HOMEOWNER'S GUIDE TO SOLAR SANITY

Solar energy is one of the least expensive ways to generate electricity. Going solar is also the most effective way to dramatically reduce your carbon footprint. Figuring out what you need to know to make an informed decision about which solar company to use can be a challenge. I know, I went through the process when I built my second home in Florida in 2020. Solar energy has a positive impact on your pocketbook and your planet. There's a lot to know, so don't be shy about reaching out via phone, text, or email. Schedule an appointment so I can help you turn sunlight into savings. And please, let this document help guide your way…

TAKING THE SHADE OUT OF SOLAR

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SOL MAN SOLAR

SAVINGS

In simple terms, your solar savings is the difference in the expected price that you would pay for electricity purchased from the utility monopoly versus your expected costs for going solar. Solar energy should save you lots of money over time. If you are going solar primarily to save money, please take note. There are 7 primary drivers that determine the savings you get from solar.

1. **Cost of electricity purchased from your utility monopoly.** This is usually expressed in dollars per kilowatt hour, for example $0.17/kWh or seventeen cents per kWh. Your utility bill won't show this number, because your utility doesn't want you to know how much they charge. Simply divide the monthly charge from your utility company by the number of kilowatt hours you used that same month. So, if your average monthly utility bill is $300, and you use an average of 1,500 kWh, then you are paying $300/1,500= $0.20/kWh, or twenty cents per kilowatt hour. Knowing this number let's you compare utility cost to solar cost, apples to apples.
2. **Cost of the solar equipment and installation labor.** There can be very large price disparities between companies and even amongst salespeople within the same company. Make sure the price you are getting is competitive or at least justified if you decide to go with a company that charges more. I've seen customers charged $5k or $10k more by companies offering the exact same solar system size and equipment. I've also seen neighbors overcharged for the exact same solar system size and equipment. Thanks to the magic of loan interest and lender fees, if you finance your system, this price difference can easily double over the 25-year life of the loan. So, these differences are actually closer to $10k or $20k over time. All things being equal, you may as well keep that money in your pocket rather than give it to the bank or solar company.
3. **Rate of your utility monopoly price increase.** You don't have a choice as to which utility monopoly provides electricity for your home. Solar energy is your only other option to lower your electricity payments. Price increases are practically inevitable, more demand for a finite resource tends to do that. Still, some utilities raise rates slower than others. Some utilities have shareholders to satisfy, while others have less market pressure or operate with varying degrees of cost efficiency. At the end of the day, all utility price increases are approved by a politically appointed body of 5 commissioners working for the Florida Public Service Commission. Unlike the cost of solar, electricity generated by utility monopolies has gone up over time. The only way to protect yourself from the whims of the market and the winds of politics is to lock in your low rate with solar energy as a hedge against inflation. Looking back at historic price increases can be a good way to estimate future increases. My utility monopoly has increased prices an average of 6% each year over the last 8 years.
4. **Loan fees and interest.** The only thing that is certain are death and taxes, but you may as well add paying interest to this short list. Put simply, interest is the cost of borrowing money. Solar loans have helped millions of people go solar, but they can be confusing, even if you're good at math. Make sure you understand how your loan is structured and how it is amortized in case you sell your home before the loan is paid off. Finding this out at closing can be a rude awakening for people whose salesperson neglected to explain this during the switching to solar process. Most loans charge a lender fee, this gets added to the principal balance of the purchase price of the solar system. These fees can vary

from almost nothing, to 10s of thousands of dollars. If you sell your home before the loan is satisfied, the remaining principal balance is then due at closing if the new home buyer doesn't agree to take over the terms of your solar loan. If you haven't been in your home long enough to make a large dent in the principal of the loan balance, you'll be expected to write a check out of your home equity to make good on the loan terms that may not have been presented by your solar salesperson, that you may not remember, or that you may not have fully understood when you agreed to finance with the solar loan company. Taking the time to understand how this works will save you from potentially costly surprises at closing. Since your home equity will also likely increase after you add your solar system, the higher sale price of your home can help offset some of these costs.

