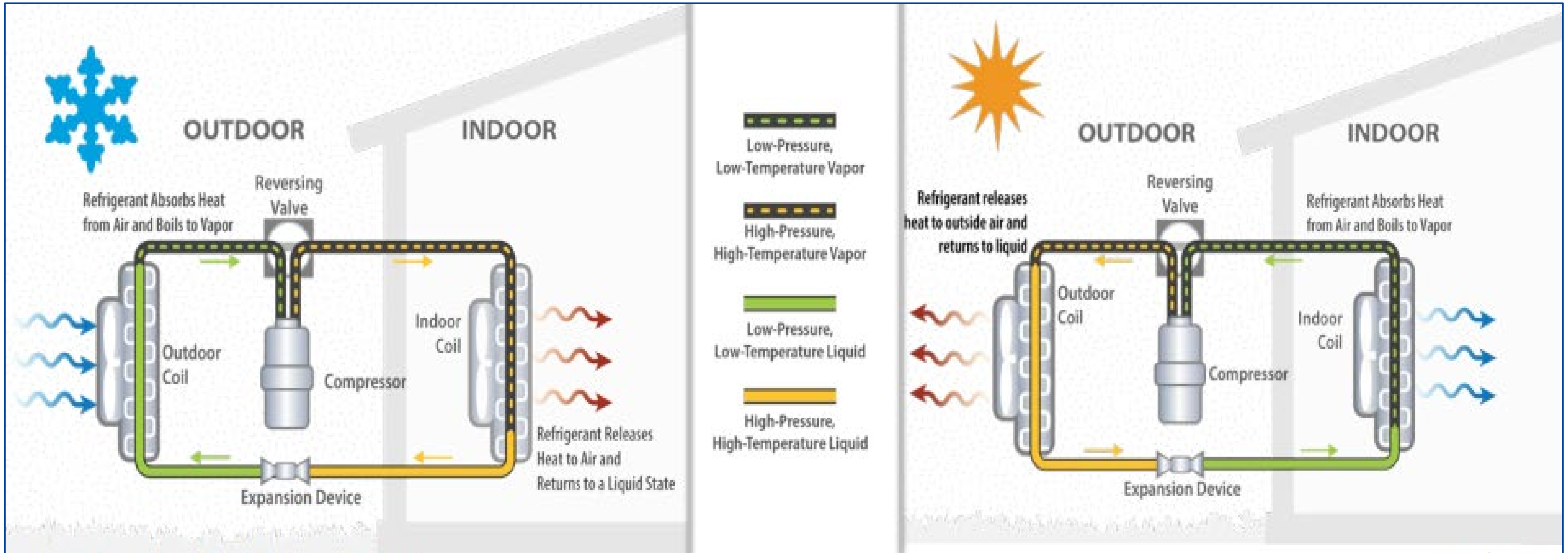
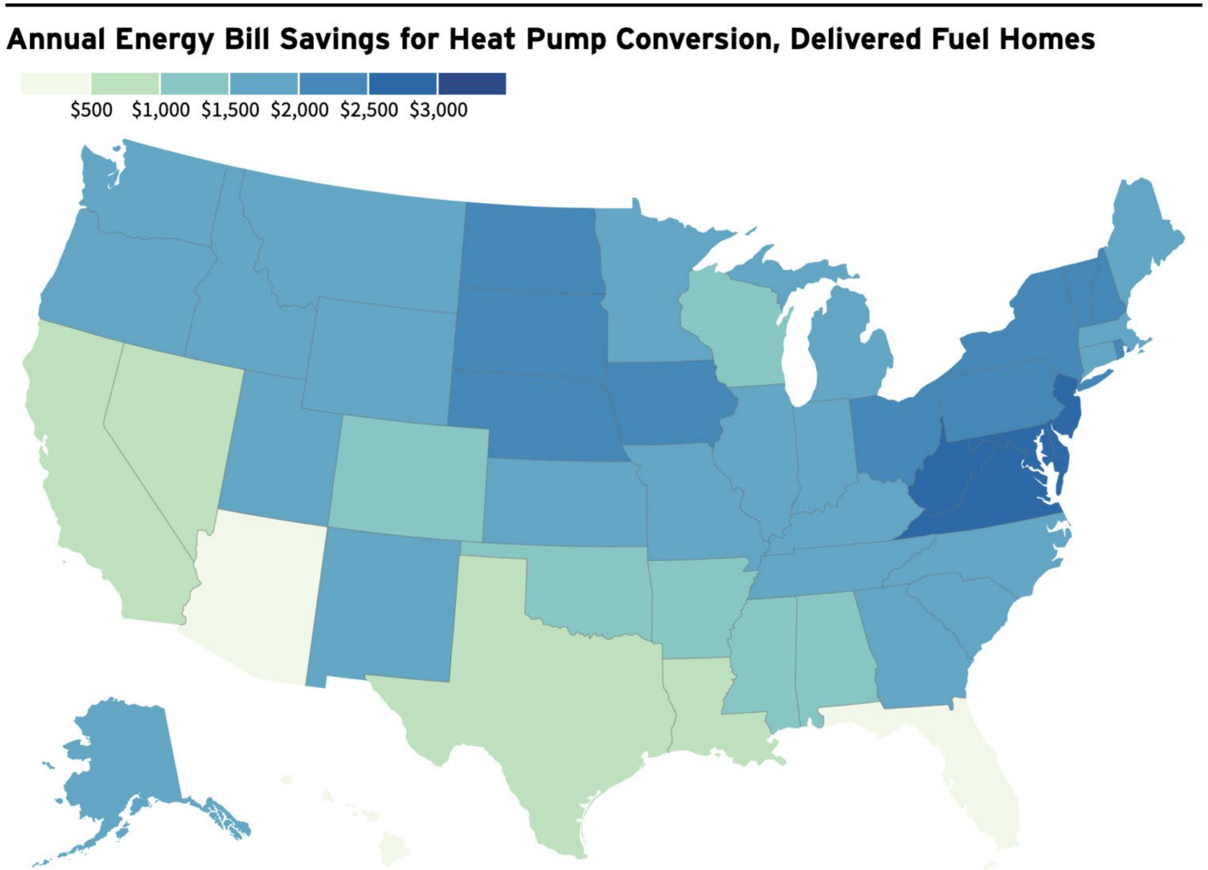


