

IDEAS TO ACHIEVE GREEN ENERGY SAVINGS



Green Accelerator Project (GAP) Team

OVERVIEW

One of the key components of the Green Accelerator Project (GAP) is to help Rock Spring members become more aware of the impact their energy choices have on the environment and on climate change. The GAP Team has prepared this document to help people go green -- not only to save the planet, but to also **SAVE MONEY**. Here are six steps that can be taken:

Step ONE: Find out how much energy you use on an annual basis – electricity, natural gas or heating oil, gasoline, auto maintenance – and then find ways to save and conserve energy.

Step TWO: Conduct an energy audit of your home. For \$250-450, a professional can survey your home to find out where the greatest cost savings can be achieved with the quickest return.

Step THREE: Choose green electricity. Electricity is the second biggest cause of greenhouse gas emissions worldwide and fossil fuels supply two-thirds of the electricity used in the U.S. The choice you make every day when you flip the switch for your electricity needs has a profound impact on climate change and the future of our world. Purchase 100% green energy from Dominion or another provider. Install solar panels if appropriate.

Step FOUR: Choose green transportation. Transportation has now surpassed the energy used to heat and cool your home as the largest source of greenhouse gas emissions. Green transportation options include mass transit, biking and walking, and making your next car purchase an electric or plug-in hybrid vehicle.

Step FIVE: Green your home. The GAP document includes 17 ideas, including LED bulbs, low-flow showerheads, insulating your attic with blown insulation to a value of R60 and replacing single pane windows with highly efficient e-windows that reflect UV rays.

Step SIX: Decide what investments will yield the greatest savings.

The goal of GAP is to help each one of us become better educated on the energy choices we make, and when appropriate and affordable, to choose the best green energy options. You will be surprised at how much energy you waste and how much energy savings can be achieved. Yes, it will require some up-front investment to achieve energy savings. But if your return on investment can be achieved in the first year, wouldn't it be worth considering? And if the return was achieved in five or ten years, but it meant your kids and grandkids would have a better future, wouldn't that be worth doing?

The ideas and information in the full GAP document can help you chart your course and accomplish your goals to live a greener life. Copies are available in the Saegmuller Room and online at [fill in].

STEP BY STEP GUIDE

Step ONE: Find out how much energy you use on an annual basis.

In order to achieve energy savings, you first have to know what your current usage is. The goal is to become both better informed on how you use energy, and then to consider ways to save both money and the amount of energy:

- a. Electricity. Look at your Dominion bill and see what you spent in the past year. Notice the really high costs of air conditioning in the summer months? Did you have a lower bill when you were on vacation and adjusted the thermostat?
- b. Natural gas or heating oil. How much did Washington Gas charge you for natural gas, or if you still use heating oil, what did that cost?
- c. Gasoline purchases. Many credit card companies provide an annual breakdown of specific expenditures which allows you to tally transportation costs.
- d. Auto maintenance. This is important to calculate because electric vehicles have almost no maintenance costs.

Step TWO: Conduct an energy audit of your home.

Conduct a home energy audit. For \$250-450 you can have a professional come in and survey your home to find out where the greatest cost savings can be achieved. Where are your biggest air leaks? What are the simplest things you can do to make a difference? You don't have to fix everything at once, but it's very important to have a baseline from which to measure future progress. Pick the items that make sense for your budget and bring the quickest return on investment. Two local firms that are highly rated include: [Max Insulation](#) and [Comfenergy](#).

Step THREE: Choose 100% Green Electricity

- Purchase 100% green energy from Dominion or another provider. This is the simplest and cheapest action you can take to save the planet and create more demand for green energy. For a small additional amount per month, Dominion lets you choose 100% green energy (wind, solar, biomass) instead of fossil fuels, i.e. coal and natural gas, for your energy needs. You are already purchasing electricity — more than likely from Dominion. Why not choose to spend those dollars on green energy? Your choice will force Dominion to purchase clean energy on the open market. If enough Virginians choose green energy, Dominion will be more likely to scale back fossil fuel sources, and instead invest in green energy. The Virginia coastline has enormous potential for wind energy but currently this natural resource is untapped. While shutting down coal power plants has been a welcome trend in the last decade, the switch to natural gas has proven to be ineffective in slowing climate change. Recent studies have shown that the [methane released](#) from natural gas drilling more than offsets reductions achieved from switching to coal. Methane is the most potent greenhouse gas on earth. Moreover, natural gas injection wells force enormous amounts of toxic wastewater into shale deposits to free up natural gas. The long-term impact of this process on groundwater is not fully

understood. Finally, the gigantic pipelines (3-4 foot in diameter) needed to transport natural gas create local opposition and negative environmental impacts.

- Install Solar Panels. This is a great way to achieve green energy savings and it puts you in control of your own energy instead of relying on the choices that utilities make. The large upfront costs of installation can take many years to achieve return on investment however. But if your house and property are well suited for solar, this is a great option to consider.

