



Home Energy Assessments All You Need to Know and More!!!

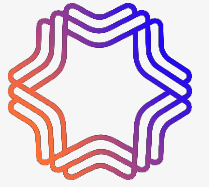
Bahareh van Boekhold, LEED AP, CEM, BPI

Date: 12/2/2021

Prepared for: Middletown Township



About AEG



AEG provides a comprehensive suite of Demand-Side Management (DSM) consulting services designed to address the evolving needs of utilities, government agencies, and grid operators.

Founded in 1981 | Joined Ameresco 2011



85 Dedicated professionals



20 years of Software as a Service (SaaS) offerings



49 States and provinces in which we've worked



2,000+ EE programs managed in VisionDSM



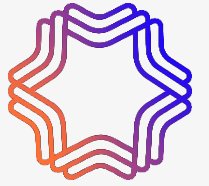
200+ Utility and government clients served



1,000+ Projects completed



A Subsidiary of Ameresco, Inc.



As a subsidiary of Ameresco, AEG maintains its uniquely tailored client experience while also receiving the backing, support, and resources of a leading energy services company.

Founded in 2000 | Public in 2010



\$7 Billion+ in energy solution projects, 250+ MWe of Owned Assets in Operation



8,000+ Customers benefiting from energy efficiency measures and renewable energy generation



1,000+ Employees throughout North America and the United Kingdom



Up to 45% Energy cost savings with comprehensive, audit- based improvements



70+ Offices providing local expertise in markets served



In 2019, our renewable energy assets and customer projects delivered a carbon offset equivalent to **11,167,978 metric tons of CO₂**

Ameresco (NYSE:AMRC) is a leading energy services company with a comprehensive portfolio of energy efficiency and renewable energy solutions.

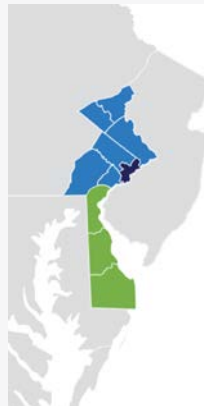
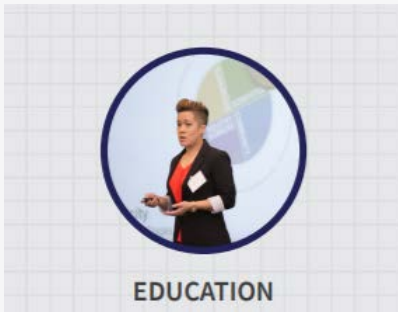


Green Building United



Focuses on **scalable education, policy, and program solutions** to improve the built environment for the health and well-being of all.

Facilitates a **Just and Equitable** future



GREEN BUILDING UNITED

MISSION

Green Building United fosters transformative impact in our communities through green building education and advocacy.

VISION

A sustainable, healthy, and resilient built environment for all.

Home Energy Assessment



What is a Home Energy Assessment?

AKA Home Energy Audit:

Helps you understand the whole picture of your home's **energy use**, **comfort**, and **safety**.

Answers following questions:

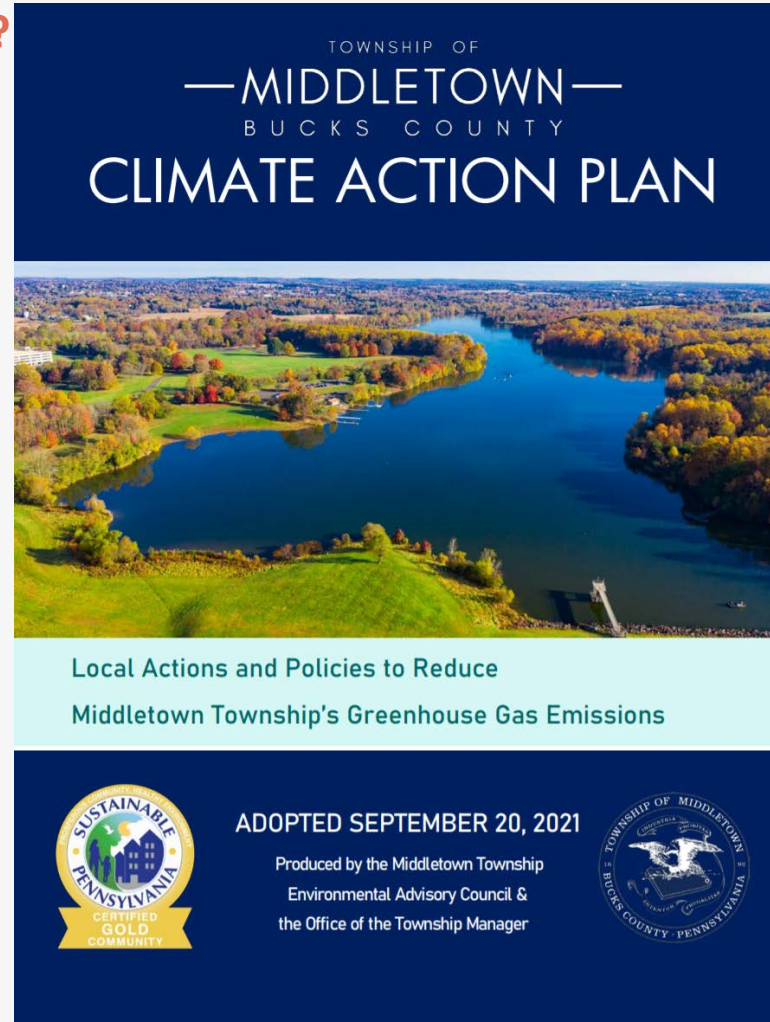
- How much energy does your home use?
- Where is your home is inefficient?
- Are there health and safety issues?
- Which problem areas should you prioritize and fix to save energy and improve the safety and comfort of your home.



Home Energy Assessment

Why have a Home Energy Assessment?