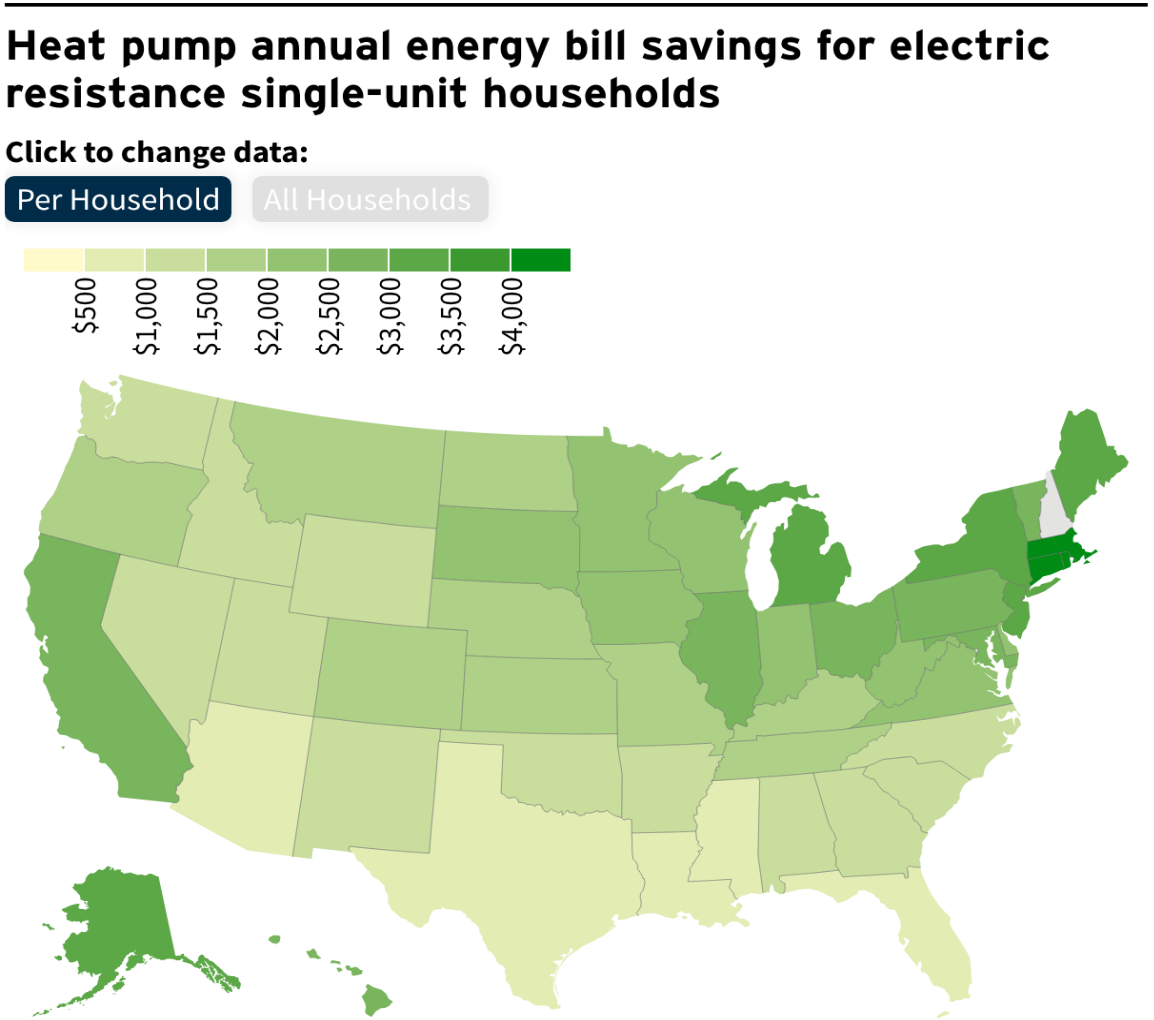
Figure depicts the air-to-air heat pump refrigeration cycle.

NREL | 12

Heat Pumps Cost Savings



Source: RMI Green Upgrade Calculator



Note: Results include upgrading electric resistance space and water heating to an air-source heat pump and heat pump water heater

Source: RMI Green Upgrade Calculator

RMI

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Source: https://rmi.org/resources/lower-bills-better-grids-heat-pump-benefits-for-electric-resistance-heated-homes/

Financing Sources

- EPA Clean Water State Revolving Fund (CWSRF) provides low-interest loans for energy efficiency upgrades.
- Many electric utilities offer custom incentives for large energy users like WWTPs.
- Energy Savings Performance Contracts (ESPCs) allow facilities to implement upgrades with no upfront capital. The energy service company guarantees savings that cover the project costs over a defined term, typically 10-15 years.

Steps to Improve Energy Efficiency

Assess Current Energy use

- Use Self-assessment and energy audits

Develop Management Plan

- Create roadmap for improvements

Upgrade Equipment

- Install VFDs,
- high-efficiency motors/pumps
- SCADA Systems

Operational Changes

- Shift equipment to off-peak hours
- Using real time data to make decisions

Renewable Integration

- Add solar
- biogas capture & utilization

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Where Should We Start?

System Condition	Start here
Electric bill is high	Review utility rate schedule, demand charges, and 12 months of bills
Aeration is the largest load	Check DO setpoints, diffusers, blowers, mixer operation, and run times
Flow increases during rain or snowmelt	Investigate inflow and infiltration (I&I)
Pumps or motors are old or oversized	Evaluate VFDs, motor efficiency, pump sizing, and maintenance

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Renewable Energy Integration

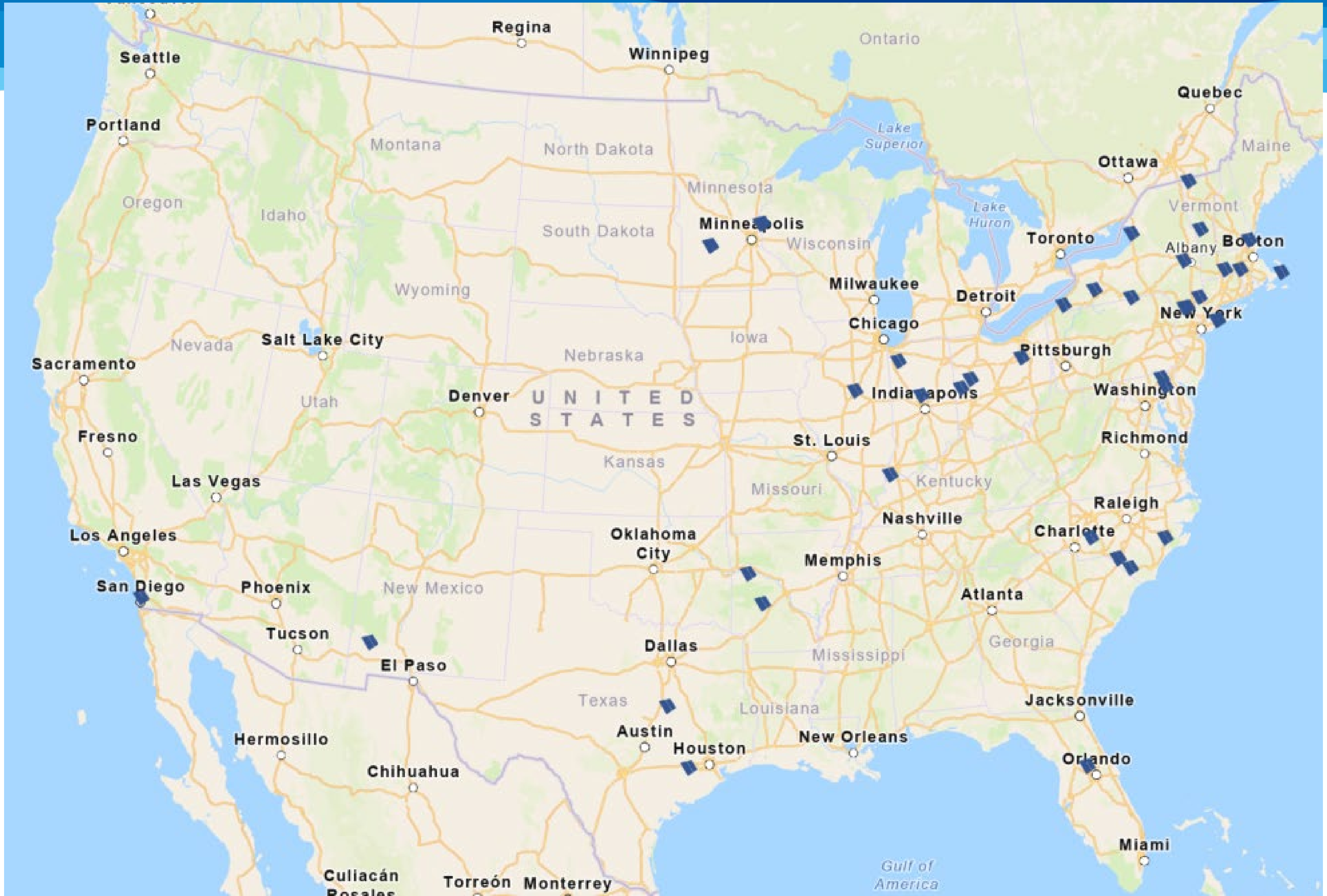
Renewable Energy Integration

- Cuts electricity bills and lowers operational expenses with minimal maintenance.
- Reduces greenhouse gas emissions, supporting sustainability goals.
- Reduces reliance on external power providers, enhancing reliability.
- Easily scaled to meet the specific energy needs of any facility size.
- The initial investment is offset by long-term savings, with a payback period of 7 to 14 years, after which energy becomes virtually free.

