



Green Sanctuary Unitarian Universalist Association of Congregations

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Application for Green Sanctuary Candidacy

Congregation Information

Date of submission: 9/3/2018

Congregation Name: Eno River UU Fellowship (ERUUF)

Address: 4907 Garrett Road

City and State: Durham, NC

Web site: <https://www.eruuf.org/>

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Ministers: Reverend Deborah Cayer, Lead Minister and Reverend Jacqueline Brett, Minister of Congregational Engagement

Congregational Profile

Since ERUUF's founding in 1966, the congregation has grown exponentially from 42 members to its current membership of approximately 700 members and an annual budget of approximately \$950,000. Presently, there are two Sunday services from September-May and one Sunday service June-August. The average attendance for September 2017-May 2018, 9:30 a.m. worship service was 123 and 194 for the 11:15 a.m. service. The average attendance for summer worship is currently 217 (as of July 2018). RE enrollment for church year 2017-2018 was 189 children.

The primary source of congregational demographic data is ERUUF's annual Pulse of the Congregation Survey (Pulse Survey). The 2018 Pulse Survey results reported the following:

Total Respondents: 227

Membership Status: 86% were members, 13% were not; 1% did not know.

Length of Involvement:

- 37% had been involved more than 15 years

- 21% had been involved for 6-15 years
- 20% had been involved for 3-5 years
- 13% had been involved for 1- 3 years
- 9% had been involved less than a year

IOC Identification:

- 8% identified as an individual of color

Age:

- We had no respondents under 21
- 11% were between 22 and 40
- 49% were between 41 and 65
- 38% were between 66 and 80
- 3% were over 80

Distance Traveled:

- Approximately 70% lived closer than 9 miles but 10% travelled more than 15 miles.

Staff and Board of Trustees

There are presently 12 paid staff and consultant roles including Lead Minister, Assistant Minister for Congregational Engagement, Director of Administration, Bookkeeper, Office Assistants, Facilities Assistants, RE Director, RE Assistant, Youth Ministry Coordinator, Accompanist, Music Director, Beloved Community Choir Chorus Director, Pastoral Care Consultant, as well as an IT Consultant. Our general cleaning is done by contractors.

ERUUF is governed by a nine-member Board of Trustees (BOT) elected by the Fellowship for three-year terms. The lead minister serves as an ex-officio member. The BOT follows a policy-based governance model. Under policy-based governance, the Board of Trustees serves as representatives of the congregation and both gives voice to the vision and mission of ERUUF as well as writes the basic governing policies of the organization.

Authority for the program and administrative operations of ERUUF are delegated to the Lead Minister, who works in partnership with the Coordinating Team. Operations are strictly under the purview of the ministerial and administrative staff and follow the policies as outlined by the Board of Trustees.

Brief History

ERUUF was founded on April 17, 1966, at a Holiday Inn on Hillsborough Road in Durham. The instigator was Mimi Harrison, then living in Chapel Hill, who had attended the All Souls Church while she lived in Washington, DC. Her associate minister at All Souls was James Reeb, a white UU minister who was clubbed and killed while walking home from a meeting with Martin Luther King in Selma, Alabama, on March 11, 1966.

Spurred by this event, and wanting to honor Rev. Reeb, Mimi contacted Fran and Bill Hollister, who had experience founding UU congregations, and they organized the first meeting. Forty-five people attended, of whom 42 signed the membership role. For the first two years the

congregation met at the Allied Arts Building in Durham. The current sanctuary located at 4907 Garrett Road was built in 1999 with a capacity of 350 people. The current campus also includes a Fellowship Hall (capacity 150 people) and a CARE (Classroom) Building (total capacity approximately 150-175 people).

The mission of the Eno River Unitarian Universalist Fellowship is to transform lives by building a free and inclusive covenantal religious community of spirit, service, justice and love. The collective vision of the Eno River Unitarian Universalist Fellowship is stated as the Ends it intends to achieve. These Ends were taken from multiple sources, including a congregational Appreciative Inquiry process; they were adopted by the Board of Trustees in May 2008.

Current Ends Statements

- The people of ERUUF are engaged in a deeply meaningful, transformative liberal religious experience.
- The people of ERUUF create and sustain a community of care, mutual respect, inclusiveness and love.
- The people of ERUUF reach beyond their congregation, individually and collectively, as they live out Unitarian Universalist values.

Green Sanctuary Committee

Presently, our Green Sanctuary (GS) Team is a working group of our Earth Justice Action Group within ERUUF's Justice Ministry.

The mission of the Earth Justice Action Group is to transform the ERUUF community to fully engage in addressing the climate crisis as a moral issue that is inextricably linked to our commitment to work for justice, equity, inclusion. We seek to build awareness and knowledge of our material and spiritual interconnectedness, to initiate sound practices that benefit nature through projects and activities, and to direct congregants to efforts local-to-global that create a just, resilient, and sustainable world.

The purpose of the Green Sanctuary Team is to facilitate the successful completion of the UUA Green Sanctuary Accreditation process with the larger ERUUF community. The current members of the GS Working Group are Albert Hardy, Tom Fletcher, Kristie Mather, and Denise Frizzell. Albert Hardy and Denise Frizzell serve as the lead co-facilitators. All members of the GS Working Group are members of the congregational Earth Justice Action Group. In addition, Albert Hardy, Tom Fletcher, and Denise Frizzell are members of the Justice Ministry Council.

While the group members consider environmental issues as interconnected and interrelated, Albert has interest in climate mitigation and resilience. Tom has a particular interest in renewable energy, sustainable farming, and adult education. Kristie has a particular interest in youth education, sustainable living and political action. Denise has a particular interest in sustainable living and sustainability solutions (e.g., renewable energy; humane, organic & local food systems, green buildings, electric vehicles, transportation systems, etc.)

UU Identity and Spirituality

Our Green Sanctuary Team and congregation ground our GS accreditation efforts and our Earth Justice work overall in our UU Identity and Spirituality which is informed and inspired by our UU Seven Principles, particularly our 1st, 2nd, 6th, and 7th Principles,

- 1st Principle: The inherent worth and dignity of every person;
- 2nd Principle: Justice, equity and compassion in human relations;
- 6th Principle: The goal of world community with peace, liberty, and justice for all;
- 7th Principle: Respect for the interdependent web of all existence of which we are a part.

We ground our work in our UU Principles by consistently explicitly reaffirming them in our individual, group, and congregational work as the source of our inspiration for and commitment to the work of environmental justice and ecological sustainability.

Environmental Assessment 3 Parts

Our environmental assessment included three parts as required, a professional energy audit, a congregational assessment, and an environmental justice assessment.

Professional Energy Audit

Our professional energy audit was completed by John Seymour, Retired Environmental Engineer II and volunteer for NC Interfaith Power and Light in May 2018. The audit findings are covered in a 19-page report including the following (see Appendix A for full report):

The church staff and volunteers water the landscaping of the ERUUF grounds by hand held hoses. A comparison of water bills from one month to the same month the year before shows a sizable water use reduction. As there were no leaks reported over the last two years, it may be the hand watering in the last several months was done with more thrift and less waste than the hand watering done the same months the previous year. Church staff may want to regularly check to make sure water hoses are not left accidentally running during watering season.

The ERUUF electronic church sign, on Garrett Road, was not discussed. It is not clear if the lighting on the sign dims at night or even shuts off in the early hours of the morning. It is evident that being on 24 hours a day (Note: ERUUF Director of Administration, Daniel Trollinger confirmed that the sign is not on 24/7), the sign uses a lot of electricity. The church staff may want to check or calculate how much electricity the sign uses, especially the fan system cooling the electronics in the hot weather. The ERUUF road sign, and message board, serve as a powerful tool and purpose for the Church. Having an idea of how much it costs to run the sign can be helpful in deciding how to operate the sign.

The Care Building, Noted Items

On the corner on the preschool level of the Care Building there is a closed off (solid plate cover) electrical plug box hanging off the wall by its wires. Sometimes when an outlet or switch is ‘closed off’ with a solid plate someone may have twisted the two wires together which is like leaving a light on 24 hours a day. The church will make sure there is no electricity going through this or other closed off outlets or switches.

The janitor's closet in the preschool area has a large number of chlorine jugs, a number of ammonia containers, and what appeared to be other containers for cleaners and painting chemicals. Storage, and commingling of these jugs and bottles as well as whether the plastic shelving was holding the weight are a concern. Accidental mixing of these chemicals could be a danger to the pre-school.

Staff in the preschool office should be sure to make a regular practice of turning all office machines and computers off at the end of the day.

The preschool sets its thermostat AC settings a little on the cool side. If energy is used for something that is needed, then it is not waste. But, as a “rule of thumb” for every thermostat degree setting saved, up in summer and down in winter, you can save as much as 3%.

A few of the outside upstairs and downstairs doors have gaps around them. One upstairs door to the deck is difficult to close (or cannot be closed). Door weatherization kits were recommended

The two outside HVAC condenser units for the Care Building appear to be in good condition but need their coils cleaned soon. The pipe insulation on fluid lines to and from both of these condenser units are in reasonable shape but may need to be replaced in the next few years. The Care Building has large rectangular attic vents, to help cool and ventilate the attic. Effective attic ventilation can save HVAC costs, as heat bleeds down from the attic space into the living areas of the building. The Church may want to check on how hot the attic typically gets to see if more ventilation is needed and/or the attic screens may need cleaning.

Fellowship Hall Building Noted items

The outdoor condenser unit for the kitchen HVAC system has dirty coils and should be cleaned as soon as feasible. Buildup from dirt, dust, pollen, and diesel exhaust particle as little as two-human hairs thickness on these coils can cost 10% to 30% of the heat transfer efficiency. Which adds more system operating time, creating more costs, for the same amount of air cooling. The pipe insulation between the building and the unit appears to be in reasonable shape but may need to be replaced soon.

The insulation on the copper piping between the building and the kitchen condenser units may need to be replaced soon.

The Fellowship Hall kitchen thermostat is right above where the coffee makers are stored and operated. Computers, coffee pots, copiers or other heat making items should not be located near a thermostat.

Doors in the Fellowship Hall building have gaps around them.

Sanctuary and Church Office Building Noted Items

The Sanctuary HVAC air handler system condenser coils need to be cleaned. The ductwork in the Sanctuary crawl space was not looked at to see if there are any condensate rust holes or loose insulation that could cost conditioned air to the sanctuary (or allow bugs and mold to get into the sanctuary).

The other condenser units (three for the offices and other rooms and the Mothers room unit) for the Sanctuary Building appear to be in good condition but need their coils cleaned soon after pollen season. The pipe insulation on fluid lines to and from all four of these condenser units need to be replaced.

Signs above light switches, notices on educational boards, instructions on how to report leaks, or instructions on the Church's thermostat policy can help members and guests know how they can help the Church conserve energy.