- Comfort
- Savings - energy and bill
- Health and safety
- Cleaner environment
- YOUR leadership in Climate Action



Home Energy Assessment



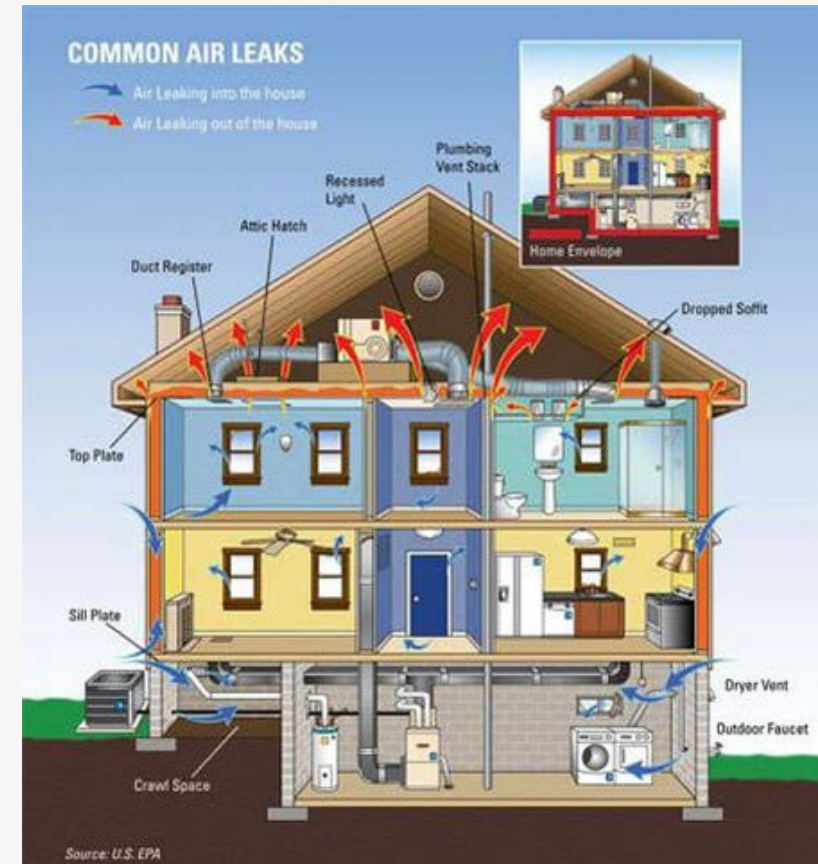
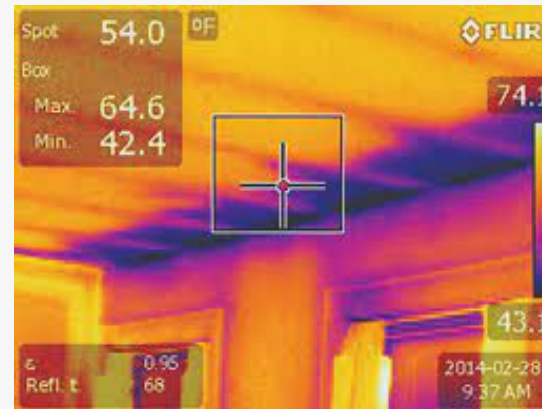
How is a Home Energy Assessment done?

- ✓ Interview with residents
- ✓ Utility bill analysis
- ✓ Visual Assessment- inspection of attic, basement or crawlspaces
- ✓ Blower door testing
- ✓ Thermal inspection with infrared camera
- ✓ Combustion appliance zone testing
- ✓ Report with recommendations



Home Energy Assessment

How is a Home Energy Assessment done?



Home Energy Assessment

What to expect:

Home Energy report and recommendations:

- Low-cost measures:
 - LED lamps, faucet and shower head aerators, weather stripping
- Weatherization and envelope upgrades:
 - Air Sealing and Insulation
- Efficient heating, cooling, and water heating equipment
- Efficient appliances



Home Energy Assessment



Next Steps

Check PECO's website and schedule your home Energy Assessment with a certified energy advisor.

Remember to get an energy assessment before:

- Home renovations
- Replacing heating, cooling or water heating equipment
- Installing PV on your roof



Assess your home for opportunities to improve your energy efficiency!

A PECO Energy Assessment helps you save money and learn more about your home's energy use. Customers have a choice of an in-home or virtual energy assessment to receive professional advice from a PECO energy advisor, free energy-saving products like LED bulbs, a personalized report of energy-saving recommendations, and rebates for qualified improvements.

In order to participate in PECO Energy Efficiency Programs, you must first [Sign In](#) or [Set Up an Account*](#)

*PECO Customers please have your PECO account number available when signing up to gain access to all the Energy Efficiency Programs you can participate in.

Thank You.

Bahareh van Boekhold

bvanboekhold@appliedenergygroup.com

302.504.3088 (Office)

302.562.3112 (Cell)



Energy Efficiency

PECO Act 129 Phase IV Update

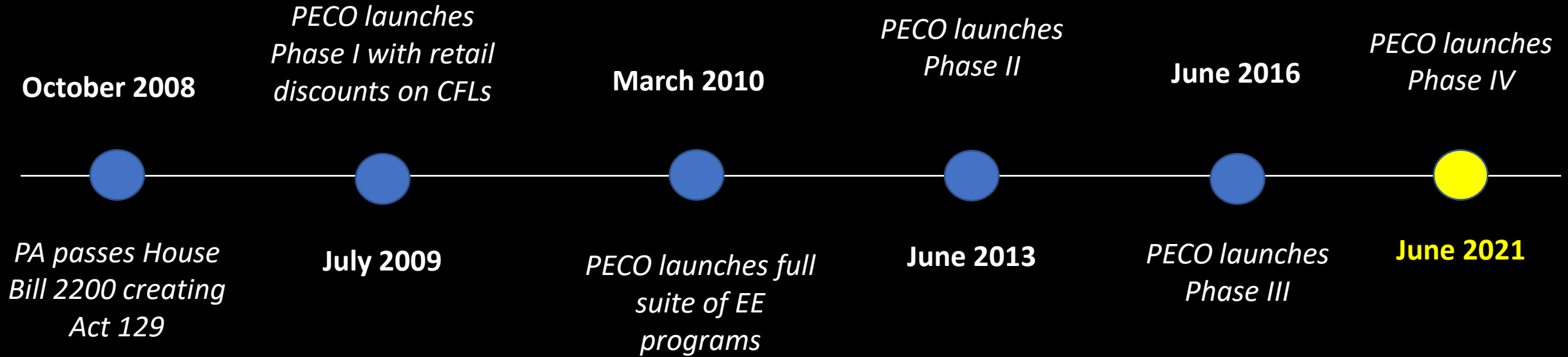
December 2, 2021

PECO Marketing



An Exelon Company

Act 129 Timeline



Act 129: Energy Efficiency Impacts

Since 2009, PECO customers have reduced electric consumption by more than 4.6 million megawatt hours, enough energy to power 560 homes for a year

In that time, customers have received more than \$367 million in energy efficiency rebates and incentives

We also have attended more than 2,232 education outreach events reaching more than 727,120 customers

Phase IV: Overview

5-year Phase: June 1, 2021 to May 31, 2026

MWh savings goal: 1.35 million megawatt hours

Demand Reduction goal: 256 MW

6 residential EE customer offerings

1 commercial EE customer offering

5.8% of savings must come from limited-income customers

Phase IV: Changes

AC Saver bill credit program: the PUC determined that incidental demand reduction can be achieved more efficiently and economically through energy efficiency

New “Energy Answers” advertising campaign: to highlight residential and commercial programs with PECO’s customers

General Awareness Campaign

New “Energy Answers” Advertising Campaign

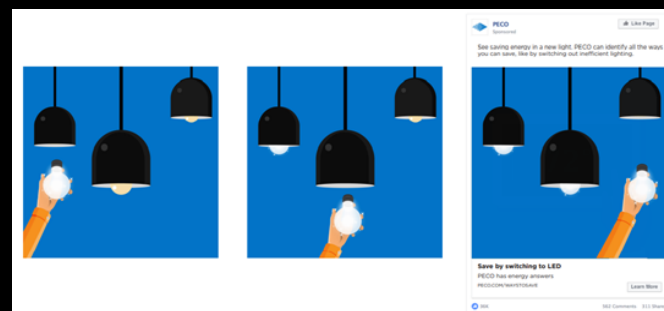
Launched mid-September

Creates general awareness about our energy efficiency offerings

[PECO.com/waystosave](https://www.pECO.com/waystosave)

You have energy questions?
We have answers.

