Energy Efficient Congregations

How Hoosier Congregations are Cutting Their Energy Use by 25% - and Yours Can Too

Welcome!

https://www.faithinplace.org/thriving-faith-communities

https://www.faithinplace.org/who-we-are

Why Save Energy?

After surveying several hundred Hoosiers, three reasons emerge.

1. Save money for operations, outreach, mission, etc.

2. Faith teachings – till and tend, laudato si, care for creation, other religious teachings

3. Climate change – save the earth for our grandchildren

I. **Using Energy Prudently Initiative: Overview**

II. **Heating & Cooling Your Building**

- A. Zoning &Thermostat Setbacks
- B. Sealing & Insulating
- C. HVAC Equipment

III. **Monitoring & Managing Everything Else**

- A. Lighting
- B. Everything Else: An Energy Saver Checklist

IV. **Engaging Your Congregation**

IV. **Wrap-up & Closing**

Our Mission

Earth Care

To enlist and assist congregations in Monroe County –and beyond – to reduce their energy use in their facilities by at least 25% and to engage at least 33% of their member households to reduce their energy consumption by at least one seventh (14%).

Faith in Place

To empower people of diverse faiths and spiritualities to be leaders in advancing environmental and racial justice, providing resources to educate, connect, and advocate for healthier communities.

Energy Efficient Congregations

For each topic we will:

- ✓ Explain our objectives;
- ✓ Share our stories;
- ✓ Go over the tools we have created;
- ✓ Answer your questions;
- ✓ Take time to plan what your congregation will do.

I. Savings and the Using Energy Prudently Initiative

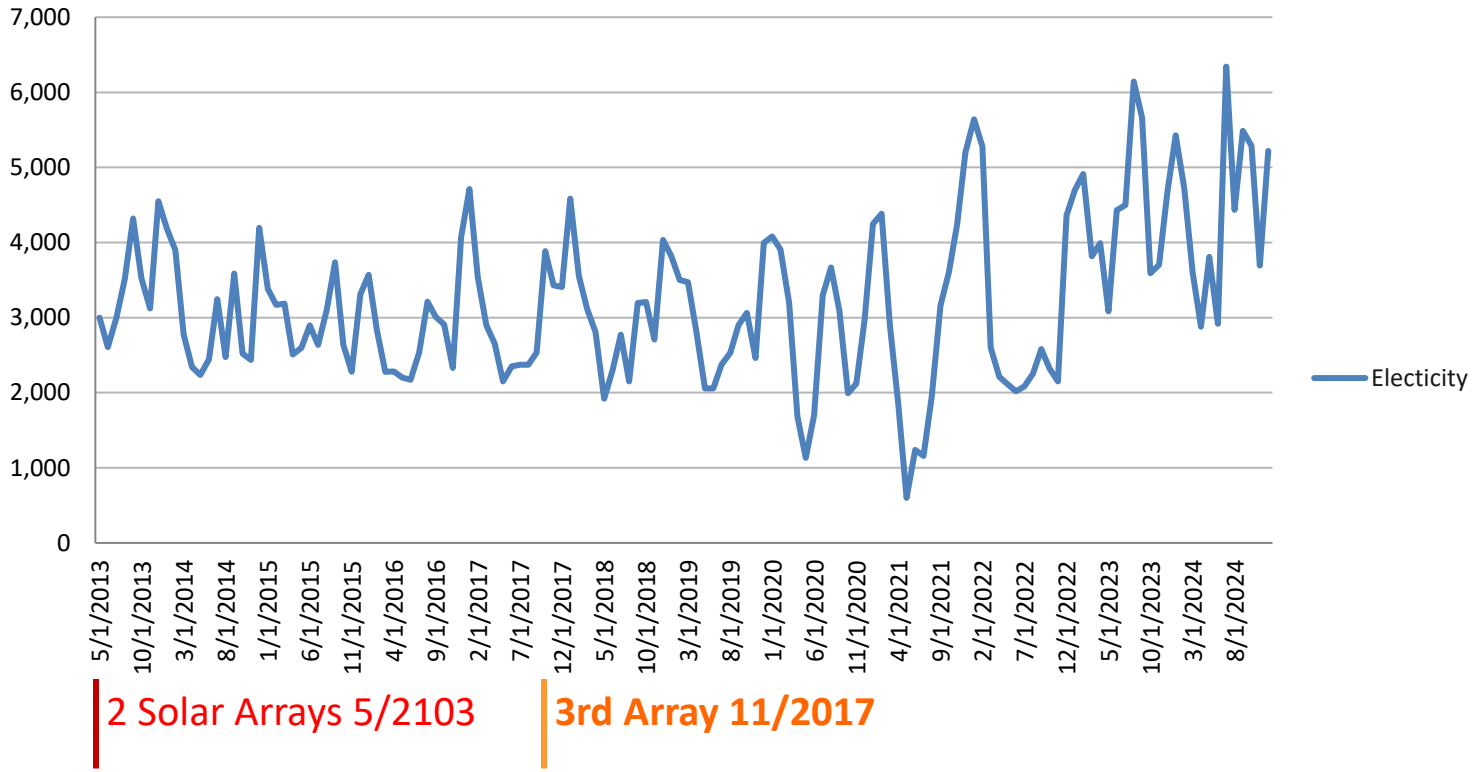
Why We Are Here

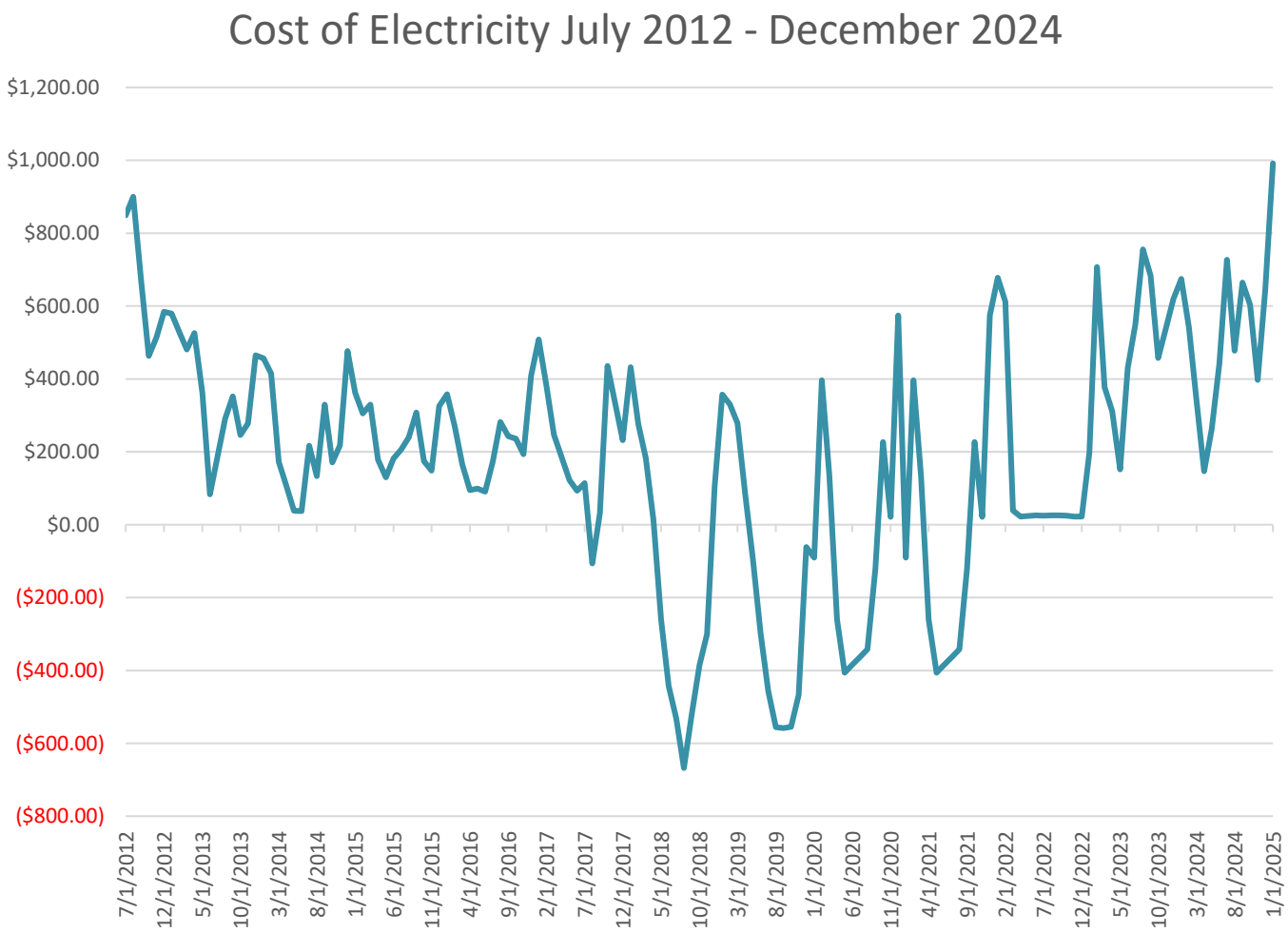
- Faith in Place is catalyzing a movement among Midwest faith communities and their members to greatly reduce their use of energy.
- We need you and your congregation to be in the vanguard of leading this effort.
- A year from now we hope that your congregations will have reduced their energy use and saved money, and will be leading other congregations to do the same.

