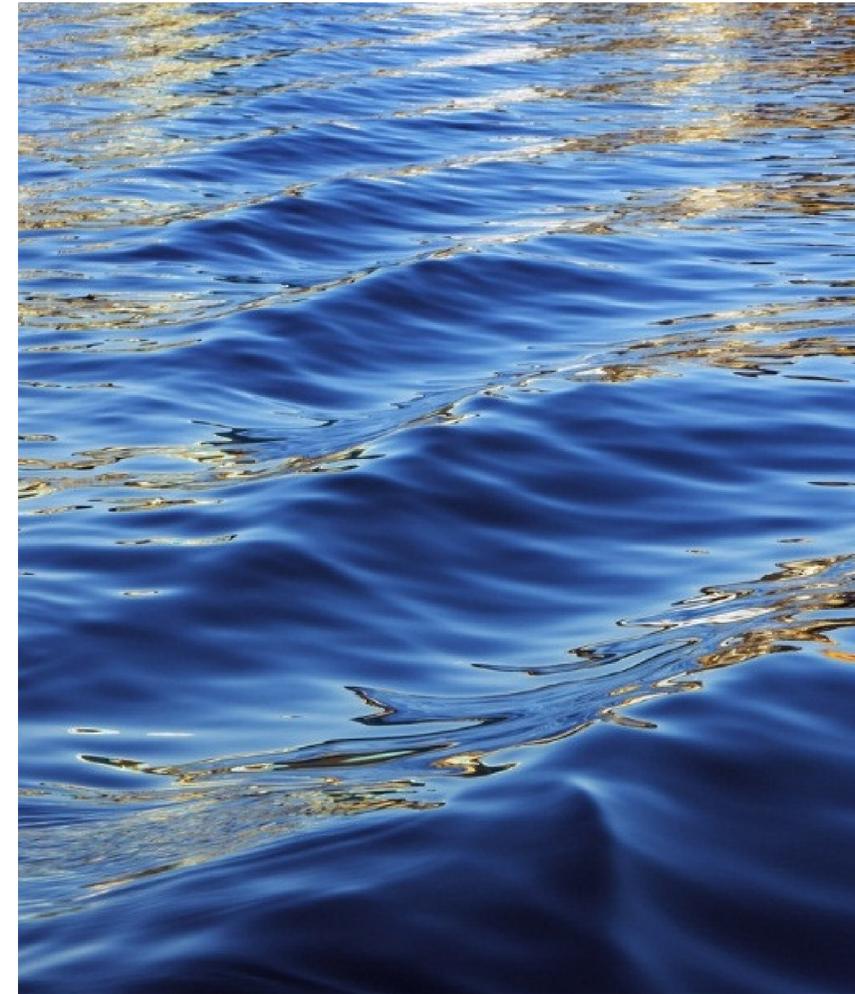




Carbon Neutral by 2030: Trinity Episcopal Cathedral Sacramento, CA

[Sample Presentation using Trinity Data]
November 2023

Bob Wohlsen
Diocesan Commission on the Environment



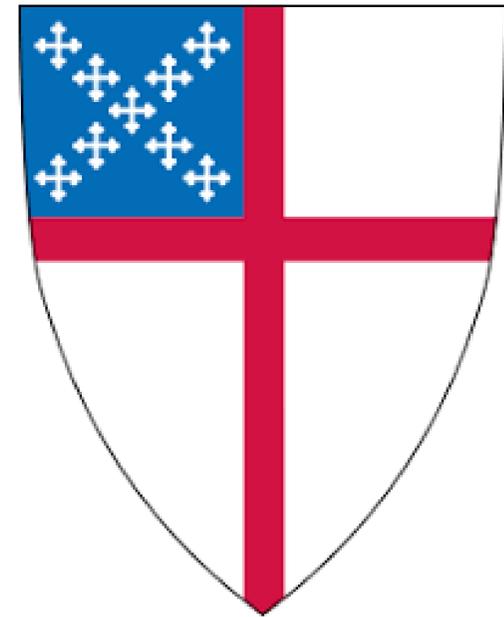
Agenda

- Background
- Project Process
- Carbon Footprint and Facility Assessment Results
- Next Steps: Creating a Plan

Project Background: Creation Care

Church Covenant for the Care of Creation

- Loving formation
- Liberating advocacy
- Life-giving conservation as individuals, congregations, ministries, and dioceses.



Project Background: Creation Care

Climate Action and Environmental Justice

- Respect for God's Creation
- Catastrophic effects of climate change
- Disproportionate effects on the poor and marginalized
- Increased social disparity
- Global instability



Project Background: National Church and Creation Care

General Convention Resolution A-087 (2022)

“Commit to goal of Net Carbon Neutrality in operations by 2030”

- Reducing emissions from travel
- Reducing energy use
- Increasing energy efficiency
- Purchasing offsets



Project Background: Diocese of Northern California

General Convention Resolution A-087

“Identify Path to Carbon Neutrality by 2030”

Congregations to:

- Study and pray discern how the Spirit is leading us to address climate change
- Conduct a facility needs assessment
- Identify actions needed to become carbon neutral

Diocesan Commission on the Environment to provide support



Background: What is Carbon Neutrality?

Carbon Neutrality

A balance between the carbon emitted by a facility and the amount of carbon that is absorbed or removed from the atmosphere using offsets.

A two-part equation:

- Reducing carbon emissions
- Providing offsets to account for the difference (plant trees, purchase carbon credits, etc.)



