Westminster Presbyterian Church

Energy, Water and Cost Initiatives

Energy Savings

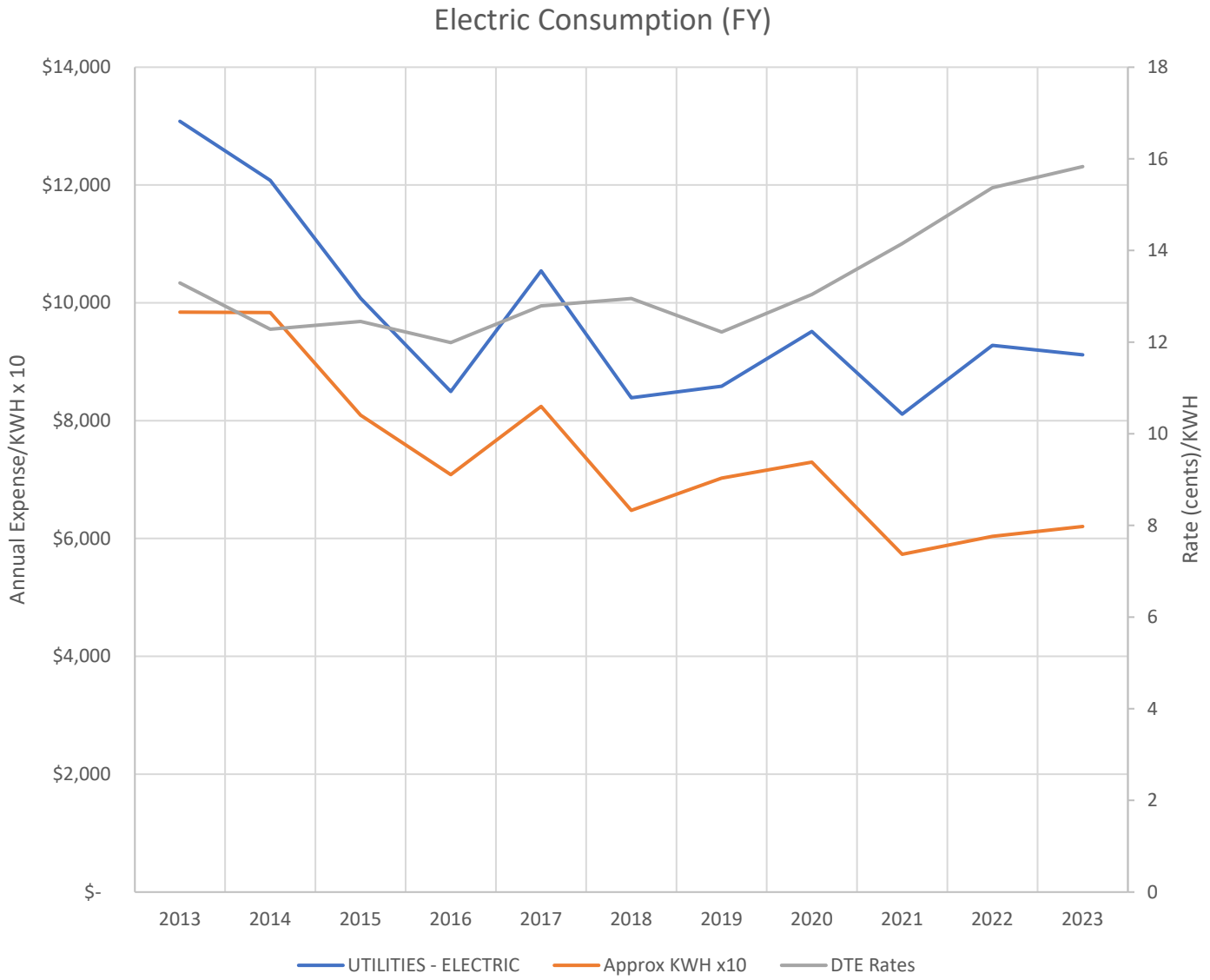
Step 1 – Use Less Energy

Impact

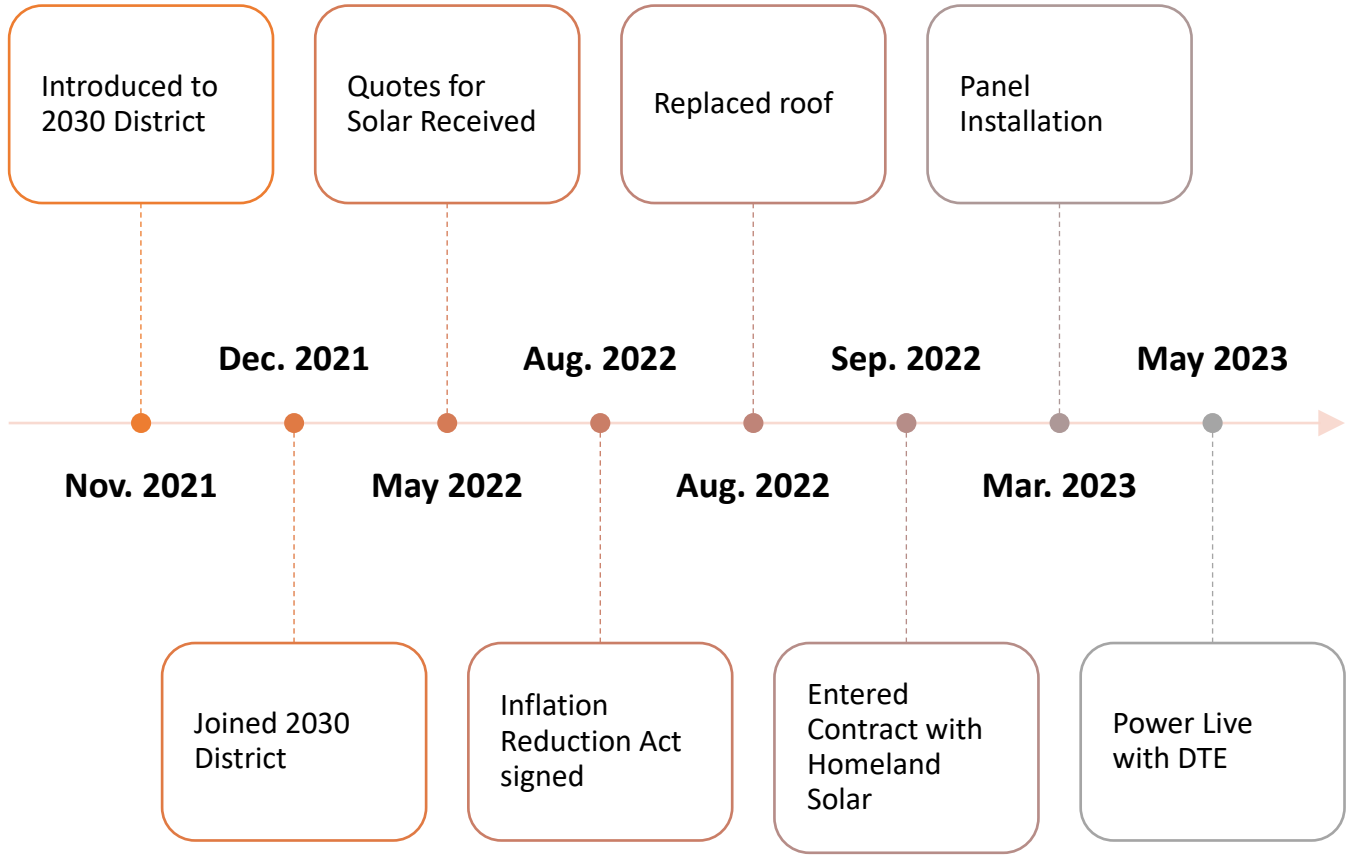
- Our usage has decreased by 40%
- Our costs have decreased by 31%
- Even though costs have increased about 19%.

Steps

- LED lighting and other fixtures
- Replaced a freezer (!)
- Reduced parking lot lighting hours



Step 2 – Go Solar



Solar Quotes Received (May 2022)

Vendor	# of panels	Total KW	Budget Cost	$/watt
Homeland Solar	100	40KW	$79,500	$1.99
Absolute Solar	163	60KW	$143,538	$2.38
Distributed Power	74	30KW	$70,000	$2.33

Final System

- **Cost**
- $85,000 ($1.95/KW)
- Payments:
  - $25k contract signing
  - $35k installation start
  - $25k go live
- Additional $43k for roof replacement
- **Financing**
- $13,000 donations
- $15,000 endowment
- $57,000 borrow from reserves and pay back over time (0% interest) - $25.5k “tax” credit
- Expected finish payback: 6-8 years
- Overall breakeven period 9 - 11 years

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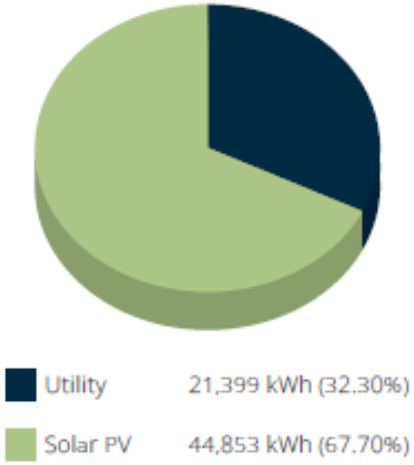
wer	43.6 kWp