Congregational Assessment

For the past 10 years, ERUUF members and friends have completed an annual survey known as the Pulse of the Congregation, administered by the Committee on Evaluation of Ministry. The survey includes closed-ended questions that ask respondents to rate their experiences at ERUUF and the quality of ERUUF's activities.

These results are compared to results in previous years to identify trends over time. The survey also includes two open-ended questions that ask respondents to describe in their own words what is going well and what needs work. These open-ended responses are analyzed to identify themes. Additional questions may also be added that focus on specific areas of interest; in 2018, specific questions focused on Earth Justice and Green Sanctuary Accreditation were included. A total of 227 individuals responded to the survey in 2018.

Earth Justice Pulse Responses										
Q34. Please indicate the extent to which you agree with the following statements:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly disagree	
	Percent	#	Percent	#	Percent	#	Percent	#	Percent	#
I'd like to see more celebrations and worship services with earth-based and earth justice-based themes.	14.42%	31	34.88%	75	42.33%	91	7.44%	16	0.93%	2
I'd like more opportunities to learn what I and others can do to mitigate the impact of human activity on the environment	22.79%	49	49.77%	107	22.33%	48	5.12%	11	0.00%	0
ERUUF should do more to empower those who are affected by climate change and environmental disasters.	15.89%	34	38.32%	82	40.65%	87	4.21%	9	0.93%	2
ERUUF should do more to make our facilities environmentally sustainable.	29.77%	64	46.05%	99	21.86%	47	2.33%	5	0.00%	0

The top qualitative responses to the 2018 Pulse survey question, "How do you think ERUUF should respond in our congregation and community to climate change and environmental degradation?" were:

- Continue and complete Green Sanctuary Accreditation
- Lead by example within ERUUF campus and the larger community

Furthermore, the Green Sanctuary Team held three Congregational Engagement sessions in October-November 2017 to connect with the aspirations of fellow ERUUFians. Some of the themes that emerged from these sessions are as follows (see Appendix B for remaining themes):

Sustainable Living

- Theme 1: Invest in & support renewable energy & energy efficiency for ERUUF
- Theme 2: Reduce all waste---Strive for zero waste
- Theme 3: Support & advance alternative modes of transportation

Religious Education

- Theme 1: Provide RE on sustainable living: Food, agriculture, transportation, etc.
- Theme 2: Provide RE on waste reduction and zero waste
- Theme 3: More 7th Principle and ecology oriented RE programming to include experiential learning

Worship and Celebration

- Theme 1: More worship services, celebrations, and spiritual groups with 7th UU Principle and earth justice-oriented themes
- Theme 2: More art in sanctuary and music in worship services honoring Mother Earth/Our BlueBoat Home

Environmental Justice

- Theme 1: Work to end fracking and dirty energy
- Theme 2: Partner with existing organizations to advance environmental justice and decrease environmental injustice
- Theme 3: Engage in the democratic process for pro people, place, and planet policies

Religious Education Assessment

Youth RE

We assessed the degree our current curriculum contains nature and environmental based lessons as a primary or ancillary focus.

One of our K-1st curricula “World of Wonder” which is used for slightly less than half the year, focuses primarily on our Seventh Principle and about a third of the Environmental and Nature based lessons are delivered to this age group. The other grade levels have environmentalism and nature as a primary or ancillary focus to different degrees but are skewed towards more exposure in either form in the younger grades. Environmental Justice is discussed only in two lessons among the 228 total at ERUUF, fewer than 1%. Environment and Nature based lessons form 9% of the lessons, and when combined with lessons which include these topics in concert with others are 17% of the total.

In pre-K through 5th grade classes, the opening words mention our UU Seven Principles. Some years the Earth Day Service is intergenerational and designed to be accessible to children. This year, our Earth Justice team awarded our first ERUUF Earth Justice Youth Leader Scholarship

for one of our high school students to attend “The Redesigning our Future” an environmental summit in July at Catawba College. We intend to award this Scholarship annually.

Adult RE

Adult classes on a variety of topics are offered to our congregation. These courses are taught by congregation members based on their interests, thus availability varies from year to year. The Earth Justice Action Group recruits members to teach classes that are aligned with environmental justice and sustainability themes.

ERUUF’s Earth Justice team offers a monthly environmentally themed movie and plant-based potluck September - June (except for the month of December). Last Fall, the Earth Justice team sponsored a visit from Sarah Van Gelder, author and co-founder/editor of *Yes! Magazine*. She talked about her work at *Yes!* and her 2016 book, *The Revolution Where You Live*, which highlights what ordinary Americans are doing to transform their communities to address issues of climate, economic, and racial justice.

The Plant-Based ERUUFians group provides a main dish for the movie potlucks and presents an annual “Plant Based Eating” Week, with the goal of introducing people to the health and environmental benefits of a plant-based diet.

Twice a year, the ERUUF Parents group organizes an overnight multi-generational camping trip. These events are well attended and allow our children (and adults) to enjoy the natural world and build an appreciation for our interconnectedness with all of life.

Lastly, the top qualitative response to the 2018 Pulse survey question, “How do you think ERUUF should respond in our congregation and community to climate change and environmental degradation as it relates to RE?” was the following:

- Continue to increase awareness of the issues and solutions for justice and sustainability through regular and ongoing adult and youth educational programs geared to ERUUFians and the larger community.

Worship & Celebration Assessment

Our Worship and Celebration assessment primarily consisted of holding a series of meetings with our lead minister and centered on the three questions below:

Question 1: How are environmental awareness and Earth wisdom integrated into Sunday worship? (Consider sermon topics, music, readings, meditations, and so on.)

- Since 2016 we’ve celebrated an Earth Day service designed collaboratively by one of our ministers and members of our Earth Justice Action Group around themes of environmental awareness and Earth wisdom with related music, readings and meditations.
- April 22, 2018: Church of What We Know—Peter Mayer, sermon and music
- April 23, 2017: Fourteen Billion Years of Love and Beauty
- April 24, 2016: Restoring Relationships, Rebuilding the World

- On October 8, 2017, we celebrated an Indigenous Peoples Day service designed by members of ERUUF Covenant of Unitarian Universalist Pagans (CUUPs) and our Earth Justice Action Group together with one of our ministers. A key focus was concern over plans for an Atlantic Coast Pipeline (ACP). Tabling at coffee hour after the services provided postcards for people to complete and send to government officials asking them not to support the ACP.
- A service in August or September—often the ingathering service--traditionally includes a water ritual, and themes in the service often touch on Earth wisdom.
- On other occasions, not related to particular days or with any planned frequency, ministers have included worship themes, readings, meditations or music related to environmental awareness or Earth wisdom.

Question 2: What alternative and seasonal worship programs - such as solstice and equinox celebrations - does your congregation regularly provide?

- For many years ERUUF has held an intergenerational Winter Solstice celebration

Question 3: What other worship or spiritual practices have been used to deepen your connections with “the interdependent web of all existence”? (Examples: weekly or monthly ecospirituality vespers, or a covenant group with a deep ecology theme.)

- None identified

Furthermore, the top qualitative response to the 2018 Pulse survey question, “How do you think ERUUF should respond in our congregation and community to climate change and environmental degradation as it relates to Worship & Celebration?” was:

- Give more attention to our natural environment and planet as a spiritual matter in and through diverse perspectives or views (e.g., science, evolutionary spirituality, 7th Principle, Creation Care, Native American spirituality, Earth-centered traditions).

Sustainable Living

Our sustainable living audit was part of our professional energy audit which included recycling, office and cleaning supplies, water use, and energy use (see Appendix for full report). In addition, **the top qualitative response to the 2018 Pulse survey question**, “How do you think ERUUF should respond in our congregation and community to climate change and environmental degradation as it relates to Sustainable Living?” were as follows:

- Invest in renewable/solar energy generation.
- Reduce waste and increase recycling and composting efforts.

Environmental Justice Assessment

Our Environmental Justice assessment included an examination of past and current environmental justice efforts undertaken by Justice Ministry action groups in addition to Earth Justice. Three groups conducted projects related to environmental justice either directly or indirectly: Homeless Action Group, and the Refugee and Immigrant Action Group.

The Homeless Action Group has been a partner with the Homeless Shelter operated by Urban Ministries in downtown Durham for many years. Much of this effort has involved Food Justice. ERUUFians organize and operate food pickup at Food Lion stores, to the shelter kitchen and pantry. Members also prepare and serve meals on a monthly basis. This is one of the longest running action groups and continues to have wide participation among ERUUFians.

The work of the ERUUF Refugee and Immigrant Justice Action Group add a global dimension to the issue of environmental justice. The Refugee & Immigrant Action Group supports people in our communities who may well have been forced to leave their homes as a result of complex causes that include environmental degradation or climate change. Many refugee problems have at their core some environmental issues, although the immediate precipitating factors causing people to flee are persecution, violence or war. For example, in Sudan, competition for dwindling good land has forced people to migrate into areas where tribal conflicts were inevitable. A similar story is found in Syria, where severe drought has forced many into urban areas, exacerbating challenges. In Yemen, scarce water supplies are behind many local conflicts which have been magnified by outside forces. In many countries like Bangladesh and Maldives, sea level rise imperils communities and causes people to flee. So, in those and similar cases, the immigrant and refugee problems that are sweeping the globe now can be said to be correlated with underlying environmental causes.

The Refugee & Immigrant Action Group does not now offer any programs here that are directly focused on environmental issues, although their projects may occasionally involve food and nutrition. For example, the Global Women's Support group led by an ERUUFian, Irene Felsman, partnered with the ERUUF Community Edible Landscape Program on a small home garden project of a couple of years ago. It is also worth noting that refugees often come from an agricultural background and once they are settled here they grow gardens, often with plants from their home cultures. This information opens up the possibilities for mutual benefit and learning among interacting groups. Relatedly, led by ERUUF member and minister, Nathan Hollister, Sacred Fire (a community-based congregation) has worked with refugee immigrant groups and Farmer Foodshare to organize distribution of locally grown food in Carrboro and Chapel Hill.

Efforts of the Earth Justice Action Group related to environmental justice have been primarily focused on awareness building and education. Earth Justice has offered a series of environmental and climate change related courses and films, some of which offer a justice lens on these issues e.g., the Northwest Earth Institute course "Seeing Systems: Peace, Justice & Sustainability" and film *Fierce Green Fire*). Members of ERUUF Earth Justice helped plan and have participated in the North Carolina Climate Justice Summit over the last three years. Two of our members had the honor of representing the UUA as observers at the UN Climate Summits in Paris and Marrakech, where they met members of frontline communities, learned their stories, and what they are doing to mitigate and adapt to climate change.