Project Background: Commission on the Environment

Commission Objectives

- Provide education and guidance to congregations
- Identify a path/process to assess facilities and energy use
- Identify resources to help congregations further carbon neutrality by 2030



Trinity's Cathedral's Process and Progress

Four-part Process (Commission)

- Form a Green Team
- Measure Our Carbon Footprint
- Conduct an Energy Study
- Develop a Plan for Carbon Neutrality

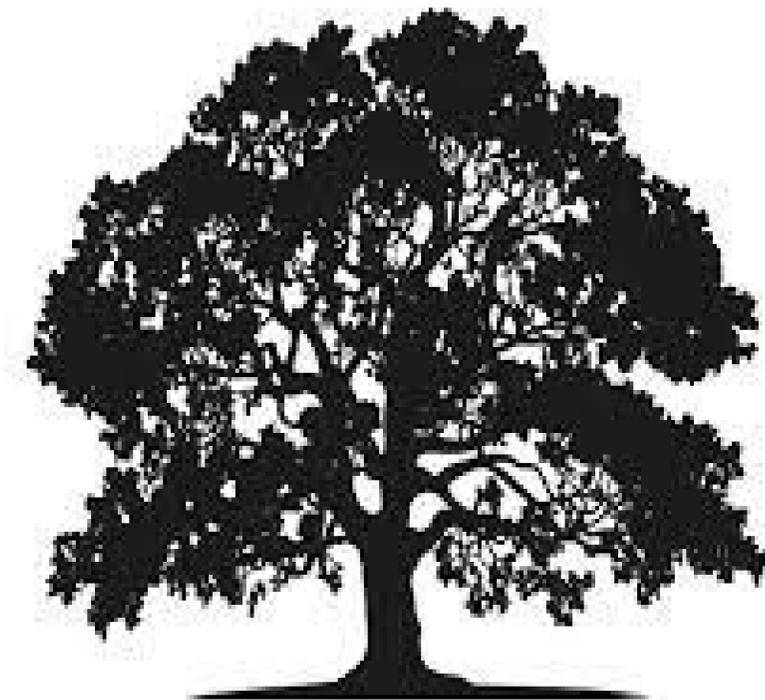


Trinity's Process and Progress

Four-part Process (Commission)

- **Form a Green Team**

Trinity Respecting Earth and Environment (T.R.E.E)



Trinity's Process and Progress

Four-part Process (Commission)

- Form a Green Team
- **Measure Our Carbon Footprint**

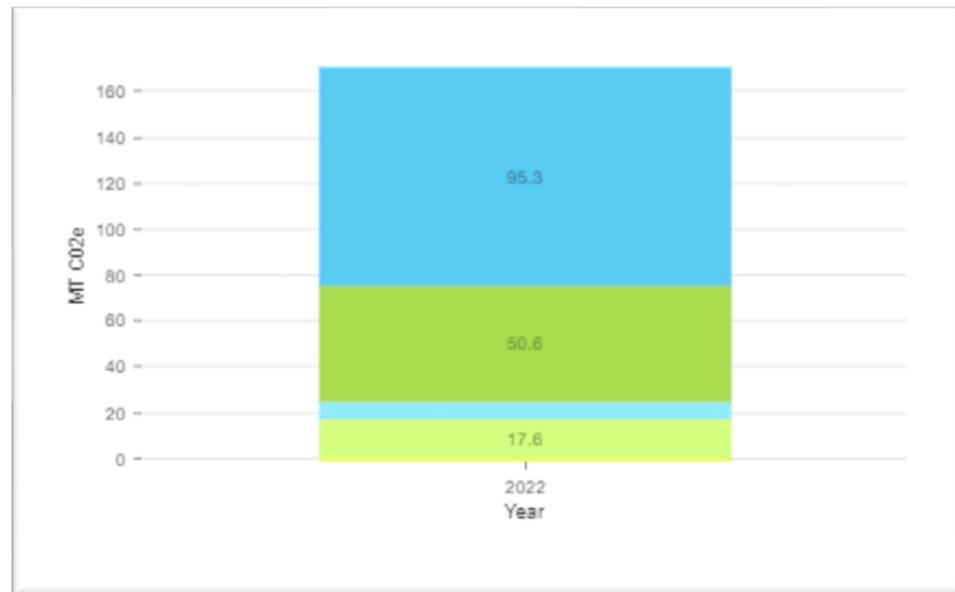
Interfaith Power & Light

Cool Congregations Calculator



Trinity's Process and Progress

2022 Emissions	170.6 MT CO2e	<i>metric tons CO2e</i>
• Facilities	95.3 MT CO2e	
• Transportation	50.6 MT CO2e	<i>Staff + Congregation</i>
• Food/Meals	7.1 MT CO2e	<i>Includes serving meat</i>
• Procurement	17.6 MT CO2e	<i>Printing, supplies, maintenance, furniture goods/services, etc.</i>



Facility operations are the greatest emitter of CO2!

Trinity's Process and Progress

How much is a metric ton of CO₂e?



Trinity's Process and Progress

Four-part Process (Commission)

- Form a Green Team
- Measure Our Carbon Footprint
- **Conduct an Energy Study**

Energy for Purpose Audit (July 2022)