The First Step

- ✓ Download utility data from utility companies for the past several years
- ✓ Use Excel to plot the consumption and cost of your energy

Electricity from Grid 05/2013 – 12/2024




Cost of Electricity July 2012 - December 2024
$1,200.00
$1,000.00
$800.00
$600.00
$400.00
$200.00
$0.00
($200.00)
($400.00)
($600.00)
($800.00)
7/1/2012
12/1/2012
5/1/2013
10/1/2013
3/1/2014
8/1/2014
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6/1/2020
11/1/2020
4/1/2021
9/1/2021
2/1/2022
7/1/2022
12/1/2022
5/1/2023
10/1/2023
3/1/2024
8/1/2024
1/1/2025

How Do You take This First Step?

Depending on your culture, your hierarchy, your position, your place on the journey, your objective:

1. Under the radar.
2. Core group of advocates.
3. Full bore with congregation.

How do we cut our bills by 25% to 50%?

We cut out waste.

- Heat, cool & light people not empty spaces
- Plug holes and create thermal barriers
- Use technologies and practices that use less energy:
  - Cost-effective lighting
  - Manage big energy users: automatic controls
  - More efficient and better maintained HVAC equipment

II. Your Building

A. **Thermostats & Zoning**

B. **Sealing and insulating**

C. **Maintaining & Replacing HVAC Systems**

D. **Managing & Monitoring Everything Else**

The Building: A

Thermostats & Zoning

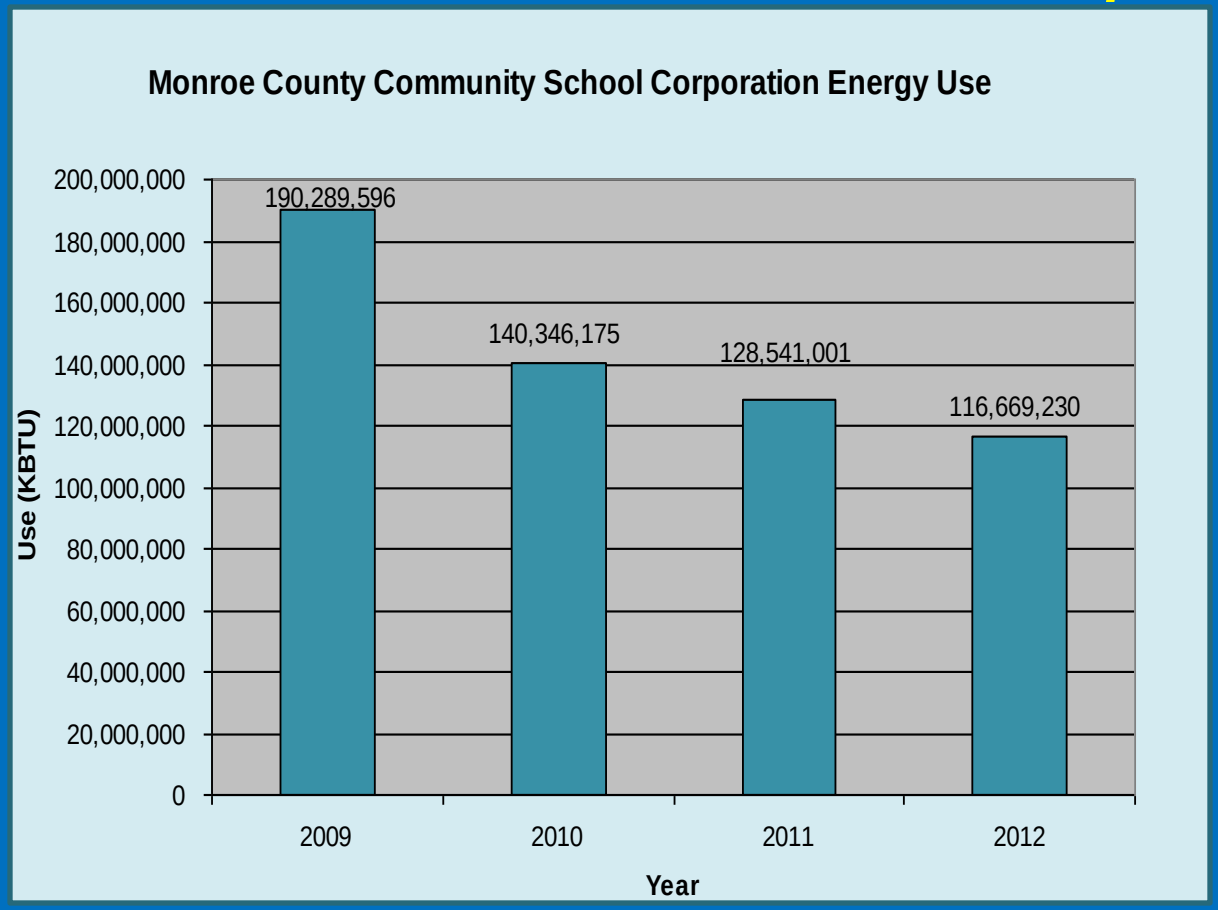
Heating and cooling people… not empty spaces.

*Turning your thermostat back 10° to 15° for **8 hours** can save 5% to 15% a year on your heating bill saving as much as 1% for each degree setback for each 8 hour period..*

U.S. Dep't. of Energy

Madi Hirschland

Thermostats: An excellent example



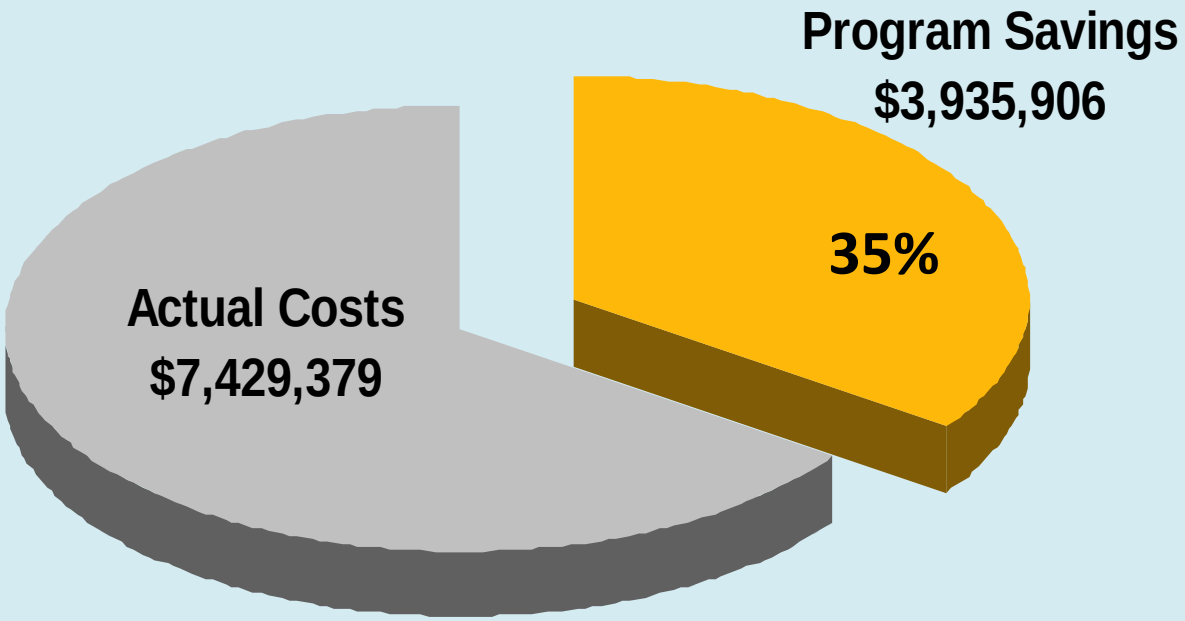
Monroe County Schools reduced their energy use by 35% almost solely by setting back their thermostats!