5. **Cost of panel removal and replacement.** Every company I interviewed when I was looking at solar for my home back in 2019 did not bring up the subject. Matter of fact, when I asked the various salespeople, nobody knew how much they charged for this service. I even spoke face to face with an owner of a large central Florida solar company who told me that he didn't know how much his company charged for this service. At his suggestion, we walked back to the customer service department where he asked the department manager. When I politely pointed out the contradiction between what she told us and the verbiage in their solar sales contract, he stopped all communication with me. It wasn't until I insisted on knowing this information, that it was reluctantly provided to me by any salesperson. If you expect to be in the home when your roof needs to be replaced every 12-15 years or so, then your solar company will need to remove the panels before the new roof is installed, and then replace them afterwards. Big surprise, but this cost varies from company to company as well. Most companies charge by the panel, which is the right way to do it in my opinion. Others charge by the system size in kilowatts. As one of your potentially larger expenses with solar, this number can impact your solar savings greatly.
6. **Time in your home.** While it is true that solar energy is cheaper than buying from your utility monopoly, you're not actually "saving" money until your system is paid off or paid down significantly, if you took out a loan to finance it. The savings comes years down the road, after you reach the point where your utility spending would have been more than your solar costs. So, if you sell your home in a few years after installation, you've probably not spent enough time to have the solar system pay for itself. Now, your home equity should have increased immediately after installation, so there's a way to recoup some of what you would have saved over time, had you stayed in the home longer. It's just something you should probably consider when going solar.
7. **Whether you get to keep the ITC, investment tax credit.** Generally speaking, if you pay cash for your solar system, and have a qualifying federal tax obligation, which most working people do, then you get a 30% investment tax credit, and this is real savings. This is applied to your federal income tax obligation and can be rolled over throughout a 5-year tax period after you purchase your solar system. If you took out a solar loan, then most likely, you are obligated to give this tax credit to the lender, either during the first year and a half of your loan, or afterwards, if you sell your home years later before paying off your loan principal. They cleverly call this a "voluntary pre-payment" when describing the loan, but often fail to mention the "mandatory post-payment" that the lender is entitled to at closing if you chose not to pay this up front. If you keep the 30% ITC and decline to make the "voluntary pre-payment" up front, then your loan payment

increases nearly 40% in some cases. The value of the tax credit then gets added separately to the outstanding principal of the loan, but does not accrue interest. Instead, if you sell your home before you have paid off the principal balance, then you must pay the 30% tax credit to the lender. If you sell your home and want to transfer the loan to the new buyer, some loans require an outstanding principal balance of $5,000 or more. If you owe less than that, you cannot transfer the loan and will be required to pay off the loan balance. If loan clauses like this are not understood, it can create an unwanted surprise at closing. So, make sure to ask the salesperson and most importantly the lender for this information. A final point regarding the 30% ITC, if you choose the low payment option for your loan and decide to make the "voluntary pre-payment" of your ITC before the first 15 months, make sure you know your anticipated federal tax obligation. If you won't owe more than the value of the 30% ITC, you will still be expected to make a payment in that amount prior to the 15th month of the loan. This might mean writing a check that is larger than the amount of the tax credit you were able to apply towards your federal tax obligation in the first year, or committing to a slightly higher monthly payment. For example, if the 30% tax credit is $13,500, but you only owe the government $10,000, then you will have to wait until next tax year to recoup the other $3,500 by applying it to future federal income tax obligations. The solar loan company will still expect you to make the $13,500 payment after 15 months in order to keep your monthly payments at the same low price. Paying back anything short of this amount will increase your monthly payments accordingly. Some lenders will also let you pay down the principal balance a few times in order to lower your monthly payment.

COSTS

Yes, going solar can save you lots of money, but it is not without its costs. Most solar salespeople skip over a few of these in their excitement to sell you on the benefits of going solar. Since most of these aren't applicable when homeowners buy electricity from their utility monopoly, you may not be familiar with some of them. In order to do a true cost/benefit analysis, like Sol Man provides for all his customers, itemizing and accounting for them is essential.