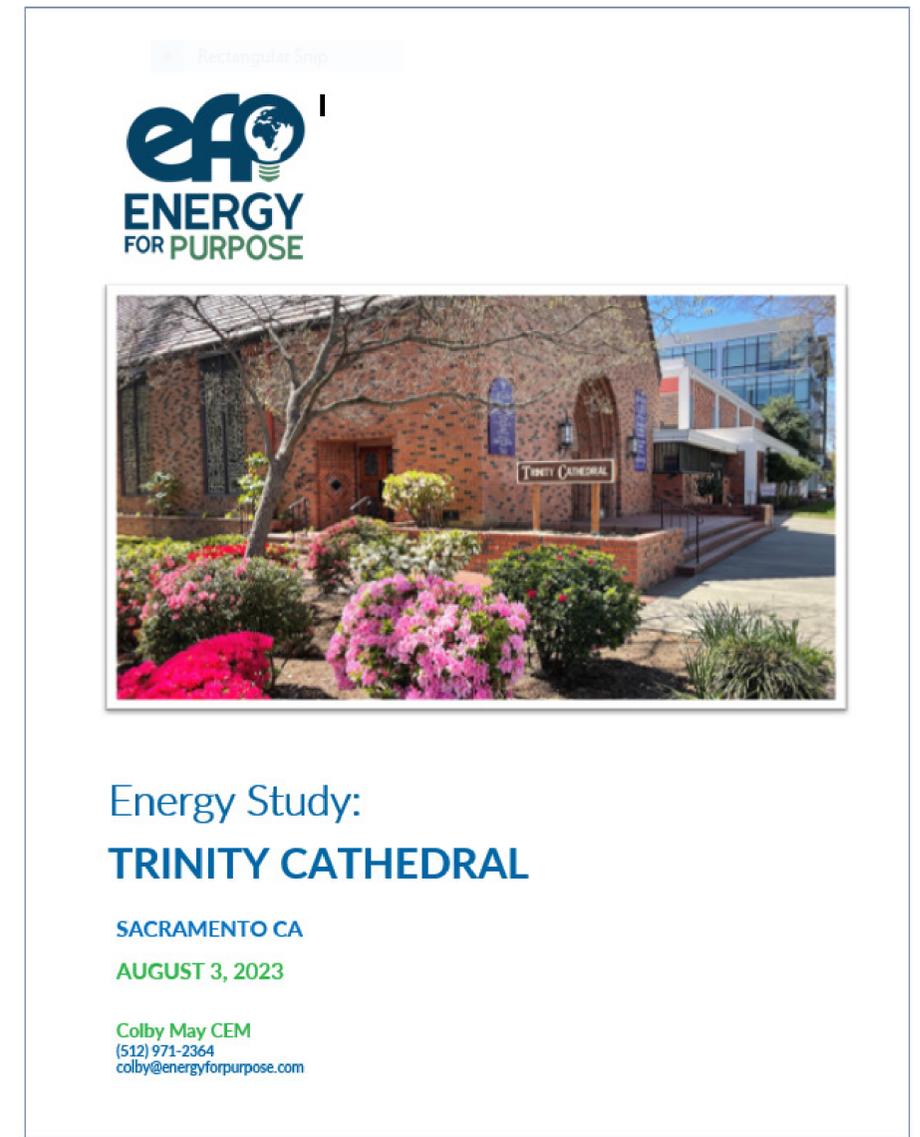
Develop a Plan for Carbon Neutrality



Trinity's Energy Study and Results

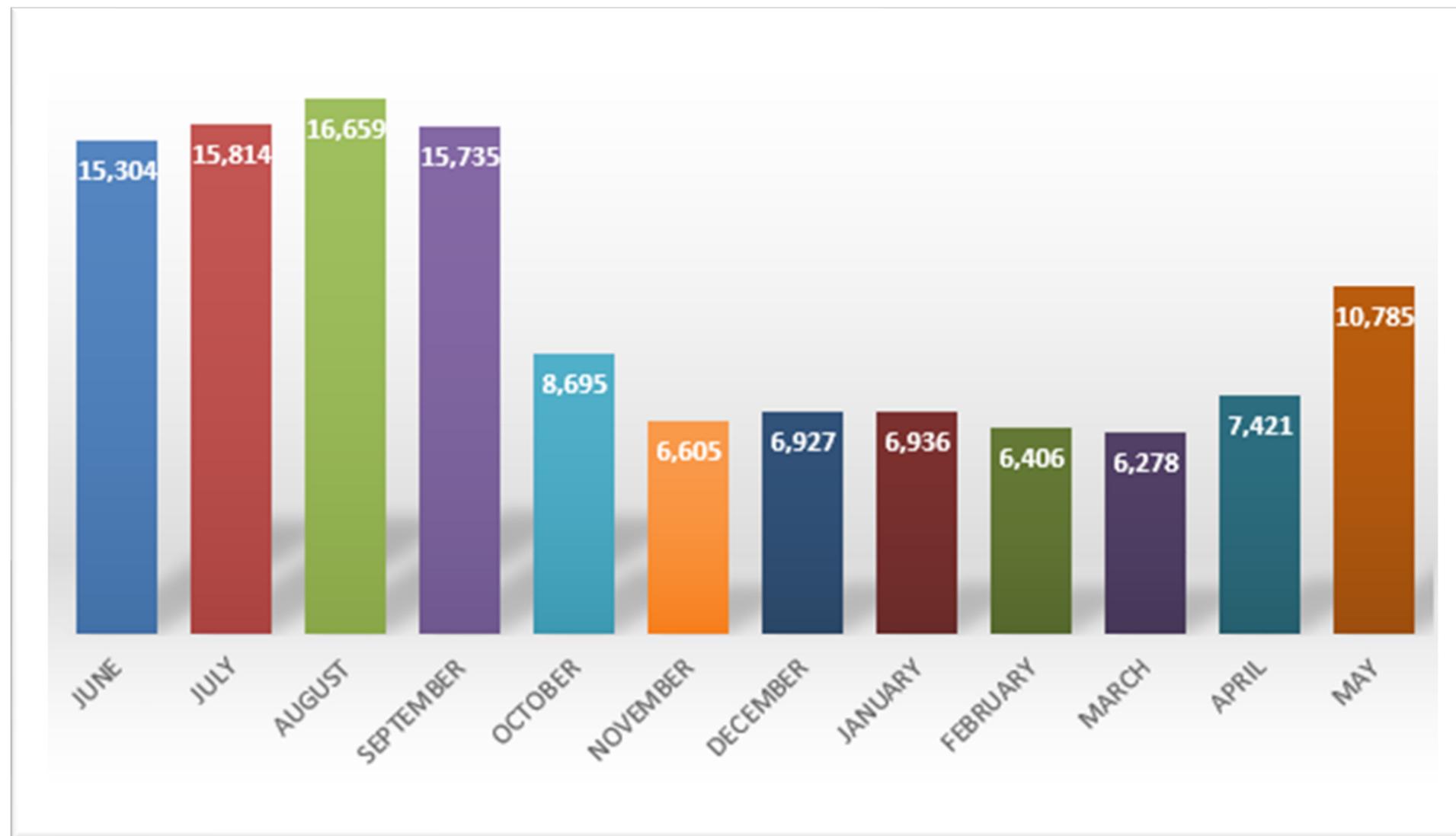
Energy for Purpose Study (July 2022)

