"Hot Stuff"
Energy efficiency measures we can take in our homes

The Climate and Environment Committee hosted a forum on Saturday afternoon, February 28th. The topic was "Hot Stuff," and we explored how we can reduce our consumption of energy – gas (or oil) and electricity – by undertaking a variety of measures. Most of these steps cost little, cause no reduction in comfort, yet can save homeowners hundreds of dollars a year – and reduce our contribution to pollution and greenhouse gases.

The audience heard from four speakers: Stu Sessions, town resident and an environmental economist, who provided an introduction on what we spend on energy utilities for our homes. Following him was John Brochu, a consultant with Steven Winters Associates, who spoke about low cost, simple steps that can be taken to reduce energy consumption, including programmable thermostats, duct sealing and low-flow shower heads. Next up was Mike Geary, from Supreme Air. Mike, an evaluator and designer of HVAC systems, spoke about the state-of-the art technologies for heating and AC, and the substantial savings that can be achieved in lower fuel and electricity costs. Finally, William Ellis from Pepco provided an overview of the various rebates and programs that Pepco offers to help residents pay for the measures we discussed. Barney Rush, town resident and energy consultant, served as moderator. Thanks also to Julia Craighill and Kirk Renaud who joined in helping to organize the event.

What do we spend, and what do we spend it on?

Stu Sessions offered the following information, based on an average 3,000 sq. ft. home in the Town of Chevy Chase:

Item	Annual Bill
Entire Home	**$3,970**
Heating	$1,550
Cooling	$850
Hot water	$220
Major appliances	$580
Lighting	$420
Minor appliances	$350
Electricity (Pepco)	*$2,200*
Natural gas (WGL)	*$1,770*

Heating (including hot water) and cooling account for 65% of the nearly $4,000 average total bill for a year. So these items are the logical place to focus for the greatest possible reductions in cost. Almost everyone in Chevy Chase uses gas for heat, with nearly 60% using a gas furnace with forced air, and just over a third using a gas boiler with radiators. Over 80% of the homes have central air, with most of the remainder using room units.

What are some of the simple things we can do to cut our bills and improve home efficiency?

John Brochu offered many good ideas on ways we can have comfortable homes with lower bills. His key ideas were the following:

- Get an energy audit. There are many firms that will undertake a systematic evaluation of your home, determining the best and most significant ways to reduce costs. Pepco will provide a "quick home energy check-up" for its customers at no cost, or will contribute toward the cost of a full audit.

- Use programmable thermostats. At a minimum, every home should have a programmable thermostat for each zone of heating and cooling. Most of these controls permit temperatures to be changed for four different times during the weekday, and set for four different times over the weekend. Different settings can also be applied for the heating and cooling seasons. These only take a few moments to program, but can make a very large difference. With forced air systems, you can easily set back the temperature by 10 to 15 degrees (on the main floor, overnight, when everyone is sleeping upstairs, for example), and John estimates that there will be a 1% savings for every 1 degree of reduced temperature over an 8 hour period. This alone could generate $240 - $360 of savings per year! Please note, however, that radiator systems and thermal floor systems can't react as quickly as forced air systems, and therefore cannot accommodate such significant temperature shifts. For these systems, it is generally better to use setbacks of no more than 5 degrees, although if you're out of the house for over 8 hours, you could set the thermostat down by as much as 10 degrees – recognizing that it could take 30 minutes to bring the home back up to your desired temperature.

  Many have heard of the new technology of "smart" thermostats, such as Nest, owned by Google, or Honeywell's Lyric system. These programmable devices have sensors that can tell when people are moving – and hence will turn down the heat in an area when it can tell no one is in the vicinity. They also "learn" the habits of the household over time, and will adjust thermostats accordingly; and finally, they are accessible from a smart phone app, so the homeowner can control temperature remotely. Several Town residents have the Nest and are happy with it.

  A "smart" thermostat may offer some degree of incremental control over older programmable thermostats. However, the major source of improvement arises from simply using the full range of options which any programmable thermostat offers. Many people have programmable thermostats but less than half use them effectively. The "smart" thermostats learn when you tend to like things warmer and when cooler, so they can give you the savings from adjusting your temperatures without you actually having to program them to do so. **So John's major point: whether you own a good programmable thermostat or will now buy one, the most important thing is to USE it!**

- Better Duct Sealing and Insulation: Poor duct work – a combination of bad seals and inadequate or no insulation – can cause a homeowner to lose 15 – 30% of the heating and cooling energy that he or she would want to deliver to the rooms that are used. No reason to heat and cool the attic or a crawl space!! Studies by Steven Winters Associates show that a reduction in such losses from 30% to 5% can save $300 per year.

