Meet Some Frederick County Renewable Stars

David and Jan Barrow's 16.9 kW solar PV System

Long before Myersville residents David and Jan Barrow installed renewable energy systems, they focused on being efficient with their use of energy. When they built their house in 1995, they positioned it due south to take advantage of passive solar heating. This was their first step in using renewable energy. They also built their house with a larger than normal overhang to prevent the summer sun from entering the house.

When they upgraded their deck to an enclosed sunroom, they chose to use an energy efficient pellet stove to provide heat to the new room. This was their second step in using renewable energy.

In May of 2009, the Barrows decided to take advantage of the incentives available to make their house more energy efficient before they retired. The Barrows started with a geothermal heating, air conditioning, and water heating system. They also corrected problems with air infiltration discovered during a home performance energy audit. David, being an analyst, decided to use all the statistics he had kept on their energy consumption to justify the expenditure and to validate the results of upgrades they performed. As a result of the upgrades, the Barrows have reduced their consumption of electricity by 35%, propane by 83%, and wood pellets by 69%.

This kind of energy efficiency savings justified going even greener with a renewable energy solar photovoltaic (PV) system that generates 99% of the electricity they use. Today, they purchase only 1% of their electricity from wind farms through their utility, and their total annual utility bill averages just $93.

Here's how the Barrows did it:

- **They installed a wood pellet stove in their sunroom.**

  The Barrows choose a wood pellet stove because
  - The energy source was renewable;
  - The temperature controls and automatic starter and shutoff keeps the room at a pre-set temperature without intervention; and
  - Highly efficient burn process results in a minimal amount of smoke and the ash generated by one ton of pellets can fit in a one cubic foot container.

- **They used a certified contractor to conduct a Home Performance Energy Audit**

  This essential analysis identified significant issues in their home that needed attention. For example, it
  - Determined that air infiltration was more than double the amount it should have been for a house their size;
  - Found that the temperature differential in their skylights was 30 degrees between the bottom and top of the skylight well; and
  - Justified adding more insulation even though the current amount was above the old code level;

David filling the pellet stove in their enclosed sunroom.

David points out that the pump for the geothermal HVAC system does not need to be very large or powerful.

David demonstrates how their geothermal HVAC system preheats water for their hot water heater.

- **They reduced air infiltration and increased insulation (net savings 8%)**
  - A spray foam contractor sealed the skylight wells, bathroom fans, recessed light fixtures, exposed duct work, and the ceiling of a crawl space.
  - They upgraded attic insulation from R38 to R57.
  - They insulated their attic access panel.

- **They installed a Geothermal Heating and Air Conditioning System (HVAC) (net saving 42% - electricity, propane, and pellets)**
  - A new 4 ton geothermal system replaced the old hybrid propane heat pump system.
  - They also installed a geothermal hot water heater. Whenever the geothermal HVAC system runs during the winter or summer, water is preheated before it reaches their super-efficient propane hot water heater.

- **They installed a 16.9 kW Solar PV System (net savings 40%)**
  - They measured their electricity consumption for one year after the initial efficiency improvements were made.
  - Then they purchased a roof-mounted solar PV system that would produce 75% of their annual usage knowing that they would continue to make energy improvements when other equipment in their house failed.

- **They purchase the remainder of the electricity they need from Wind Farms.**
  - For the 1% of electricity the Barrows still use from the grid, they ensured that it comes from clean renewable wind farms by selecting Washington Gas Energy Services CleanSteps as their energy supplier.