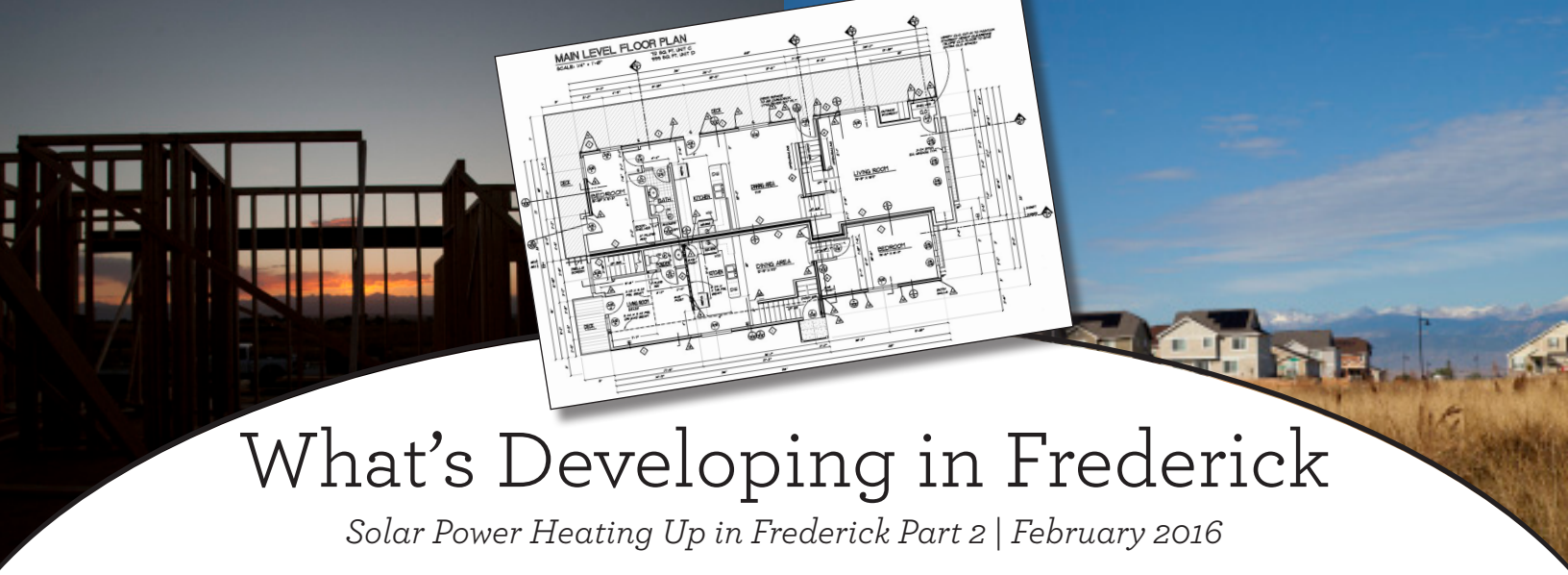

What's Developing in Frederick

Solar Power Heating Up in Frederick Part 2 | February 2016

When last we met, we talked about the spike in solar energy system installations that Frederick has seen over the last couple of years and how most of the new homes being constructed here in town are being equipped with this "off-the-grid" capability. However, we did not talk in any depth about what the financial benefits are from "going solar," how homeowners can get a solar power system if they want one, or why solar is a more sustainable option than traditionally-generated electricity. So, let's take this opportunity to fill in some of the gaps in our discussion and provide what I hope is helpful information.

Cost Savings

Residential solar systems are more obtainable than ever and can really help free up space in your monthly household budget. Companies such as Solar City and Namaste Solar, both active in the Frederick area, offer a variety of programs designed to make it easy for homeowners in all income ranges to benefit from solar power systems. While programs offered by different companies vary, there appear to be three general ways to go about obtaining a solar system for your home.