See Ways to Save



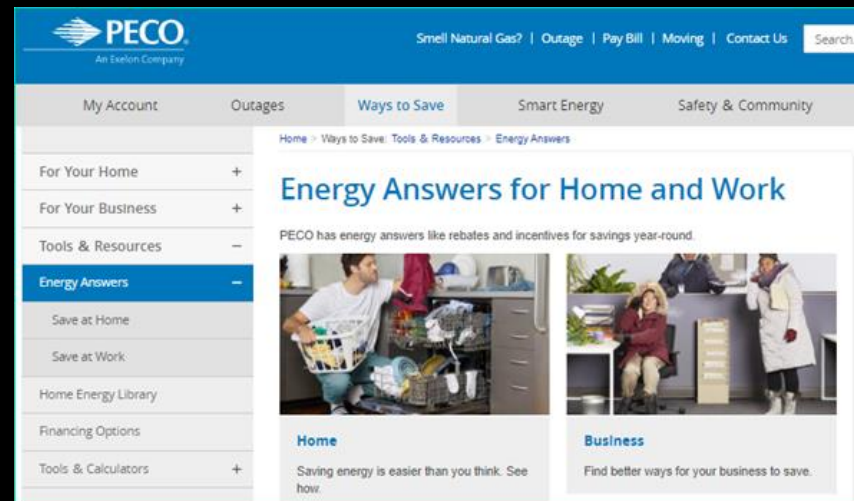
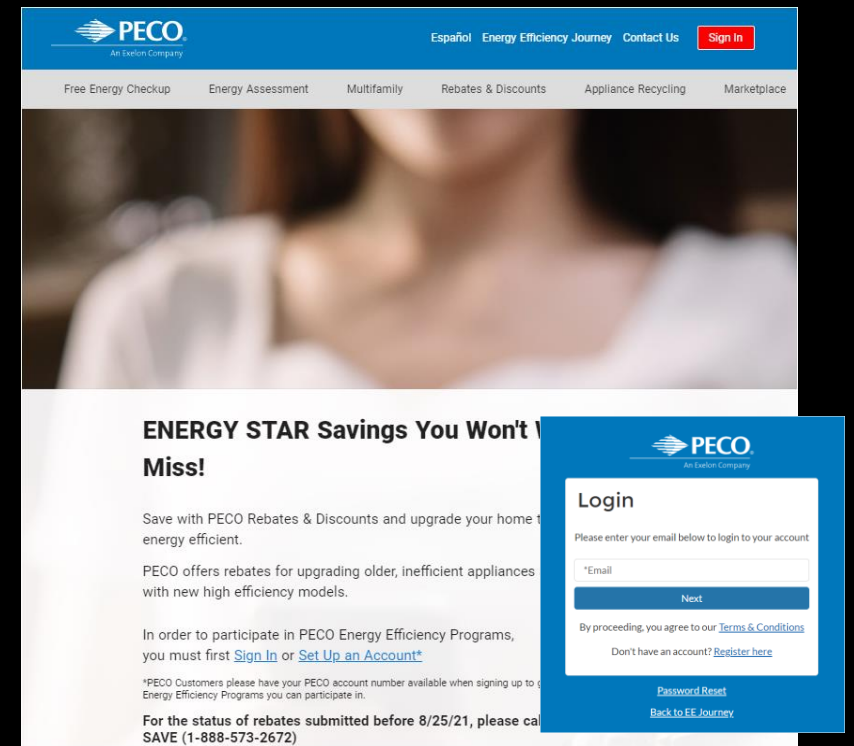
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Customer Experience

"Energy Answers" Campaign: Reaching customers through tv, radio and digital channels to create awareness and engage them in offerings

Rebate Portal: Centralized online location in English and Spanish

Web site & Energy Efficiency Call Center: Easy access for program information and application



Residential EE Offerings
1-888-5-PECO-SAVE (1-888-573-2672)
PECO.com/home



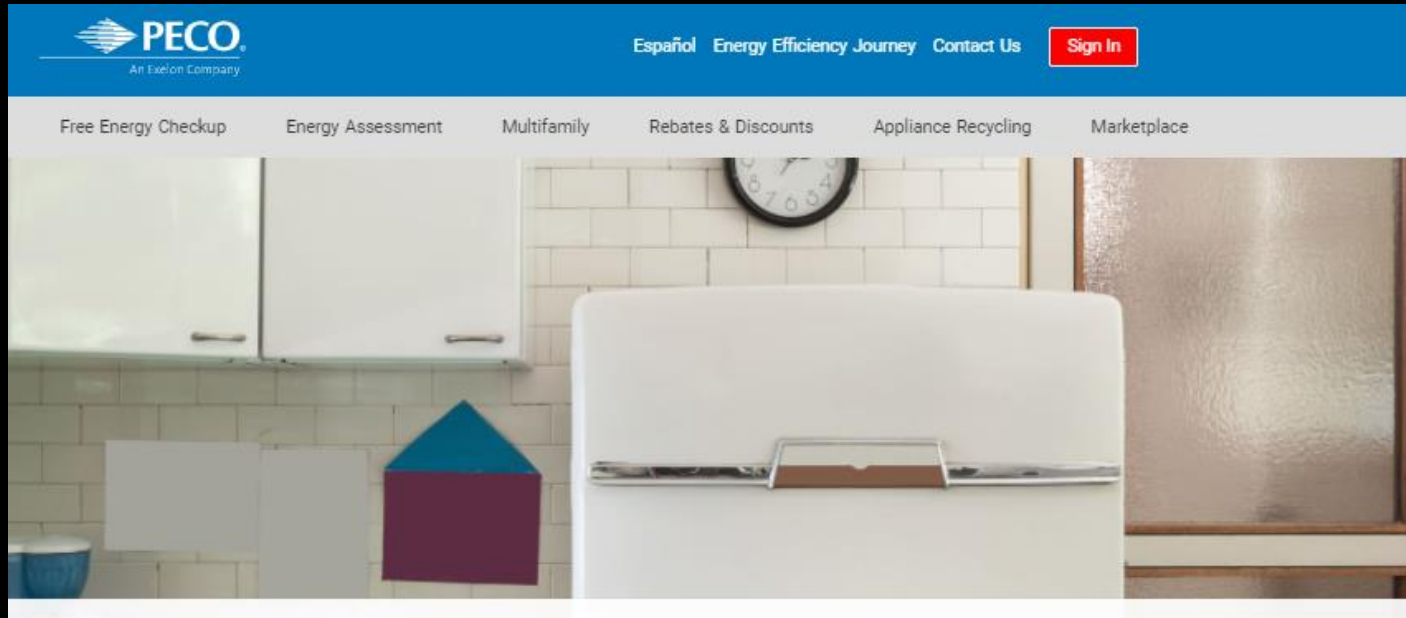
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Seamless Customer Experience