Poll*

Do you or a system near you have solar/renewable system?

WWTP with Solar



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Solar / Photovoltaic Systems

- WWTPs typically have abundant open land or roof space ideal for solar installations. Ground-mounted systems offer the highest energy density and easiest maintenance access.
- **Annual production:** 1200-1700 kWh per kW installed
- **System lifespan**: 25 years with minimal maintenance
- **Cost:** 2000-3000$/kW *(Bigger ground mount systems will cost less)*

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Steps for Transition to Solar

1. **Energy Assessment:** Evaluate current energy needs
2. **Feasibility Study:** Solar potential, site suitability, budget
3. **Installation Process:** Permits, vendor selection, installation

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1. Energy Assessment

Basic Assessment

- Analyze Monthly/Yearly Energy Bill and Cost
- Analyze Peak Demand and Time-of-Use Charges
- Determine whether solar and battery storage could reduce peak costs.

Detail Assessment

- EPA Energy Assessment Tool for WWTP
- Energy Audit
- Consult a solar developer

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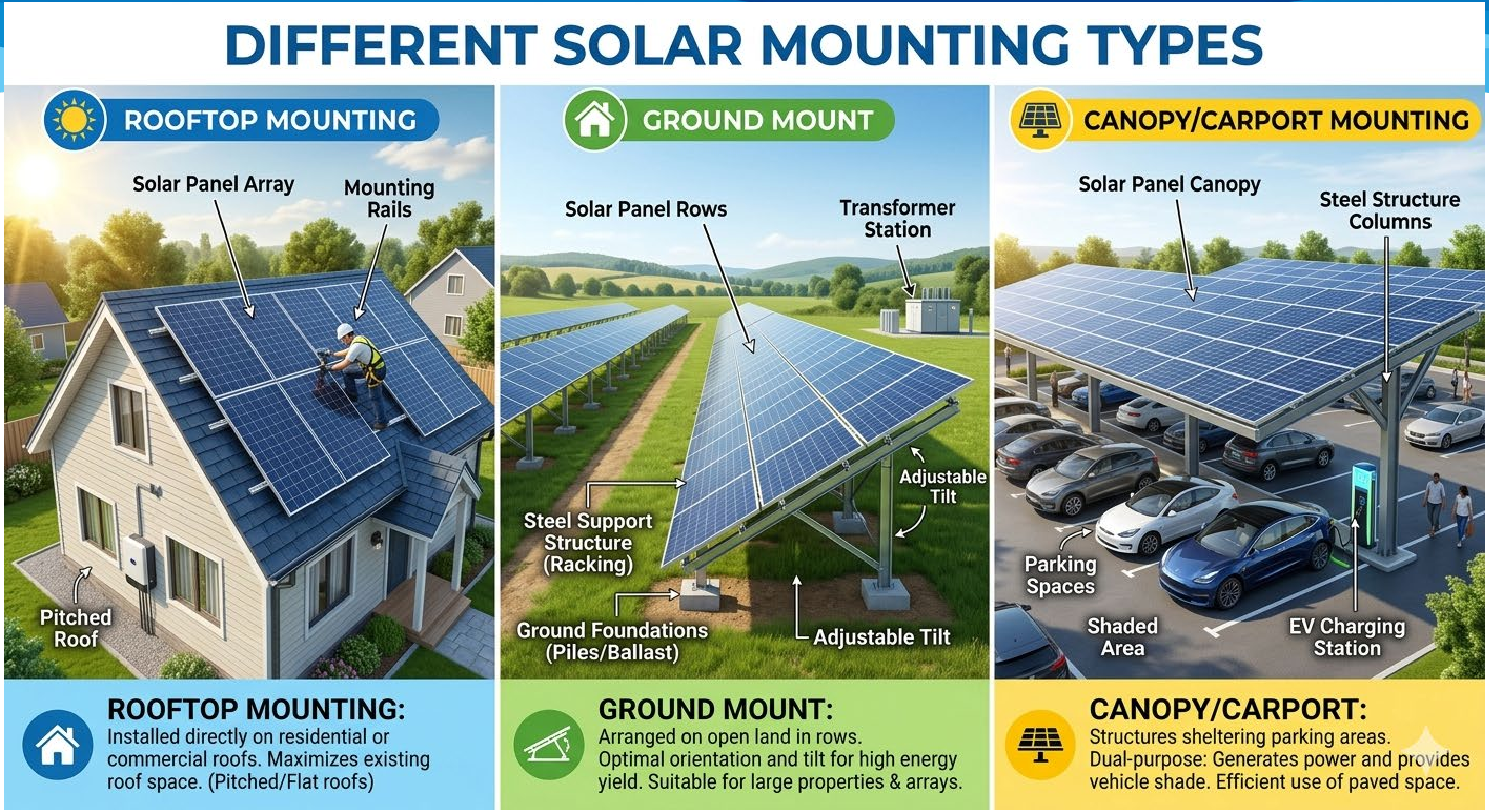
2.Solar Placement



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2. Solar Potential & Pre-Feasibility