MCCSC Energy Cost Analysis

December 2009 – December 2012

Expected Energy Costs

$11,362,937



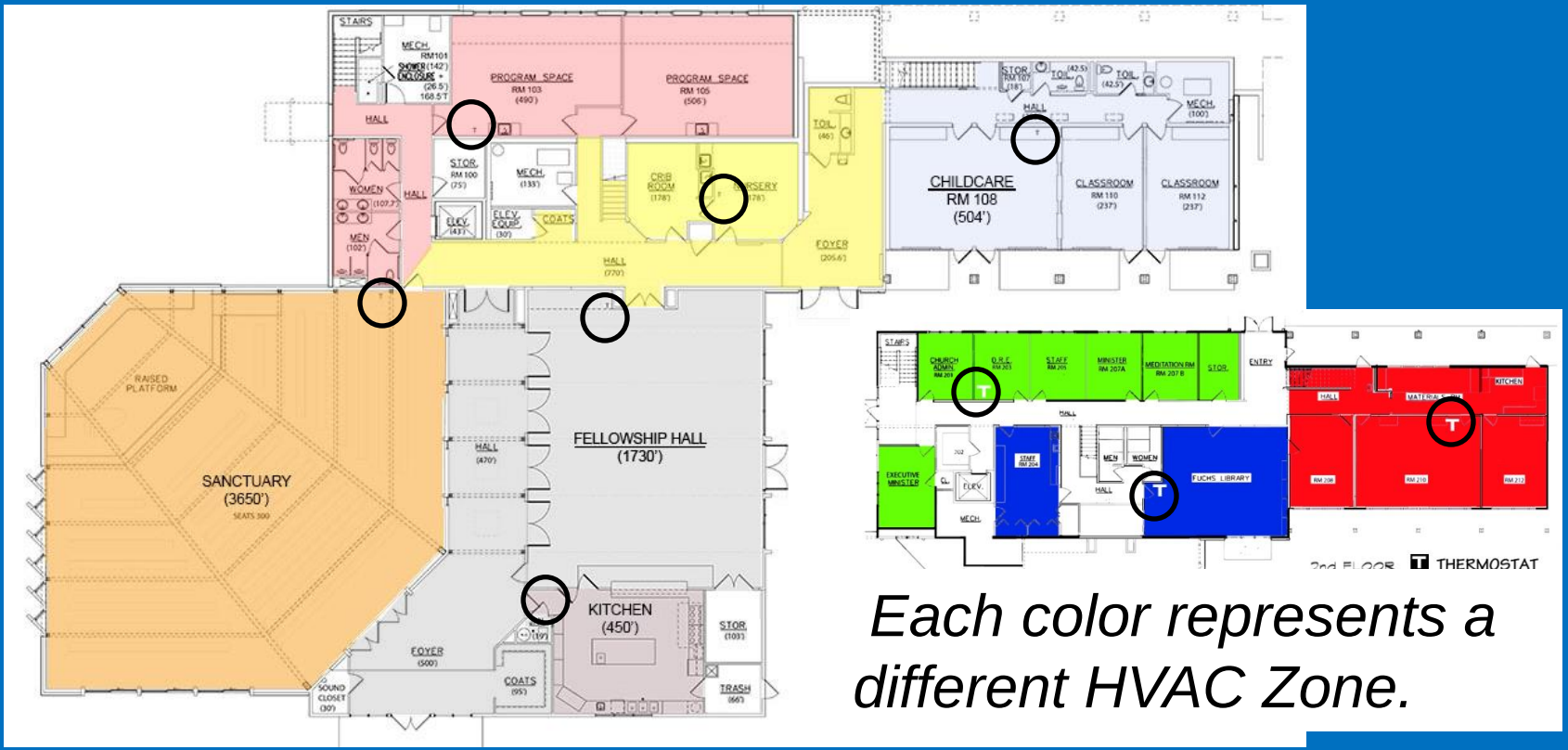
Base year usage adjusted for changes in weather, energy loads and prices

Five Simple Steps

1. *Heating / Cooling Zones: Map out each zone & thermostat*
2. *Barriers: Is each zone separated by doors or walls?*
3. *Time: When is each zone in use? For what?*
4. *Comfort: Pick temperatures collaboratively for*
   - *when you have a program*
   - *when zone is occupied by staff*
   - *when no one is present*
5. *Setting: In collaboration*

Identify your Zones

- Locate your thermostats (black circles in plan);
- Note which spaces each heats & cools,
- Can any of these be closed off from others?



Each color represents a different HVAC Zone.

It's common sense…

You always save energy when a furnace or AC is off rather than on. And they last longer too.

The less you use your furnace and AC, the more you save.

Questions
or
Comments?

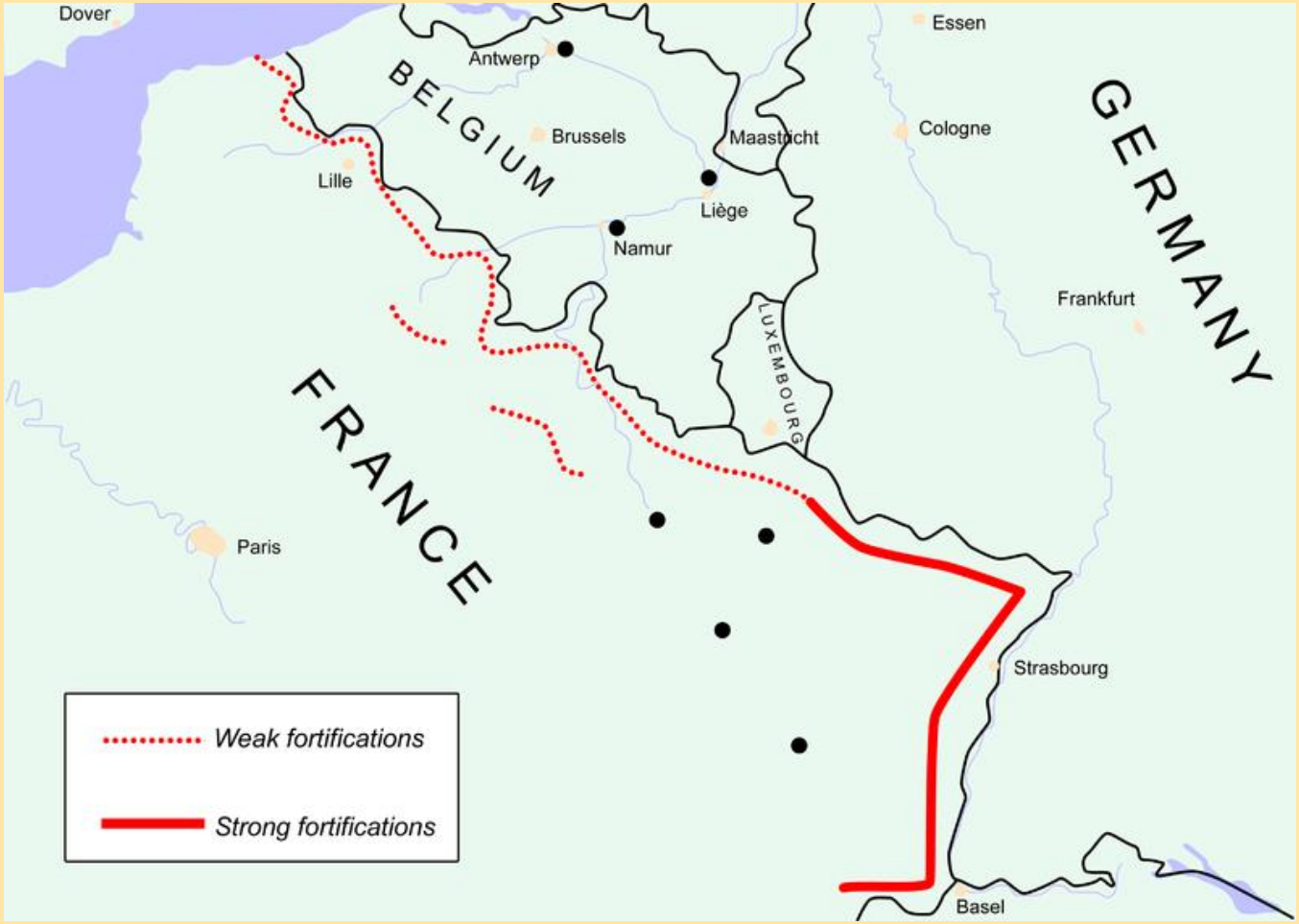
Planning:

What will you do?

The Building: B

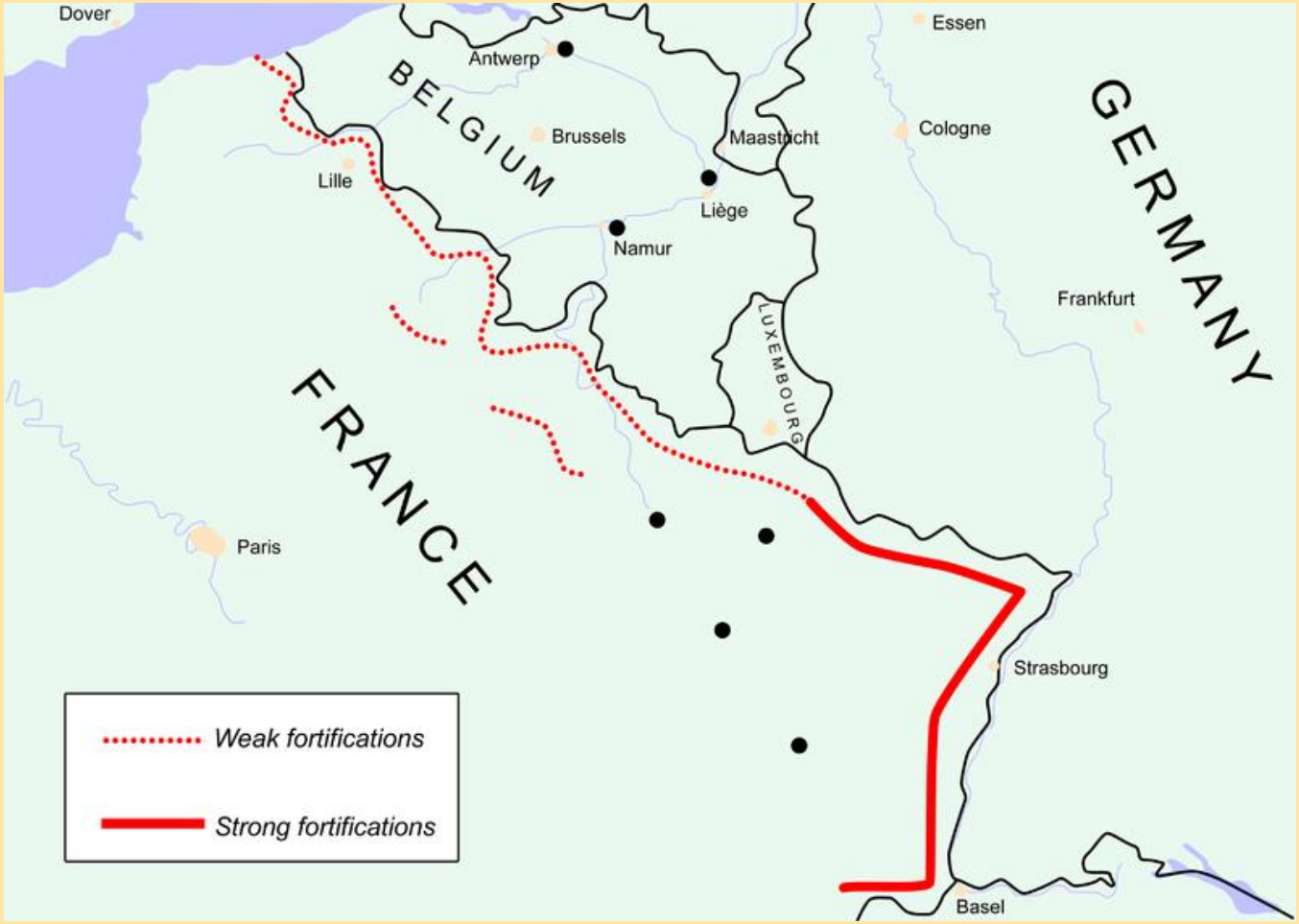
Sealing
Air Leaks &
Insulating

Why start here?



Heat will find a way

around…



air barriers!