Centralized Rebate Portal

Streamlining the Phase IV experience customers can participate in all residential EE programs using one centralized online rebate portal. Spanish available with a click!

PECOeeportal.com



Appliance Recycling

PECO will pick up your old, working fridge or freezer

Pickup is free and you get a \$75 rebate

Fridge/freezer must be clean and free of food and mold

\$10 rebate for old working room air conditioner with fridge/freezer pickup

[PECO.com/recycling](https://www.pECO.com/recycling)



129,111 fridges, freezers and room AC units picked up and recycled since 2010!



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Home Rebates

Rebates for qualifying ENERGY STAR® new appliances, heat pump and central air systems, along with discounts on LEDs

LED discounts available at retail and online

Find more discounts on smart thermostats and some small appliances at PECO Marketplace

[PECO.com/rebates](https://www.pECO.com/rebates)

[PECO.com/marketplace](https://www.pECO.com/marketplace)



*Since 2010, 36,631,090
discounted bulbs purchased and
428,633 rebates issued!*



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Energy Assessments

For just \$49 (\$150 value), a PECO energy advisor will visit your home in person or virtually

For \$99 (\$300 value), electric heat customers may opt to receive diagnostic testing and qualify for rebates for improvements made

Customers receive personalized report and energy efficient products installed

Income eligible customers receive services at no charge and can qualify for equipment replacement

[PECO.com/assessment](https://www.pECO.com/assessment)

[PECO.com/freeenergycheckup](https://www.pECO.com/freeenergycheckup)



157,408 market rate and low-income assessments completed since 2010!



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Energy Assessments (continued)



Virtual Energy Assessment

\$49.00

Valued at: \$150 | Save: \$101 (67% off)

- ✓ Pre-assessment call
- ✓ Self-installed energy-saving products
- ✓ Virtual walk-through (60-90 minutes)
- ✓ Personalized report

Schedule Pre-Assessment Call



Standard Energy Assessment

\$49.00

Valued at: \$150 | Save: \$101 (67% off)

Duration: 1 - 2 hours

- ✓ Walk-through evaluation
- ✓ Personalized report
- ✓ Energy-saving products

Select Assessment



Energy Assessment Plus

\$99.00

Valued at: \$300 | Save: \$201 (67% off)

Duration: 2 - 4 hours

- ✓ Walk-through evaluation
- ✓ Personalized report
- ✓ Energy-saving products
- ✓ Blower door test ?
- ✓ Thermal imaging ?
- ✓ Combustion safety testing ?
- ✓ Estimated cost of upgrades
- ✓ Eligible for up to \$1,150 in rebates

Select Assessment



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Multifamily

Income eligible customers living in multifamily buildings can receive a free energy checkup

Property managers and owners benefit from available incentives for common space improvements

[PECO.com/multifamily](https://peco.com/multifamily)



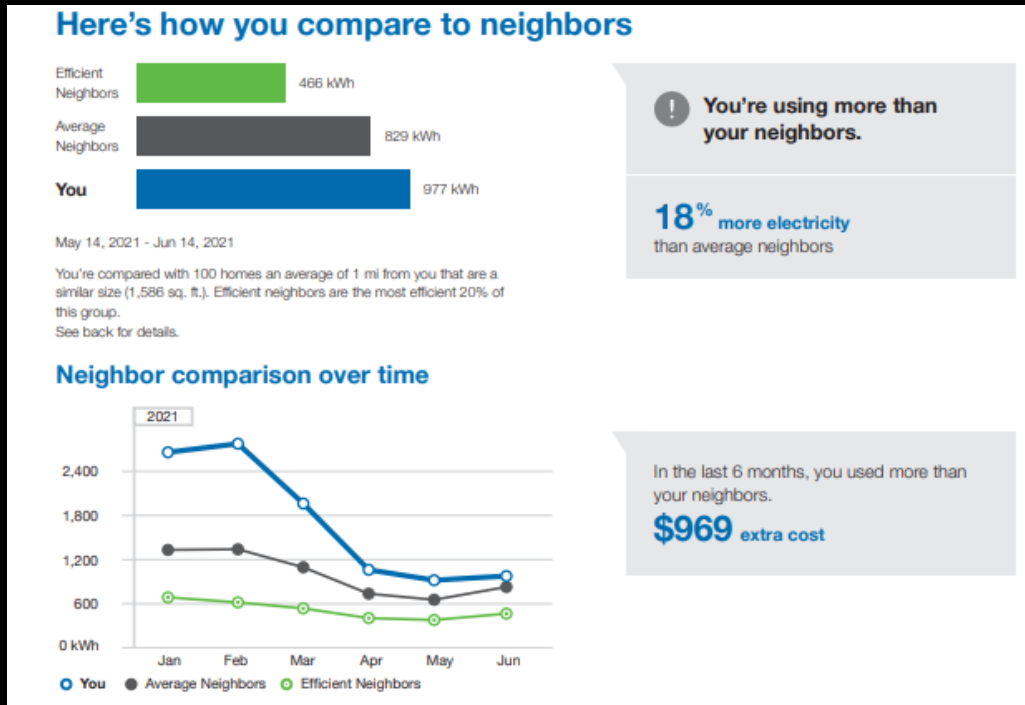
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Home Energy Reports

Over 500,000 high usage customers receive energy reports by mail and/or digitally

Customers can opt out of this “behavioral” program

[PECO.com/homeenergyreport](https://peco.com/homeenergyreport)