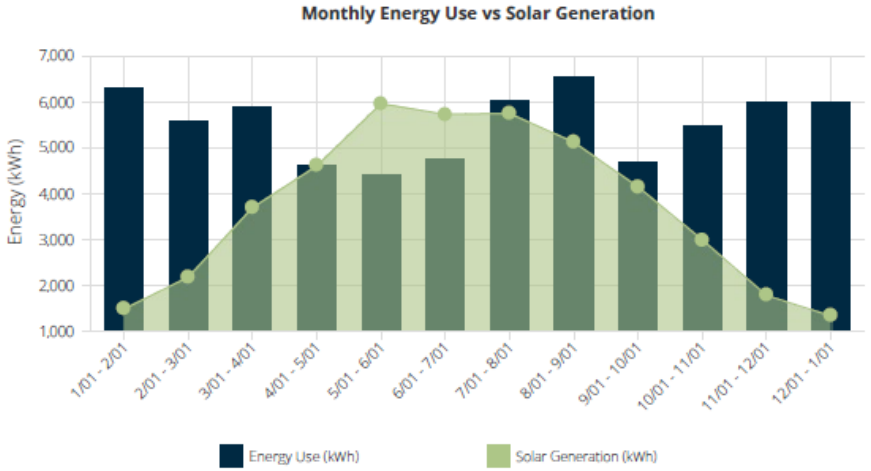
Estimated Performance

- Annual power supply:
  - Pre-installation Estimate: 67.7% of annual power supplied by system.
  - Could be >70% with reduced demand
- Demand:
  - Average: 5200 KWH/month (62,000 KWH/year)
  - Range: 4000 – 6000 KWH/month (highest use in winter)

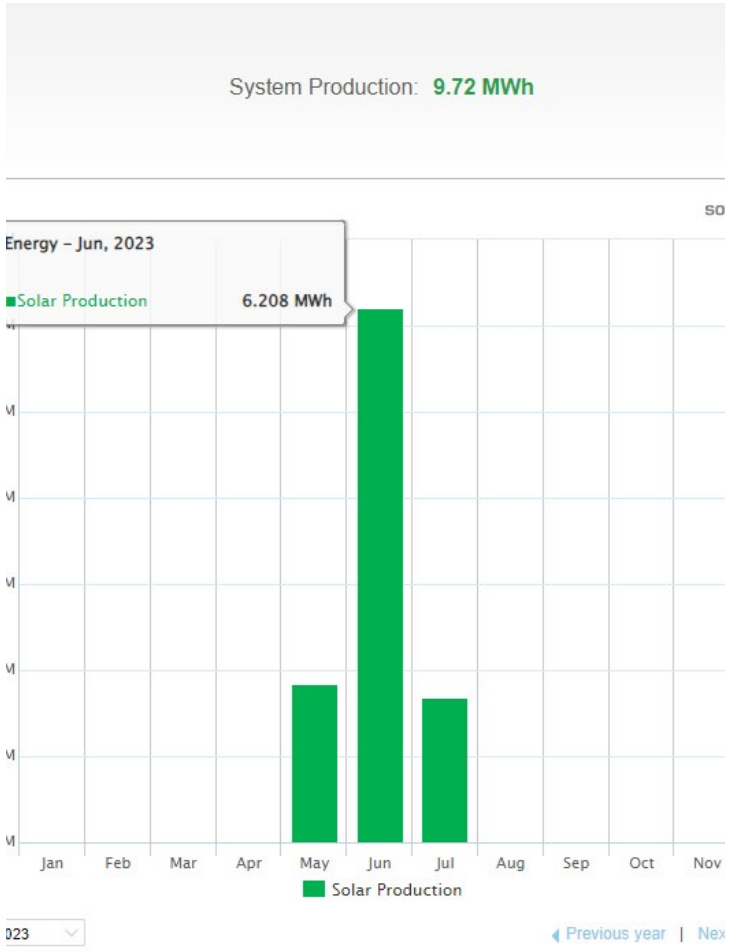
Solar PV System Rating
Power Rating: 40,000 W-DC
Power Rating: 34,124 W-AC-CEC

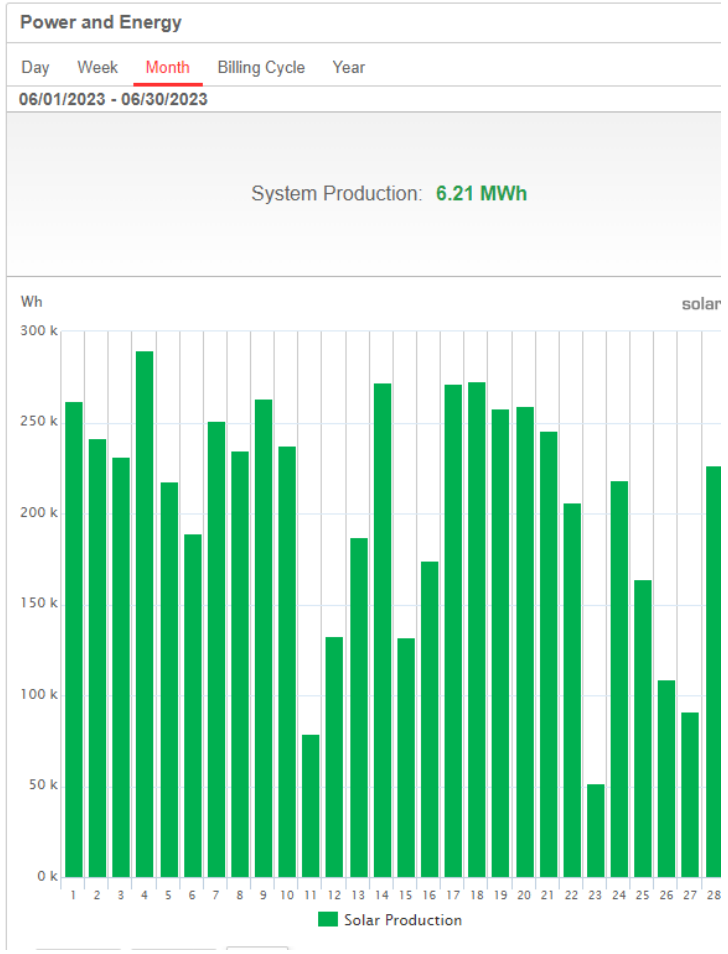
Energy Consumption Mix
Annual Energy Use: 66,252 kWh