Space for Panels

Average 5 acres needed per MW for ground mount installation

Avoid shading for Maximum Output

Optimize Orientation for Maximum Output

PV Watts

Open Solar

EFCN Solar Saving Calculator

Site needs

Solar Potential

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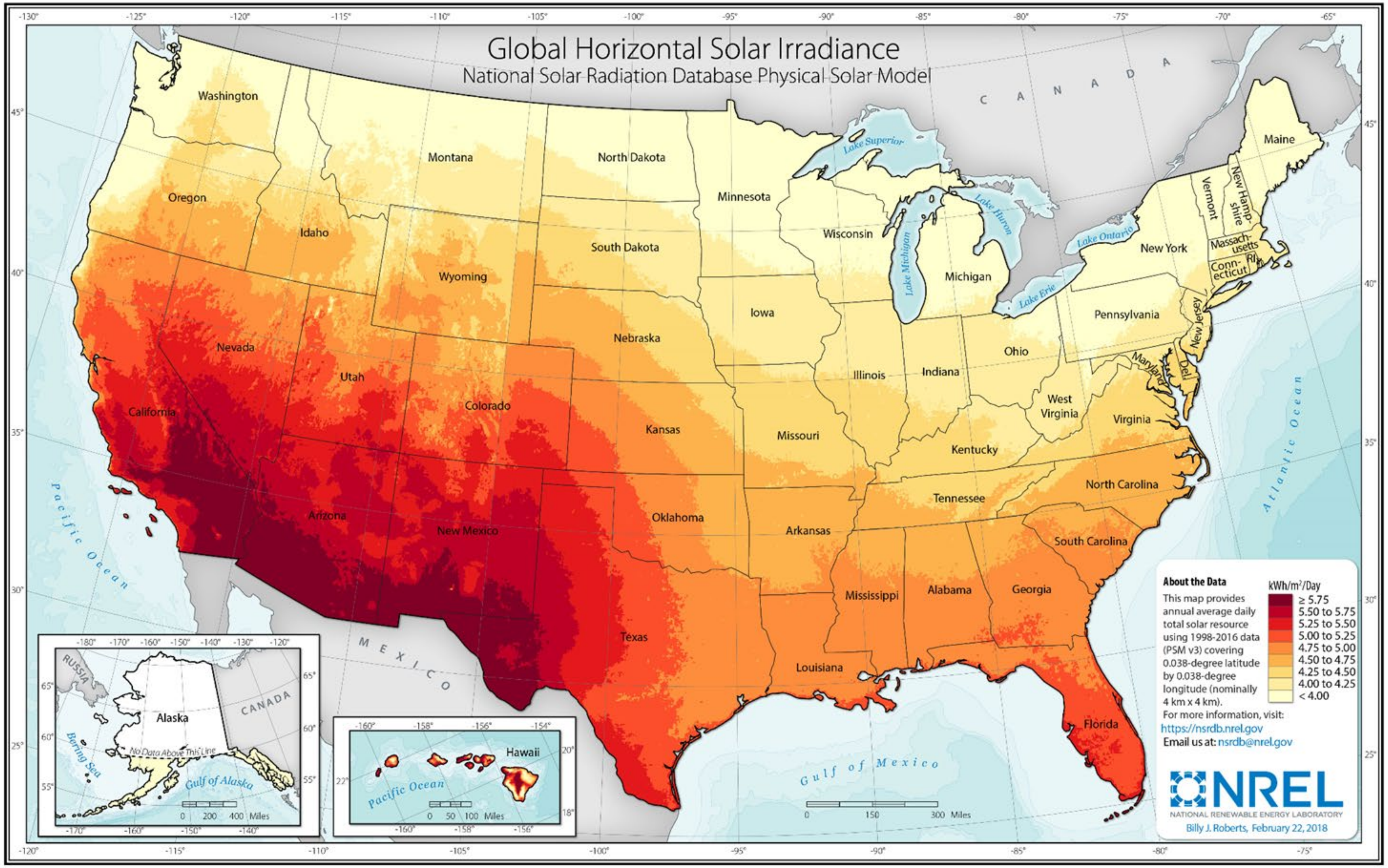
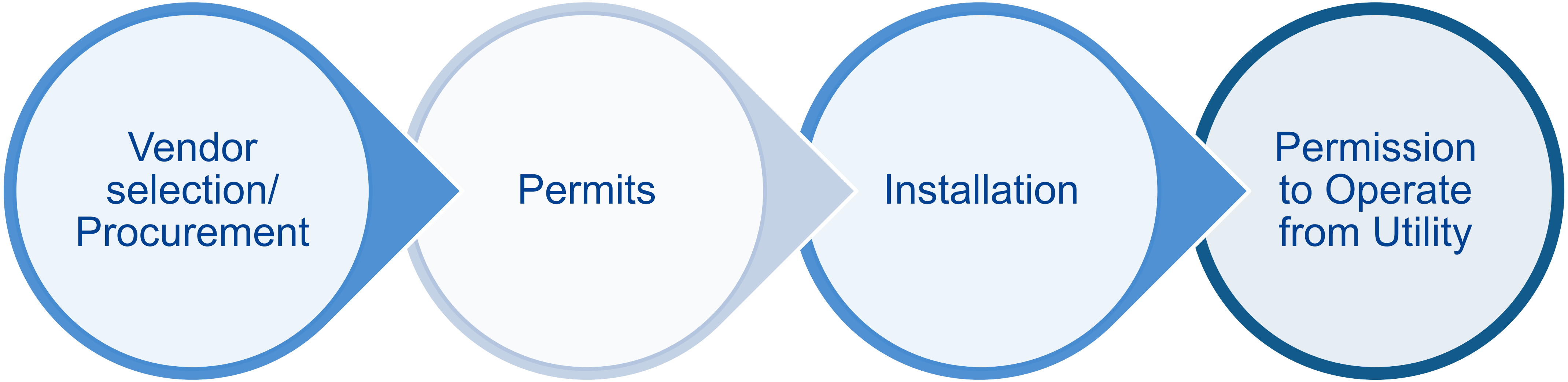
Average Daily Solar Energy



3. Installation Process



Transition to Solar for Small WWTP

- This plant X, with a capacity of 0.5 million gallons per day (MGD), can meet its energy needs through a 600-kW solar installation. This setup can offset the plant's daily electricity consumption of approximately 3,000 kWh.
- Installation Cost: The estimated cost for a 600-kW solar project is about $1.2 million, based on an average rate of $2,000 per kW. This cost may vary due to factors like local labor rates, permitting requirements, and site-specific conditions.
- Operation & Maintenance (O&M) Costs: Maintaining the solar system over its lifetime requires annual O&M expenses.
  - For commercial-scale solar (100 kW to 2 MW), these costs typically range from $15-30/$kW_{DC\text{-}yr}$

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Solar for Small WWTP-Community X

Factor	Value	Unit
Plant X Capacity	0.5	MGD
Population Served	5000	People
Average Small WWTP Energy use	6000	kWh/MGD
Energy use at Plant X	3000	kWh
Average Peak sun hours	5	Hours
Required System Size	600	kW
Average Total Installation Cost	2000-3000	$/kW
Solar Cost at Plant X	1,200,000	$
Annual Energy Savings	164,250	$

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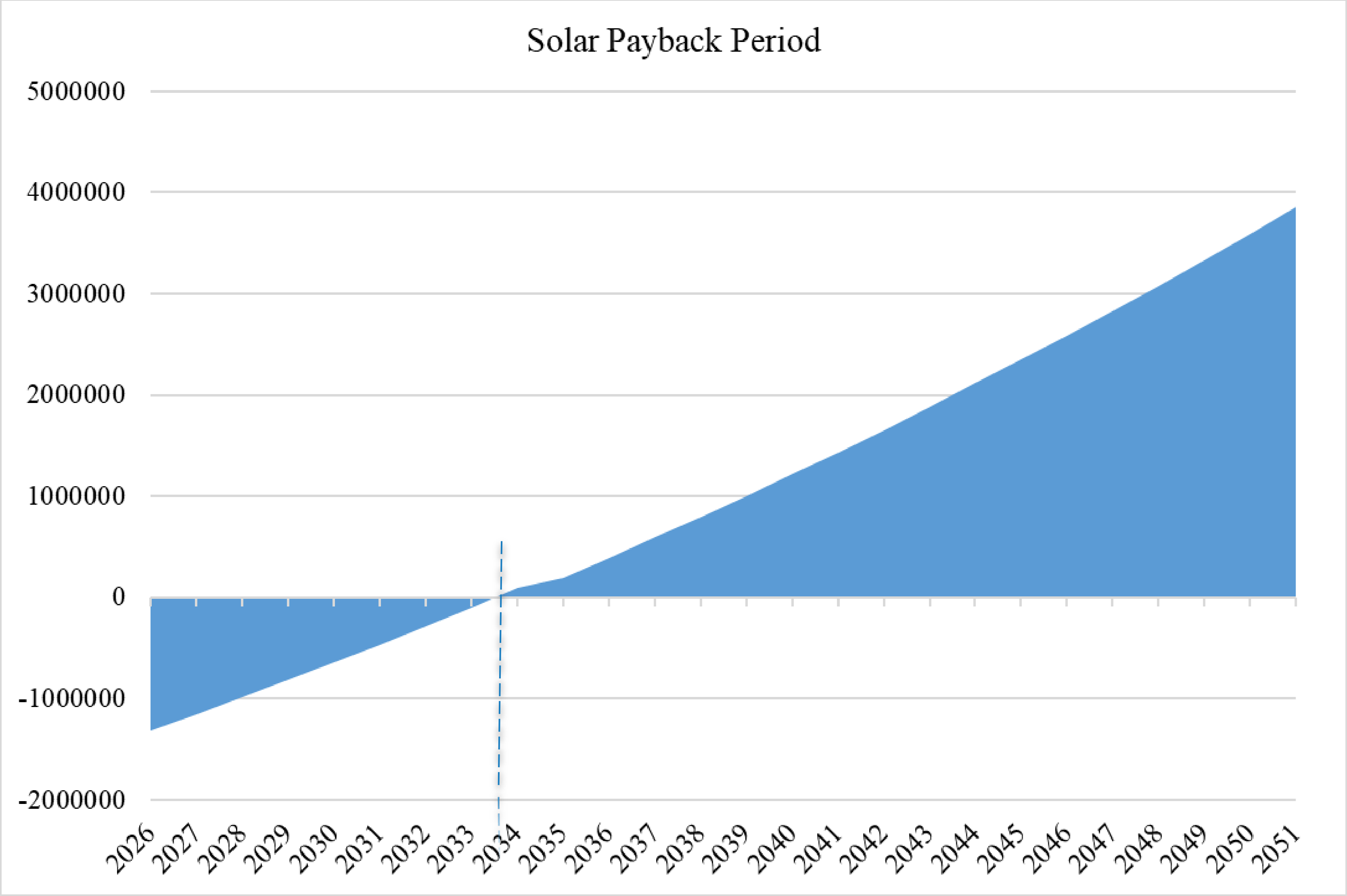
Solar Payback period with Cumulative Savings