The top qualitative responses to the 2018 Pulse survey question, "How do you think ERUUF should respond in our congregation and community to climate change and environmental degradation as it relates to Earth Justice?" were:

- Partner with other groups at local, state, national, and international levels

- Engage in political action

ERUUF Proposed Action Plan

Environmental Justice Projects

➤ Project Title I: Focus on Energy

Project Description: Join a partnership with NC WARN on their project, Clean Path 2025 Plan. This plan involves directing energy conservation and solar power conversion to toward marginalized communities in Durham.

Timeline for Completion: June 2021 (We will continue our partnership with NC WARN on this important endeavor but would like to complete our accreditation work by June 2021)

Outcomes:

- Reduce the energy bills of economically marginalized members of Durham, NC while providing opportunities for local green jobs and helping the City of Durham meet its greenhouse gas emission reduction goals by:
 - Engaging at least 10 ERUUFians as active members of the NC WARN community partnership that contribute to a project or projects that involve:
 - Conserving or converting energy production to renewable solar electrical power
 - Creating financing options for local solar power, battery storage, and efficiency upgrades that allow everyone to benefit without financial burden
 - creating well paying, safe jobs in the green economy with a focus on hiring local community members

Project I Lead: Tom Fletcher with Earth Justice

➤ Project Title II: Focus on Food

Project Description: Combine resources of the Plant-based ERUUFians Group, Refugee & Immigrant Rights Action Group, Homeless Action Group, and our Community Edible Landscape Project (CELP) to initiate a comprehensive food-oriented program from production to distribution to consumption to disposal that is mutually beneficial while also taking advantage of each group's strengths related to health and nutrition, equity, cultural inclusion, and sustainability.

Timeline for Completion: June 2021

Outcomes:

- Increased access to locally and organically grown produce by populations that typically have limited access to such quality food by:
 - Growing, collecting, and distributing two hundred (200) lbs. of fresh food annually in the community garden and other members' gardens to be distributed to the Urban Ministries shelter kitchen.
 - Collectively preparing six healthy meals at Urban Ministries using fresh and nutritious foods.
 - Collectively hosting four community potlucks involving fresh, whole-food, plant-based, culturally diverse foods.

Project II Lead: Tom Fletcher with Earth Justice

Religious Education Projects

➤ **Project Title I:** Greening the Youth RE Curriculum

Project Description: Work with the RE Curriculum Team in their evaluation of the youth RE curriculum with a goal that our 7th Principle appear in a prominent role at least four of the lessons each year at all age levels. Currently, the youth exposure to environmentally focused lessons is concentrated in the K-1 curriculum. Children whose families join our Fellowship at older ages miss this curriculum. In some cases, this will mean supplementing existing curriculum and in others writing entirely new lessons. These lessons will involve experiential learning and be outdoors when possible. We are fortunate to be situated on land with a small forested area and have a community garden on campus and we will utilize these resources.

Timeline for Completion: 2021

Outcome: Our UU Seventh Principle prominently appear in at least four of the RE lessons every year at all age levels.

Project I Lead: Kristie Mather with Earth Justice

➤ **Project Title II:** Climate Justice Month Participation

Project Description: Participate in Climate Justice Month (CJM) in April of each year to educate our adult congregants on ways that they as individuals can live more sustainably and in greater harmony with the interdependent web of life. Since 2015, the UUMFE has provided annual material and resources for CJM. We will use these, as well as other resources,

incorporating local farms, nonprofits, and businesses as much as possible. Our 2018 Pulse survey results indicated an interest in adult education on sustainability and environmental justice.

Timeline for Completion: 2019 and on-going

Outcome: For an increasing number of ERUUFians to actively choose to live more sustainably and harmoniously with our interdependent web through practical actions such as driving more fuel- efficient vehicles, eating less meat and more plant-based diets, investing in renewable energy, etc. However, assessing this outcome is difficult. Thus, we will initially focus on outputs while we explore possible ways to capture the outcome or impact of this project. Every year during Climate Justice Month, we will offer at least two activities and touch at least 200 ERUUFians with climate justice and sustainable living messages and support.

Project II Leads: Betsy Bickel and Jonathan Sheline with Earth Justice

➤ **Project Title III:** RE Youth Engaging in Environmental Justice

Project Description: (Environmental Justice): South Eastern Efforts Developing Sustainable Spaces (SEEDS) is a local non-profit with a mission of developing the capacity of young people to respect life, the earth, and each other through growing, cooking, and sharing food. Its physical facilities include a two-acre urban garden and kitchen classroom in the heart of Durham. They provide food to homeless shelters, work with urban lower-income communities to plant community gardens and offer programs for at-risk youth. We will explore a partnership with SEEDS to introduce our youth to an environmental justice issue in our community, and how we can play a role in change. Our 2018 Pulse survey results showed strong congregational interest in and support of environmental justice activities.

Timeline for Completion: 2021

Outcome:

- To increase awareness of our children and youth that the environmental crisis affects marginalized groups earlier and more deeply by creating a program with SEEDS that will become a permanent part of RE at ERUUF, enabling all our children and youth at some point to experience a hands-on environmental justice activity.

Project III Lead: Kristie Mather with Earth Justice

Worship & Celebration Projects

➤ **Project I Title:** Focus in Sunday worship on our natural environment and planet as spiritual and moral issues.

Project I Description: Give conscious intent to designing worship services with a regular once per month focus on environmental themes and Earth wisdom. Worship services may be informed by diverse views/approaches such as evolutionary spirituality, 7th Principle, Creation Care,

ecospirituality, quantum physics, deep ecology, Native American spirituality, Earth-centered traditions, etc.

Address the climate crisis and environmental degradation as moral and spiritual crises. We will also explore the intersectionality of earth justice, racial justice, and economic justice with the intentions of creating a sacred space where congregants can connect in authentic ways to the spiritual and ethical meanings of our 7th Principle as well as express feelings of grief about the climate crisis while finding hope and care for one other in community.

Project I Timeline for Completion: Beginning in congregational year 2018-19 and ongoing

Outcomes:

- For a growing number of ERUUFians to see and relate to our climate crisis and environmental degradation as moral and spiritual crises.
- To create a sacred space where congregants can connect in authentic ways to the deep meaning and implications of our 7th Principle as well as express feelings of grief about the climate crisis while finding hope and care for one other in community.

We will do accomplish these outcomes by:

- Holding Four services per year (possibly February, April, July and October) that are fully Earth/Environment oriented.
- In eight additional services (possibly Solstices, Equinoxes, and cross-quarter days), we will use Opening Words, Prayer and Music that connect us to our sacred and interdependent relationship to nature, animal life, and our planetary home, Gaia.
- Creating at least two curated rituals involving Earth themes inspired by other traditions and perspectives that are authentic to us and that we draw on more often

Project I Lead: Rev. Deborah Cayer, Rev. Jacqueline Brett, and Cheryl Turney with Earth Justice

➤ **Project II Title:** Environmental Justice Sunday (EJS)

Project II Description: Designate one of the four Sundays when services are fully focused on earth/environmental themes, as “Environmental Justice Sunday” and focus on the intersectionality of racial, economic, and environmental justice. This service will address the climate crisis and environmental degradation as moral and spiritual crises. Service participants may include members and youth participating in Environmental Justice and other Justice projects at ERUUF. EJS may also include tabling at coffee hour after services so folks can sign up for the various Environmental Justice projects that are part of the Green Sanctuary Action Plan. In addition to the services, we may provide other activities for between and after services such as intergenerational activities, a guest speaker, or a plant-based potluck.

Project II Timeline for Completion: Congregational year 2018-19 and ongoing

Project II Outcome:

- Increased recognition in the congregation of the intersectionality of environmental justice, the climate justice, racial justice and economic justice.
- Increased congregational participation in the Justice Ministry with Action Groups that work to address one or more of these areas while appreciating the interrelatedness of the issues and cooperating with other Actions Groups when able.

Project II Lead: Rev. Jacqueline Brett, Rev. Deborah Cayer, and Cheryl Turney with Earth Justice

- **Project III Title:** Congregational “Common Read” with an Earth/Environmental Justice theme

Project III Description: The GS team works with the Earth Justice Worship & Celebration team and Rev. Deborah Cayer and/or Rev. Jacqueline Brett to select a common read and coordinate with small group discussions. The ministers may include themes and readings from the book into worship services.

Project III Timeline for Completion: Congregational year 2018-19 and ongoing

Outcomes:

- Increased recognition of and action to address the intersectionality of environmental justice, climate justice, racial justice, economic justice by having approx. 125 people participate in the GS Common Read by December 2021.

Project III Lead: Rev. Jacqueline Brett and Cheryl Turney with Earth Justice.

Sustainable Living Projects

- **Project I Title:** High Efficiency HVAC Installation and Retrofitting

Project I Description: Replace two of the 10 existing HVAC systems on campus purchased around 1990 for the Fellowship Hall Building with 2018 Tranes XR 32 AMPS high efficiency units with 14.0-15.0 SEERS and 8.2-9.0 HERs ratings. In addition, when any of the remaining systems fail (varying purchase-installation dates that range from 1999-2016), units will be replaced with high efficiency systems (SEER rating > 15.0/HER > 8.0). Furthermore, using the findings of the May 2018 NCIP Energy Audit and possibly additional energy audit data, we will identify and correct the worst cases of energy loss/leakage across the campus while prioritizing the CARE Building, the most utilized building on campus.

Timeline for Completion: December 2018

Outcome: Reduced carbon footprint/energy consumption with projected annual energy savings of approximately \$750 (annual utility expense approx. \$28,000).

Project I Lead: Peter Romeyn; Albert Hardy with Earth Justice

- **Project II Title:** Project Conserve: Installation of LED Lighting, Motion Sensor Lighting, and “Flip the Switch” Messaging Campaign

Project II Description: Replace existing fluorescent lighting with LED lights throughout the ERUUF campus to include the CARE Building, the administrative offices, and the Music Room, located in the Sanctuary Building, and the Fellowship Hall kitchen. In addition, install motion sensor lights in bathrooms where they are not yet installed (6 total). Furthermore, the Project Conserve Project Team will work with the Campus Sign Committee to select readily visible, aesthetically appealing and modest signage to install throughout the CARE Building rooms gently reminding users to “Please help protect our planetary home: Flip this switch when room is vacant.”

Timeline for Completion: February 28, 2019

Outcome: Reduced carbon footprint/energy consumption and projected energy savings of approximately annually \$1,000.

Project II Lead: Peter Romeyn; Albert Hardy with Earth Justice

- **Project III Title:** Comprehensive Integrated Waste Management Initiative

Project III Description: Complete a comprehensive waste management audit of all existing waste management practices to include trash, recycling, and composting. Identify and act on at least three actions to reduce waste and save resources.

Timeline for Completion: June 30, 2019

Outcomes:

- Develop and implement a comprehensive integrated waste management program that includes ongoing education and results in a reduction of waste by 20% by December 2021.