Performance to Date





- Generation:
  - June: 6200 KWH
  - 9720 KWH to date (as of 7/9/23 – 48 days)

Water Savings

Why do we care about water?

- https://www.hrwc.org/wp-content/uploads/Carbon-Footprint-brochure_single-pages.pdf
- More than 13% of the nation's electricity consumption, nearly 521 billion kilowatt hours (kWh), is associated with water related energy use. The energy required to provide water to a running faucet for five minutes is equal to that needed to light a 60-watt bulb for 14 hours
- Fifty percent of the total energy consumed by the City of Ann Arbor goes to drinking water and wastewater treatment.

Huron River Watershed Analysis

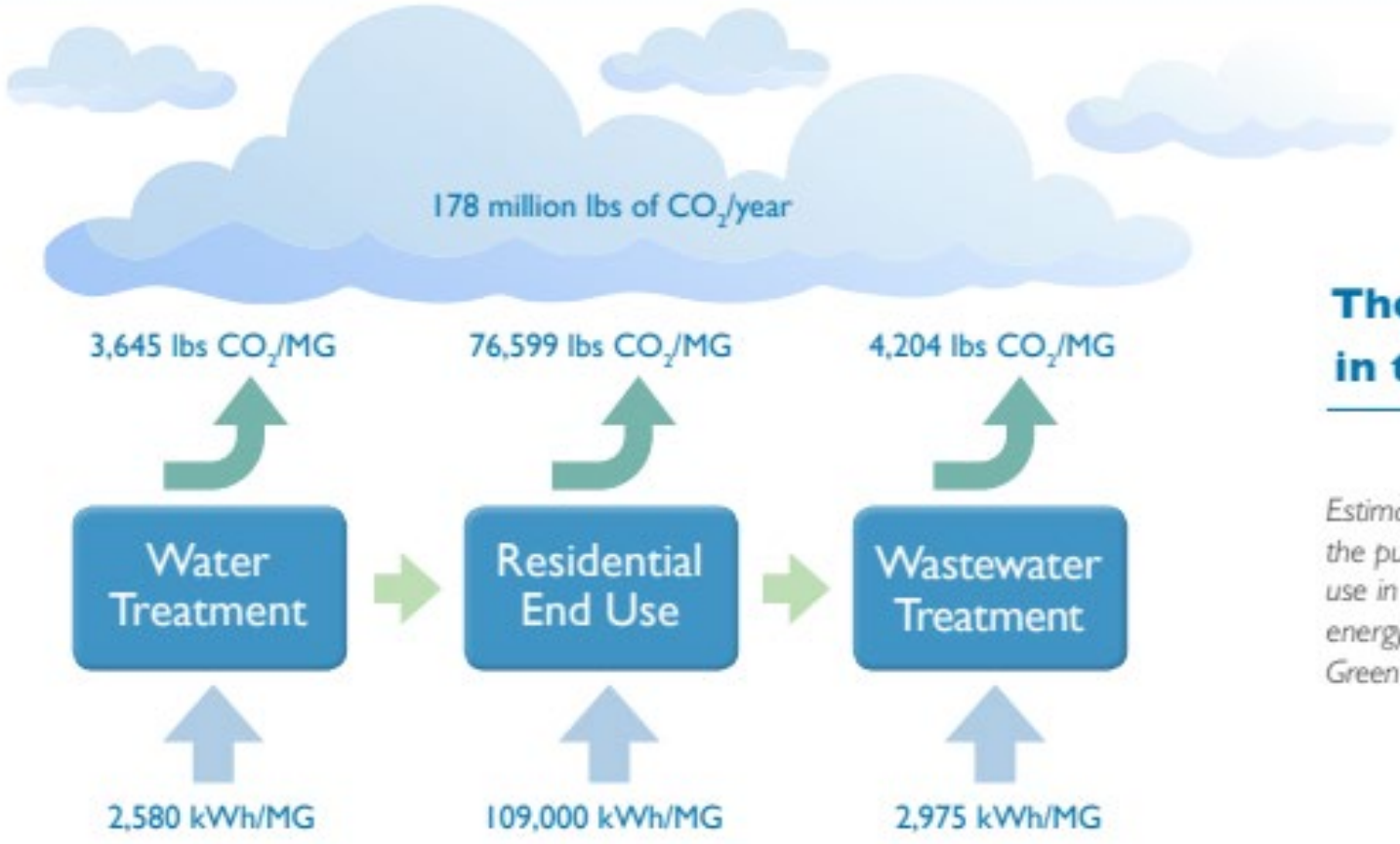


FIGURE 2

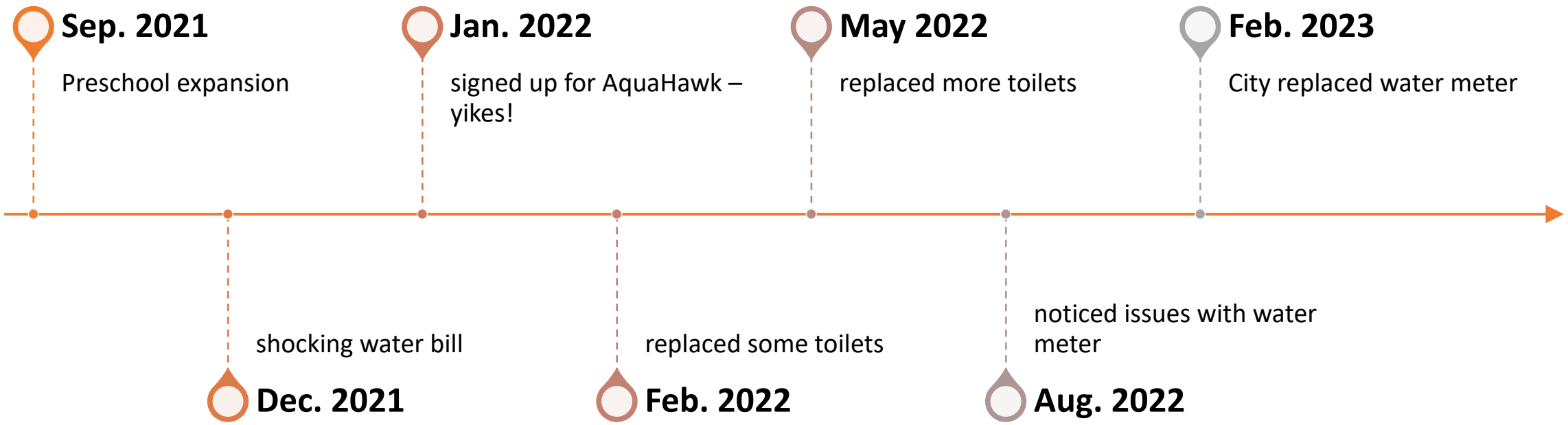
The Carbon Footprint of Water in the Huron River Watershed

Estimate of total annual carbon dioxide released from the pumping, treating and heating of water for residential use in the Huron River watershed. Blue arrows represent energy inputs during each phase of the water cycle. Green arrows show carbon outputs.

Energy Use for Water Treatment

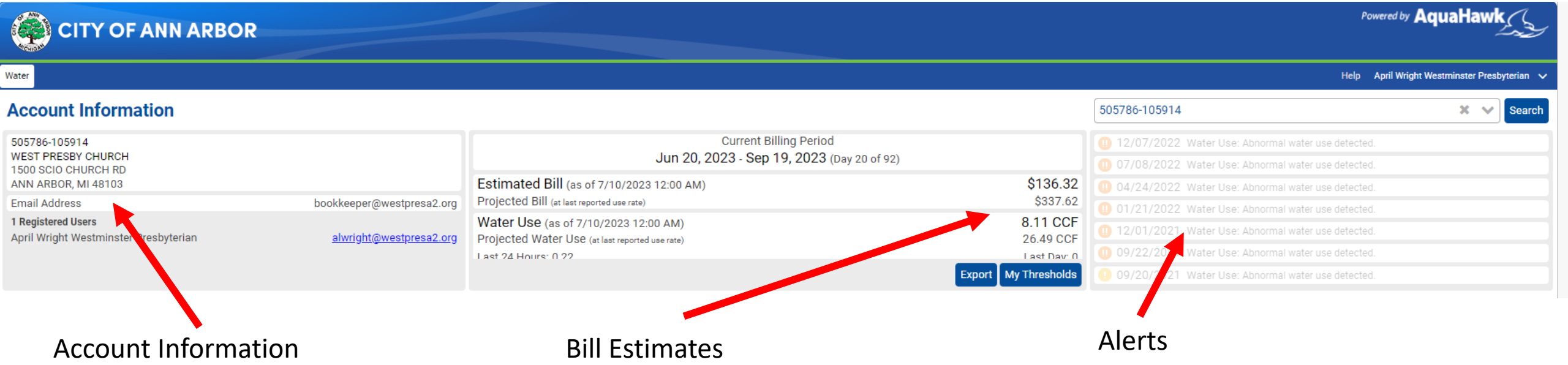
- Water treatment: 2580 kWh /MG
- Wastewater treatment: 2975 kWh /MG
- Overall, about 4.2 kWh/CCF
- About 1.41lb CO_2/kWh
- 5.9lb CO_2/CCF