or through gaps in…

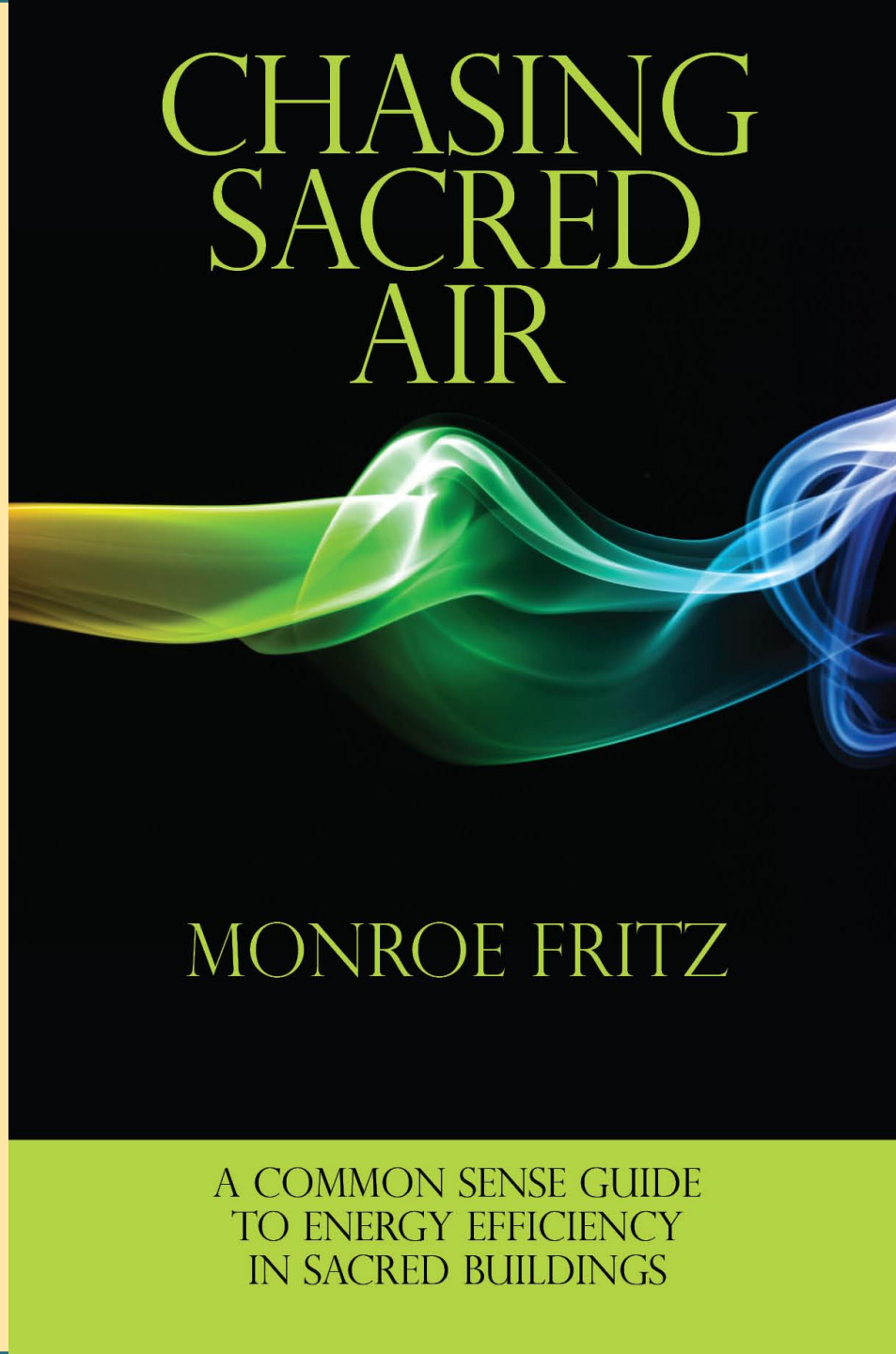
“Air tightness

is the

#1 priority

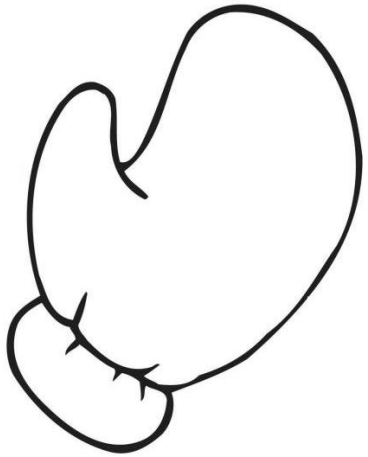
for energy

efficiency”



Air Barriers vs. Thermal Barriers

What's the difference?



"Doesn't our insulation stop the air?!"

Thermal Barriers

—like loose & most batt insulation—

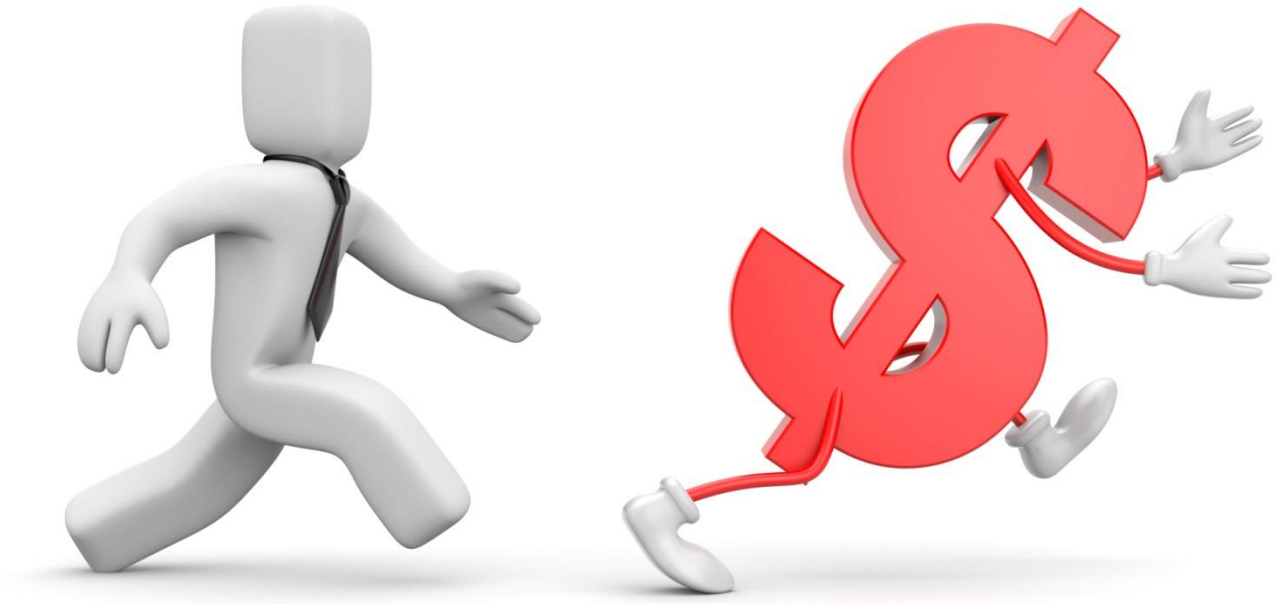
only reach their full potential when *next to* an Air Barrier

Why is this true?

Heat moves from areas of
higher to lower temperature;

and the
greater the difference
between indoor and outdoors
the more heat
—which you are paying to manage—
moves

So “Chasing Air” is chasing—



So why is air tightness often overlooked?

When there is a problem we think of the usual suspects:

- **Insulation**
- **Leaky doors and windows**
- **HVAC efficiency**

And we call in those professionals

but *when all you have is a hammer…*

CASE STUDY: First United Methodist Church, Bloomington

THERMOGRAPHY

Thermal camera image of a 1930s church sanctuary

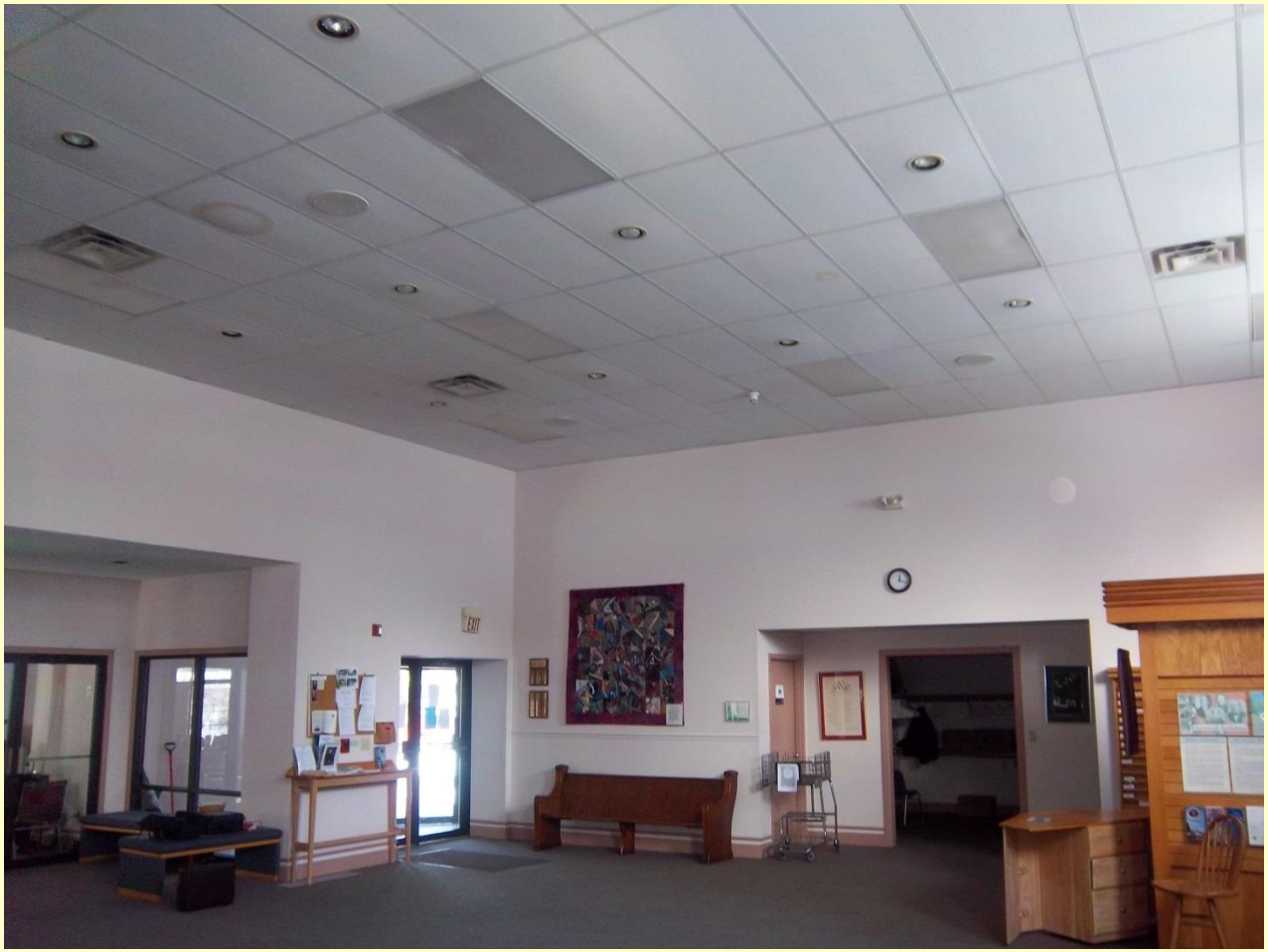
Why was the upper wall so much colder?