Project III Lead: Betsy Bickel with Earth Justice

- **Project IV Title:** ERUUF Solar 2021

Project IV Description: Engage in a comprehensive process to identify the best possible option for ERUUF to generate at least 20% of its energy consumption from solar energy technology by December 30, 2021. The best possible option will be determined by a multiphase triple bottom line analysis that thoroughly addresses the social, environmental, and economic factors of the

project. A final report along with recommendations will be presented to the Coordinating Team for approval. During this time, the ERUUF Solar 2021 Team Project Team will also seek to identify and recommend other potential opportunities to support the transition to our clean energy future such as community solar projects.

Timeline for Completion: December 30, 2021

Outcome: ERUUF decreasing its carbon footprint and contributing to the transition to a clean energy future by generating at least 20% of energy consumption from solar energy technology.

Project IV Lead: Denise Frizzell with Earth Justice

Communications Plan

The Green Sanctuary Communications Plan includes the ongoing use of a variety of ERUUF communication channels such as the weekly Friday E-News, Sunday Order of Service bulletins, the monthly ERUUF newsletter, ERUUF member Google Groups, the ERUUF website, coffee hour tabling, social media, and periodic announcements and updates at worship and other ERUUF events.

As we move into Action Plan implementation and invite participation in our activities and events, we will continue to utilize these same channels. In addition, we intend to create a large poster board of our Action Plan and update it as milestones are reached and projects completed.

We will display the Action Plan poster at coffee hour and other ERUUF events. Furthermore, our Solar 2021 Project will require additional communications as it is one of the more complex projects of our GS Action Plan given the multiple variables and number of internal stakeholders. Consequently, we may complement overall GS communications with designated ERUUF Solar 2021 Project congregational meetings.

In addition, we will continue to engage and collaborate with our community partners directly related to our GS Action Plan in and through ongoing meeting attendance, phone conversations, email exchange, newsletters, etc.

Application Instructions

Using this format, submit your electronic application to uua_greensanctuary@uua.org.

There is a one-time \$100.00 application fee. Please submit by check or money order, made payable to "UUA". Mail to: 24 Farnsworth St.; Attn: Finance Department; Boston, MA 02210.

IMPORTANT: clearly indicate it is your Green Sanctuary application fee and include your congregation's full name, city, and state.

For additional information and advice for preparing your application, feel free to contact Rev. Karen Brammer via email at kbrammer@uua.org or by phone at 603.380.1603.

Appendix
Appendix A
Full Energy Audit Report



North Carolina Interfaith Power & Light
a program of the NC Council of Churches
www.ncipl.org • info@ncipl.org

27 Horne Street
Raleigh, NC 27607
(919) 828-6501

July 3, 2018

Mr. Peter Romeyn
Eno River Unitarian Universalist Fellowship
4907 Garrett Road
Durham, North Carolina 27707

Dear Mr. Romeyn

Through the North Carolina Interfaith Power & Light Program, a part of the NC Council of Churches, I was invited to come Eno River Unitarian Universalist Fellowship, on May 31, 2018, and do a free energy savings review of your church buildings. We started with a discussion that included how ERUUF is working on achieving a Green Certification for Churches, how two large church energy savings projects will be starting soon, and a number of no-cost and low cost things energy savings items not easily seen during a walk-through of a building. We also discussed how the Church addressed energy savings items pointed out in the report from a similar ERUUF energy review performed in November of 2008. Then we did a walk-through of the Care Building, the Fellowship Building and the Sanctuary (and church office) Building to see how energy and water are being used. Often energy and water saving items can be addressed by how people use the existing facilities in a building to save energy.

The information in this letter focuses on what no-cost and low-cost energy and water savings we noted during the walk through of your building on May 31, 2018. It is good you, and other Church members present, were taking notes during the presentation and walk through, so they will be familiar with the locations of the energy items in this report letter. The format of this report is a little different from the November 2008 report so that you will have a more direct listing of the main energy items found during this energy review visit.

I am impressed with the energy savings projects ERUUF is already working on, and how the Church is looking at future energy and pollution savings projects. Like yourself, everyone I

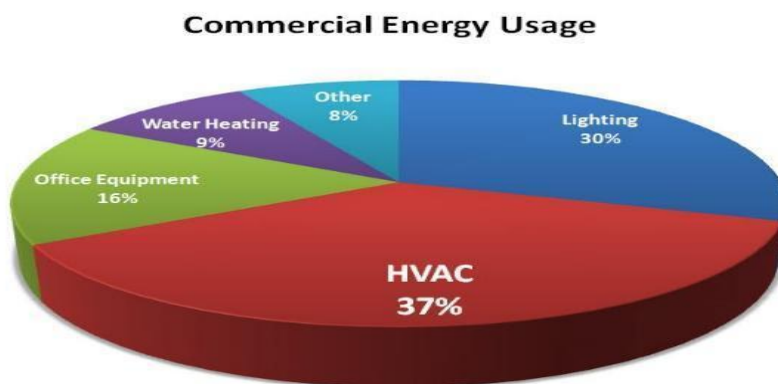
talked to at ERUUF was helpful and knowledgeable on how and where energy is being used in the different buildings. It is clear the members of ERUUF supports the call to care for creation with actions. The Church is getting a great head start in its Green Certification of Churches goal, with the Fellowship Hall HVAC upgrade and the Lighting upgrades for all the church buildings and this energy assessment.

The nation's estimated 370,000 houses of worship spend more than \$3 billion on energy each year. For Example: If America's houses of worship cut energy use by 10 percent through wise management:

- About \$315 million would be saved for congregations' missions and other priorities.
- Nearly 2 billion kWh of electricity would be available without additional cost and pollution.
- About 1 million tons of greenhouse gas emissions would be prevented.

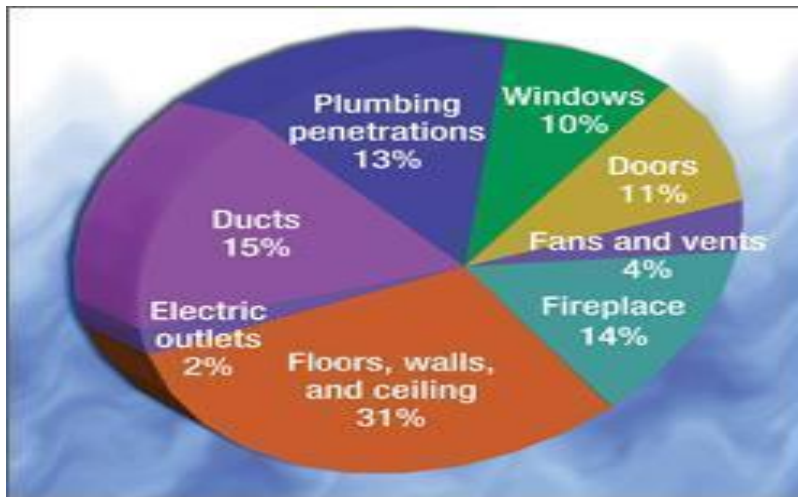
To help, NC IP&L wants to help houses of worship improve their energy performance and reduce their environmental impacts while reducing energy costs.

Looking at public buildings in general, there have been studies on where the majority of energy is used, and their potential for being lost or used inefficiently. The pie chart below shows in a very broad way, where energy is used in a typical commercial building. Each type of building will use energy in different ways, and the different buildings found on the ERUUF property will not use energy the same as an office building, but the Church buildings will have a similar energy usage. This chart gives us a broad visual. The two largest energy cost components of the Church buildings, that use energy, are lighting and HVAC.



Energy Loss

Ideally, all the warm or cool air generated by the HVAC systems stays in the building, but in most houses of worship that is not the case. In an average building there are many potential areas where leaks allow heated or cooled air (conditioned air) to mix with the air on the outside and thus make the heating and cooling system work harder than needed and wasting energy and money. Some of the biggest losses are through the roof, walls and windows, otherwise referred to as the building envelope, and can be as much as 30 % in a building that is not well sealed or insulated. Leaks in the ductwork, through bathroom and kitchen fans, and in plumbing or electrical spaces are small, but can add up. The pie graph below gives a rough idea of where energy is lost in a commercial building.



The Report

Below, are the energy items we noted for each building, during the 3-hour energy review of the ERUUF buildings and grounds. In a second section, further below, are many small items we briefly noted and talked about during the energy review. While many of these items are small, and/or may only have a small potential savings, adding up many small no-cost and low-cost, easy-to-do items could equal a noticeably large energy cost savings. More importantly they can add up to noticeable pollution savings.

- It was discussed how, starting in June, ERUUF will begin a project for replacing the main HVAC units for the Fellowship Hall building. While the specific kind of replacement HVAC units were not discussed, the impression is this replacement project will save electricity and gas usage in the Fellowship Hall building for the Church. It is understood the Church is taking into account how the HVAC thermostats are placed, so as not to be affected by drafts, heat from machines, or not be so isolated they can't read the room properly. The discussion also referenced the Church providing proper thermostat instructions for folks using the Fellowship Hall. How well folks use the HVAC controls and settings are often the difference in successful energy savings. It was briefly referenced how the Church will be making sure the new HVAC condenser units outside will have the clearance to pull in air to dissipate the heat energy without the heated exhaust air being bounced back onto the condenser units. It is expected the Church will notice a large energy savings with the new HVAC system, when it is operating properly.
- It was reported that ERUUF is scheduled for LED lighting upgrade project, for August of this year. The project was briefly discussed but not studied for its details. The lighting improvement project, for all three of its buildings, is part of a lighting efficiency program through Duke Progress Energy. Discussion of this project in this letter report in no way questions the understanding the Church has with the projects lighting contractor. In General, church lighting can be as much as 25% or more of a Church's electric bills. The anticipated savings will likely be very noticeable on the three electric bills the Church receives from Duke Power. The Church may want to make sure the Duke Progress Energy billing office knows about the massive lighting upgrade and ask about any

adjustment needed to the Church's Rate Schedules for the three buildings. Duke Power Rate Schedules usually have penalties added to a utility bill when a building doesn't meet the listed minimum usage level on its Rate Schedule.

- It was not clear if the lighting upgrade contractor or the Church would be disposing of the old fixtures and fluorescent tubes. The Church may want to make sure the old fluorescent tubes and ballasts are safely disposed, for both human health and the protection of the environment. Older fluorescent tubes contain measurable amounts of mercury and other gasses. A County Landfill is not likely to accept large numbers of fluorescent tubes from an institution, and commercial disposal company would be expensive.
- It was briefly mentioned how the Church may do a self-commissioning at the end of the lighting upgrade project to make sure all the lights work and no fixtures were missed or taken out but not replaced, and no other equipment or outlets were affected. It was mentioned the church will monitor the electric bills to note and measure the lower utility bills the lighting upgrade project promises.
- It was noted the church staff and volunteers water the landscaping of the ERUUF grounds by hand held hoses. A comparison of water bills from one month to the same month the year before shows a sizable water use reduction. As there were no leaks reported over the last two years, it maybe the hand watering in the last several months was done with more thrift and less waste than the hand watering done the same months the previous year. Church staff may want to regularly check to make sure water hoses are not left accidentally running during watering season.
- The ERUUF electronic church sign, on Garrett Road, was not discussed. It is not clear if the lighting on the sign dims at night or even shuts off in the early hours of the morning. It is evident that being on 24 hours a day, the sign uses a lot of electricity. The church staff may want to check or calculate how much electricity the sign uses, especially the fan system cooling the electronics in the hot weather. The ERUUF road sign, and message board, serve as a powerful tool and purpose for the Church. Having an idea of how much it costs to run the sign can be helpful in deciding how to operate the sign.