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Power Purchase Agreement (PPA) for Solar

A Power Purchase Agreement (PPA) is a contract between a WWTP and a third-party solar provider. Under the agreement, the solar provider installs, owns, and maintains the solar system.

Under a PPA, the WWTP purchases solar electricity at a negotiated rate that may be lower or more predictable than the utility rate (typically 15-25 years).

Some PPAs offer a buyout option, allowing the WWTP to purchase the solar system after a certain period (usually after 5-10 years), potentially increasing savings over the system's lifetime.

The solar developer takes advantage of tax incentives, which may be reflected in lower PPA rates for the WWTP.

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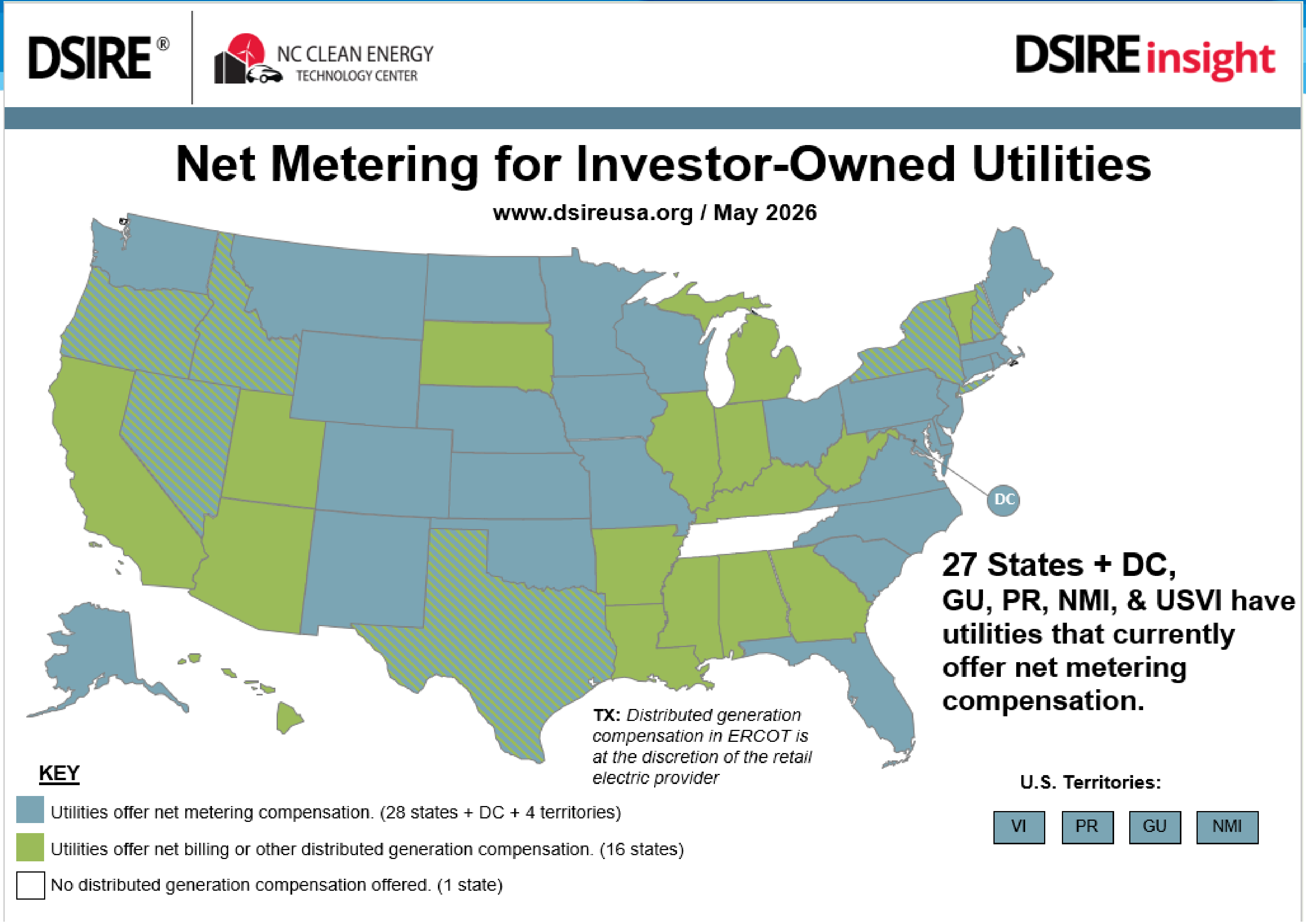
Net Metering Policies in US



Before Installing Solar

Questions	System Response
Have we reduced avoidable energy waste first?	
Do we have 12 months of electric bills?	
Are demand charges a major part of the bill?	
Does our utility allow net metering or interconnection?	
Do we have enough land or roof space?	
Who will own and maintain the system?	
Are we eligible for grants, incentive or PPA options?	