1. **Equipment, installation, and maintenance.** Make sure you are getting state of the art solar panels and microinverters, not some unbranded knock-offs. Stay away from string inverters which is the older, slightly cheaper way to go. Even though there is little to no maintenance expected, your solar company should make it clear that they are responsible for facilitating any manufacturer warranties, usually for 25-years, should the need arise. They should also provide "free" monitoring of your panels electronically via the internet and notify you when they detect a problem. Since your panels are tied into the internet via cellular connection or WI-FI, most of the time alerts can be handled remotely via SW update or the tried-and-true system re-boot.
2. **Loan fees.** Since the aim of the solar loan is generally to lower your monthly electricity payment, they tend to come with a few unique attachments. There are literally hundreds of different loans available ranging from 7–25-year terms, with low and high interest rates. The lower the advertised interest rate, the higher the loan fee will be. The higher the advertised interest rate, the lower the loan fee will be. Remember, this loan fee becomes part of the principal that you owe on your solar panels. If you sell your home,

without transferring your loan terms to the new buyer, you are not obligated to pay the interest remaining or a penalty, just the principal balance that has been increased with a lender fee as per the terms of the loan.

3. **Loan interest.** Pretty standard on any loan, this is the cost of borrowing money from the lender. Just like you agreed to do with your car loan and your mortgage, the solar loan builds this into each monthly payment. If you are cost conscious, ask the lender for the loan amortization schedule so you can see how much of your payments goes to paying down the principal vs. the interest over the years. Make sure you are comfortable with the terms. And just a quick buyer beware regarding the advertised interest rate vs. the APR of the loan. For example, the advertised 4.99% interest rate is probably not inclusive of the loan fees discussed above, or the investment tax credit discussed below. When these financial costs are added into the cost of the loan, the APR can be several points higher. So, the 4.99% rate looks good on its face, but looking further into the details may reveal a much different picture. Lending institutions and consumer financial protection agencies are constantly playing cat and mouse with respect to loan rules and regulations. The banks seem to want the terms and conditions of the loan to be in their favor and somewhat murky, so consumers may not read or understand the fine print that describes financial penalties or obligations. They tend to word loan documents in such a way as to be in minimal compliance with the standards set forth by the consumer financial protection agencies, but may not go out of their way to make terms and conditions any more transparent than required by law. Since laws change with the political winds, you'd be best advised to understand the concepts outlined here.
4. **Paying back your ITC.** If you read the savings section above, this one will sound redundant, because it is, verbatim. Generally speaking, if you pay cash for your solar system, and have a qualifying federal tax obligation, which most working people do, then you get a 30% investment tax credit, and this is real savings. This is applied to your federal income tax obligation and can be rolled over throughout a 5-year tax period after you purchase your solar system. If you took out a solar loan, then most likely, you are obligated to give this tax credit to the lender, either during the first year and a half of your loan, or afterwards, if you sell your home years later before paying off your loan principal. They cleverly call this a "voluntary pre-payment" when describing the loan, but often fail to mention the "mandatory post-payment" that the lender is entitled to at closing if you chose not to pay this up front. If you keep the 30% ITC and decline to make the "voluntary pre-payment" up front, then your loan payment increases nearly 40% in some cases. The value of the tax credit then gets added separately to the outstanding principal of the loan, but does not accrue interest. Instead, <u>if you sell your home before you have paid off the principal balance, then you must pay the 30% tax credit to the lender.</u> If you sell your home and want to transfer the loan to the new buyer, some loans require an outstanding principal balance of $5,000 or more. If you owe less than that, you cannot transfer the loan and will be required to pay off the loan balance. If loan clauses like this are not understood, it can create an unwanted surprise at closing. So, make sure to ask the salesperson and most importantly the lender for this information. A final point regarding the 30% ITC, if you choose the low payment option for your loan and decide to make the "voluntary pre-payment" of your ITC before the first 15 months, make sure you know your anticipated federal tax obligation. If you won't owe more than the value of the 30% ITC, you will still be expected to make a

payment in that amount prior to the 15th month of the loan. This might mean writing a check that is larger than the amount of the tax credit you were able to apply towards your federal tax obligation in the first year, or committing to a slightly higher monthly payment. For example, if the 30% tax credit is $13,500, but you only owe the government $10,000, then you will have to wait until next tax year to recoup the other $3,500 by applying it to future federal income tax obligations. The solar loan company will still expect you to make the $13,500 payment after 15 months in order to keep your monthly payments at the same low price. Paying back anything short of this amount will increase your monthly payments accordingly. Some lenders will also let you pay down the principal balance a few times in order to lower your monthly payment.