The Care Building, noted items

- In the Care Building, it was noted and discussed that many of the Care Building restrooms have a heater switch, for electric heat, as well as a fan switch for the restroom. Like a space heater, if these restroom heaters are left on when not needed they can waste a lot of electricity. It is understood the church regularly checks the Care Building to make sure lights and other energy using items, such as restroom fans and heaters, are turned off. This could explain some of how a comparison of the electric bills for the Care Building shows a decrease of electric use over the past several months.
- It was noted the Care Building has individual HVAC wall units for rooms in half the building and two HVAC systems for the other half of the building. It was stated the

Church regularly changes, or cleans, the air filters for all these units. This is a very positive and cost saving practice as dirty air filters can slow down the airflow forcing the units work longer and harder to condition the same amount of air.

- It was noted outside, on the lower corner on the preschool level, of the Care Building there appears to be a closed off (solid plate cover) electrical plug box hanging off the wall by its wires. It is not known if these wires are live. We discussed it and Mr. Romeyn took a picture of it as a reference for getting it repaired. It was then mentioned how sometimes when an outlet or switch is ‘closed off’, with a solid plate, someone may have twisted the two wires together. In such a case it would be like leaving a light on 24 hours a day. The church may want to make sure there is no electricity going through this or other closed off outlets or switches.
- In the Care Building, it was noted the janitor’s closet in the preschool area has a large number of chlorine jugs, a number of ammonia containers, and what appeared to be other containers for cleaners and painting chemicals. I am concerned with how these jugs and bottles were stored, pushed and mixed in together, and questioned how some of the plastic shelving was holding the weight. It was discussed how an accidental mixing of these chemicals could be a danger to the pre-school. It is understood the Church has had discussions about this before and will look at this the issue again.
- I was noted in the preschool office there were office machines and computers still left on. But it appeared there were some Preschool staff present. So, it is not known if the Staff makes a regular practice of turning everything off at the end of the day. Many types of office equipment will still use a noticeable amount of electricity in standby and sleep modes.
- It was stated the preschool sets its thermostat AC settings a little on the cool side. If energy is used for something that is needed then it is not waste. But, as a “rule of thumb” for every thermostat degree setting saved, up in summer and down in winter, you can save as much as 3%.
- The HVAC air handler units in the crawl space of the Care Building were viewed from a short distance. The ducts and the condensate pan appeared to be working well with no holes seen. Rust creating holes, from condensate being trapped in the ducts, can waste a lot of conditioned air escaping into the crawl space. The Church’s HVAC maintenance contractor (or someone else) could check for condensate or rust holes, every few years. Often rust holes can be detected by using infrared camera, temperature gun, or feeling for air escaping out from under the duct insulation.
- In the upstairs mechanical room, the HVAC unit appeared to be well maintained. It was not clear how the return air from inside the upstairs part of the building gets back to the mechanical room to this unit. The church may want to check to make sure the ducts for this upstairs unit do not have condensate trapped or air leaks as well.

- It was noted, in the Care Building, how one of the EXIT signs upstairs was out. It was not known if EXIT signs are part of the Church's Duke Energy light replacement project. EXIT signs operate 24 hours per day and can consume noticeable amounts of energy to operate. Older EXIT signs use incandescent bulbs or small fluorescent tubes or compact fluorescent lighting (CFL) technology and also require frequent maintenance due to the short life span incandescent bulbs and fluorescent tubes. For example, some older exit signs could consume over 350 kilowatt-hours (kWh)/yr. and costs approximately \$30 each annually to operate. Exit signs using light emitting diodes (LEDs) can operate typically for just \$4 or \$6 a year. Replacing old exit signs with more energy efficient signs, like LED's, have been known to pay for themselves in a matter of months. *(As a general note, all existing ERUUF building EXIT lights will be replaced during the scheduled LED lighting upgrade project in August.)*
- In the upstairs offices of the Care Building it was noticed how many of the office machines were turned off at the desks of the staff that were not there, - there was one staff person working at his desk. It was noted how the office copier room has no vents. It was discussed how the staff keeps the copier room doors open to keep that room cooler and ventilated. It was stated the copier room machines appear to be set on sleep mode and are turned off at the end of the day. Using sleep mode and turning off large machines at the end of the day saves a lot of kilowatt hours over the year.
- The upstairs kitchen of the Care Building appeared to have little energy usage. It was asked how much the range hood is used, because a hood left on can pull a lot of conditioned air out of a building, making it more expensive to recondition new air. It is understood the range hood is hardly used. The ventilation behind the refrigerator was asked about to see if there was enough air circulation to ventilate the refrigerator coils and cut down on the amount of time the refrigerator needs to run to cool the inside. It appears the refrigerator is the recommended three-inches from the wall. It was noted how other appliances were kept unplugged.
- In the Care building, it was noted that a few of the outside upstairs and downstairs doors, have gaps around them, as noted by the sunlight coming in. In fact, one upstairs door to the deck was discussed due to a problem with closing it. As a "rule of thumb", a quarter inch gap around a single outside door is the equal to a red brick missing from the outside wall, with conditioned air getting out and outside air coming in. There are door weatherization kits, at many hardware and lumber stores, which are easy to use, and often pay for themselves in a matter of weeks or months with the savings.
- The two outside HVAC condenser units for the Care Building appear to be in good condition but need their coils cleaned soon. It was noted the pipe insulation on fluid lines to and from both of these condenser units are in reasonable shape but may need to be replaced in the next few years. Typically, the black pipe insulation around these fluid lines, between the unit and the building, deteriorates very quickly in harsh outdoor

conditions. Often it is just a few years before this pipe insulation is noted as needing to be replaced. As an example, if the condenser unit is only cooling the fluids from the building about 10 degrees and the return line exposed to the hot sun loses one-degree, then that is a 10% loss in efficiency, meaning the unit has to run longer to do the same cooling.

- It was noted the Care Building has large rectangular attic vents, to help cool and ventilate the attic. Effective attic ventilation can save HVAC costs, as heat bleeds down from the attic space into the living areas of the building. The Church may want to check on how hot the attic typically gets to see if more ventilation is needed and/or the attic screens may need cleaning.

Fellowship Hall Building noted items

- With it understood the Church will soon be replacing the main HVAC units of the Fellowship Hall Building, attention was placed on the Fellowship Hall Kitchen HVAC system, located in the kitchen attic. Mr. Romeyn was the first to ask how often the air filter for the kitchen air handler is changed. It is understood the air filter is supposed to be changed every four months, but it was not clear who climbs up to the attic to do this. It was **not** noted how well the kitchen attic is ventilated. Air conditioning coils in a hot attic have to work much harder and longer, depending on the attic temperature, to cool the kitchen. Good ventilation can bring down the attic temperature closer to the outside temperature.
- The outdoor condenser unit for the kitchen HVAC system was noted as having dirty coils and should be cleaned as soon as feasible. Buildup from dirt, dust, pollen, and diesel exhaust particle as little as two-human hairs thickness on these coils can cost 10% to 30% of the heat transfer efficiency. Which adds more system operating time, creating more costs, for the same amount of air cooling. The pipe insulation between the building and the unit appears to be in reasonable shape but may need to be replaced soon. Typically, the black pipe insulation around these fluid lines, between the unit and the building, deteriorates very quickly in harsh outdoor conditions. Often it is just a few years before this pipe insulation is noted as needing to be replaced. As an example, if the condenser unit is only cooling the fluids from the building about 10 degrees and the return line exposed to the hot sun loses one-degree, then that is a 10% loss in efficiency, meaning the unit has to run longer to do the same cooling.
- It was observed the insulation on the copper piping between the building and the kitchen condenser units may need to be replaced soon. Typically, pipe insulation around the fluid lines between the unit and the building deteriorates very quickly in harsh outdoor conditions. Often it is just a few years before this pipe insulation is noted as needing to be replaced. If the condenser unit is only cooling the fluids from the building about 10 degrees and the return line exposed to the hot sun gains just one-degree, then that is a 10% loss in efficiency.

- It was noted the Fellowship Hall kitchen thermostat is right above where the coffee makers are stored and operated. Computers, coffee pots, copiers or other heat making items should not be located near a thermostat. Heat from a machine can confuse a thermostat and over chill the room it controls. It is a common problem for a thermostat to make an area uncomfortable because of a nearby heat source. For example, one summer in a state office building it was discovered that dozens of employees needed to wear sweaters at their desks because the break room coffee pot was stationed under the thermostat for their hallway.
- It was observed the Fellowship Hall Building has an ‘On-Demand’ hot water heater for its kitchen. This type of hot water unit can save a great deal of energy compared to storing large amounts of water kept hot 24 hours a day in a typical tank hot water heater. The church may save a lot on hot water heating, given the amount of time the kitchen is used every week.
- It is understood the Fellowship Hall restrooms are supplied hot water by a very small hot water heater in the closet, next to the restrooms. The lower the temperature setting for this hot water heater the more electricity the Church will save. As a rule of thumb, for every degree saved on a hot water heater setting as much as 3% of the energy can be saved.
- It was discussed how folks using the Church can report water leaks and drips. It was not clear if there is a formal system in place. One drip per second equals 2,100 gallons of water per year. Based on the City of Raleigh distribution rate of \$1.96 per 748 gallons, saving 2,100 gallons/year saves \$5.50 per year. Saving leaks totaling 18 drips per second can save around \$100 per year. The average drip size according to U.S. Geological Survey, or USGS, is 0.25 ml or one liter = 4,000 drips (see the USGS drip calculator at <http://ga.water.usgs.gov/edu/sc4.html>).
- It is understood the Fellowship Hall sound system is turned off when not in use. From the Church’s web site, and discussions, I admire how the church is able to help so many community groups and organizations with the meeting space they need. Sound systems left on when not needed can use a lot of energy in standby mode. It was noted how the church uses a garden hose reel system for rolling up the wire and power cord for the sound system, which is very original and may help preserve the usable life of the sound system wire and power cord.
- It was noted that a few of the outside doors, in the Fellowship Hall building, have gaps around them, as seen by the sunlight coming in around the door edges. As noted above, as a “rule of thumb”, a quarter inch gap around a single outside door is the equal to a red brick missing from the outside wall, with conditioned air getting out and outside air coming in. There are door weatherization kits, at many hardware and lumber stores, which are easy to use, and often pay for themselves in a matter of weeks or months with the savings.

