



APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 2, 2017.** Please include this application form with electronic entry.

PROGRAM INFORMATION

County: Arlington County
Program Title: Energy Lending Library
Program Category: Environmental

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR CHIEF ADMINISTRATIVE OFFICER

Name: MARK J. SCAMONIZ
Title: COUNTY MANAGER
Signature: Mark J. Scamoniz

**Virginia Association of Counties
2017 Achievement Awards Application
Arlington County Energy Lending Library**

Short Overview:

Arlington's Initiative to Rethink Energy (AIRE) is committed to helping County residents save energy and leave a lighter footprint on the environment. In 2016, the AIRE program was the first community in the country to launch an Energy Lending Library (ELL). In partnership with Arlington Public Libraries, the ELL offers residents tools to identify energy efficiency opportunities. It's now as easy to check out a book as it is to check out a thermal camera, a box of 10 different LED bulbs, an energy meter to manage home electricity use, and Do-It-Yourself energy retrofit books. These tools help residents spot energy opportunities and help them to take action to fix them.

This program is unique because it provides a new resource to residents, reaches more diverse audiences, relies on a close partnership with Arlington Public Libraries, and directs residents to action-oriented solutions (e.g. tools, solar co-op, and Home Energy Rebates). The AIRE team freely shares the Energy Lending Library concept with other communities and the program has been emulated by regional jurisdictions and other jurisdictions nationally are exploring the implementation of a similar program.

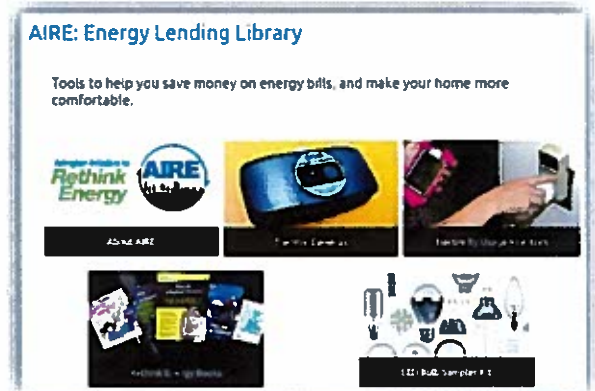
Problem and Challenge:

The Rethink Energy Program helps our community make smart decisions about energy and supports individual actions to improve and sustain Arlington's quality of life. Arlington's Community Energy Plan (CEP) establishes a specific greenhouse gas emission reduction (GHG) goal for the County -- reducing GHG emissions by 75 percent by 2050. Extraordinary measures are required to achieve this goal and the entire community must be actively engaged and involved. Many Arlington homes were built with little

to no insulation and homeowners have made multiple home improvement choices over the decades. This leaves our community with an aging housing stock that could benefit from home energy retrofits to make them more comfortable, save energy, and leave a lighter footprint on the environment.

Program Description:

The Energy Lending Library has several components that can be checked out at the Library. The goal is to increase energy awareness and move people to take action toward energy efficiency. The ELL was rolled out in 2016, at approximately the same time as Arlington’s [Home Energy Rebates](#). These tandem programs provide solutions to issues discovered by residents.



Energy Lending Library Components:

- **Thermal Cameras**

The camera attaches to a smart phone and, with the addition of a free app, the camera takes thermal images. The cameras see what your eyes can't. Thermal images indicate where insulation may be missing or where air is leaking in or out of the house. The comprehensive instructions and helpful hints included with the camera

explain what to do if the resident identifies areas that need insulation and air sealing.

The thermal cameras are loaned in a custom-made case with laminated instructions and a user guide.

Six thermal cameras (three Apple and three Android versions) were placed in circulation



in April 2016. Within the first week of launching, there was a waiting list of almost eight months. AIRE purchased six additional cameras and placed them in circulation. The wait list continued to grow even with additional cameras in circulation. To meet demand, 13 additional cameras were purchased. There are now a total of 23 cameras (16 Apple and 7 Android) in circulation. The Apple cameras have been significantly more popular than the Android version. The cameras have been used continuously since the launch and there is now about a 2-week wait to borrow the cameras.