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Biogas Recovery Systems

Optional for small systems or facilities with digesters

- Anaerobic digesters convert wastewater sludge into methane-rich biogas that can fuel combined heat and power (CHP) systems.
- Modern digester designs maximize gas production through optimized mixing and temperature control.
- Typical biogas yield: 0.8-1.0 m^3 per kg of volatile solids reduced
- CHP electrical efficiency: 35-40%
- Heat recovery potential: 45-50% of fuel energy

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Key Takeaway Checklist

- ✓ Collect 12 months of electric bills
- ✓ Calculate kWh per million gallons treated
- ✓ Identify top energy users
- ✓ Ask utility about rate schedule and rebates
- ✓ Start with no-cost operational changes
- ✓ Consider an energy audit
- ✓ Prioritize aeration and pumping
- ✓ Explore funding before major upgrades
- ✓ Evaluate solar after reducing energy waste
- ✓ Track savings after implementation

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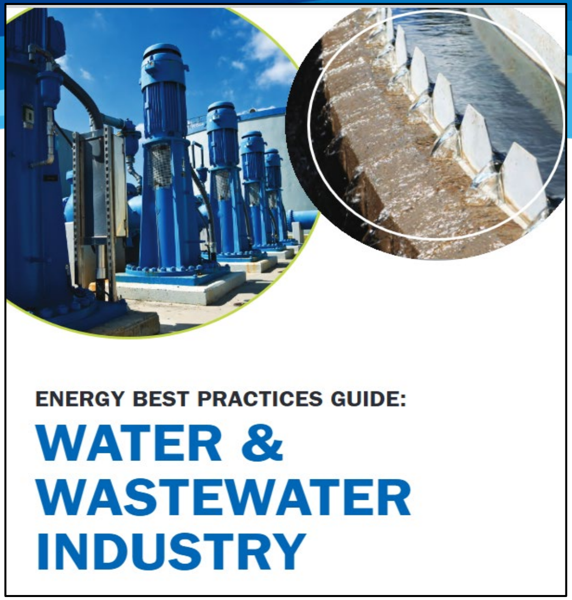
Resources

Resources

Energy Best Practices Guide: Information and resources to assist in identifying and implementing opportunities to reduce energy use.



Energy Data Management Manual for the Wastewater Treatment Sector: Practical guidance for small WWTPs on tracking and managing energy performance to support cost-saving energy management programs.
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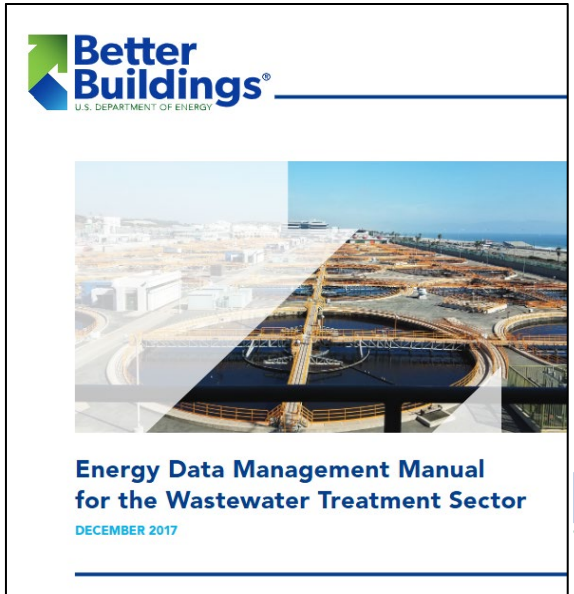
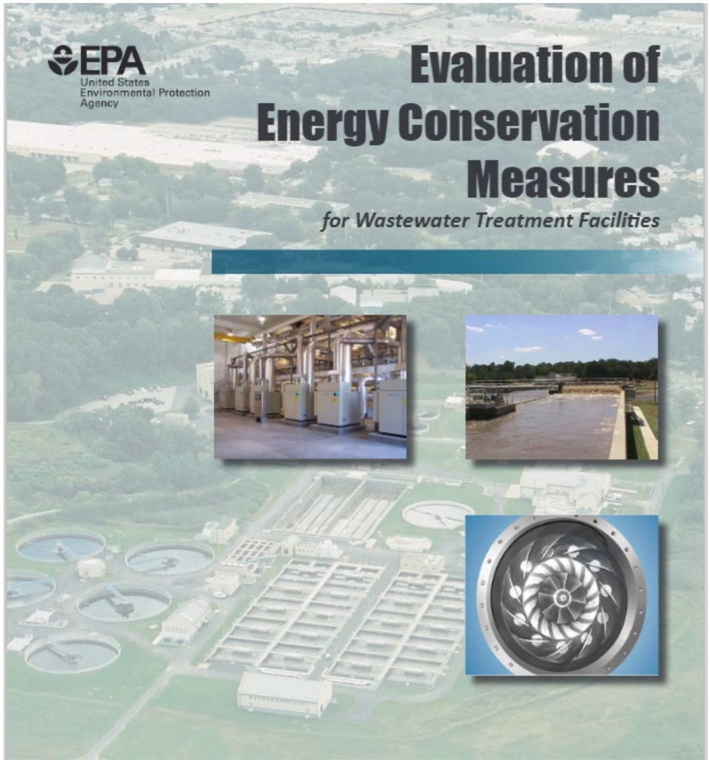
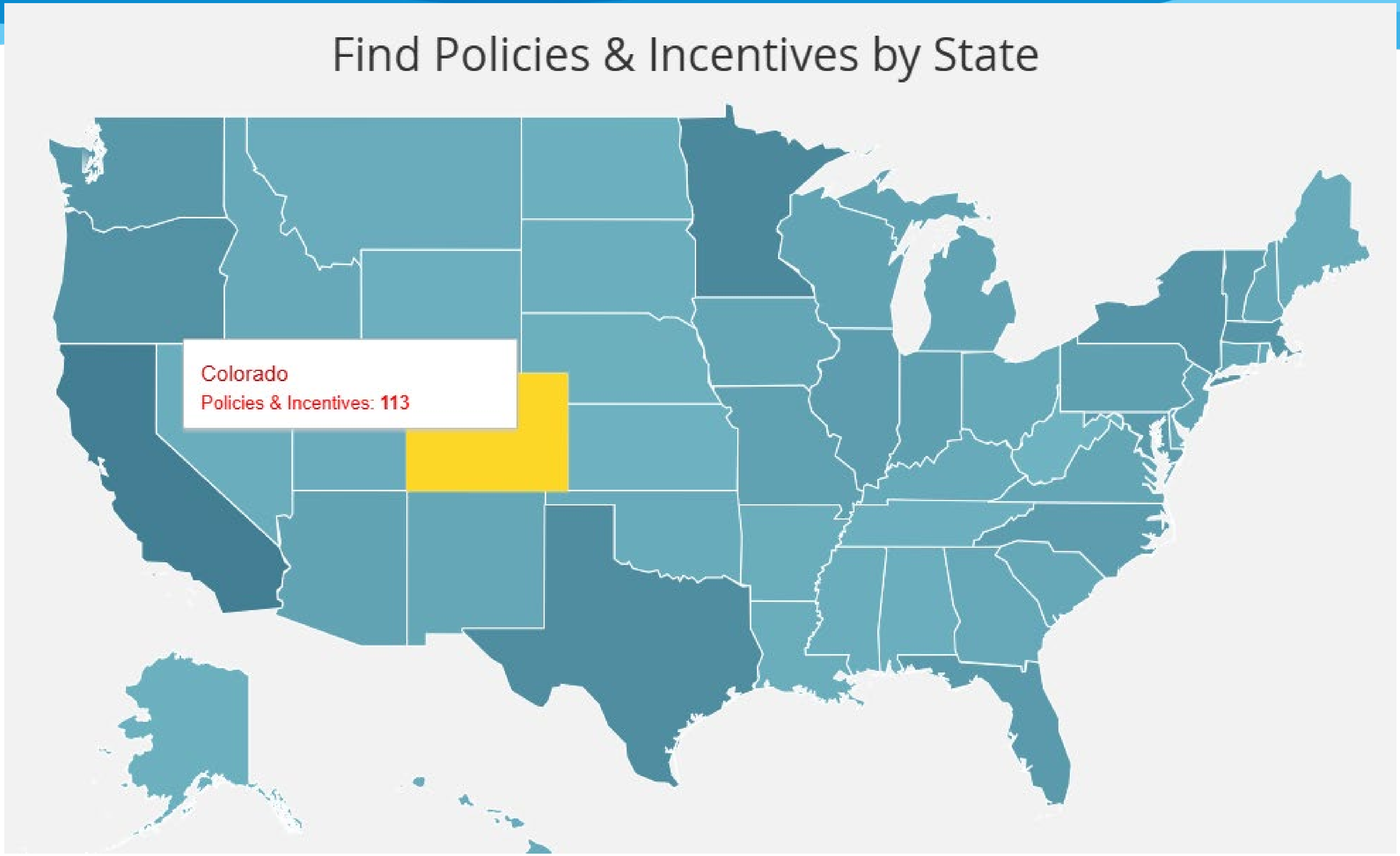


Resources

Evaluation of Energy Conservation Measures: Provides performance and cost-benefit information for projects like efficient equipment replacement and operational improvements with reasonable payback periods.