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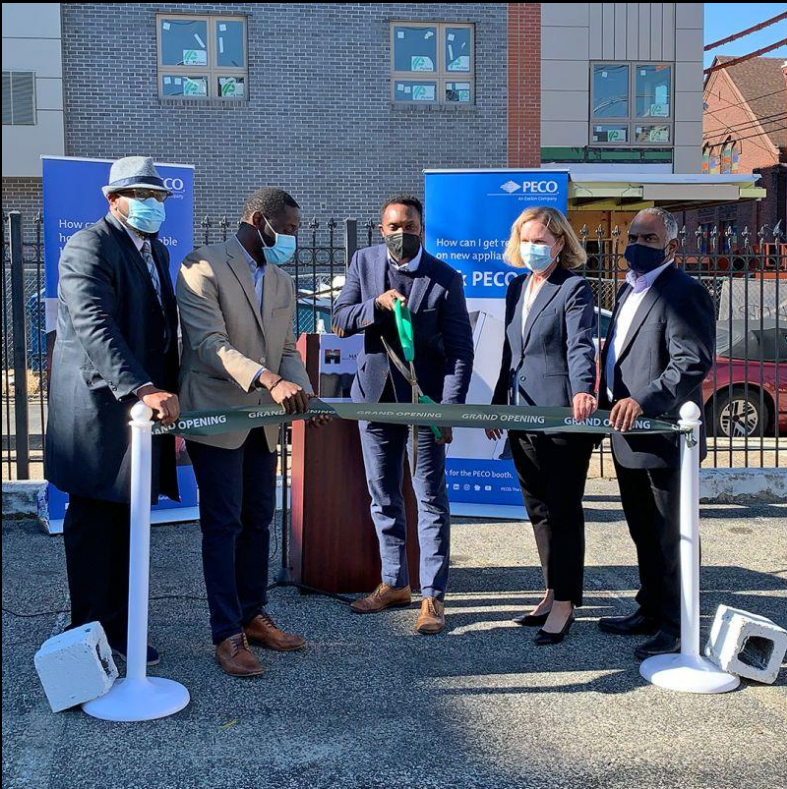
Homebuilder Rebates

Residential homebuilders building in PECO's territory are eligible for rebates and technical assistance when they build ENERGY STAR® certified or energy efficient homes

Starting in Phase IV the program includes rebates on smart thermostats

[PECO.com/newhomerebates](https://www.pECO.com/newhomerebates)

[PECO.com/newhomes](https://www.pECO.com/newhomes)



4,142 ENERGY STAR and energy efficient homes built and rebated since 2013!

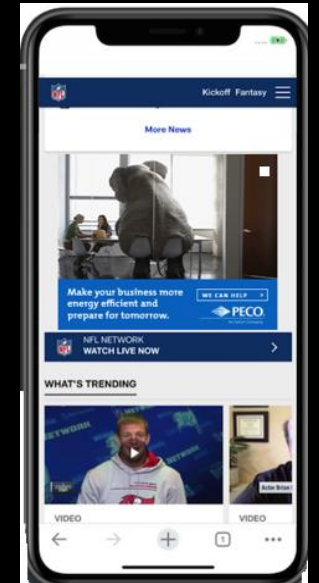
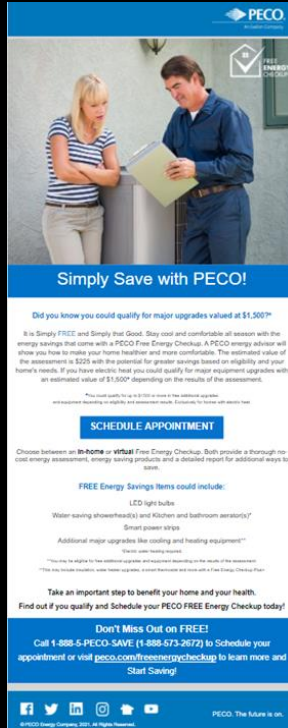
How do we engage customers to participate in PECO's EE programs to save energy and money?



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Direct Marketing Campaigns

Ongoing print and digital marketing tactics designed for customers to participate in our energy efficiency offerings



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Education Outreach

Supports Energy Efficiency Programs for PECO Act 129 Phase IV to educate PECO residential electric customers, students, and small businesses by sharing information at events and schools.

- Tabling at Community Events
- Speaking Engagements – Virtual and In-Person
- Student Education
- PECO's Energy Force Ambassador Program

PECO's Energy Force Ambassador Program hires special needs people to attend outreach events and educate customers on ways to save energy.

Training and closing graduation ceremony are held for Ambassadors

Past participants are eligible to participate again
Non-Profits participating in the past include:
Aspira, Special Olympics, Variety Club and JCHAI



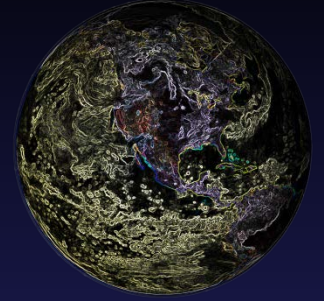
Thank you for participating.

Questions?

peco.com/waystosave



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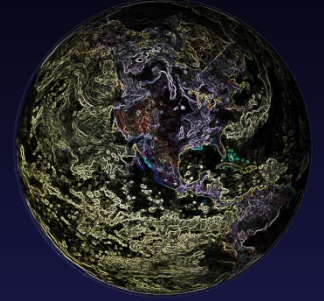


Weatherization

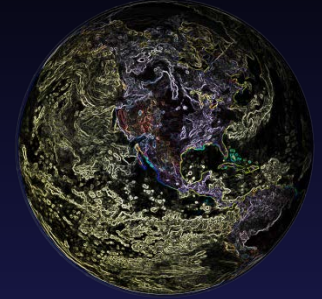
a focus on efficiency

Kevin Deeny, P.E.

Case Study



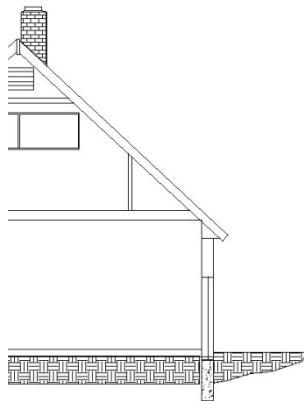
Levittown, PA
Circa 1954 – 1959 Construction



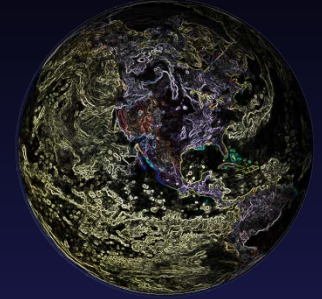
KC Environmental, Inc

Evaluating Levittown Pennsylvania Homes for Energy Savings – Part 1

*A Case Study in evaluating the potential for
energy conservation in existing tract housing
developments.*



Levittown PA



~17,300 SF Homes

~ 5,500 Acres

Four Jurisdictions:

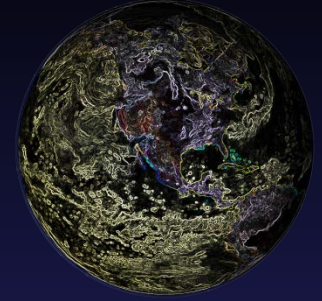
Bristol Township

Falls Township

Middletown Township

Tullytown Borough

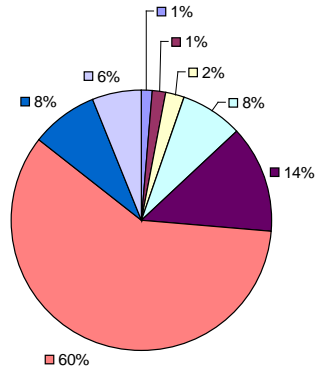
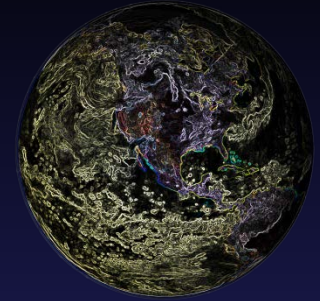
Original Features



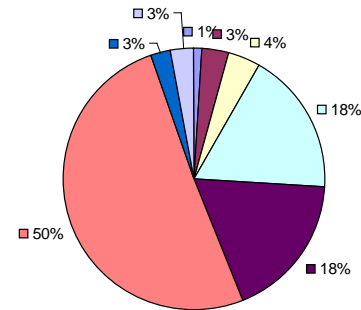
- Six basic house models
- Slab-on-grade, wood frame construction
- Oil-fired, hot water radiant floor heating
- Insulation – R-11 to R-13 (or less)
- Single paned glass w/storm windows

Note: Heating Oil Cost at Time Of
Construction - \$0.16/gallon.

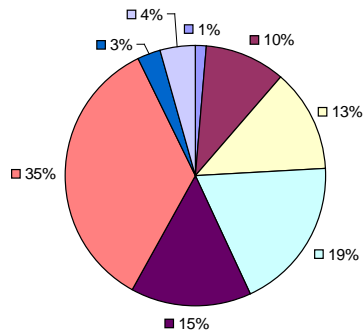
Vintage of Homes in Levittown Municipalities



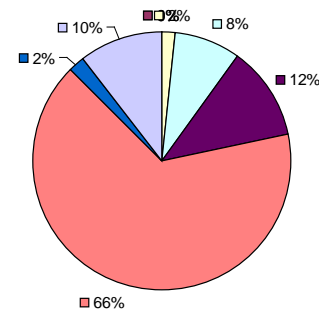
Bristol Township



Falls Township

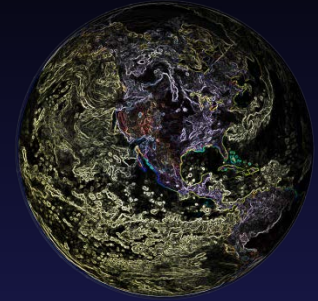


Middletown Township



Tullytown Borough

Original Status

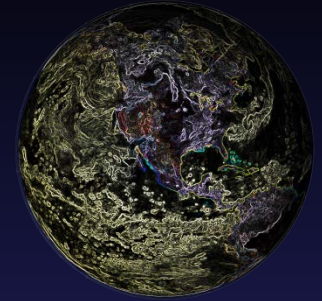


Category	Area ft ²	Linear ft	Air Flow CFM	Loss BTU/hr
Windows	191	-	-	6,967
Doors	192	-	-	7,431
Walls	1,738	-	-	6,340
Slab Edge		178.5	-	7,262
Ceilings	523	-	-	2,579
Roofs	619	-	-	2,495
Infiltration		-	427	26,304
Total				59,376

Country Clubber w/ Optional Finished 2nd Floor; 2,460 ft²

Basis 14°F Outside, 70°F Inside – ACCA Manual J (7th)

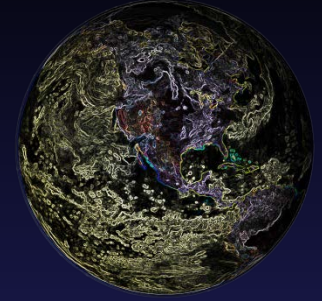
Upgraded Status



Category	Area ft ²	Linear ft	Air Flow CFM	Loss BTU/hr
Windows	191	-	-	2,550
Doors	192	-	-	3,739
Walls	1,738	-	-	4,906
Slab Edge		178.5	-	6,938
Ceilings	523	-	-	644
Roofs	619	-	-	1,324
Infiltration		-	230	13,531
Total				33,632

Country Clubber w/ Optional Finished 2nd Floor; 2,460 ft²
Basis 14°F Outside, 67.5°F Inside – ACCA Manual J (7th)

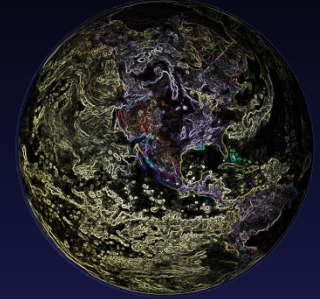
A Few Numbers



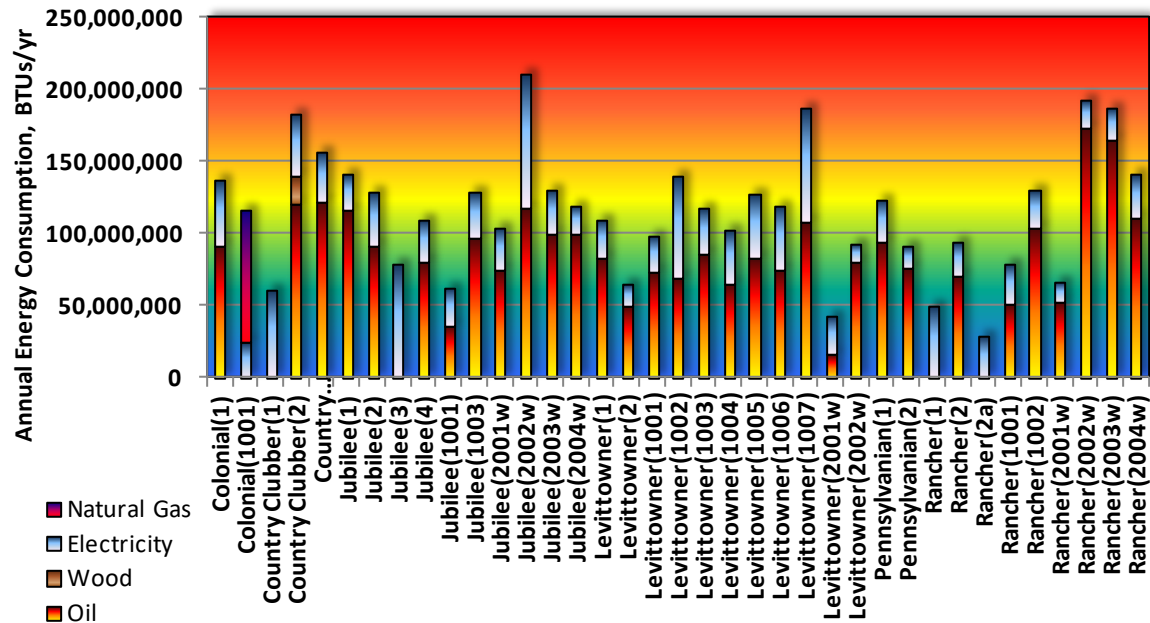
In environmental terms; for the 50+ years of Levittown's existence:

21,000,000,000 (21 billion) pounds of CO₂ have been emitted related to residential energy use.