A look behind the wall at the rose window…

…add Visqueen, a board or other air barrier next to the insulation

Air Barriers + Thermal Barriers

CASE STUDY: UU Church of Indianapolis



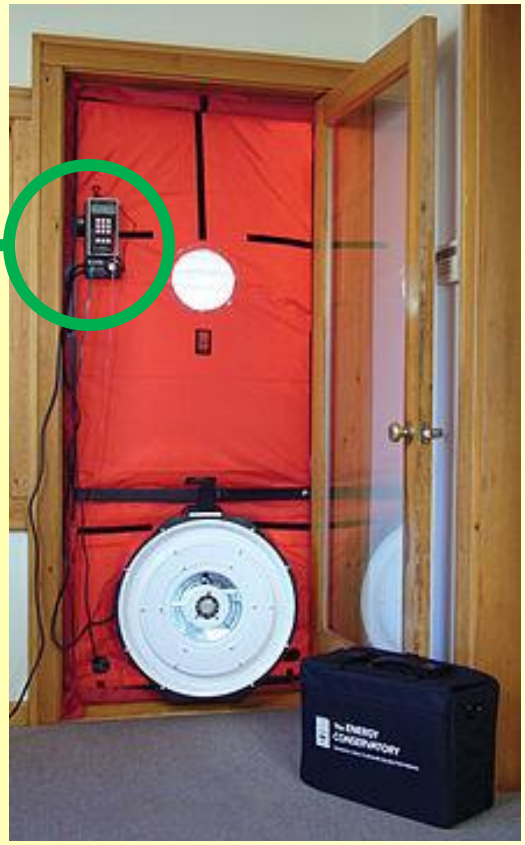
CASE STUDY: UU Church of Indianapolis

CASE STUDY: UU Church of Indianapolis

Uninsulated wall

And in the cottage, un-insulated ducts were outside the “envelope” (portion not heated or cooled)

A professional sealed and properly insulated above the dropped ceilings



Blower door reading after sealing

BLOWER DOOR TEST RESULTS

Initial reading: 11,900 cfm at 50 Pascals

Final reading: 3,700 cfm at 50 pascals

This equates to a 68% reduction in air infiltration or a ACH (air change per hour) of 7.7

Prediction: "Based on these numbers, you should see a 50% or better reduction in winter heating loads."

Estimated savings for gas and electricity of $700/year

How to assess your building's tightness?

BUILDING'S ENVELOPE:

A. Finding leaks:

- Common places to look
- Problems are often hidden
- Profession audit may be needed

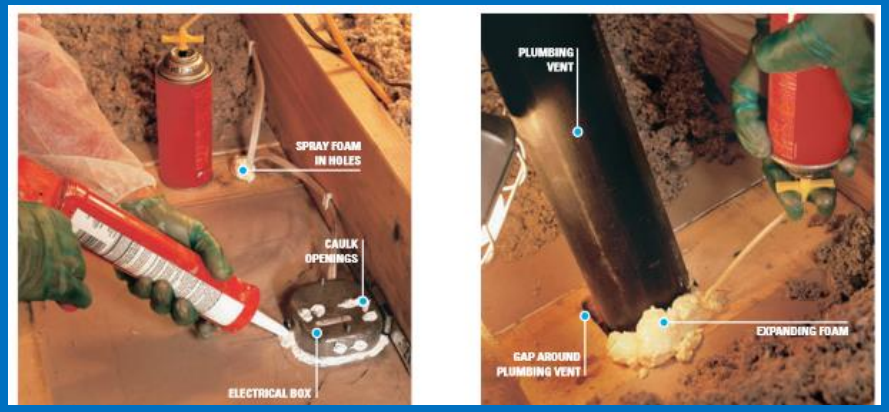
B. Sealing Leaks:

1. **Prioritizing:**

   Make a plan:

   - **Low cost or by volunteers**
   - **Biggest impact**

2. **Volunteer projects**



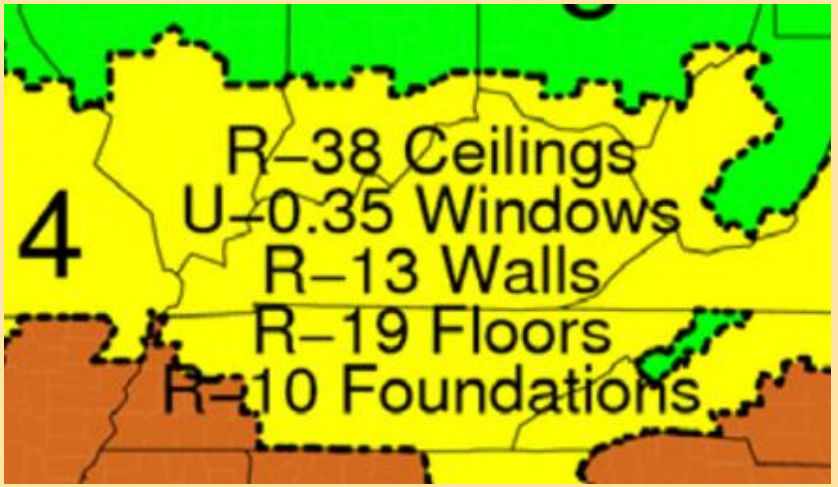
3. **What about windows?**

C. Finding funds:

- Solutions may quickly pay for themselves;
- Volunteers can do much of the work;
- Reinvest savings from thermostat setbacks;
- Look for rebates!

Insulation Quick Guide:

1. **Prioritizing:**
   - ❑ **Where to add insulation?**
   - ❑ **How much is enough?**
   - ❑ **What type to use?**



2. **Watch out for Wiring & Ventilation**

3. **How to up the insulating value of windows?**

Questions
or
Comments?

Planning:

What will you do?

Short Break

The Building: C

Maintaining & Replacing HVAC Equipment

1. ***Maintain* Equipment for Best Efficiency**
   - ❖ **And to extend equipment life**
2. ***Reduce Use for Greater Savings***
   - ❖ **Cool with fans.**
   - ❖ **Effect of less AC on humidity.**
3. ***Plan for Efficient Upgrades***
   - ❖ **How to decide when & how efficient.**
   - ❖ **Estimate savings with more efficient system.**
   - ❖ **Find the funds.**

1. Two Kinds of Maintenance

A. PREVENTIVE

B. PREDICTIVE

A. PREVENTIVE HVAC MAINTENANCE

1. Why is Maintenance Important?

- Helps system operate at its peak efficiency.
- Increases equipment life by as much as **20%**.

Keeping outdoor AC units clean can save 30%.

A. PREVENTIVE HVAC MAINTENANCE

2. How to be sure it is happening?

a) Get to know your service provider:

- understand what they plan to do & what volunteers could do;
- how often steps need to be taken;
- be sure they follow through, especially if staff changes!