Database of State Incentives for Renewables & Efficiency



Source: https://www.dsireusa.org/

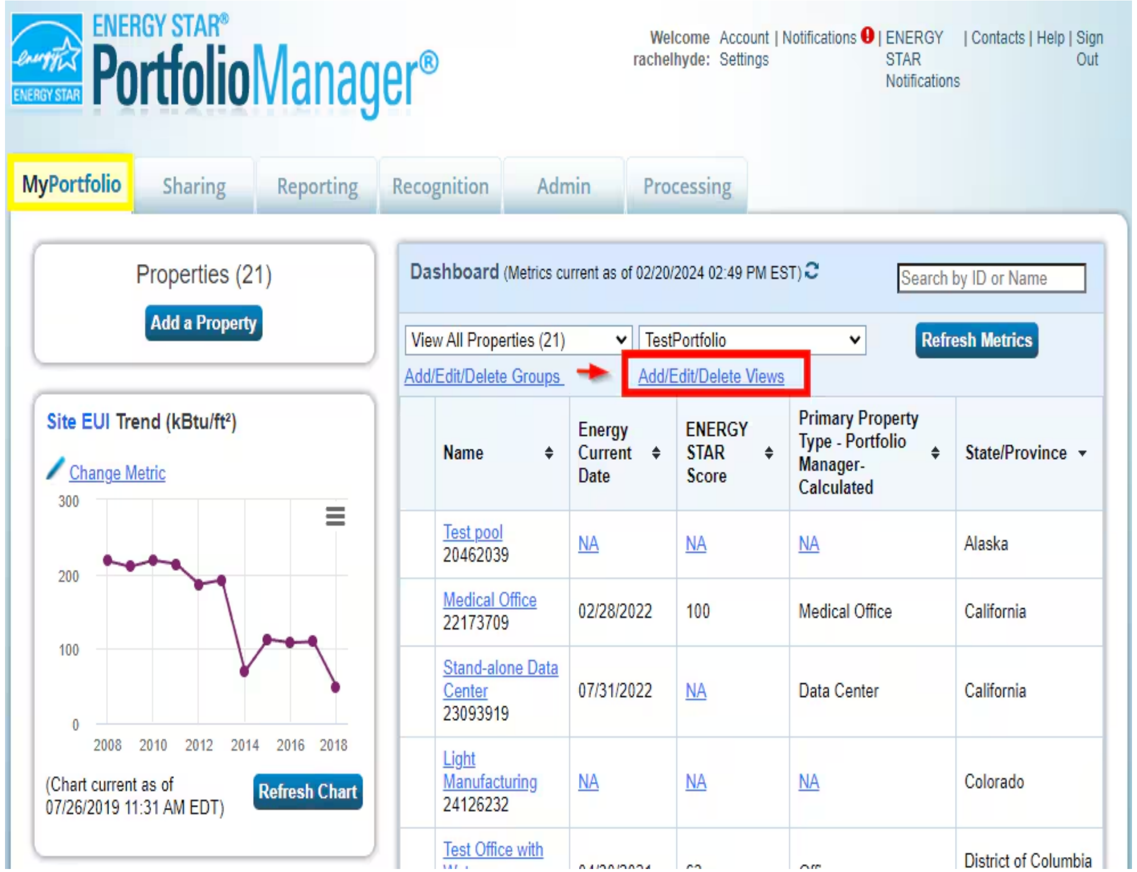
Resources-Portfolio Manager

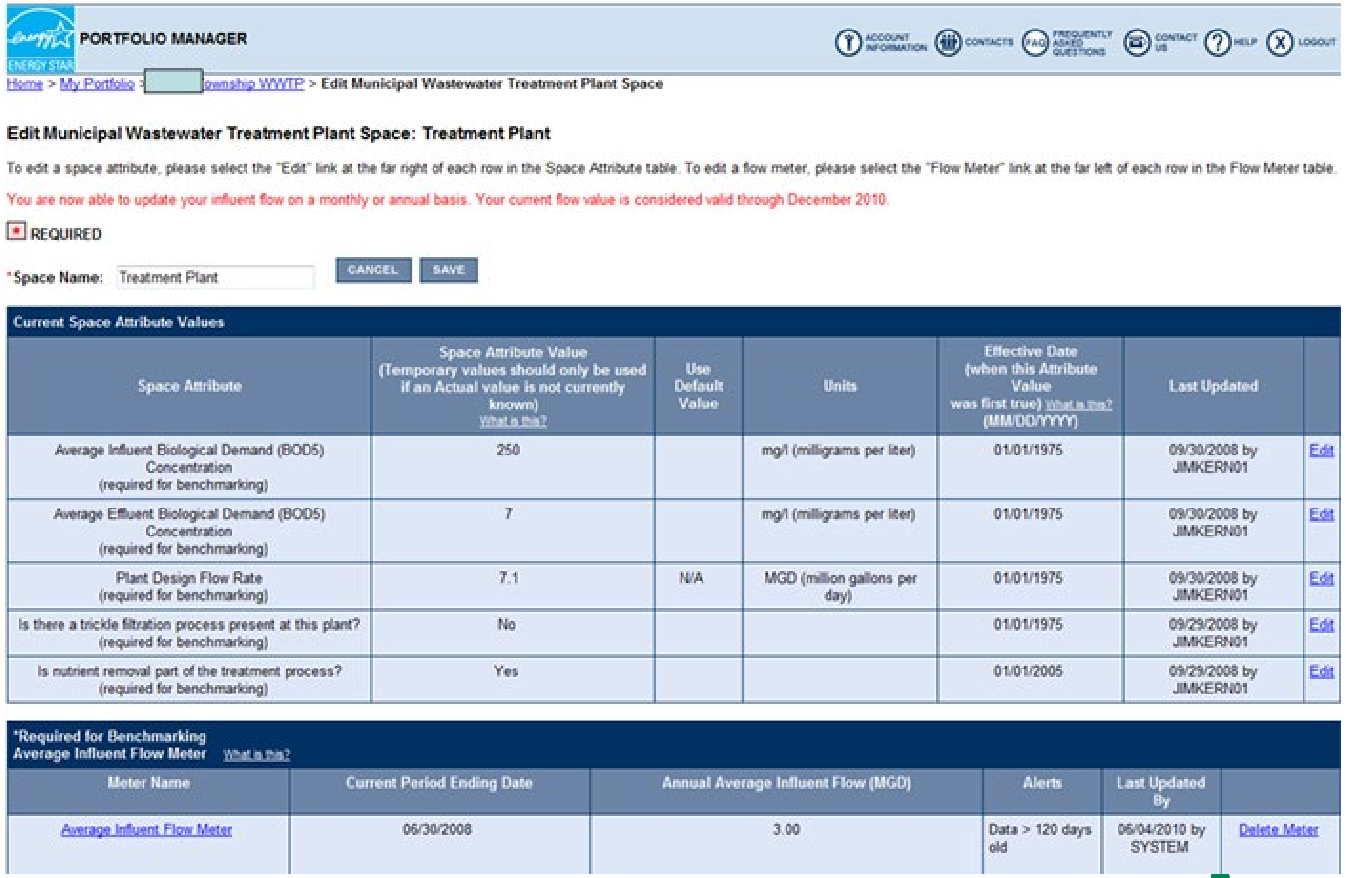
- **Property Information**
  - Monthly Energy use for all fuels (kWh, therms, etc.)
  - Average Daily Influent Flow (gpd or MGD)
- **Plant data:**
  - Building square footage
  - Average Influent BOD - average over 12 months (mg/l)
  - Average Effluent BOD - average over 12 months (mg/l)
  - Plant Design Flow Rate - treatment design (MGD)
  - Trickle Filtration Process (yes/no)
  - Nutrient Removal (yes/no)