- Three-part focus
 - *Energy Efficiency*
 - *Behavior*
 - *System operations*
- Analyze utility use and costs
- Provide findings and recommendations for reduced and more efficient energy use



Study Results: Use of Electricity

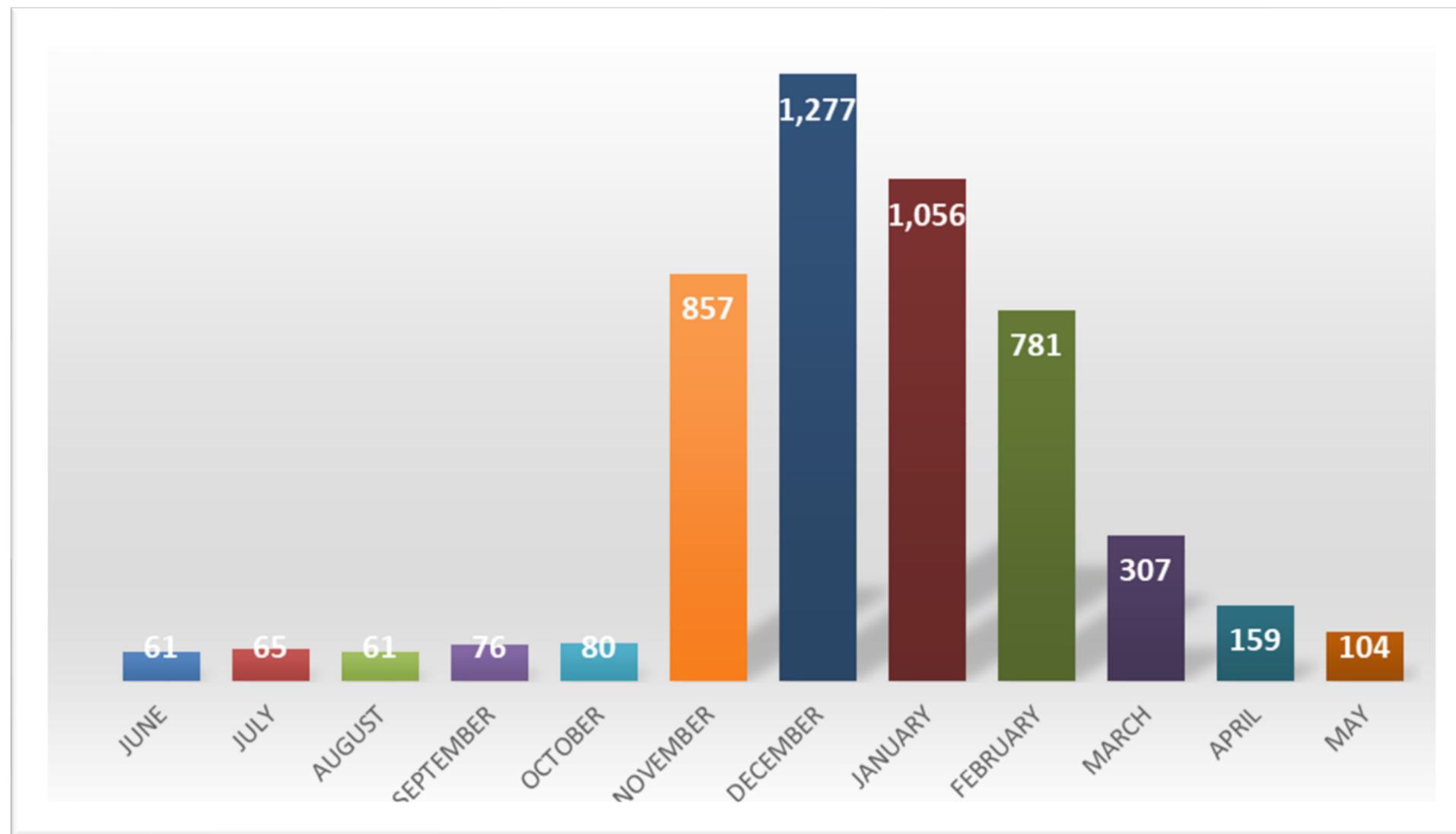
12-Month Electricity Use (KWH): 2020-2021