  No one is recommending that people tear into dry wall to get at their duct system, but in fact, most residents will find that a lot of their duct work is quite accessible, either in their attic or basement. The duct work tends to be accessible when it passes through the areas that you typically don't want to heat or cool, which is where sealing and insulation are most important. Also, for sealing, there is a technique for blowing sealant through the interior of the duct work, which requires no external access, but this can cost $2,000 or so and should be considered only after a professional evaluation. As for insulation, sealing the exterior of accessible ducts where they go through unconditioned spaces can be readily done by the homeowner if he or she wants to, with supplies purchased at any DIY store.

- Consider Ceiling Fans: Ceiling fans will allow you to stay comfortable with more efficient settings in rooms you are using. The moving air can cut the costs of both heating and cooling substantially. In the winter, a slow moving fan can bring the warm air that has risen to the ceiling back down to where people are. In the summer, a faster moving fan can make you feel several degrees cooler than you would in still air. Stu mentioned that a typical house will spend approximately $800 over the summer season on electricity for air conditioning. Over the same time period, the cost of running 6 fans – enough to cover many of the rooms used most frequently in a house – would be only $35. It would be unusual to find that one would not use AC at all with ceiling fans, but several hundred dollars per year could be saved by using the AC a lot less. Open the windows on a spring night, with ceiling fans, and you can stay comfortable with no AC until well into the late spring or early summer warmth.

- Lower the temperature at your hot water heater and insulate pipes. Do you really need the setting that your heater is set to? If you don't, you could save 3 – 5% for every 10 degrees you lower the setting. However, Will Ellis suggested that health hazards could result if you reduce the temperature to less than 120 degrees. You can also save another 3 – 5% just by insulating the pipes leading out of the water heater. These are often exposed in your basement, and can be readily accessible. (Please note that insulating the hot water heater itself is not needed or recommended.)

- Switch to Low-Flow Showerheads. For a family of four, switching to these showerheads can save 45 gallons per day of water – over 16,000 gallons per year, with savings of approximately $200 per year just in water charges. John acknowledged that earlier versions of this technology had some problems, but that the modern models work as well as or better than many conventional showerheads. There will be further savings from not heating all the shower water that you are not using

- Clothes washers and other appliances: If you're in the market for a new clothes washer, consider a front-loading unit: It uses only 1/3 the amount of electricity and water of top-loading units. Pay attention to energy ratings, including Energy Star certification, when you get a new clothes washer, dishwasher or other appliance. It is usually worth it to pay a little more for an appliance that will save you money over the long run.

- Certifications: If any resident is interested in having his or her home certified to a LEED or ENERGY STAR standard, John would be happy to help. Please contact him at jbrochu@swinter.com.

What are the advantages of up-to-date AC and heating systems?

Most of us will only consider purchasing a new AC or heating system when our trusty current systems break down – and then, of course, we're in no position to shop carefully and pick the units that really make sense for the long term. It was therefore very helpful to have Mike Geary with us, to offer us an understanding of the value in replacing old and inefficient systems before they break down – when we can prepare to make wise choices. If you wish to follow up with Mike directly, he can be reached at: mikeg@supremeairllc.com.

- Heating: The efficiency of gas furnaces and boilers has improved steadily over the past 20 years – from approximately 80% to as high as 96% efficient. As Mike put it succinctly, the lower the efficiency, the more heat you are sending up the flue and into the outdoors – helping the town stay a bit warmer. So a new furnace which might be 15% more efficient than the old one being replaced should use 15% less gas to heat the home. This would represent a savings of close to $300 per year.

  Mike noted that a furnace can last 25 years or more, but he recommends that it be checked carefully and may need to be changed even within around 20 years if the heat exchanger through which the flue gasses go has deteriorated and combustion gasses (including carbon monoxide) are escaping into the basement instead of being fully vented outdoors.

- Air Conditioning: AC efficiency is measured using the Seasonal Energy Efficiency Ratio, or "SEER" index. The higher the index, the more efficient the unit. Twenty years ago, the best that a new unit could achieve was a SEER number of about 8. Today, all units must have a SEER rating of at least 13 and can range up to 16 or higher. A unit with a 16 rating is twice as efficient as an older one at 8, and so should be able to provide the same level of inside comfort for half the consumption and cost of electricity. Recall from Stu's numbers, above, that an average home spends $850 annually on cooling. But the actual level of improvement compared to an old unit may be even more than double, since the efficiency of AC systems declines over time, so an old unit sold with a SEER value of 8 in 1990 may have a rating of only 4 now – making a new unit four times more efficient than the unit it might replace.

In addition to higher efficiency, many new AC units can operate at two or more speeds, and can therefore run at lower speeds on a more continuous basis – which is a more efficient and more comfortable than older binary systems which turn on at a high speed, and then off, cycling as required.