Metrics Summary

Metric	Dec 2017 (Energy Baseline)	Dec 2021 (Energy Current)	Change
ENERGY STAR Score (1-100)	Not Available	Not Available	N/A
Energy Cost ($)	90,479.79	83,802.43	-6,677.36 (-7.40%)
Water/Wastewater Site EUI (kBtu/gpd)	4.39	3.78	-0.61 (-13.90%)
Water/Wastewater Source EUI (kBtu/gpd)	12.29	10.59	-1.70 (-13.80%)
Water/Wastewater Weather Normalized Site EUI (kBtu/gpd)	4.39	3.78	-0.61 (-13.90%)
Water/Wastewater Weather Normalized Source EUI (kBtu/gpd)	12.29	10.59	-1.70 (-13.80%)
Water/Wastewater - Weather Normalized Site Electricity Intensity (kWh/gpd)	1.3	1.1	-0.20 (-15.40%)

EPA's ENERGY STAR Portfolio Manager





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EPA Energy Assessment

EPA Energy Use Assessment Tool for Drinking Water Systems

Drinking Water Systems Energy Usage

Save and Continue | Reset Data | Return to General Info

EQUIPMENT ELECTRICAL ENERGY INVENTORY

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs ($/Yr)	Estimated Per Site Electric Cost (%)
Chemical Mix and Feed	Blower	Blower 1	7	65.0 %	660	600	880	90.91%	7.30	6,427	$650	
Chemical Mix and Feed	Blower	Blower 2	7	65.0 %	660	600	880	90.91%	7.30	6,427	$650	
Decarbonation	Mixer	Decarb Mixer 1	8	88.0 %	775	550	5,270	70.97%	4.81	25,364	$2,567	
Low Service Pumping	Pump	Pump1	7	65.0 %	660	600	8,760	90.91%	7.30	63,979	$6,475	
Low Service Pumping	Pump	Pump2	8	88.0 %	775	550	8,760	70.97%	4.81	42,161	$4,267	
Clarification	Mixer	Rapid Mixer	8	78.0 %	775	550	8,760	70.97%	5.43	47,566	$4,814	
Clarification	Mixer	Tk Mixers Summer	7.5	9.6 %	10.3	5.3	8,760	51.46%	29.99	262,707	$26,586	1
Distribution Pumping	Pump	HSPS	2	1.0 %	230	102.13	8,760	44.40%	69.01	604,543	$61,180	2
Distribution Pumping	Pump	HSPS	2	1.0 %	230	156.4	1,200	68.00%	105.68	126,820	$12,834	
Filtration	Pump	Backwash Pump	75	0.9 %	98	84.7	91	86.43%	5,199.65	473,169	$47,885	2
Filtration	Pump	Backwash Blower	75	0.9 %	88	54.2	12	61.59%	3,665.97	43,992	$4,452	
Non Process HVAC	Other kW Load	Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	$11,321	
Lighting	Other kW Load	Building HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	$6,525	

Add Row

	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs ($/Yr)	Estimated Per Site Electric Cost (%)
Estimated Annual WTP Electric Use & Cost	9,127.40	1,879,493	$190,205	8
Actual Annual WTP Electric Use & Cost		2,248,000	$227,497	
Difference Between Billed and Identified		-368,507	-$37,293	
Percent of Site Electrical Energy Identified		83.61%		

Tool link:
https://www.epa.gov/sites/default/files/2016-01/energy-use-assessment-tool-for-excel-2010.xlsm

PVWatts

SYSTEM INFO

Modify the inputs below to run the simulation.

DC System Size (kW):	4
Module Type:	Standard
Array Type:	Fixed (open rack)
System Losses (%):	14.08
Tilt (deg):	20
Azimuth (deg):	180

Loss Calculator

RESULTS

Print Results

958,685 kWh/Year*

System output may range from 916,215 to 995,594 kWh per year near this location.

Click HERE for more information.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	3.31	61,684
February	3.56	58,806
March	4.91	87,280
April	5.62	93,590
May	5.67	93,607
June	6.28	98,925
July	6.33	101,456
August	5.77	91,936
September	5.22	83,677
October	4.26	73,354
November	3.48	59,851
December	2.97	54,520
Annual	4.78	958,686

User Comments

Type here to add optional comments to printout.

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EFCN Solar Calculator

Project Inputs

Latitude or Address	38.9773938	Use a latitude number or type a full address.
Longitude	-76.9294667	Required if the first field is latitude.
Available Area for Solar (m²)	500	
Panel Power (Watts)	450	
Electricity Rate ($/kWh)	0.18	
Array Type	Fixed - Open Rack	
System Losses (%)	14	
System Tilt (degrees)	20	
Azimuth (degrees)	180	
Module Type	Standard	

▸ **Advanced financial and layout assumptions**

Run PVWatts Analysis **Print / Save PDF**

PVWatts analysis complete. Results updated.

Monthly Electricity Use

May	140659.83
Jun	145608.33
Jul	148468
Aug	154443.16
Sep	167480.25
Oct	150329
Nov	154852.16
Dec	172799.33
Total	**1,735,149**

Reload Workbook Example **Clear U**

▸ **Paste electricity data from Excel**

Dashboard

CALCULATED SYSTEM SIZE **90** kW DC	ANNUAL PRODUCTION **123,411** kWh/year	ANNUAL SAVINGS **$22,214** USD/year	USAGE OFFSET **7%** solar production ÷ annual use
SOLAR SYSTEM COST **$288,000** estimated capex	SIMPLE PAYBACK **13.9** years	NPV **$223,935** present value	IRR **11.6%** project return

Monthly Solar Output

Jan	7,947 kWh
Feb	7,569 kWh
Mar	11,232 kWh
Apr	12,045 kWh
May	12,047 kWh
Jun	12,732 kWh
Jul	13,057 kWh
Aug	11,832 kWh
Sep	10,769 kWh
Oct	9,441 kWh
Nov	7,709 kWh
Dec	7,031 kWh

Your solar system can produce approximately 123,411 kWh per year.
Based on today's electricity rate: $0.18/kWh and usage: 1,735,149 kWh/year.
Your system may offset: 7% | Estimated annual savings: $22,214.
Estimated payback period: 13.0 years.
Avoided emissions: 57 tons/year.
This tool is for early scoping only; consult a solar developer for detailed estimates.

Scenario Widgets

Scenario Summary **Monthly Results** **Financial Model**

Download Monthly CSV **Download Financial CSV** **Download Excel Analysis**

Download monthly and financial results after running the analysis.

Technical Assistance

- Drinking water, wastewater, and/or stormwater systems serving <10,000 people. Wider variety of topics and issues covered.
- Educational resources & trainings, plus technical assistance around U.S.: efcnetwork.org
- For technical assistance within Region 3, email or call Danish Kumar dkumar18@umd.edu (301) 405-9945

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Any Questions?

Contact:
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