32% of electricity is used for cooling

Study Results: Use of Gas

12-Month Gas Use (Therms): 2020-2021



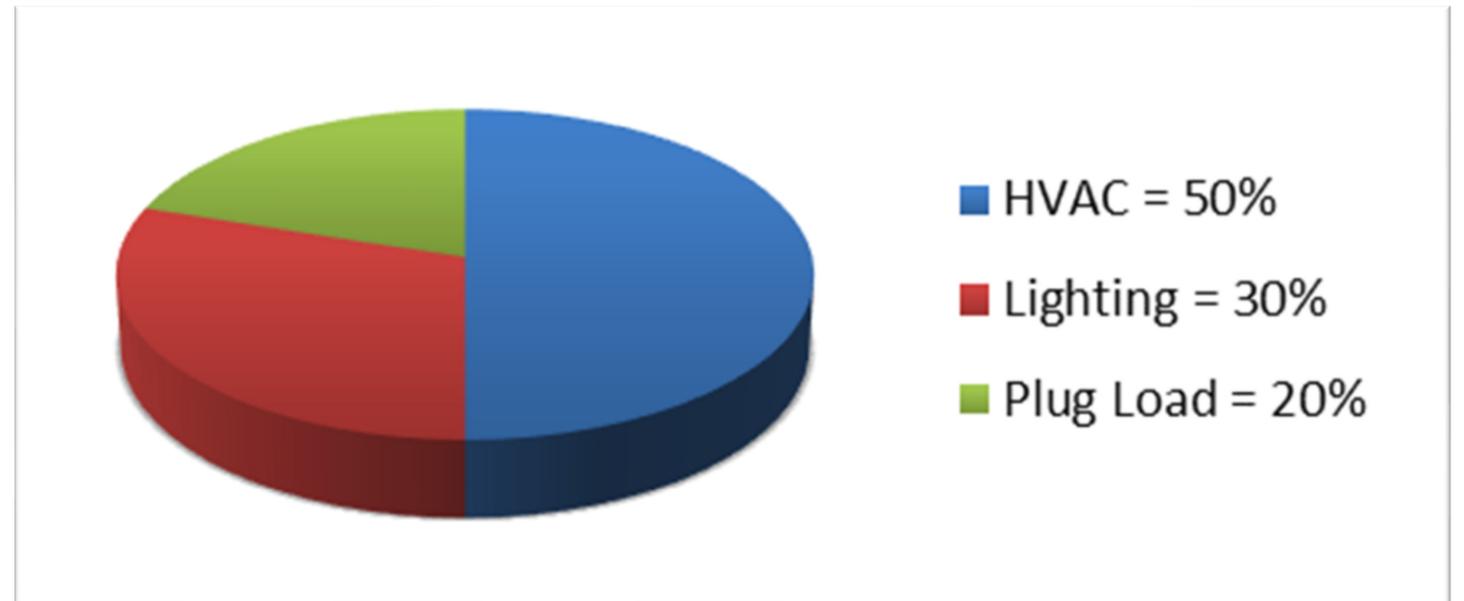
92% of gas is used for heating

Study Recommendations

What affects energy use?

- Building envelope (insulation, doors and windows, etc.)
- Thermostats and controls
- Occupancy
- Weather conditions
- Behavior

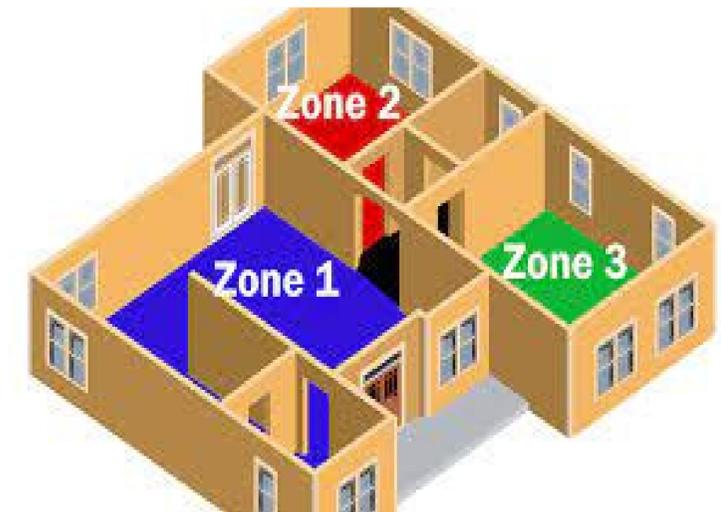
Typical Electrical Use



Recommended Energy Reduction and Control Measures

ERCM No.1: Sequence Operations

1. Adapt a “Zone Strategy”
 - Trinity has 9 HVAC Zones
 - Operate HVAC only in used zones
2. Modify Scheduling
 - Use the same zone for adjacent events/meetings
 - Adapt or tighten schedules to optimize HVAC use
3. Modify Temperatures
 - 66-70°F for cooling
 - 72-76°F for heating
 - Potential savings \$2,767 per year



Recommended Energy Reduction and Control Measures

ERCM No.2: Install Wi-Fi Thermostats

1. Replace 15 thermostats with Wi-Fi thermostats
 - Enable centralized temperature control
 - Supports sequencing of controls
 - Prevents overrides
2. Cost
 - \$150/250 per thermostat
 - PG&E can offset cost by up to \$75

Potential Savings for ERCM 1 and 2

ERCM	Cost	Savings /Yr	Payback
1	0	\$3,000*	Instant
2	\$3,000	\$3,000*	1 Year

** Measures 1 and 2 must occur together to achieve total savings of \$3,000*

Recommended Energy Reduction and Control Measures

ERCM No.3: Replace HVAC Units

1. Replace 7 HVAC Units
 - Trinity has 15 HVAC Units
 - 7 have outlived their useful lives
2. Benefits of Replacement
 - Increased efficiency
 - Enable Trinity to convert from gas to electric heat to support carbon neutrality
 - Estimated savings of \$10,500 year in fuel expense.



Recommended Energy Reduction and Control Measures

ERCM No.3: Replace HVAC Units - Continued

HVAC Units Recommended for Replacement

Zone	Year Installed	Tons	Cost
AC 1	1989	3	\$9,000
AC 2	1989	3	\$9,000
AC 3	1989	7.5	\$22,5000
AC 4	1989	10	\$30,000
AC 5	1989	5	\$15,000
AC 6	1989	4	\$12,000
AC 9	1989	15	\$45,000
AC 12	1989	5	\$15,000
TOTAL		37.5	\$157,500

An annual cost-savings of \$10,500 enables payback in 11 years.