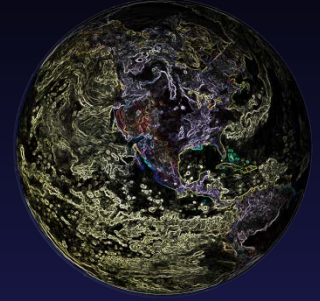
Summary Data



Levittown House Models
Annual Energy Consumption (By Fuel)



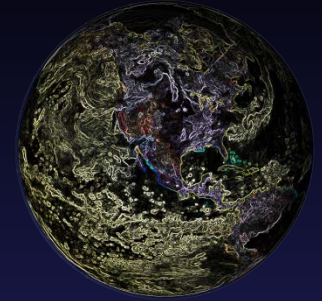
Thermographic (IR) Scan



Sagging
Insulation



Thermographic (IR) Scan



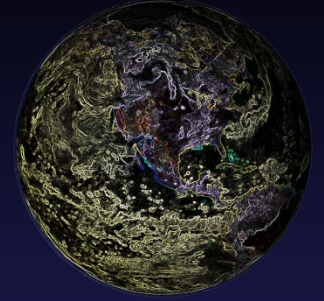
Air
Leakage

Sagging
Insulation

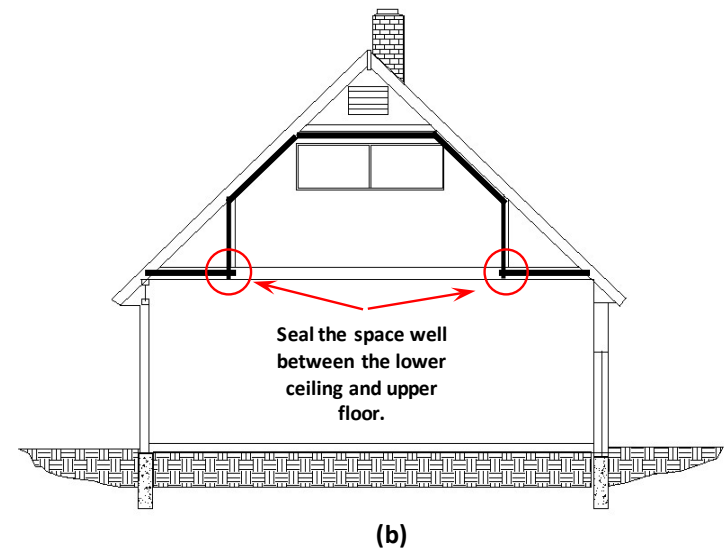
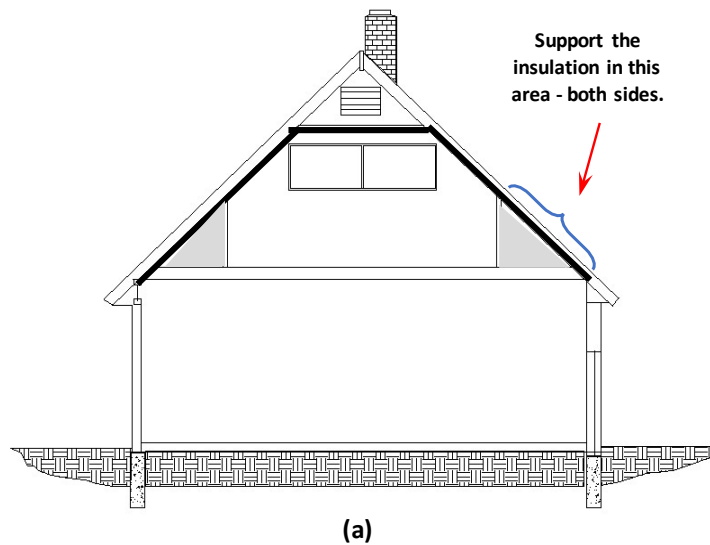
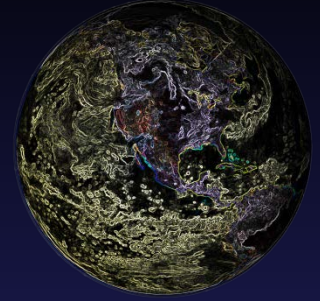
Cold
Joists



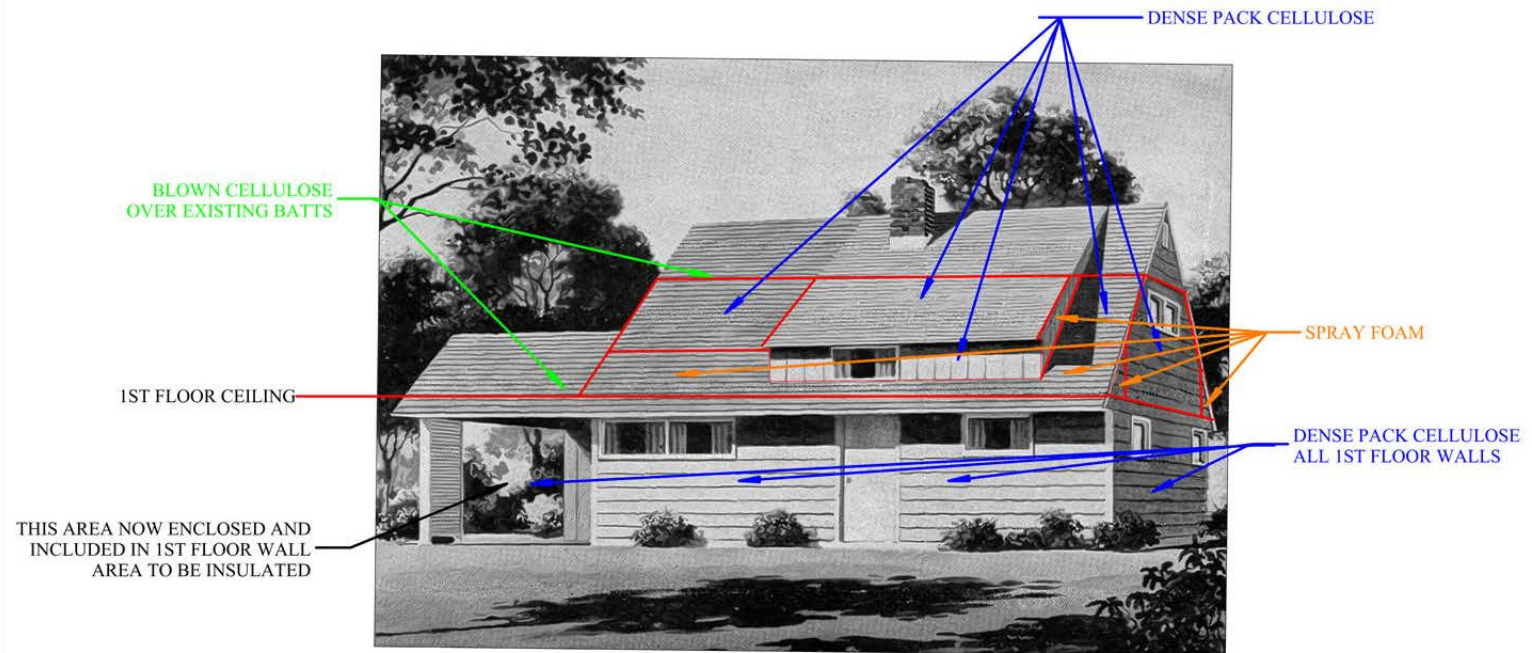
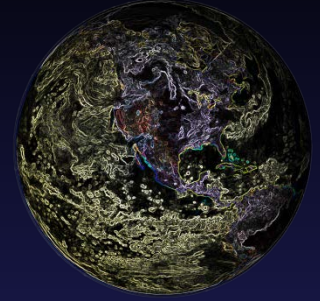
Evidence of Heat Loss