Westminster's Water Journey



About AquaHawk

- Available to all City of Ann Arbor water users
- Provides in depth indication of water use.
- Strongly recommended



Daily Data – July 2021 – July 2022

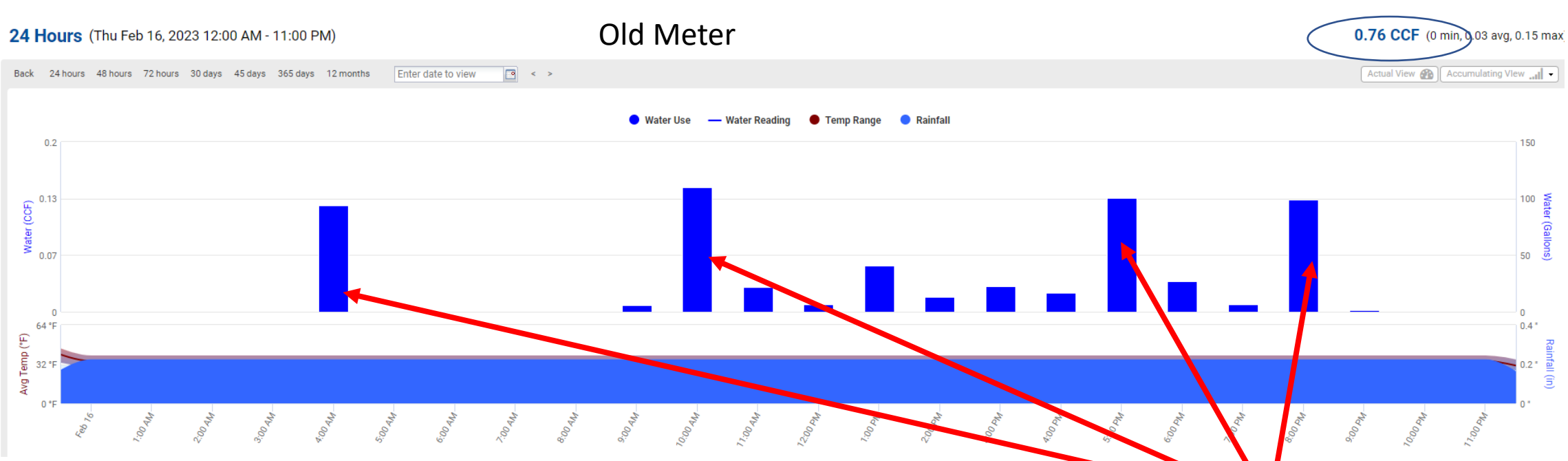
All About Toilets

- Replaced 16 toilets
  - 2 as part of restroom renovation
  - 8 in continual use by preschool
  - 6 in parts of the building with more periodic use
- Original to building construction in 1956 and 1991
- Used 1.6 gallon/flush toilets
- Cost: $4,024. Volunteer Labor

Other Excess Water Use

- Water cooled ice machine
  - Uses about 80 gallons / day
  - Turn off when not in use

- Irrigation
  - Timed system: uses 600 gallons 2x/week
  - Turn off in wet periods
  - Other irrigation hand done