Recommended Energy Reduction and Control Measures

ERCM No.4: Replace Lighting with LEDs

1. Inefficient Lighting/Lamp Types Throughout Campus

- Many lights and lamps no longer manufactured
- Utility companies recommend replacing models to enhance efficiency.
- Replace with 2-lamp 13 or 15 watt LED linear fluorescents

2. Benefits of Replacement

- Decreased energy consumption (up to 80% less energy)
- Increased lifetime (5X longer life)



Recommended Energy Reduction and Control Measures

ERCM No.4: Replace Lighting with LEDs - Continued

Existing and Proposed Lighting

No. of Fixtures	Existing Lamp	Replacement Lamp	Cost
3	60-watt Inc	8-watt LED equivalent	\$30
106	32-watt T8	13-watt LED equivalent	\$5,300
4	40-watt T12	13-watt LED equivalent	\$80
TOTAL			\$5,410

Recommended Energy Reduction and Control Measures

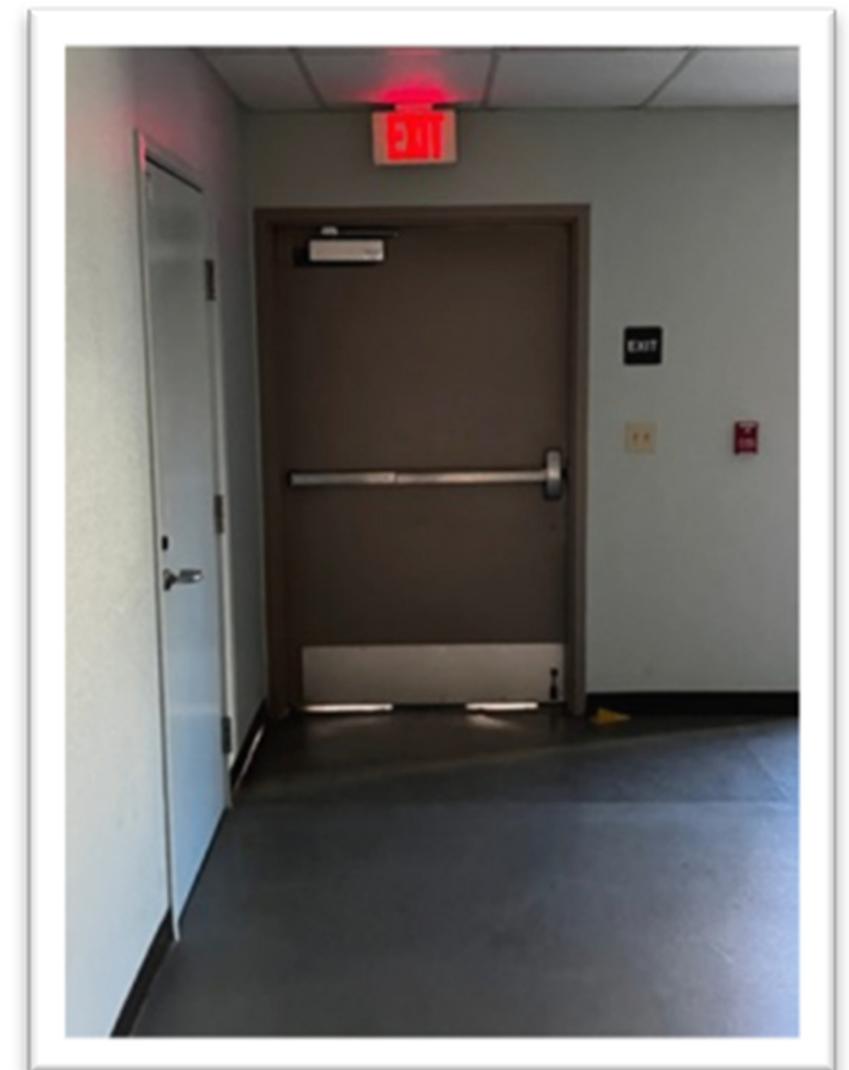
ERCM No.5: Building Envelope

1. Proposed Maintenance, Retrofits, Improvements

- Doors: Upgrade weather stripping (\$350)
- Insulation: 50% ceilings on top floor lack insulation

Building Envelope Improvements

Improvement	Cost	Savings/Yr
Weather stripping	\$350	\$35
Insulation	\$5,000	\$500
Total	\$5,350	\$535



Recommended Energy Reduction and Control Measures

ERCM No.6: Low-Cost Opportunities

1. Lights Turn off lights/install sensors/modify behavior
2. Water From 1400 to 1200
3. Plug Load Install 5 adaptors (\$20/each)
4. Commodes When replaced, install low-flow units
5. Awareness Provide ongoing education to staff and facility users.