Supplemental Information provided with the camera:

- Using a Thermal Camera Guide: <http://bit.ly/2qkJUSE>
- Thermal Camera Video: <http://bit.ly/2rVdxeu>

- **LED Bulb Sampler Boxes**

Changing to LED bulbs is the easiest way to make a *switch* and reduce energy use at home. That said, have you walked down the lighting aisle of Home Depot, Lowes, or your local home builder store lately? The options are dizzying! Instead of buying a simple 60-watt bulb, residents must now know about bulb and base shapes, brightness (lumens), energy (watts), and color (Kelvin).

The AIRE program tries to take the guess work out of this process by offering an LED Bulb Sampler box. The Bulb Sampler boxes allow library patrons to sample ten different LED lights at home without having to buy a variety of expensive bulbs they may not like. The Sampler includes standard bulbs of different brightness levels and color, recessed fixture bulbs, chandelier bulbs, a bathroom vanity bulb, a three-way bulb, and an LED nightlight. The LED bulbs are loaned in a

custom-made case with information noting each type of bulb, cost, brightness, color, and brand. A shopping guide is also included. (see attached documentation and <http://bit.ly/2qX7uHb>)



- **Electric usage meters (aka Kill-a-Watt)**

The typical American home has 40 devices that are continuously drawing electricity. It's only a small amount of power per house, but it adds up. Some of the main energy culprits in the home are the computer printer, DVD player, laptop, coffee maker, TV, stereo system, game console, microwave oven, or cell phone charger. Many culprits continue to operate after the appliance is turned "off."

The Energy Lending Library includes 23 Kill-a-Watt meters available for patrons to check out. These devices let patrons track what is using energy at their house, how much energy is used, and what it is costing them.

- **Program Costs, Staffing, and Results**

- Each **LED Sampler Box** costs approximately \$125, including the ten bulbs, customized case, and educational materials. (8 Sampler Boxes Total = \$1,000)
- Each **Thermal Camera** package costs approximately \$300, including the thermal camera, customized case, and educational materials. (Initial investment for 6 cameras = \$1,800. Additional 17 cameras purchased due to demand = \$5,100. Total = \$6,900)
- Each **Energy Usage Meter (Kill-a-Watt)** costs approximately \$18 each. (23 meters Total = \$414)
- Books were already owned by Arlington Public Library.

Energy Lending Library Loan Metrics

Component	Launch date	Number of loans
LED Bulb Sampler	February 2017	64
Thermal Camera for iPhone	May 2016	206
Thermal Camera for Android	May 2016	92
Energy books – Adult	May 2016	181
Energy books – Children	May 2016	72
Kill-a-Watt Meters	Spring 2010	116
		Total Loans 731

All the outreach materials including how-to guides, video, photos, web design, and graphic design were created and produced by AIRE program staff. The partnership with Arlington Public Libraries is key to the program success. Library staff have offered creative solutions to loaning the unconventional Energy Lending Library materials and have been enthusiastic and supportive partners. No contractors were used to create this program or associated materials. Arlington is sharing all of these materials for other jurisdictions to use and amend as they see fit to implement similar programs.

- **Brief Summary:**

Arlington's Initiative to Rethink Energy (AIRE) helps county residents and businesses save energy and reduce utility costs. Arlington's Community Energy Plan establishes a specific greenhouse gas emission (GHG) reduction goal for the County – reducing GHG emissions by 75 percent by 2050. The entire community must be actively engaged and involved to meet this goal. The Energy Lending Library, developed in partnership with Arlington Public Libraries, offers hands-on tools and detailed information for residents to address their own energy use and efficiency opportunities and directs them to County-sponsored energy efficiency focused incentive programs (such as energy efficiency rebates and solar co-op programs).

The Energy Lending Library offers several items that any Arlington resident can borrow at no charge. The components include thermal cameras (for use with iPhone and Android devices), LED Bulb Sampler boxes, home energy meters, and a curated collection of energy books for adults and children. The cameras allow residents to identify missing insulation or air leaks in their homes. The LED Sampler gives residents the opportunity to test a variety of LED bulbs before purchasing. The energy meters provide information on the energy used by home appliances and electronics. The curated book selections offer specific energy information for the homeowner.