Step FOUR: Choose Green Transportation

Transportation has now surpassed the energy used to heat and cool your home as the [largest source of greenhouse gas emissions](#) in the U.S. When you purchase a new vehicle, carefully consider the choices. Electric vehicles are the wave of the future. GM alone will release [18 models of electric vehicles in the next five years](#) — largely due to Chinese and European markets. This trend is unlikely to change no matter how the U.S. market develops. Today, [GM sells more cars in China than it does in the U.S.](#) While electric vehicles have higher upfront costs, [you can save thousands in gasoline costs and maintenance costs are much lower on electric vehicles](#). When you consider the [average price of a new car](#) is \$36,000, electric vehicles become much more affordable when savings from gas and maintenance are taken into account. In addition, the \$7,500 federal tax credit helps offset the larger upfront costs. (Note: the federal tax credit will begin to expire in 2018 for Tesla and GM because they will have reached the limit of 250,000 electric vehicles allowed for each company to begin start up production.)

- Purchase an electric or plug in hybrid vehicle. Options for electric vehicles include the following:
 - Tesla: \$49 - 100,000 before tax credit. While the Model 3 has had initial production problems, you can now purchase a Model 3 for \$49,000. Range: 235 - 315 miles.
 - Chevy Bolt: \$42,000 before tax credit. Motor Trend Car of the Year. Designed like a small SUV. Range: 235 miles.
 - Nissan Leaf: \$30,000. The largest selling electric vehicle in the U.S. Range: 90 miles.
 - Chevy Volt and Toyota Prius. \$25-35,000. These models can go up to 50 miles on an electric charge before a backup gas engine kicks in to recharge the battery and provide hybrid power for the drivetrain.
- Use Mass transit. DC is blessed with a great metro and bus system. Use it! According to the [American Public Transportation Association](#), “A household can save nearly \$10,000 by taking public transportation and living with one less car. Communities that invest in public transit reduce the nation's carbon emissions by 37 million metric tons annually.”
- Bike and hike. Biking and hiking are wonderful activities for your health. Today, there are many options for bike sharing and bike rental. There are designated bike lanes on major

roads and well-maintained hike/bike trails to help you avoid traffic and get around the city more safely.

Step FIVE: Green Your Home

In the DC area, older homes are seldom energy efficient or adequately insulated, and newer homes are rarely built with energy savings in mind. Is your upstairs really hot in the summer time? Does your AC run nonstop throughout the afternoon and overnight on the hottest days? Does your house have cold spots in the winter? Do you feel a draft near windows? These are common symptoms found in older homes that are not properly insulated and which have single pane windows or old aluminum storm windows. You can spend a fortune heating and cooling such homes, or you can provide an upfront investment of insulation, for instance, that will immediately yield long-term savings. Here are some basics to consider:

- Insulate your attic with blown insulation to a value of R60 — the amount for green homes. Such insulation is over two feet thick and will allow your home to still breathe — while holding warm air in during the winter and keeping hot air out in the summer.
- Install an [attic aluminum barrier](#) to reflect the sun's ultraviolet radiation. When your car sits in the sun the interior can heat up to a life-threatening 150 degrees. This greenhouse effect comes from solar UV rays heating up the internal surfaces. In the same way, your attic temperature can soar to 150 degrees in the hot afternoon sun as the UV rays penetrate and heat up the infrastructure in your attic. A radiant aluminum barrier reflects 97% of all heat and cold, thereby keeping your house warmer in the winter and cooler in the summer. The same principle that keeps the space station comfortable in frigid outer space can work for your home.
- Install a solar fan to ventilate the attic once the temperature reaches 95 degrees or higher.
- Use LED bulbs which use 70% less electricity than traditional bulbs and last up to 25 years.
- Use programmable thermostats like Nest that learn your lifestyle and adjust accordingly. In the winter, set the temperature at 65 at night; in the summer, when you aren't home, turn off the AC. On average, a [programmable thermostat can save you \\$3-400 per year](#).
- Turn out the lights! Too many of us leave lights on, even when no one is in the room or at home. How many times do you see lights burn 24 hours per day on outside porches? Modern homes have so many canned lights that it can rival the outdoors. Our cities pollute the night sky so much that it has [changed the pattern of migratory birds!](#)
- Install motion-activated LEDs so that lights turn off after a few minutes if no one is present. Such lights are especially useful for outdoor needs. Motion-activated lighting is standard in LEED building and is standard in many nations around the world.
- Consider [replacing single pane windows](#) with highly efficient [e-windows](#) that have a metallic glaze to reflect UV rays. Windows are significant source of energy waste, which can amount to 10-25% of your total heating bill. Depending on the climate where you live, [ENERGY STAR windows can save you \\$126-\\$465 a year when replacing single pane windows](#). Window shades, shutters, screens, and awnings can also provide an extra layer of insulation between your home and external temperatures.