PREVENTIVE MAINTENANCE:

b) Assign a lay person or staff member to monitor the work.

- **Especially if volunteers are changing your filters!**

Plugged Furnace Filter discovered at UUI!

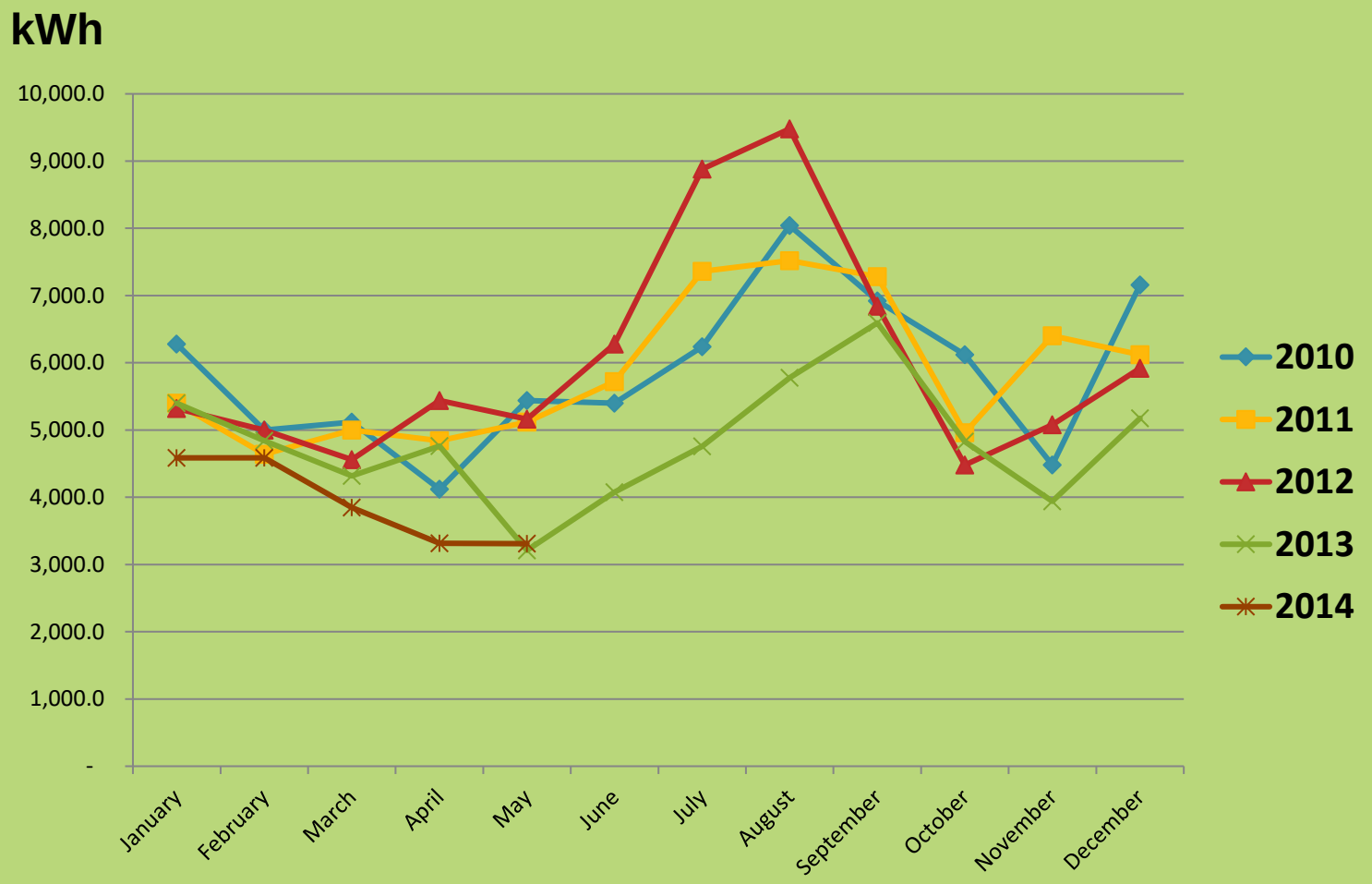
2. *PREDICTIVE* HVAC MAINTENANCE

- Keep track of your equipment age to help predict when it might need replacement.

- Frequent or major repairs toward the end of expected life may indicate it is time to replace it with a more efficient system.

SIGNS OF TROUBLE?

Monitor energy bills to look for anything unusual



Take relative average temperatures into account.

Predicitive Maintenance:

1. Look for Common Causes of Waste

- **Are you bringing in more fresh air than needed?**
- **Do your fans run more than needed?**
- **Has your system been balanced?**
- **Is your equipment larger than necessary?**

2. Reduce Use for Greater Savings

- ✓ **All types of systems can benefit from thermostat setbacks, with some experimentation.**
  - ❖ **Hot-water boiler systems may need to turn up and turn back earlier than steam or forced air.**
  - ❖ **Heat pumps may need to start changing up or down several hours before when spaces are to be occupied.**
- ✓ **Heat one or two areas with individual heaters instead of heating the whole building or zone.**
- ✓ **Cool with fans.**
- ✓ **Watch for humidity issues of less AC.**

3. HAVE A PLAN FOR REPLACEMENT

- Average life depends on system type, average weekly use and maintenance.
  - ✓ SPLIT SYSTEMS: Expect about 15 – 20 years.
  - ✓ BOILERS: Expect about 25 years if well maintained.
- Talk to your service provider about what **size** and **efficiency** you will need in case replacement is needed at height of heating or cooling season!

UPGRADING FOR GREATER EFFICIENCY

- All new equipment is more efficient than older models so will pay for itself in savings.
- The ideal system depends on what you have to start with – a boiler for heat and chillers, or a split system.
- Get several quotes and advice on size, efficiency, etc.
- Ask about alternative technologies.

Upgrading: Comparing HVAC Options

A Rough Comparison of HVAC Equipment Options

Type of System	Upfront Cost	Operating Cost	Lifetime Cost	Energy Use	CO2 Emissions in IN from Operations
Natural gas furnace – 80% efficiency	$	$$	$$	++	++
Natural gas furnace – 96% efficiency	$$	$	$	+	+
Hybrid air source heat pump and air conditioner and 80% gas furnace	$$	$	$	+	++
Hybrid air source heat pump and air conditioner and 96% gas furnace	$$	$	$	+	+
Standard electric furnace, radiant, or baseboard	$	$$$	$$$	+++	++++
Air source heat pump and air conditioner	$$	$$	$$	++	+++
Ground source heat pump – high efficiency	$$$$	$	$$	+	+
Very high efficiency air heat pump (e.g. Carrier Greenspeed)	$$$	$	$$	+	+

MORE EFFICIENT EQUIPMENT

It pays to invest in at least two steps above the current standard efficient equipment

- Ask for the cost differences from standard.
- Ask contractor(s) to give ROI* (payback for higher efficiency models is fairly short, then savings add up). *Remember electric rates are rising!
- Rebates available on more efficient systems; be sure yours will qualify before proceeding.

A Final Thought about HVAC

If your congregation wants to get to net zero carbon emissions over time, you will need to stop burning gas for heat.

You will have to use electricity produced from renewable sources like wind or solar to run an air to air or geothermal heat pump for heat.

You will want to consider the alternatives, like heat pumps, as you plan for HVAC replacement equipment.

Questions
or
Comments?

Planning:

What will you do?

~ Break ~

Lunch Time

D. Managing & Monitoring Everything Else

1. Lighting
2. Everything Else: An Energy Saver Checklist

1. Lighting

a) **Lighting Controls**

- ✓ Turn them off when not needed!

b) **<u>Upgrading</u> Lights: Our tools**

- ❑ What you need to consider when making decisions.
- ❑ Where and when new technologies pay off.

c) **An LED Case Study**.

a. Lighting Controls

WASTE NOT: TURN LIGHTS OFF!

Do you need all the lights on all the time?

Are lights left on when no one is in a space?