- I was noted the Church rigged up a desk fan, in a wall vent, to the Fellowship Hall storage room for the tables and chairs, to keep it ventilated and dehumidified. While this a neat way of doing this, it was not clear if the church is planning a better way of venting this room when the new HVAC units are put in. The desk fan still used a measurable amount of energy compared to a passive vent or smaller ventilation fan designed for the purpose.

Sanctuary and Church Office Building noted items

- In the Church Office is was discussed how the receptionist desk uses a space heater, because of the discomfort from the vents above this desk. If the discomfort is just for the receptionist desk the offending vent could be restricted to a smaller air flow. The vent was not checked to see if it has a restriction lever, or if it can be easily restricted with a large piece of cardstock pressure side of the vent screen. If there are other desks in the office that folks feel they need a space heater, the Church may want to check to see if any dampers in the air ducts have fallen causing an unbalanced air flow to all the offices. Office space heaters typically use between one to three kilowatts per hour of electricity, depending on the type or brand. As an example - during an eight hour work day, a space heater may cost \$1.92 in electricity, at an average eight cents per kWh. If a heater is used for an average of 100 heating days a year, it could cost as much as \$192 per year.
- There was some discussion by office staff about the need for better lighting. It is understood the planned Church lighting upgrade project in August will address the office lighting needs of the pastors and staff. The pastors and staff should not hesitate to speak up while the lighting contractor is still present, If the new office lighting is not better for them.
- It was stated the Church office turns off the computers, printers and office equipment at the end of the work day. However, there is one computer that controls the Church's electronic road sign that stays on. Many desktop computers will run between 65 to 250 watts of electricity and most laptops use about 15 to 60 watts. A desktop computer left on 24 hours a day, with no sleep mode or energy saving settings, costs as much as \$172 a year and laptops cost up to \$42 a year, using an average of eight cents per kWh. Turning a computer off at the end of an eight hour work day can bring the cost down to around \$58 a year for desk tops and \$14 for laptops. Using sleep mode or energy saver settings during the work day adds to further savings.
- It was discussed how the office printer room was ventilated, and how there was a previous concern of heat, and gas from the ink setting, could build up. It is not known how much or what kind of ink exhaust is generated from printer use. The printer manual and the ink maker could be consulted to identify any issues. It was stated the staff report the printer room seems to stay comfortable and not heat up. Ventilation from the air conditioning and keeping the door to the room open seems to be working well.

- It was stated how the printer room machines are turned off and often unplugged when not in use. It is understood the Church's main printer/copier as well as other office desktop printers are set for sleep mode and turn off automatically after a time. Office equipment, large or small, often continue to draw small amounts of energy even when it is turned off, as "phantom energy", and over time can account for a noticeable part of the electric bill. For example, battery chargers left plugged in continue to use a few watts per day when not charging. Some inefficient office printers in standby mode will use as much as 60 percent of the energy, just keeping the ink setting roller hot.
- The electronics in the server/phone closet were checked to see if there is a buildup of heat. The thermometer indicated the closet was in a good temperature range to keep the electronics from overheating. It was surmised the openings around the closet doors are large enough for the hot air to vent out the top and new cooler room from the room to flow in under. Electronic equipment generates heat and the equipment fans will just rotate the hot air until temperatures get hot enough to breakdown the insulation on the electronic wiring, unless the hot air is vented or cooled in some way.
- It was noticed how the Sanctuary Building mechanical room is very clean and well organized. It is understood the air filters for the building are changed regularly. It was not discussed what temperature the large tank hot water heater in the mechanical room is set at. As stated above, the lower the temperature setting for this hot water heater the more electricity the Church will save. As a rule of thumb, for every degree saved on a hot water heater setting as much as 3% of the energy can be saved.
- It was noted, in the Music Room, how one of the EXIT signs was out. As stated above, it is not known if EXIT signs are part of the Church's Duke Energy light replacement project. EXIT signs operate 24 hours per day and can consume noticeable amounts of energy to operate. Older EXIT signs use incandescent bulbs or small fluorescent tubes or compact fluorescent lighting (CFL) technology and also require frequent maintenance due to the short life span incandescent bulbs and fluorescent tubes. For example, some older exit signs could consume over 350 kilowatt-hours (kWh)/yr. and costs as much as between \$30 to \$60 each annually to operate. Exit signs using light emitting diodes (LEDs) can operate typically for just \$4 or \$6 a year. Replacing old exit signs with more energy efficient signs, like LED's, have been known to pay for themselves in a matter of months. *(As a general note, all existing ERUUF building EXIT lights will be replaced during the scheduled LED lighting upgrade project in August.)*
- It was noted the restrooms in the Sanctuary Building have motion sensors on the light switches to allow the fans and the lights to turn off when the rooms are not in use. Lights left on and fans left pulling conditioned air out of the building can waste a lot of electricity.
- It was stated the Church recycles what it can. Recycling in North Carolina is a major industry creating many thousands of jobs, providing cost saving resources for many

industries, saving tax payers space in the landfills and helping the environment. In fiscal year 2009/2010, state government spent a reported average of \$58 a ton for waste collection and disposal fees. Recycling during the same period only cost about \$3 a ton.

- In the Sanctuary it was noticed how the HVAC air flow goes from the altar area up over the congregation to the air returns. The Sanctuary thermostat appears to be in good location and not easily heated by someone leaning against it or putting equipment near it. It was briefly discussed how the Sanctuary thermostat is set back on days when not in use, to save a lot of energy for a room this big. It is understood the air filter for the Sanctuary HVAC unit is changed regularly.
- The “mothers room” behind the glass wall at the back of the Sanctuary was not visited. It appears to have its own HVAC system. The HVAC air handler was not looked at to see if it has any issues such as air leaks, ductwork with condensate holes, or has to deal with heat in an unventilated space. It is not known if there is additional ventilation to add fresh air to this room as folks fill it with carbon dioxide they are breathing out. It is assumed this room is set back on days when not in use. It is not known if the thermostat in this room is influenced by air from the Narthex or air from the Sanctuary. It is not known where the
- Outside the Sanctuary HVAC air handler system was looked at. It was discussed how the condenser coils appeared to need cleaning and are likely to be cleaned right after the pollen season. The ductwork in the Sanctuary crawl space was not looked at to see if there are any condensate rust holes or loose insulation that could cost conditioned air to the sanctuary (or allow bugs and mold to get into the sanctuary). The replacement or fresh air intake for the Sanctuary HVAC unit appears to be unobstructed and dry. It is not discussed how much additional fresh air the HVAC unit is set to bring into the Sanctuary during services or events, when a large number of folks are breathing out carbon dioxide.
- The other condenser units (three for the offices and other rooms and the Mothers room unit) for the Sanctuary Building appear to be in good condition but need their coils cleaned soon after pollen season. It was noted the pipe insulation on fluid lines to and from all four of these condenser units need to be replaced. Typically, the black pipe insulation around these fluid lines, between the unit and the building, deteriorates very quickly in harsh outdoor conditions. Often it is just a few years before this pipe insulation is noted as needing to be replaced. As an example, if the condenser unit is only cooling the fluids from the building about 10 degrees and the return line exposed to the hot sun loses one-degree, then that is a 10% loss in efficiency, meaning the unit has to run longer to do the same cooling.
- It is understood lighting upgrade project, in August, will address lighting improvements in the Narthex. Discussion briefly included asking how often the narthex lights are turned off when there is more than enough light on a sunny day through the glass walls. There is

a lot of wattage being used by the many small lights in the Narthex of the Sanctuary building.

- Discussion during the closing meeting of the Energy Walkthrough of the ERUUF Buildings included how the church can help members and guests know how they can help the Church save costs. These ideas included signs above light switches, notices on educational boards, instructions on how to report leaks, or instructions on the Church's thermostat policy. Most church members, and other people who use a building, do not think about how much energy costs, and what uses energy in a building. Most people are willing to help and will use their common sense to find ways to save energy costs when they know what to do and feel they have permission to help.

The following are common items that have often been found in church energy audits. They include several energy items noted during the visit to ERUUF. These items are intended as reminders of energy items ERUUF can check on. Some of these things were mentioned during the visit and/or are part of the specific list above. Other items were not noted during the walk through of the buildings but may be worth looking at to save energy for the Church.

Lighting Savings

The Eno River lighting upgrade project, scheduled for August of this year, was briefly discussed but not studied for its details. Several indirect items related to the project were mentioned so the Church can use them as a reminder to double check. Some of the items in this section on lighting savings will not apply to the ERUUF lighting upgrade project but can serve as reference in explaining to church members and guests.

- The simple habit of turning off lights when not needed can potentially save more lighting energy than the most efficient lighting available. As an example, for an office building - one 40-watt fluorescent tube turned off at night and on weekends (5,628 hours /year), saves more than 225 kilowatt hours (kWh.) At a conservative off-peak rate of three cents a kWh, one tube saves \$6.75 per year. It only takes turning off fifteen of the 40-watt tubes on nights and weekends to save \$100 a year.
- For most fluorescent tube fixtures, 1.5-inch diameter (T-12) fluorescent tubes can be replaced by a smaller more energy efficient 1-inch diameter tubes (T-8) saving electricity, and still gives the same light. Note the fixture's ballasts should also be changed, to keep the larger ballast from wearing on the life of the smaller tubes. (T12s are 1.5-inch dia., and T8s are 1-inch dia.)
- Many of today's fluorescent tubes are more energy and cost efficient than the tubes developed 30 years ago. Unfortunately, some of the least expensive tubes today are still the old 30-year design. With lighting, often established and mainstream brands are more cost effective than cheap brands of fluorescent bulbs.
- There are commercially available LED replacement tubes for existing fluorescent tube fixtures. LED tubes are more expensive but use a fraction of the electricity than a

fluorescent tube and give much more light. An LED tube will last thousands of hours longer than a fluorescent tube and be environmentally safer to dispose of, many years later. There are environmentally safer fluorescent tubes are still available (green color tips on the ends) which have far less mercury in them and can be disposed of more easily. Federal Universal waste laws allow landfill disposal of these environmentally friendlier green tip tubes. (But, a landfill has the final say on tube disposal.)