Random 90 gallon spikes, generally every six hours

Old meter:
1 day use
0.76 CCF

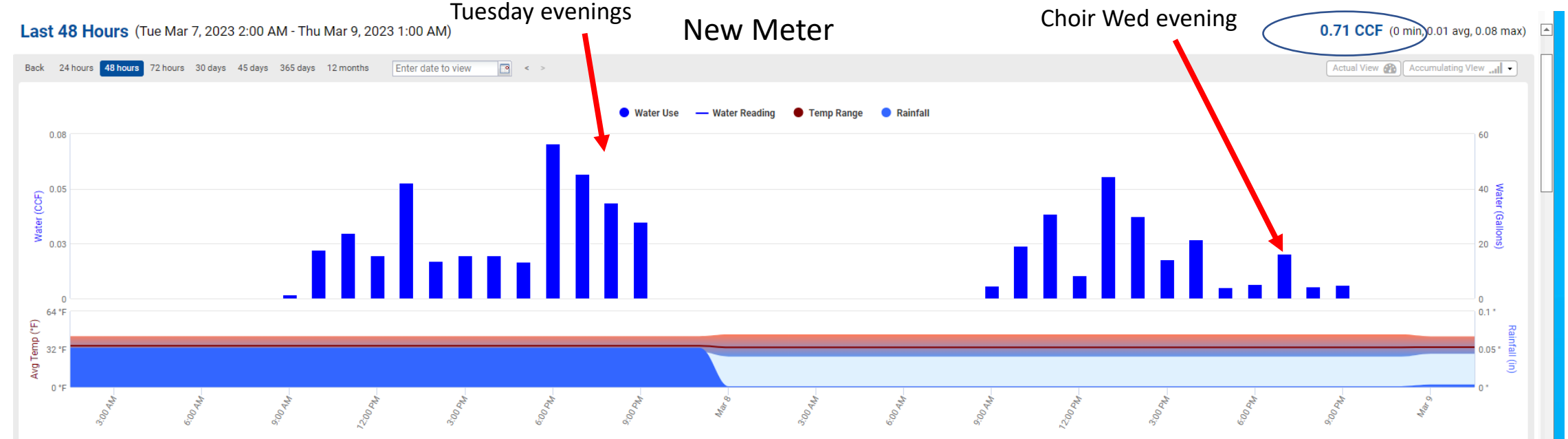
New meter
2 day use
0.71 CCF

1 CCF =
$11.35

Phantom readings about 150 CCF/year = $1700/year

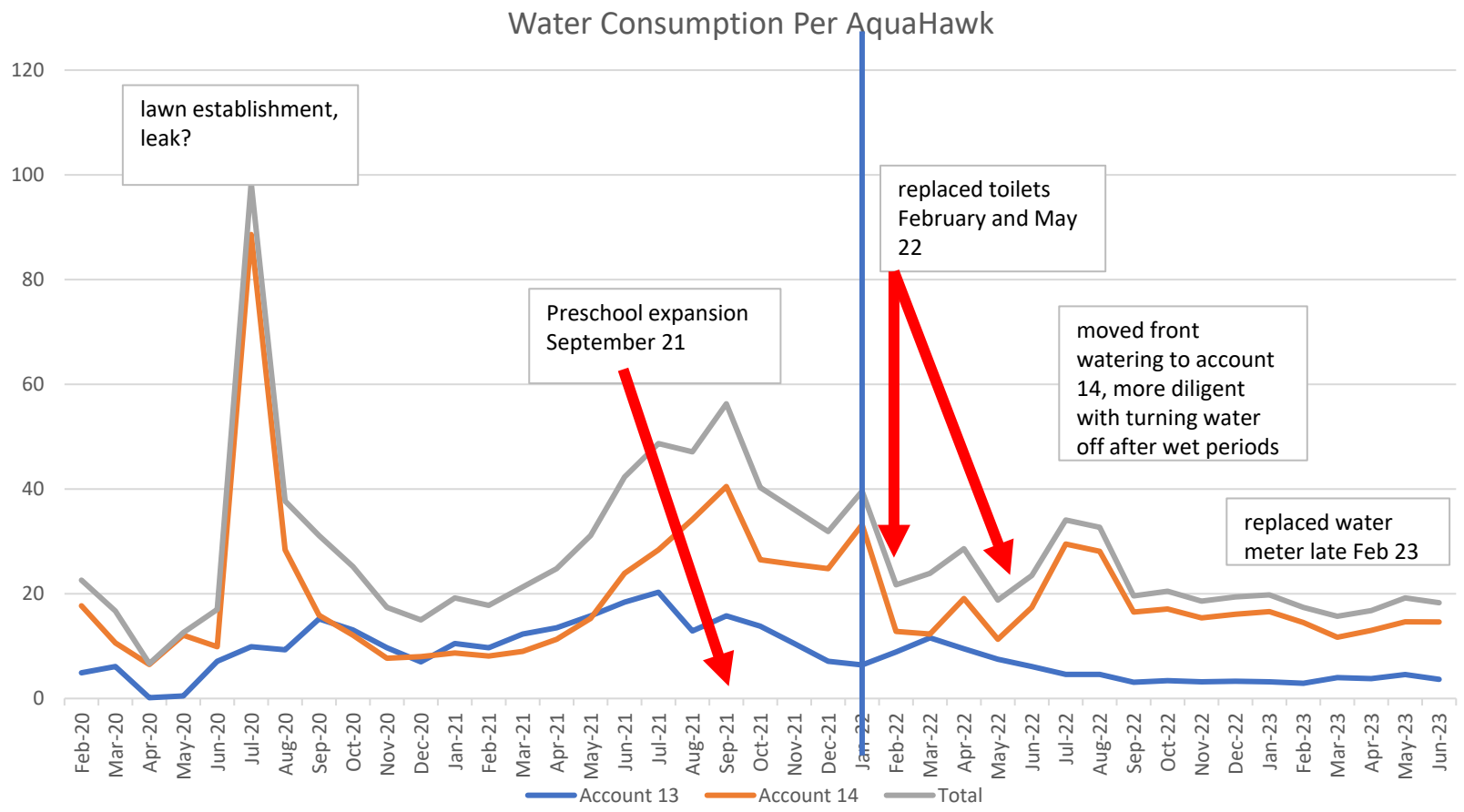
Gypsy Big Book Tuesday evenings

Choir Wed evening



Pattern has been in place for close to two years with some variability on and off. Magnitude of spikes increased over time.