Since the first week, the thermal cameras and the LED bulb sampler have been oversubscribed and a waiting list is maintained. In order to address the overwhelming interest in the cameras, additional cameras were purchased shortly after the initial launch. Participation remains robust. The AIRE team freely shares the Energy Lending Library concept with other communities and components of the program has been emulated by several other jurisdictions. Partnership with Arlington Public Libraries is key to the success of the program.

Additional Energy Lending Library Promotional Program Materials:

LED bulb sampler Outreach Guide

YOUR GUIDE TO LED LIGHTING

Brought to you by

Arlington Initiative to Rethink Energy

YOUR SHOPPING GUIDE TO LED LIGHT BULBS

Consider both brightness and color when buying light bulbs. Use the chart below to select energy efficient LED bulbs.

Lumens = Brightness
Watts = Energy

Watts (energy)	Lumens (brightness)
40	450
60	800
75	1100
100	1600
150	2300

You used to look for (pointing to Watts) *Now you look for* (pointing to Lumens)

Light bulbs come in an array of colors. Choose the color of light that you prefer.

Kelvin (K) = Light Color

2700K warm & soft white
4000K cool & natural white
5000K natural & blue daylight

LED BULBS LAST 25 TIMES LONGER

1 LED = Number of light bulbs necessary for 25,000 hours of use

4 CFL

25 INCANDESCENT

Source: U.S. Environmental Protection Agency's ENERGY STAR Program

SAME BRIGHTNESS, LESS ENERGY

800 LUMENS = 10 Watt = 15 Watt = 60 Watt

Wattages are approximate. Source: Cree Inc.

ENERGY COST COMPARISON

1 BULB FOR ONE YEAR

\$1.20 = \$1.80 = \$7.20

10 Watt LED = 15 Watt CFL = 60 Watt INCANDESCENT

Based on 1 light fixture turned on 3 hours per day per Dominion Virginia Power's (DVP) electricity rate (11 cents/kWh). Rounded to nearest 10 cents.

ENTIRE HOUSE FOR ONE YEAR

Entire house — 25 light fixtures turned on 3 hours per day

\$30 = \$45 = \$180

10 Watt LED = 15 Watt CFL = 60 Watt INCANDESCENT

Based on 25 light fixtures turned on 3 hours per day per DVP's electricity rate. Rounded to nearest \$5.

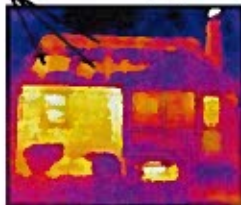
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Thermal Camera Outreach Guide

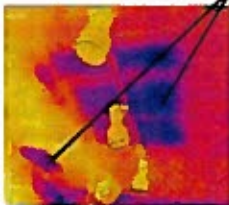


Using a Thermal Camera A Picture is Worth a Thousand Words

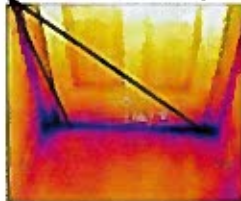
Missing roof insulation



Missing attic insulation



Air leaks at the front door



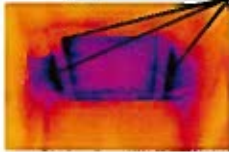
Floor and outlet air leaks



No basement insulation



Attic access air leaks



Using a Thermal Camera A Picture is Worth a Thousand Words

A thermal imaging camera is a great tool because it can see what your eyes can't. You can use the camera to see air leaks and missing insulation in your home. Insulation and air sealing are key to home comfort and lower utility bills.

To get started, here are a couple ideas of where to point the thermal imaging camera in your home.

- | | |
|-------------------------------------|--------------------|
| Doors and windows | Ceilings and walls |
| Recessed ceiling lights and outlets | Fireplace |
| Exterior of your home and roof | Attic access areas |

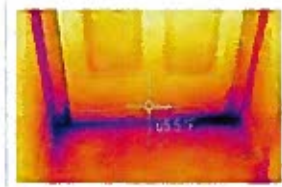
It is best to use the camera when the temperature difference between the outside and the inside of your home is 20 degrees or more.