- EXIT signs operate 24 hours per day and can consume noticeable amounts of energy to operate. The older design EXIT signs use incandescent bulbs or small fluorescent tubes or compact fluorescent lighting (CFL) technology and also require frequent maintenance due to the short life span incandescent bulbs and fluorescent tubes. Replacing old EXIT signs with more energy efficient signs using LEDs greatly reduces energy usage and maintenance costs. LED's, have been known to pay for themselves in a matter of months. Many stores sell LED bulbs designed to fit in many existing EXIT signs. For example, some older EXIT signs could consume over 350 kilowatt-hours (kWh)/yr. and can typically cost between \$30 to \$60 each, annually to operate. EXIT signs using light emitting diodes (LEDs) can operate typically for just \$4 or \$6 a year. *(As a general note, all existing ERUUF building EXIT lights will be replaced during the scheduled LED lighting upgrade project in August.)*
- Using task lighting where it is needed may be more efficient than lighting entire rooms. This depends on how big the room and often the room is used. A simple energy efficient desk lamp using a 60-watt compact fluorescent tube, or LED equivalent, could save many hundreds of watts in overhead lighting in a large office room.
- As pointed out for the Sanctuary Building Narthex with its glass walls, rooms with enough window space can make free use of daylight, to save on lighting costs. Intelligent management of day lighting may allow reduced electrical light use in several building areas. Many new buildings have sensors that dim light fixtures near windows on bright days, to keep light levels constant and save electricity costs.
- Turning lights off when not needed saves more on energy bills than most other changes. It is not about doing without light, as is only using light when needed. For example, in a typical office building, just two T8 fluorescent tubes left on overnight and on weekends, will cost around \$16 a year extra to operate, at a 3-cents a kWh "off peak" rate. Many religious buildings have a history of people leaving lights on in empty rooms.
 - In many buildings light sensors are used to automatically turn off lights, after so many minutes of no motion or infrared heat changes.
 - With today's electronic ballasts, the old rule of "not turning off fluorescent fixtures only if you are gone for more than 30 minutes" is no longer valid. Old fluorescent fixtures use mechanical/magnetic ballasts that wear out quickly. Today's electronic ballasts designs can to be turned off regularly. The age of a

building makes a good first guess to estimate if fixtures use mechanical or magnetic ballasts. Electronic ballast usually has a capital 'E' in a circle stamped on the ballast casing.

- Isolated building areas, such as storerooms, crawl spaces, attics, and outdoor structures can accidentally have lights left on days, weeks or even months before someone notices. A single 100-watt bulb left on unnecessarily can cost an extra 30-cents a day, or \$2 a week, at an average of 12-cents a KWh. Like ERUUF, some churches use a specific list or routine to find lights left on when the building is being closed up at night. Often signs are needed to remind people to turn off lights when they see them on.
- Hidden lighting – Historically, as much as 30 percent more light can be recovered by dusting and cleaning the light fixture reflectors, covers and lamps, every few years. Air pollution, pollen, slough, fibers and dust from human activity can build up over time to slowly dim room lighting. Generally, most people will not notice how dim a fixture has become until around the 30% light loss level.
- As observed outside the ERUUF Care Building, in general outdoor lights under building overhangs, on signs, on building features, along sidewalks, under shelters, in fountains and in parking lots can be on sensors and/or timers. Most outdoor light fixtures can also use outdoor compact fluorescent bulbs, and several fixture designs can use LED bulb equivalents, to save on the utility bills.
- Making sure parking lot lights, church sign illumination lights, and building illumination lights are not on during daylight. A 400-watt parking lot light bulb, or equal combination of bulbs, left on during daylight can potentially cost extra \$140 or more a year. Timers can malfunction, and light sensors can get dirty so a periodic check should be made to save the church unnecessary costs.

Office Savings

These items were looked for in all four of the ERUUF office areas.

- Individual space heaters are addressed above for the Church's main office. The presence of space heaters was checked for in the other three office areas of the ERUUF buildings. It was not checked to see if there are space heaters in any of the classrooms, that could be accidentally left on. Office space heaters typically use between one to three kilowatts per hour of electricity, depending on the type or brand. During an eight hour work day, a space heater can cost \$1.92 in electricity, at an average eight cents per kWh. If a heater is used for an average of 100 heating days a year, it could cost as much as \$192 per year.
- It was asked at all four office areas, in the ERUUF buildings, if computers and other office machines are turned off at the end of the work day. Turn off the computer at the end of the work day can save a noticeable amount on the utility bills. Many desktop computers will run between 65 to 250 watts of electricity and most laptops use about 15 to 60 watts. A desktop computer left on 24 hours a day, with no sleep mode or energy saving settings, costs as much as \$172 a year and laptops cost up to \$42 a year, using an

average of eight cents per kWh. Turning a computer off at the end of an eight hour work day can bring the cost down to around \$58 a year for desk tops and \$14 for laptops. Using sleep mode or energy saver settings during the work day adds to further savings. (For IT maintenance issues there are systems that can remotely turn computers on at night.)

- Turn off equipment or unplug it when it is not being used. Many houses of worship and facilities have problems with “phantom energy” losses. Many types of office equipment, large or small, will continue to draw small amounts of energy even when it is turned off, and can account, over time, for a noticeable part of the electric bill. For example, battery chargers left plugged in continue to use a few watts per day when not charging. Some coffeemakers can use a few hundred dollars per year in energy costs just keeping the water tank warm during times when the office is closed. Some inefficient office printers in standby mode will use as much as 60 percent of the energy, just keeping the ink setting roller hot.
- It was noted that ERUUF has several Energy Star rated pieces of office equipment, but not all the Church’s office equipment we looked at is energy star rated. Using Energy-Star rated office equipment such as copiers and printers can save hundreds of dollars a year in operating costs, for each piece of large equipment. Manufacturers have to prove a substantial energy use reduction to qualify for the Federal Energy-Star Program logo on their product. If a piece of equipment is not Energy-Star rated it may not be feasible to replace it immediately. But a plan should be in place to get an Energy Star rated replacement when the time comes for a new machine. Some dealers will provide free estimates in hopes of getting your business, when you do replace a big item like a copier or printer.
- By recycling everything reasonably possible a church can to save a lot on waste disposal costs. Recycling in North Carolina is a major industry creating many thousands of jobs, providing cost saving resources for many industries, saving taxpayers space in the landfills and helping the environment. As an example, according to a fiscal year 2009/2010 report, State government spent a reported average of \$58 a ton for waste collection and disposal fees. Recycling during the same period only cost about \$3 a ton.

Kitchen Savings

The ERUUF has four complete kitchens in its three buildings. All these items could help save energy in these kitchens.

- Many churches have big business or commercial type coffee makers that keep a tank of water hot 24 hours a day. Often these coffee makers are only used a few times a week. Some churches save a lot by putting their big coffee makers on timers so they are ready when they are usually needed. Other churches use timers that only allow the coffee maker to run a few hours to keep them from being left on. As an example, A state office did a calculation of its large restaurant type coffee maker, left on 24 hours a day, and estimated

it cost \$400 a year to keep a half gallon of water hot - using the wattage on the maker's name plate, its tank heater coming on 4 times per hour, assuming an average of 8-cents a KWh.

- Ice machine can be expensive to run. The ice machine air filter, and any water filter it may have, needs to be cleaned regularly. Many models have an ice level switch on the machine to save power by not making more ice than is needed. Some more expensive ice machines will have timers to melt the old ice out from under the new ice on top. The owners' manual or the vendor should be able to show where the ice level setting is located, as well as a switch for melting old ice setting.
- Use of a large kitchen range hood should be limited to minimize the huge volumes of conditioned air it can suck out of the building when it is on. For example, a typical home bathroom fan can replace the air volume of a 3-bedroom home in around 90 minutes. Large kitchen range hoods can replace the air in large areas of a building very quickly, adding expense to condition more air for the building. Many commercial kitchen operations use replacement air vents to supply the volume of air a large hood needs when it is running.
- The condenser coils for the kitchen freezers and refrigerators need to be cleaned at least every few years to help them dissipate heat energy faster. Allowing air circulation behind these units, or around their coils, helps them work better, by faster dissipation the BTUs from inside the box.
- Refrigerator and freezer door seals should be checked periodically for air leaks. For a standard residential refrigerator, if a piece of paper the consistency of a new dollar bill is closed in the door and it moves up and down freely then the air leak from this refrigerator could be as much as \$50 a year.
- Read and monitor the temperature settings for large refrigerators and freezers. Over freezing and over refrigeration usually cost more with little, or no, extra savings. Finding the right and legally required temperature setting can potentially save a lot of refrigeration costs. Usually these setting controls are well hidden inside the unit. Every degree you save on the refrigeration setting, without risking food safety, can save a few percent in operation costs.
- There are house of worship buildings old enough that they may have a hot water recirculation pump. A hot water recirculation pump for a building is not always needed. Many large buildings have a hot water pump to circulate warm water in the piping back to the hot water heater, or boiler. The question needing to be asked is, will there be hot water at all the faucets without having to run the pump? Not having to run a recirculation pump motor could save a noticeable amount of electricity.

Thermostat Savings

It was stated that ERUUF has a person who checks thermostats routinely, sometimes referenced to as the ‘thermostat patrol’. It was stated the Church is talking about, maybe getting a centrally located thermostat computer control system.

- Computers, coffee pots, copiers or other should not be located near a thermostat. Heat from a machine can confuse a thermostat and over chill the room(s) it controls. It is a common problem for a thermostat to make an area uncomfortable because of a nearby heat source. For example, one summer in a state office building it was discovered that dozens of employees had to wear sweaters at their desks because the break room coffee pot was stationed under the thermostat.
- As a “rule of thumb”, for every degree setting on a thermostat that is saved (down for heating or up for cooling), 3% to 5% of the electricity can be saved, depending on humidity. Using programmable thermostats or HVAC controller systems can be used to adjust the thermostats to keep rooms comfortable when in use and savings when the rooms are empty.
- Setting back a thermostat for overnight and when nobody uses a building can save very noticeably on the utility bill. Typically, a 10-degree set back is recommended, but every degree saved can be potentially 3% to 5% of energy savings. Programmable thermostats can be set to come on a few hours ahead of when a building or room is needed. The vast majority of buildings recover very quickly. It is noted that some buildings with electric backup heat need to raise the temperature slowly to keep the electric backup from coming on.
- As a general rule of thumb, the average person will feel 7-degrees cooler under a ceiling fan. In summer ceiling fan air movement can allow thermostats to be set as much as seven degrees higher. In winter ceiling fans can help with thermostat settings by pulling down heated air trapped near the ceiling. Ceiling fans are relatively inexpensive and often pay for themselves with the savings from the better thermostat settings.
- A thermostat should not be buried behind furniture, stacks of papers or books, and other materials because it can stop circulating air from reaching the thermostat. This often leads to a lot of extra air conditioning in that area because the buried thermostat can’t accurately detect the temperature of the air circulating in the room.
- Where a thermostat is located can have a big effect on the cost of running the air conditioning or heating. A thermostat located across from an outside door can get confused every time the door is opened. The thermostat directly under a vent can be tricked into turning off the airflow before a room is comfortable. A thermostat located in a closed room can make the other rooms on that thermostat uncomfortable. In some cases, it is easy and cheaper to move the thermostat to a good location and save a lot on utility costs.