- Upgrade your furnace and AC unit to a [90% efficient](#) model. Given how much we use these units and how much they cost to operate, it may well be time to replace an older model. Furnaces that are over two decades old have an AFUE (annual fuel utilization efficiency) rating of around 60 percent – meaning that 60 percent of the fuel becomes heat, and 40 is lost. High-efficiency furnaces feature impressive AFUE numbers, ranging from 90 to 98.5 percent. [Heating and cooling costs constitute nearly half of an average home's utility bills](#), so these reductions in the intensity and frequency of heating and cooling offer the greatest savings.
- Buy the most energy efficient appliances available. Whenever a replacement is needed, it is well worth the money to buy the most energy-efficient models. On average, [appliances are responsible for 13% of your total household energy use](#). When purchasing an appliance, you should pay attention to two numbers: the initial purchase price and the annual operating cost. Although [energy efficient appliances](#) usually have higher purchase prices, their operating costs are 9-25% lower than conventional models.
- Get rid of that old refrigerator (like the one in your garage). Refrigerators in particular have become much more energy efficient in the last two decades. That 20-year-old unit in the garage where extra drinks are stored [is costing you a bundle](#), and it would be wise to get rid of it.
- Consider a [tankless water heater](#). According to the Department of Energy, “For homes that use 41 gallons or less of hot water daily, demand water heaters can be 24%–34% more energy efficient than conventional storage tank water heaters. They can be 8%–14% more energy efficient for homes that use a lot of hot water -- around 86 gallons per day. Other than purchasing an energy efficient water heater, there are three methods of reducing your water heating expenses: you can simply use less hot water, turn down the thermostat on your water heater, or insulate your water heater and the first six feet of hot and cold water pipes.
- Install low-flow showerheads so you use less hot water in the first place.
- Use solar-powered outdoor lighting for your sidewalk, driveway and security needs instead of traditional lighting. Today's models are very bright, and you will never have to worry about underground wiring with solar lights.
- Use the dishwasher and avoid hand washing which uses large amounts of water very inefficiently.
- Install caulk and weather stripping around doors and windows.
- Get rid of energy vampires from electronic gadgets that drain energy 24 hours per day. “Phantom loads,” or the electricity used by electronics when they are turned off or in standby mode, are a major source of energy waste. In fact, it is estimated that 75% of the energy used to power household electronics is consumed when they are switched off, [which can cost you up to \\$200](#) per year. [Smart power strips](#), also known as advanced power strips, eliminate the problem of phantom loads by shutting off the power to electronics when they are not in use. Smart power strips can be set to turn off at an assigned time, during a period of inactivity, through remote switches, or based on the status of a “master” device.

Step SIX: See how much energy you can save!

Make the decision on what investments will yield the greatest savings. You are in the driver's seat so do the easiest and cheapest things first. And remember, you don't have to do everything at once. But it makes sense financially to begin planning energy efficient improvements in stages that are affordable and which will yield long-term savings. Households should set a goal for energy savings that can be reasonably achieved in the coming year. It may be \$200 from small improvements like weather stripping or LEDs, or it could be as much as \$2,000 from an electric vehicle. At the end of the year, households calculate how much energy savings has been achieved. Under the GAP proposal, Rock Spring members are encouraged to contribute whatever savings they achieve into GAP projects to provide solar lighting for rural villagers and local environmental projects.

CONCLUSION

We have grown accustomed to an energy intensive lifestyle that unfortunately is dependent on fossil fuels both in our homes and in our vehicles. The intention of the GAP project is to make all of us more aware of excessive energy use and overreliance on fossil fuels in order to take advantage of the green choices that are available to us today. **The bottom line is simple: we don't have to sacrifice our modern lifestyle to live in a sustainable way that protects the planet.** Moreover, technological leaps in the last decade have made it very affordable to go green – potentially saving thousands of dollars over the long term in energy costs. Today, the smart choice to protect the planet and **SAVE MONEY** is going green. Yes, it will require some upfront investment to achieve energy savings. But if your return on investment can be achieved in the first year, wouldn't you consider doing that? And wouldn't it be worth considering if the ROI was achieved in 5 or 10 years – especially if it meant your kids and grandkids have a better future? Today, it costs between [\\$250-500,000](#) to raise a child, depending on how much you pay for education. That's a lot of money! Doesn't it also make sense to spend a few extra dollars **now** to make sure that our children have a healthy planet to live on **in the future**?!? GAP can help you accomplish these goals.

For More Information, Check Out These Additional Resources:

- [Department of Energy: Energy Saver Guide](#)
- [9 Home Upgrades That Are a Good Investment for You and the Planet](#)
- [12 Ways to Save Energy and Money](#)
- [100 Ways to Save on Your Energy Bill](#)