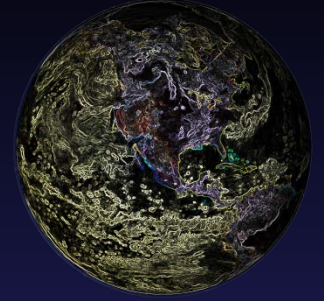
Re-Insulation



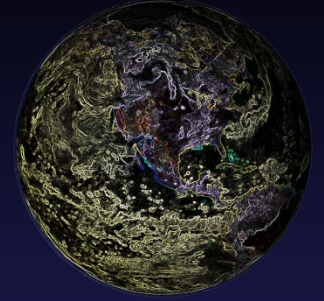
Insulation Plan



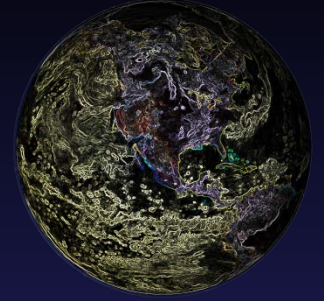
Spray Foam Addition



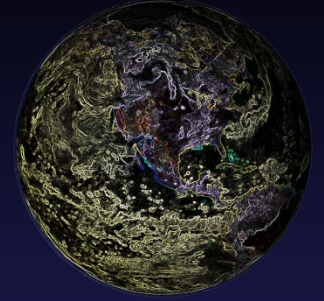
Cellulose Addition



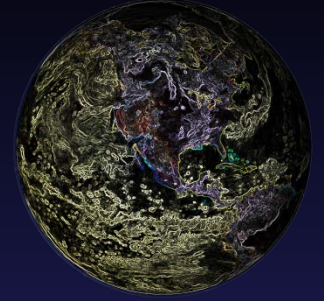
Caulking/Sealing



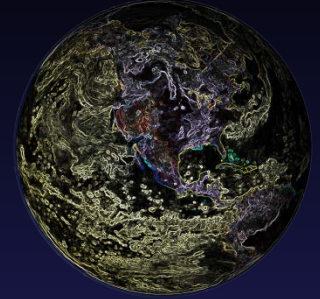
Caulking/Sealing



Ready for Drywall



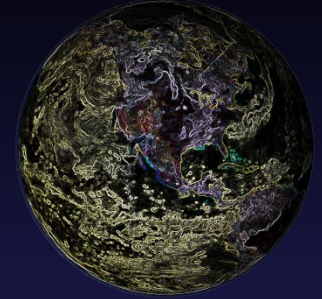
Weatherization Focus



Although we have focused on weatherization, we also need to consider other factors:

- Appliances (water heater, refrigerator, dish washer, clothes washer, etc.).
- Lighting – conversion to LED, use of occupancy sensors/controllers.
- HVAC mechanicals (efficiency of heating/cooling systems)
- “Vampire” or stand-by loads
- Moisture/humidity control.

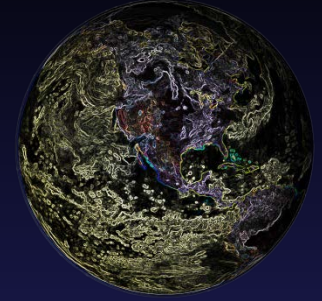
One Example



- Installation of electric hot water heater with time control.
- Replacement of oil-fired heating system with SEER 13 heat pump system.
- Replacement of glass sliding doors with Energy Star units. (24 lf)
- Replacement of entry doors with Energy Star units.
- Window replacement with Energy Star units.
- Replacement of all appliances with Energy Star units.
- Re-insulation of exterior walls from R-9 to R-15.
- Re-insulation of attic spaces to R-30+.
- Installation of fireplace enclosure.
- Installation of bathroom exhaust fans.
- Miscellaneous caulking/sealing.
- Replacement and upgrade of garage door with insulated unit.
- Conversion of lighting from incandescent to CFL to LED.
- Installation of roof-mounted solar PV system.
- Replacement and upgrade of heat pump system from SEER 13 to SEER 21.

This house is
expected to be net
zero (or better) in
2022.

A Final Thought

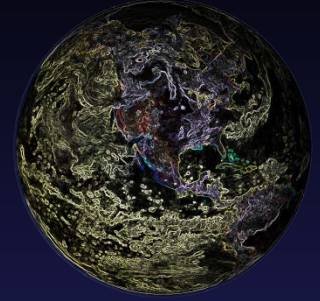


Don't be discouraged by the work that needs to be done.

- Make a plan
- Work the plan in pieces you can manage.

Good luck with your project!

Resource Links



Levittown Study [Microsoft Word - Residential Housing \(livin-in-l-town.com\)](http://www.livin-in-l-town.com/MicrosoftWord-ResidentialHousing.doc)

Levittown Insulation [InsulationNotes.pdf \(livin-in-l-town.com\)](http://www.livin-in-l-town.com/InsulationNotes.pdf)

Levittown Slab Edge Sealing [SlabLoss.pdf \(livin-in-l-town.com\)](http://www.livin-in-l-town.com/SlabLoss.pdf)

DOE Insulation Information <https://www.energy.gov/energysaver/insulation>