- A lot of energy costs can be saved by turning down the thermostat settings on the electric hot water heaters in the building. As a general rule about every degree you set a hot water heater back you save about 3% energy costs. Most dishwashers heat their own water. Many office buildings turn off the hot water completely to the restrooms. Water hot enough to kill germs can burn skin. To address any complaints about water not being hot enough to rinse soap off a church can change to a type of soap that does rinse off at lower temperatures.

HVAC Savings

Eno River has a large number of HVAC systems, large and small. It was suggested the church have a map of the many HVAC systems, especially for the location of the air filters, so any new contractor or church staff or volunteer can find all the units and air filter locations.

- ERUUF reports it is very regular in changing the air filters for the many HVAC systems it has. Air filters for air handlers and other HVAC units need to be changed on a regular cycle, and as needed. Dirty air filters can slow down the airflow forcing the units work longer and harder to condition the same amount of air. Many air handler designs have closely packed coils that can become clogged and inefficient if too much dirt and dust get past the air filter. Often each air handler will have its own pattern as to when the air filters need to be changed. A church should make sure that all air filters get changed on a regular basis, as well as fitting the opening properly. Human error or bad information can allow a filter to be forgotten and end up choking an air handler system.
- Some rooms, especially in older buildings, do not have an air return in the same room. Usually the air return system is located in the hall or other area. That would mean the air conditioning a room would have to leave the room in some way, to get to the return vent. Too often door vents or transits are blocked and air must squeeze under doors to get back into the HVAC system, or be a lost expense as one time through air. This means it will typically take a longer than usual time for a room to reach a comfortable temperature. If a room only has incoming air vent, check to see if the air can reach a system return vent somewhere nearby.
- Air return vents blocked by furniture or hidden by stacks of materials can force the HVAC system to work longer to satisfy the setting on the thermostat. Because return air has to take a lot longer squeezing around and behind obstructions the HVAC system must work longer to satisfy the thermostat setting.
- In many buildings a row or series of rooms will be on the same HVAC duct trunk line, with the thermostat in the last room on the line. Often one room will be too cold while the others are too warm. As air will follow the path of least resistance the ducts to each individual room will usually have an adjustable damper, to balance airflow to the room. Over time the dampers can vibrate loose. Usually the damper for a room is located at the trunk line. Some room vent designs are set up to automatically adjust, using a sensor in

the room. Older buildings may depend on manually operated vents to adjust the flow of air into each room.

- In many room settings an air vent is very close to a return vent. It is likely that most, if not all, of the air from that air vent is being pulled in to the return vent, without any of that air reaching the people level in the room. One way of saving the air is to choke down or close off the affected air vent so the other air vents in the room will distribute the extra air. That way conditioned air, which has been paid for, will be used in the room before it is sent back through the return vent.
- There are situations where the boiler, air handler, furnace or gas hot water heater are not getting the air they need to work efficiently. The air has to slip in under the door to the mechanical room or the wall vent is blocked. This can cause the equipment to work harder and longer for the same performance. Periodically check to see if air supplies to a mechanical room are open enough to supply the air needed.
- A condenser, heat pump or gas pack unit have transfer coils that need to be cleaned and maintained regularly. Cooling or heat transfer coils on these units need to be kept as cleaned as feasibly possible. Buildup from dirt, dust, pollen, and diesel exhaust particle as little as two-human hairs thickness on these coils can cost 10% to 30% of the heat transfer efficiency. Which adds more operating costs for the same amount of air.
- Outside HVAC units, such as condensers units, work faster in the shade. Extra ventilation around an outside HVAC unit helps dissipate the heat from inside the building faster. Although, sometimes a unit is placed so that the fans will bounce the already hot air off the retaining walls, bushes, or building overhang, causing the unit to pull the hot air back into the coils. Any overhead shading should take this into account.
- The pipe insulation on fluid lines to and from a condenser unit, chiller unit, or cooling tower unit needs to be inspected every year, especially roof-mounted units. Typically, standard commercial pipe insulation around the fluid lines between the unit and the building deteriorates very quickly in harsh outdoor conditions. Often it is just a few years before this pipe insulation is noted as needing to be replaced. As an example, calculation, if the condenser unit is only cooling the fluids from the building about 10 degrees and the return line exposed to the hot sun loses one-degree, then that is a 10% loss in efficiency and the HVAC has to run 10% longer to do the same amount of cooling.

Hallway Savings

- Most refrigerated water fountains may not need to be plugged in 24 hours a day. How often is the refrigerated water needed when there is no one in the building? Often city water is at the lower 50's degree range from just being in underground piping. If possible, a refrigerated water fountain could be unplugged or put on a timer to save the electricity the refrigeration unit uses.

- Older refrigerated vending machines can consume over 400 watts per hour, which could equal over \$350 a year to operate (average 8-cents a KWh). Many drink vending machines can have their advertising lights disconnected. This advertising lighting disconnect can be as much as a 160-watt reduction and could save over \$112 per year per machine. Putting a can soda vending machine on a timer or motion sensor can save even more money on refrigeration costs.
- It has been noticed in many energy audits that outside doors to the building can have large gaps, between and around them. As a rule of thumb, a quarter inch gap around a single outside door is the equal to a red brick missing from the outside wall, with air coming in and out. There are door weatherization kits, at many hardware and lumber stores, which are easy to use, and often pay for themselves in a matter of weeks with the savings.

Classroom & Meeting Room Savings

- TV sets and other seldom-used appliances left plugged in can add up to a noticeable utility cost. Some older TV sets when turned off will use as much as 60% of the electricity as when they are turned on, just to keep the components warmed up for the instant on feature. Many electronic appliances, such as stereos and speaker systems, will use a noticeable amount of electricity while in standby mode. It is often best to unplug appliances that use “phantom energy” such as TVs, radios, stereo sets, and wall chargers if they are not often used.
- Often in summer, windows allow heat buildup in a classroom during the part of the day the sun is shining directly in. Using curtains or blinds cuts down a lot of this heat buildup. This can save a noticeable amount of time the air conditioning runs for these areas.
- It is not uncommon to find that someone adjusted the thermostat for a room during a meeting and did not adjust it back. Potentially rooms empty for days can be air-conditioned to refrigeration temperatures. Many houses of worship secure the thermostats, use programmable thermostats that automatically reset, and/or educate members that a room doesn’t cool off any faster if you set the thermostat below where you want it. Every degree you can save on a thermostat setting can save from 3% to 5% of the energy used to control room temperature.
- Some large rooms have the vents pointed to the ceiling so as to bounce the air to the center. Sometimes this is to keep air from blowing directly on folks. Some rooms are uncomfortable because vents were closed for some past reason. It is not uncommon to check on vents and adjust these vents as needed. Often this allows a thermostat in the room to work more efficiently, especially in a high ceiling room.

Water Savings

- It was discussed during the ERUUF visit how church members and visitors need to know how to report leaks or whom to ask to fix or report water leaks and drips. As an example, calculation one drip per second equals 2,100 gallons of water per year. Based on the City of Raleigh distribution rate of \$1.96 per 748 gallons, saving 2,100 gallons/year saves \$5.50 per year. Saving leaks totaling 18 drips per second can save a \$100 per year. The average drip size according to U.S. Geological Survey, or USGS, is 0.25 ml or one liter = 4,000 drips (see the USGS drip calculator at <http://ga.water.usgs.gov/edu/sc4.html>).
- Using aerators on restroom faucets can save noticeable amounts of water. Aerators are often less than a few dollars, and most faucets are threaded to just screw the aerators on. Using an aerator on a kitchen faucet can save water usage, though it may take twice as long to fill a pan.
- About once a year, toilets could be checked for leaking from the storage tank into the bowl. With age the typical flapper seal will begin to leak water into the bowl. Potentially, thousands of gallons can be lost before someone notices the tank having to fill when nobody flushed. One easy way to test for bowl leaks is a few drops of food coloring in the tank to show if water is leaking into the bowl.
- A few cheap older designs of ice machines, as well as other types of cheap refrigeration equipment, will use a continuous stream of water to cool the condenser coils. This equates leaving a faucet on 24 hours a day. A single machine using one time through water-cooling has been known to double monthly water bills for small office buildings.

How to address many of the items noted above can be found in the various online sources. A few websites with information covering the items above have been listed at the bottom of the report.

CONCLUSION

During this energy review at ERUUF there was no time to make detailed measurements and observations, however, many energy opportunities we observed could be established through planning, maintenance checks, and thoughtful policies, such as turning off equipment and energy efficiency education. Most of the opportunities listed above are more about how people use energy more efficiently, especially with the existing systems. Education to use energy thoughtfully and turning things off when they are not needed is a major step to saving energy costs and pollution.

I would be happy to come back and provide a program to any interested people in the congregation or community about NC Interfaith Power and Light, its programs, and what has been achieved. Information on energy and water conservation, environmental impacts, renewable energy, or whatever you feel might be of interest in your congregation and community in these areas. If there are any questions, please feel free to contact me.

I and NC IP&L would be very grateful for any future information you wish to share on energy savings or pollution savings that results from this energy review. I wish to thank Eno River Unitarian Universalist Fellowship for allowing me to come and be of service.

Sincerely

John Seymour

Retired Environmental Engineer II

Volunteer for NC Interfaith Power and Light

Appendix B
ERUUF
Earth Justice Green Sanctuary Accreditation
Themes from Congregational Engagement Sessions Held October-November 2017

Sustainable Living

- Theme 1: Invest in & support renewable energy & energy efficiency for ERUUF
- Theme 2: Reduce all waste---Strive for zero waste
- Theme 3: Support & advance alternative modes of transportation
- Theme 4: Conserve and reuse water
- Theme 5: Support & advance plant-based eating
- Theme 6: Establish and follow Green policies and practices

Religious Education

- Theme 1: Provide RE on Sustainable Living: Food, Agriculture, Transportation, Etc.
- Theme 2: Provide RE on Waste Reduction and Zero Waste
- Theme 3: More 7th Principle and Ecology Oriented RE Programming to Include Experiential Learning
- Theme 4: Provide RE Offerings on Earth Justice Related Topics
- Theme 5: More Youth -Centered Environmental RE, Activities, and Recognition for Contributions

Worship and Celebration

- Theme 1: More worship services, celebrations, and spiritual groups with 7th UU Principle and earth justice-oriented themes
- Theme 2: More art in sanctuary and music in worship services honoring Mother Earth/Our BlueBoat Home

Environmental Justice

- Theme 1: Work to end fracking and dirty energy
- Theme 2: Partner with existing organizations to advance environmental justice and decrease environmental injustice
- Theme 3: Engage in the democratic process for pro people, place, and planet policies
- Theme 4: Take more actions, individually and congregationally to address environmental injustice