1. Lease/Power Purchase Agreement (PPA) – While the differences between leasing a solar system and entering into a PPA are important, they are similar enough that we combined the two into one option for the purposes of this article. The two options can be beneficial because, with no money down, homeowners can lock in monthly electrical rates and add predictability and stability to what can otherwise be a volatile electrical power market. The downside of these two options is that because the homeowner never owns the solar power system they will always have a significant, albeit likely lower than normal, monthly bill.

2. Finance – Gone are the days of taking out a second mortgage on your home or maxing out your credit cards to purchase a solar power system. Solar companies today offer their own financing programs, which can usually be accessed with no money down, and are typically designed so that monthly payments are less than monthly electric bills. Finance periods vary and can run up to 30 years. Homeowners that finance their solar systems with a down payment may also be able to take partial advantage of the federal "Investment Tax Credit." See the "Buy Outright" option below for more information and always speak with a qualified financial professional before making decisions that may impact your taxes. The downside of financing is that it takes longer to realize a return on investment because the loan must be paid off in order to truly eliminate most of that monthly power bill.

3. Buy Outright – As you might imagine, buying a solar system outright can be the best way to take full advantage of potential solar savings. Homeowners can begin to realize savings immediately and, depending upon a number of factors, the system can generate enough electricity to "pay for itself" in seven to ten years. Homeowners that purchase their solar systems outright will be able to take advantage of the federal "Investment Tax Credit" – "a dollar-for-dollar reduction in the income taxes that a person or company claiming the credit would otherwise pay the federal government…equal to 30 percent of the basis that is invested in eligible property." So, assuming that we understand the federal government's description of this tax credit, if a homeowner purchases a solar power system for $10,000 in 2016, they should get a discount of about $3,333.33 on their tax bill at the end of that year. Always speak with a qualified financial professional before making decisions that may impact your taxes. The downside of buying a system outright is, of course, that it requires a significant amount of cash up-front to purchase the system. Solar system valuations in Frederick typically range from just under $10,000 to over $20,000.

Once the details have been worked out and the system is installed, the homeowner can begin to generate their own power and save money on their monthly electric

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bill. The average cost per kilowatt hour of electricity in Colorado is 11.58 cents, and the average monthly residential electric bill is just over $105 per month, not including base charges and fees that cover grid maintenance and system administration. Solar systems can be designed to offset most of that monthly cost, but depending on how the system is financed (see previous discussion), the homeowner may or may not benefit all of those savings.

For the sake of discussion, let's assume that the average homeowner that goes solar will see a 25 to 75 percent discount on monthly electric bills. Based on that assumption, Table 1, on page three, demonstrates how much money a homeowner can save over time as a result of going solar.

Keep in mind that the figures in Table 1 were calculated using an average electric bill. Many homeowners will have higher monthly electric bills and can expect more savings from going solar. For example, a homeowner with a regular monthly electric bill of $200 might be able to save $54,000 or more over the course of a 30-year mortgage. That saved money could be leveraged using compound interest to pay off the homeowner's mortgage early, build a retirement account and/or contribute to the kids' college funds. Always consult with a qualified financial professional before making any decisions that may impact long-term investments.

Homeowners should be aware that they will not likely ever have a $0 electric bill simply because they are still tied to, and benefit from, an electrical grid, which requires maintenance and administration. "Residents do need to know that they will still have an electric bill in the way of a base rate charge, and normally will still have some usage," said Frederick Power and Light Manager Kent Van Dyne, regarding most solar-equipped homes in the Frederick Power and Light service area.

Getting Started

Fortunately for homeowners, solar power companies have gotten good at sales, marketing and generally simplifying the process of purchasing a solar power system. Quick calls to Namaste Solar and Solar City, the two companies that do most of the solar installations in Frederick, yielded prompt call-backs from professional customer service representatives ready to answer questions as to why a given homeowner should choose them.

To get started, solar companies will request previous electric bills so that they can get an idea as to how much energy a homeowner uses. They will also send a specialist out to get a better understanding of how the home and roof slopes are positioned relative to the usual pathways of the sun overhead. While south-facing homes are ideal, just about any home can benefit from a solar power system. Once design and payment details are worked out, the system can usually be installed in one day and the homeowner can begin generating electricity on-site.