Here are a few examples of how the thermal imaging camera can be used.

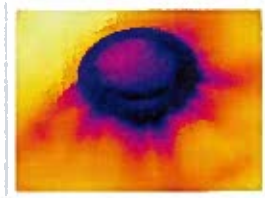
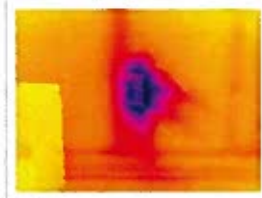
These images were taken in winter and show cold air getting into a warm house. They show cold areas as blue and purple. The yellow, orange, red, and white areas are warmer. When looking at the inside of your home in the winter, blue and purple indicates that cold air is leaking into your home. When taking photos in the winter from the outside, yellow, orange, and red areas show where heat is escaping from your home.

In the summer, leaking windows and doors will likely be warmer (warm air leaking in from the outside). Missing insulation will likely appear as warmer as well, when viewed from the inside.

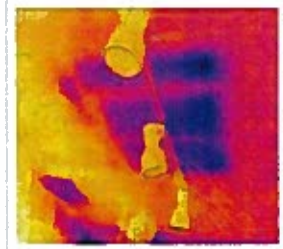
Doors and windows are areas that commonly leak and create drafty homes. The image on the left shows cold air leaks around a front door that can be fixed with weather stripping. The image on the right shows a cold air leak around the window trim. This gap can easily be sealed with a bead of caulk.



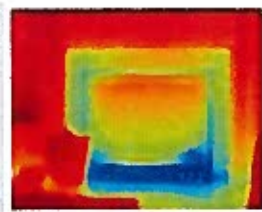
Recessed ceiling lights (a.k.a. can lights) and electrical outlets are often installed in rough openings that are not sealed. You can caulk recessed lights and install foam gasket covers to keep drafts from getting in through your outlets. These images show air leaks getting in through an outlet (photo on left) and air leaks around a recessed ceiling light (photo on right).



Ceilings and walls can be tricky in Arlington homes. Many Arlington homes were built when insulation wasn't widely used. Top floor ceilings with an attic above are often poorly insulated. The walls of upstairs rooms with crawl space behind them (a.k.a. knee walls) are also areas where added insulation can make a big difference. This image shows an area of missing insulation above track lighting in a ceiling.

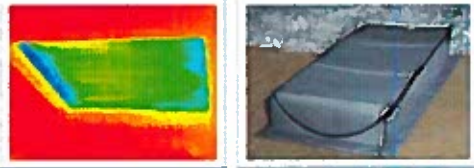


Fireplaces are common sources of air leaks. Fireplaces are not used often in most homes but create drafts all year. An inflatable chimney balloon is a simple do-it-yourself fix for leaking fireplace dampers. The balloon inflates to seal the chimney opening completely when not in use and can be quickly removed when you are ready to light a fire. The images below show an unsealed fireplace on the left and a chimney balloon on the right.



Thermal Camera Outreach Guide <Continued pg. 2>

Attics are often accessed through a pop up panel or a pull down hatch with an extending ladder. Either way, a well-sealed attic access panel can help save energy and money. Below is an image of a leaking attic hatch taken from inside the home (photo on left). The image on the right shows an attic tent as viewed from the attic. The attic tent prevents air from getting in or out of the living space from the attic. The attic tent is easily stapled in place and zips open and closed when attic access is needed.



Attic and roof insulation are critical to keep heat in during the winter and prevent the summer sun from heating your house up. In the photos below, the thermal image (top photo) was taken without snow on the roof and shows areas where insulation is missing inside the roof. The bottom image was taken a month later and shows a clear correlation between the missing insulation and snow melt (snow melted on the roof in areas where there is no insulation).



What if you find an issue?

If you are handy and can use a caulk gun or install insulation, give it a try! If not, you can contact a local contractor to help.

Getting an energy audit is the best way to comprehensively evaluate your home. An energy audit provides you with a prioritized list of actions to take in order to save energy and money. Energy auditors can also connect you with skilled weatherizers and insulation installers to help make your home more energy efficient and comfortable. BPI Certified contractors are trained to do energy audits.