Results


Water Consumption Per AquaHawk
120
100
80
60
40
20
0
lawn establishment, leak?
Preschool expansion September 21
replaced toilets February and May 22
moved front watering to account 14, more diligent with turning water off after wet periods
replaced water meter late Feb 23
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
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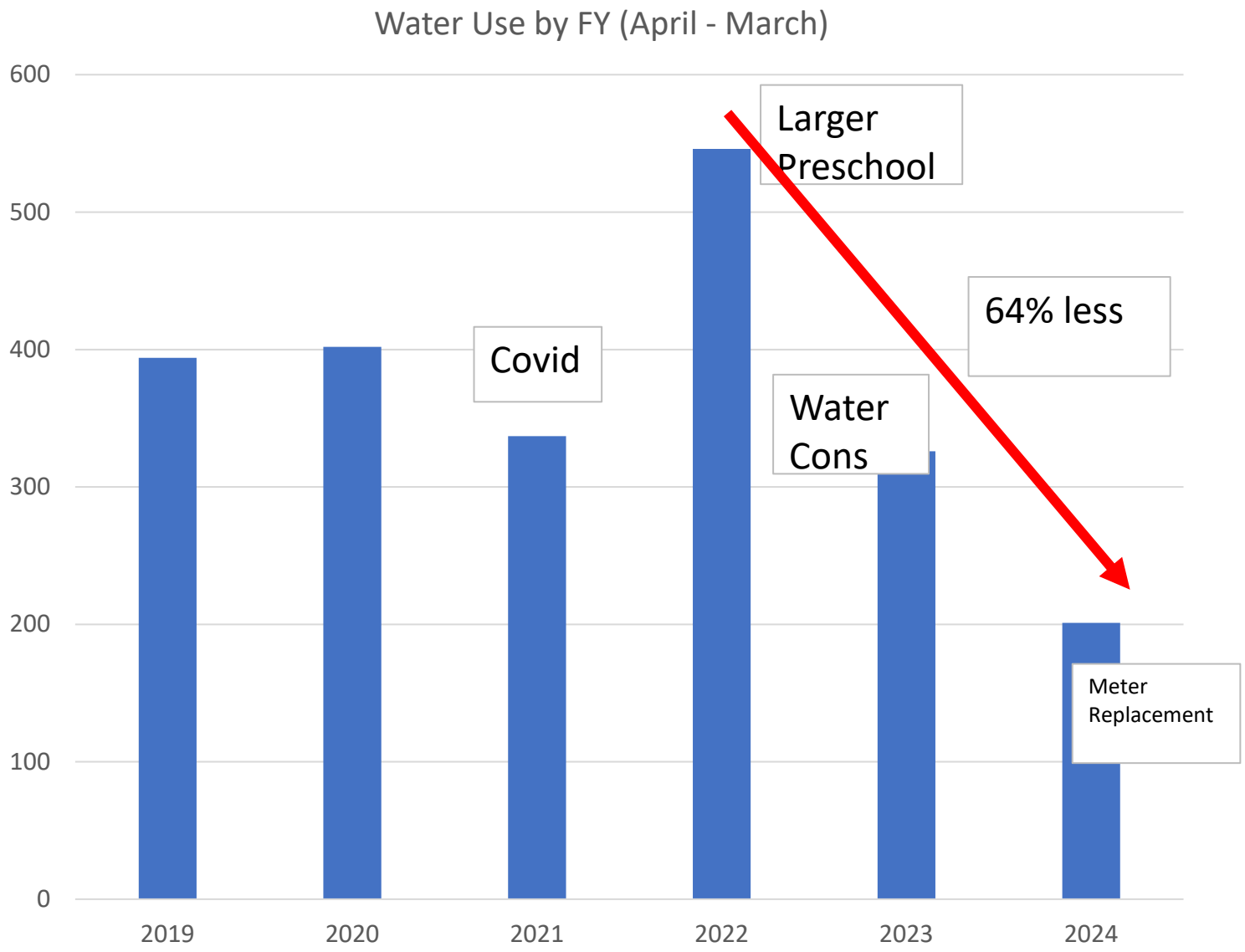
Feb-23
Mar-23
Apr-23
May-23
Jun-23
Account 13
Account 14
Total

Reduced Consumption/ Costs

- Consumption Charges
  - FY22: $5,940
  - FY23: $3,656
  - FY24: $2,300 (projected)
- Two-year payback on toilet replacement
- Would have been quicker without faulty meter.



Energy Impact

- About 1500 KWH effective energy savings from highest year to lowest year (4.2 KWH * 346 CCF)
- Based on reduced water and sewer demand related to City of Ann Arbor Utilities
- 2,000 lbs CO_2 equivalent.
- One week of our solar system.
- (But we are saving a lot of money!)

Thank You!

Westminster Presbyterian Church, Ann Arbor

An Earth Care Congregation