More detailed information is available through individual company websites, the Solar Electric Power Association, the Solar Energy Industries Association, the Colorado Solar Energy Industries Association, the American Solar Energies Society, Colorado Solar and other sources. Reviews of solar installation companies are available on SolarReviews.com and in other places.

Although Solar City and Namaste Solar have done the majority of the installations in town, the following solar installation companies were shown on the SolarReviews.com website as installers for the Frederick area:

- Burnham & Sun
- Complete Energy Solutions, LLC
- Southard Solar Energy
- Sunlight Solar Energy, Inc
- EcoMark Solar
- Affordable Renewable Energy
- Apex Marketing Group, inc
- Independent Power Systems
- Sunnova
- Sundance Solar Consultants
- BeUtilityFree, Inc.
- Gann Electric

Sustainability

While pinching our pennies to reduce the monthly bottom line is a no-brainer, knowing about the big picture and how we fit into it is also important. Approximately 67 percent of the electricity that we use in our homes on a daily basis is generated by burning fossil fuels such as coal (39 percent), natural gas (27 percent) and petroleum (1 percent), a process which emits carbon dioxide (CO_2) – a known "greenhouse" gas, which traps heat in the atmosphere. Greenhouse gases are believed by many credible scientists to be a major contributor to climate change. According to the Environmental Protection Agency (EPA), CO_2 makes up the vast majority of greenhouse gas emissions (82 percent in 2013).

Coal has long been known as a generally "dirty" fuel, and according to the U.S. Energy Information Administration (EIA), coal is responsible for emitting the most CO_2 of those commonly used to generate electricity. While different types of coal emit different levels of CO_2 when

burned, on the average coal emits 85 percent more CO_2 than natural gas. As a result, coal is considered by many to be among the least sustainable fuels currently in use.

According to Scientific American in a January 29, 2016 article entitled "Coal for Electricity Hits a 45-Year Low," cheap natural gas has pushed coal to its smallest market share since 1970. However, calculations made using data published by the EIA suggest that 2.24 tons of coal is still burned each year to help supply electricity to the average U.S. home and that 6.4 tons of carbon dioxide (CO_2) per home is emitted into the atmosphere as a result. Under current conditions over a typical 30-year mortgage, an average U.S. home will emit about 192 tons of CO_2 into the atmosphere. Table 2 applies these calculations at larger geographic scales to demonstrate cumulative impacts up to the national level.

Companies such as Solar City and Namaste Solar help to avoid using coal-generated electricity by designing solar systems that can supply all of the power homeowners need on a daily basis. If every homeowner in Frederick were to "go solar," they would avoid burning 21,733.48 tons of coal and emitting 652,005 tons of CO_2 over a 30-year period.

Table 1: Potential Savings on Monthly Electric Bill as a Result of Going Solar

Average monthly Colorado electric bill	*Range of possible monthly discounts from going solar	Possible monthly bill after discount from going solar	Possible annual savings from going solar	Possible savings after 5 years	Possible savings after 15 years	Possible savings after 30 years
$105	25%	$79.12	$316.47	$1,582.35	$4,747.05	$9,494.10
$105	50%	$52.75	$632.94	$3,164.70	$9,494.10	$18,988.20
$105	75%	$26.37	$949.41	$4,747.05	$14,241.15	$28,482.30

*Actual percentage of savings depends on a number of system design factors including site orientation and roof configuration.

Table 2: CO_2 Emissions and Residential Electricity Generation from Coal

Area	Population	Homes	Tons of coal burned per year by homes	Tons of CO_2 emitted per year from coal burned by homes	Tons of CO_2 Emitted over a 30 year period
Your House	2.94	1	2.24	6.40	192
Frederick	10,554	3,395	7,599.12	21,733.48	652,005
Colorado	5,353,471	2,149,988	4,812,376.98	13,763,398.17	412,901,945
U.S.	321,442,019	126,551,976	283,264,704.75	810,137,055.58	24,304,111,667

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