BPI Certified Contractor Search:

http://www.bpi.org/individual_locator.aspx

Questions or more information?

Send questions to Arlington's energy inbox: energy@arlingtonva.us

Visit our website for more information: www.arlingtonenergy.us

LED Sampler Box Information on Each Bulb

BOX OF BULBS INFORMATION

Use this guide to learn about the bulbs in the box and find the preferred color, brightness, and shape for your home. Bulbs were purchased from a local homebuilder store. Bulb selection is not intended as an endorsement of or preference for a particular brand.

#1



Brand: LumaPro
Brightness: 800 Lumens - 60 Watt Equivalent
Color: 2700 K - Soft White
Cost: Approx. \$5
Bulb life: 25,000 Hours - 22 Years

#2



Brand: EcoSmart
Brightness: 1100 Lumens - 75 Watt Equivalent
Color: 2700 K - Soft White
Cost: Approx. \$5
Bulb life: 25,000 Hours - 22 Years

#3



Brand: EcoSmart
Brightness: 1100 Lumens - 75 Watt Equivalent
Color: 5500 K - Daylight
Cost: Approx. \$5
Bulb life: 25,000 Hours - 22 Years

#4



Brand: FEIT Electric
Brightness: 210 Lumens - 40 Watt Equivalent
Color: 2200 K - Warm White
Cost: Approx. \$5.50
Bulb life: 15,000 Hours

#5



Brand: EcoSmart
Brightness: 250 Lumens - 25 Watt Equivalent
Color: 2700 K - Soft White
Cost: Approx. \$3
Bulb life: 25,000 Hours - 22 Years

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LED Sampler Box Information on Each Bulb <Continued pg. 2>

#6



Brand: Archipelago Lighting
Brightness: 330 Lumens - 40 Watt Equivalent
Color: 2400 K - Warm White
Cost: Approx. \$10
Bulb life: 25,000 Hours - 22 Years

#7



Brand: Maxima
Brightness: n/a
Color: Green
Cost: Approx. \$2.5
Bulb life: n/a

#8



Brand: Phillips - 3-Way bulb
Brightness: 40/70/100 Watt Equivalent
Color: 2700 K - Soft White
Cost: Approx. \$11
Bulb life: 25,000 Hours - 22 Years

#9



Brand: Phillips - Indoor/Outdoor Light
Brightness: 800 Lumens - 75 Watt Equivalent
Color: 5000 K - Daylight
Cost: Approx. \$7
Bulb life: 25,000 Hours

#10



Brand: EcoSmart Can Light - Indoor
Brightness: 938 Lumens - 75 Watt Equivalent
Color: 2700 K - Soft White
Cost: Approx. \$5
Bulb life: 25,000 Hours

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News Articles / Press Releases / Supporting Documentation

- Press Release, Nation's First Energy Lending Library: <http://bit.ly/2qQhF1V>
- U.S. DOE Better Buildings, Arlington Ups the Ante on Energy Efficiency: <http://bit.ly/2ri9MUg>
- Arlington Magazine, 2016 Editor's Pick: <http://bit.ly/2qX6kxz>
- Other Communities that are emulating the Arlington Energy Lending Library model:
 - <http://www.fairfaxcounty.gov/energy/energyactionfairfax/cameras.htm>
 - <https://fcnp.com/2017/02/14/f-c-offer-new-energy-lending-library/>
 - <http://bit.ly/2rVg6NL>
 - Prince Williams County – Exploring Thermal Camera Lending
 - Other local governments and utility outreach programs have reached out to inquire about starting a similar program.
- ARLnow News Blog: Box of Bulbs: <http://bit.ly/2qQipE5>
- ARLnow News Blog: Thermal Camera: <http://bit.ly/2qhhPfs>
- ARLnow News Blog: Energy Meters: <http://bit.ly/2dG5rin>
- ARLnow News Blog: Home Energy Rebates: <http://bit.ly/2qcTbB3>
- ARLnow News Blog: Energy Lending Library: <http://bit.ly/2qX4QTR>