Purchasing a new central AC unit large enough for one floor (one zone) of an average home in Chevy Chase will be approximately $5,000; and double that for two floors or zones. As Will Ellis explained, Pepco can help out: the utility offers a rebate of $500 for systems with a SEER exceeding 16, and $1,000 if the SEER is 18 or over. Annual electricity costs should decrease by several hundred dollars per year.

- Air Source Heat Pumps: Residents may want to consider air source heat pumps, which can be considered an air conditioner that can also run in reverse to heat rather than cool the home. In heating mode, the compressor of the heat pump extracts heat from the outdoor air and brings it inside. This can eliminate the need for the furnace to run on mildly cold days, or reduce the running time of the furnace on cold days. The heat pump will decrease the consumption of natural gas but increase the consumption of electricity (to run the compressor). Whether there is a material net benefit to the consumer depends upon the relative prices for electricity and natural gas, and the area climate. This appliance may make sense for residents, but should be carefully assessed. Like air conditioners, heat pumps need a duct system to transmit the conditioned air that the produce; they are not an option if you have radiators.

- Geothermal (Ground Source Heat Pumps): These heat pumps include an underground layout of pipes which pass through the deeper layer of earth which is a nearly constant 50 degrees year around. Water passing through these pipes is cooled to this temperature during the summer, thereby eliminating the need for any outdoor AC. In the winter when the geothermal heat pump works to provide heat, it is much more efficient than an air source heat pump because it is drawing heat from a source at 50 degrees as opposed to -- in the case of an air source heat pump on a cold day -- from a source at 20 or 30 degrees. In addition to all this geothermal systems can produce hot water as well for free without any additional energy usage.

  Because of the drilling which must be undertaken, these systems can cost approximately $30,000. However, a 30% tax credit is currently available against Federal taxes, a substantial grant of $3,000 is also available from the State of Maryland, and additional rebates are available from Pepco. As a result, Mike stated, the payback on the system could be in the range of 5 years. The following link, from Supreme Air's website, provides an example: http://www.supremeairgeothermal.com/montgomery-county-geothermal.asp?gclid=Cj0KEQiA1NWnBRDchObfnYrbo78BEiQA-2jqBanFam2gCRdYi9Yf2hTqcPfcFkyPP1IAyf09j9B_bLQaAgkf8P8HAQ

- Group Discounts for Town Residents

  To help town residents assess their options – and possible savings – regarding the purchase of new heating and AC systems, Supreme Air is offering a discount program. The Climate and Environment Committee will be providing additional information about this shortly. In addition, you can also contact Mike Geary by email at Mikeg@supremeairllc.com to learn about potential discounts.

How can Pepco help?

William Ellis explained that Pepco offers an extensive array of rebatesand other assistance to encourage homeowners to improve energy efficiency. A few of these have been mentioned above. Below is the complete listing. More information is available at: http://www.pepco.com/my-home/save-money-and-conserve-energy/efficiency-rebates-and-incentives-and-programs/md-customers/. Will Ellis can be reached at: wrellis@pepco.com.

- **Quick Home Energy Check-up**
  - No additional charge to customer, includes Direct Install Measures Customer can request check-up on pepco.com or by calling 1-866-353-5798

- **Lighting Discounts**
  - In-store markdowns for ENERGY STAR® qualified products
  - CFL $1.50 Single Bulb, $3.00 Multipack
  - Light Emitting Diode "LED" Lamps and Fixtures $10 incentive

- **Appliance Rebates**
  - Mail-in rebates for ENERGY STAR® qualified: Refrigerator up to $150, Washer up to $100, Freezer $75, Dehumidifier $25, Electric Heat Pump Water Heater $350

- **Appliance Recycling**
  - Refrigerator, Freezer, Room A/C. Removal, transport, and deconstruction of the old unit in exchange for an incentive payment to the customer
  - Refrigerator and A/C Recycling $50 incentive
  - Room A/C $15 incentive
  - Customer schedules appointment directly with vendor

- **Home Performance with ENERGY STAR®**
  - $100 Comprehensive Home Energy Assessment, with Direct Install Measures at no additional charge to the customer
  - Rebates on Air Sealing, Insulation, and Windows - 50% total cost up to $2,000
  - Participating contractors on pepco.com

- **HVAC Efficiency Rebates**
    - Equipment Replacements and Services/Duct Sealing and Performance Tune-up
    - Gas Furnace and Central A/C rebates up to $1,000, Air Source Heat Pump up to $1,250
    - Geothermal (Ground Source Heat Pumps), rebates up to $1,800; Ductless Mini Split A/C, rebates up to $600
    - Participating contractors on pepco.com

- **Income Eligible Energy Efficiency**
    - Administered by the Maryland Department of Housing and Community Development.
    - Rebates up to $10,000 for income eligible customers