Trinity Study - Summary

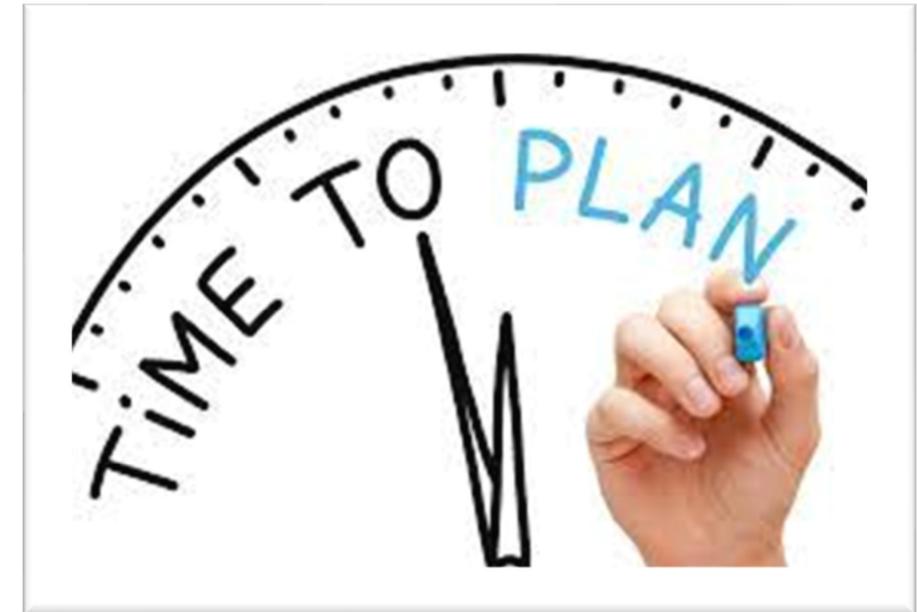
Summary of Energy Cost Reduction Measures for Trinity Cathedral

Measure	Project	Cost (\$)	Savings (\$)	Payback (Years)
1 & 2	Change sequence of operations (controls)	\$3,000	\$3,000	1
3	Replace older HVAC Units	\$157,500	\$10,500	15
4	Replace older lamps with LEDs	\$5,410	\$1,082	5
5	Weather strip doors, windows and insulation in 2 nd Flr.	\$5,350	\$535	10
6	Pursue reduce water temperatures, turn of lights, install plug load adaptors, etc.	\$0	\$250	<1
TOTAL		\$171,260	\$15,367	15

What's Next?

Four-part Process (Commission)

- Form a Green Team
- Measure our Carbon Footprint
- Conduct an Energy Study
- **Develop a Plan for Carbon Neutrality**



Thought, Prayer, and Planning!

Step 1: Review What We Know

- IPL Carbon Emission Categories
 - Facility Operations
 - Transportation
 - Food
 - Procurement
- EfP Facility Recommendations
- Other Considerations
 - Planned facility improvements
 - Behavior changes since COVID-19
 - *(e.g., Zoom v. in-person, gathering and meals, etc.)*



Thought, Prayer, and Planning!

Step 2: Consider Mission, Goals, and Values

- Identify church missions and ministries, for example:
 - Liturgy and Worship
 - Community Outreach
 - Spiritual Formation and Education
- Would any of the reports/recommendations or creation care goals affect your mission and ministry?
 - In-person gathering v. zoom meeting
 - Paper v. electronic communication
 - Community meals and outreach and dietary choices.



Thought, Prayer, and Planning!

Step 2: Consider Mission, Goals, and Values

- If conflicts arise, consider....
 - Can we adapt ministries/practices to further Creation Care goals (e.g., schedules and formats)?
 - Provide carbon offsets for targeted missions and ministries?



Thought, Prayer, and Planning!

Step 3: Identify Creation Care Goals and Priorities

- Identify specific goals and timeframes
 - Short-range goals (Present to 1 year: 2023-24)
 - Mid-range goals (Years 2 to 4: 2025-28)
 - Long-range goals (>5 years: 2029 and beyond)
- Create a budget for each goal
- Consider available funding resources (grants)



Thought, Prayer, and Planning!

Step 4: Allocate Resources and Budgets

- Work closely with vestry and staff
- Incorporate creation care measures into annual budget and facilities planning

Step 5: Document and Share Progress!

- Document creation care meetings and decisions
- Document vendor conversations
- Track progress—including challenges and delays!



Thought, Prayer, and Planning!

Step 5: Document and Share Progress – *continued*

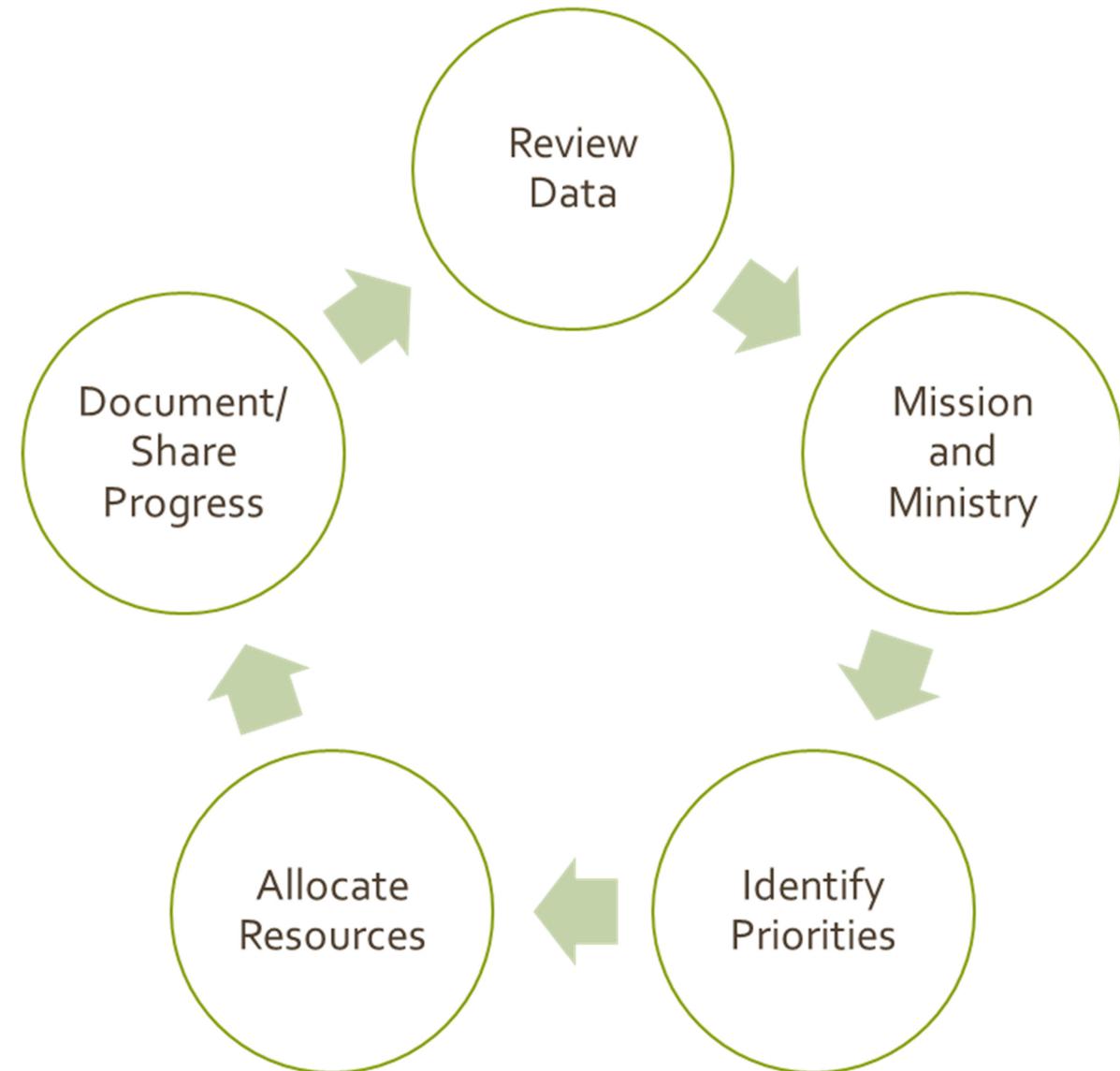
- Provide regular opportunities for prayer and sharing
- Make creation care an agenda item across ministries
- Reach out to other congregations to compare notes