- Add controls, especially in restrooms with fans on the same switch!
- Educate members: Add signs on your switches.
- Add motion sensors on exterior lights:
  - Can enhance security.
  - Are otherwise on long hours.
- When does it pay to add controls?
  - Rebates available from utilities.

b. Upgrading Lighting

1. What qualities to consider?
2. How to compare different technologies?
3. What spaces have the best return on investment?

UPGRADING LIGHTING

Qualities to Consider

- Power used (Watts)
- Brightness (lumens) [And how much light you need in a given space and time.]
- Efficacy (lumens per Watt)
- Color (warm to cool); Color Rendering Index
- Expected lifespan
- Initial Cost vs. Lifetime Cost

2. Lighting Technologies

Energy efficient LED lighting has a fairly brief payback

- Color Temperature:
  - Warmer: 2700 to 3000 Kelvin
  - Cooler (whiter): 4000 Kelvin (Daylight = 5000)
- Color Rendering Index: 80s to 90.
- 10-year warranty – and date bulbs as installed.
- Purchase from well established manufacturer.
- Consider some de-lamping.

EXIT signs are on 24x7 so converting to LEDs will start saving the first year

Lighting Technology	Annual Energy Use	Annual Energy Cost	Lamp Service Life	Annual Carbon Dioxide (CO2) Pollution
Incandescent	350 kWh	$ 28.00	2.8 months	574 pounds
CFL	140 kWh	$ 11.00	10.8 months	230 pounds
LED	44 kWh	$ 4.00	10+ Years	72 pounds

STORIES

LED CASE STUDY

Replaced (52) 80-Watt halogen with 18-Watt LEDs:

They paid for the upgrade in 20 months.

Then saved about $335 each year for 15 more years.

Following these steps, six congregations reduced their average electric usage by 33% and their gas usage by 36% from the date each started making improvements

Six houses of worship:	CBS	ECC	STLC	TEC	UUB	UUI	Avg.
Electricity	27%	32%	54%	23%	32%	47%	33%
Gas	61%	47%	7%	13%	26%	42%	36%

Questions
or
Comments?

Planning:

What will you do?

2. Everything Else

Use your

Energy Saver Checklist

Using the Energy Saver Checklist

- Scheduled inspection, operation, and maintenance items – little or no cost
- Once and done items – will take longer and cost some money
- Some improvements are so lucrative it may be worth taking out a loan to make them happen

Incentives and Rebates

Prescriptive rebates from your energy companies

- Lights
- Appliances

Custom energy incentive programs from your energy suppliers

- Furnaces, heat pumps
- Insulation
- Lights

Short Break

III. Engaging Your Congregation

- Our Stories
- Some keys
- How about you?

How to Engage Your Congregation

- Assemble a team – and lead it effectively
- Have your congregation make a commitment
- Find & create community at every level
- Provide tools, guidance and help
- Communicate, communicate, communicate!

Household Pledge

“The Eternal placed the human being in the Garden of Eden to tend it and to till it.” Gen. 2:15

As a member of _(name of congregation), I pledge to reduce my energy use within the next year. I will aim to achieve a responsible goal for household energy usage. By (date), I will aim to have undertaken measures that would reduce the energy use of an average Hoosier household by at least 14% - one seventh.

I understand that I don’t have to do this alone. My congregation and Green team will do all they can to support my efforts. By taking these actions, I join with many others in our holy community and set an example for (city) and all of Indiana. By acting together - and with congregations of other faiths – we will meet our sacred obligation to care for all Creation and the least among us.

Ways We Each Can Make a Difference

TASK OF THE MONTH

After months of record-breaking global temperatures and increasing weather-related disasters, many of us are troubled about the future for life on Earth.

Task of the Month is a program to help individuals and households take one action each month. Tasks were selected based on their potential for significant energy savings. Most suggestions are for improving homes or changing habits to reduce our carbon footprints, but advocacy is also an important way we can make a difference. Do whatever works for you!

Following this program together will strengthen our sense of community. And our joint actions can influence others to make a real difference.

Fliers on Earth Care's website will suggest ways we can take actions each month:

☑ Month	Suggested Monthly Tasks* and Actions
❑ January	Talk about climate change. Learn how *Citizens Climate Lobby* advocates for change.
❑ February	Eat green. Plan meals, buy local and compost to reduce waste.
❑ March	Be energy smart. How much power are your appliances and lights using?
❑ April	Learn how solar can work for you. Advocate for Community Solar.
❑ May	Shift your ride. Reduce the impact of your local and long-distance travel.
❑ June	Stay cool wisely. Adjust your thermostat to save energy and money.
❑ July	Be water wise. Install low-flow showerheads & faucet aerators.
❑ August	Reduce the use of plastic & paper. Adopt earth-friendly cleaning methods.
❑ September	Reduce the impact of doing laundry. Wash in cold water, air-dry clothes.
❑ October	Be heat wise. Try gradually lowering your thermostat.
❑ November	Plan greener giving. Give things people need, used items, local memberships.
❑ December	Celebrate your accomplishments!

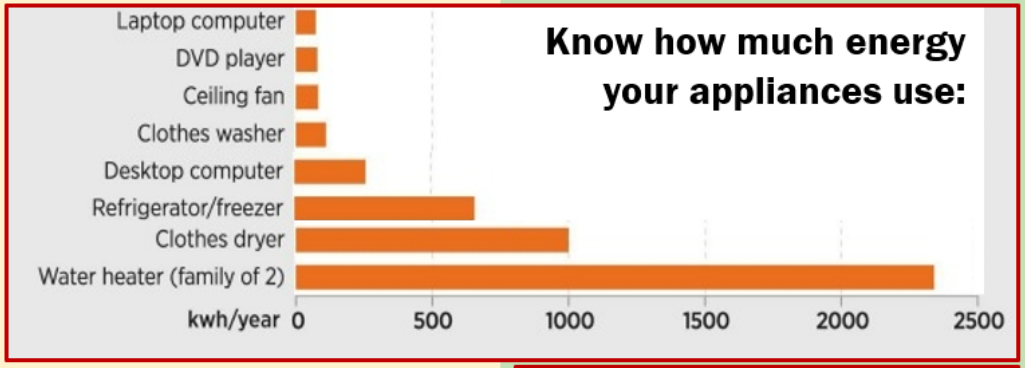
Earth Care Bloomington
http://www.earthcareindiana.org/
Questions: **contact@earthcareindiana.org**

In March

TASK OF THE MONTH

Be energy smart

TIPS for electrifying our homes



Water heaters can use about 20% of a home's energy, so upgrading has a high impact. Time to replace? Install an EnergyStar® heat pump water heater.

Set your **refrigerator** to 35°F to 38°F, your freezer to 0°F.
https://www.energy.gov/energysaver/refrigerator-freezer-use-and-temperature-tips
And don't block the air flow!

Replacing your refrigerator?
Consider size & compare EnergyStar® scores.

Want to know *exactly* how much energy your appliances or electronics are using?

Borrow an **energy monitor** from the Kirkwood branch of the Monroe County Public Library's "Library of Things" to measure how much energy each is using.

Save energy on lighting:

LEDs use less energy and last longer than CFLs, so there is less waste. They do not contain toxic mercury and turning off & on doesn't reduce their life like with CFLs.

But LED features & quality vary:

Color temperature (in Kelvin)
Warmer (2700K) for living areas.
Whiter (3000K) for work areas.

Read the labels
Look for a Color Rendering Index (CRI) in the 80s to 90s for better quality of light. Brightness is listed with incandescent equivalents and compare efficiency ratings.

Use surge protector strips to shut off **electronics** when not in use.

Earth Care Bloomington
http://www.earthcareindiana.org/

The benefits are many...

- Lower utility bills for congregation & households
- Builds community:
  - "We're in it together."
  - Youth can weatherize retirees' homes,
  - Sense we're doing something important for future generations and our global neighbors
- Serve as model in our city and state model for
- Fun and joyful
- Attracts media attention

Congregations Across the State


Muncie


Fort Wayne


Kokomo


Indianapolis