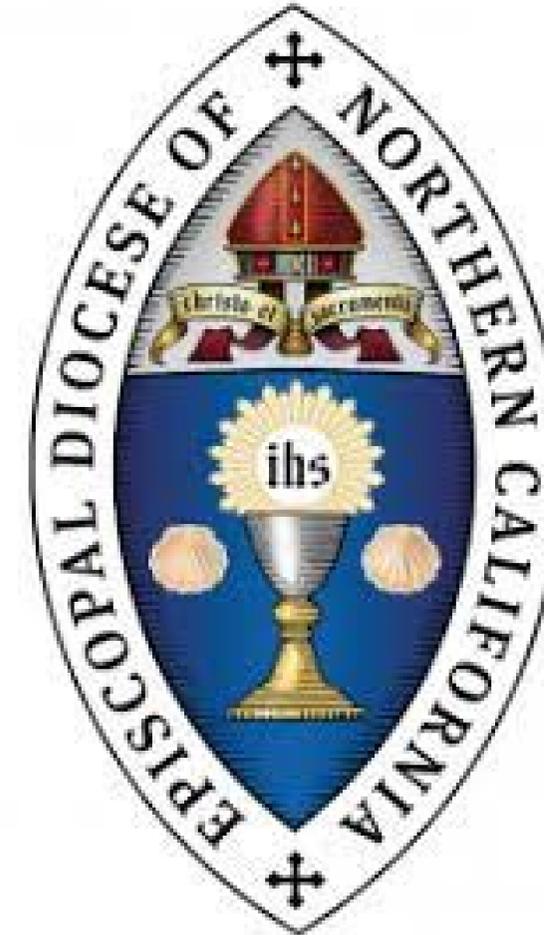
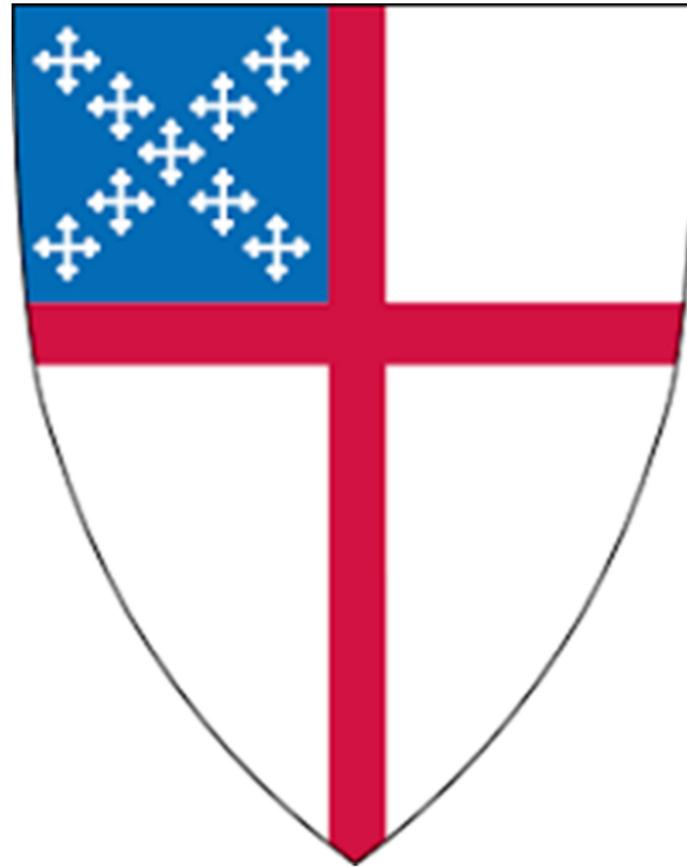
Tools From the Commission

Planning Tools

- Templates for data sharing and planning
- Finance/funding resources
- Educational resources on climate care and carbon neutrality
- A network of dedicated partners to call!



And Remember...



We're in this together!