5. **Panel removal and replacement.** If you expect to be in the home when your roof needs to be replaced every 12-15 years or so, then your solar company will need to remove the panels before the new roof is built, and replace them afterwards. Big surprise, but this cost varies from company to company as well. Most companies charge by the panel, which is the right way to do it in my opinion. Others charge by the system size in kilowatts. As one of your potentially larger expenses with solar, this number can impact your solar savings greatly. This fee can be 2x or 3x more expensive than another solar company, so make sure you know how much they charge in the year that you purchase your solar system. Since the price of labor and materials tends to rise over the years, so could the fee they charge for this service when you replace your roof in the future.
6. **Tier 2 insurance.** If your solar system size is 11.7 kW of direct current or higher, then the utilities require you to have a $1 million liability policy. The current need for this seems outdated, since my understanding is that it is a relic from decades ago when solar systems lacked the automatic shut off safety features that come standard with today's solar systems. The rule now seems to be just another financial hurdle placed in your way to make going solar just a little more expensive than it would be without it. I guess the idea was to provide financial protection for the solar homeowner if a utility worker receives a shock from a solar system while working on a downed section of the grid. I read an article where the utility company representative couldn't even describe the necessity for the rule, but it remains nonetheless. It is what it is, I guess.
7. **Minimum utility fee.** Even if your solar system generates 100% of the electricity that your home uses, they are allowed to charge every customer for a minimum amount of electricity each month. In 2023, it tends to be less than $25/month, nevertheless, it's an expense that could add up to nearly $8,000 over 25 years. In 2024, my utility monopoly charges around $18/month for this. Assuming it stays the same price for the next 25 years, that's over $5,000 out of my pocket and into their coffers.
8. **Extra utility power.** If you use more electricity than your solar system generated, you will buy that extra power from your utility monopoly. You will pay whatever ransom rate they are charging their customers at that time. Your panel performance will degrade slightly every year, meaning their potential for electricity production will diminish over time. Most manufacturers guarantee that this number will be less than 0.5% on an annual basis. Even if your home electricity use demands don't increase at all, your solar system will generate somewhere near 90% of their initial power by the 25th year. Sol Man recommends oversizing your system when you purchase it by at least 10% to allow a buffer for your family to use more electricity if needed without paying the higher rate to the utility monopoly.

9. **Homeowner insurance.** While not required, most people will add their solar system to their home policy. This way, any damage due to acts of nature or otherwise are covered, less your deductible amount. Hurricanes tend to be the biggest concern in Florida, which is why solar systems are designed to withstand the high winds and rains that are common in this climate.

FINANCING OPTIONS

There are several ways to finance your solar system. Each method will impact how much and how fast you will realize your solar savings.

1. **Cash.** My personal favorite. You pay no interest and get the most savings over time relative to what you would pay to your utility monopoly. As of 2024, in Pasco County, a large publicly traded utility is charging around 19 cents per kWh. If you paid cash for your solar system, averaged over 25 years, after you apply your 30% tax credit, you would pay about 5 cents per kWh for the equipment installation. Your solar system makes the same amount of electricity from sunlight that you currently buy at marked up prices and ever-increasing rates from your utility monopoly. People all have their own reasons for paying triple the price for the exact same commodity. And in 10 years, people will still have their reasons for paying 6x what they would be paying for solar generated electricity. During COVID I decided to build a pool with my energy savings. Yeah, I'm literally swimming in it. ;-)
2. **Solar loan.** As with any loan, you are going to have to pay to borrow money. Yes, you will pay interest, but most solar loans also charge you additional principal, on top of the cash price, in exchange for a lower interest rate. That 30% Investment Tax Credit you've heard so much about from your neighbor, it's actually a real thing, but most lenders expect you to give it to them in one way or another. The lenders give you a couple of basic loan options. a) Make a voluntary pre-payment in the amount of the ITC in the first year and a half of the loan and keep the very low monthly payment for the whole loan term. This allows you to lock in a very low payment for up to 25 years and keeps your electricity costs frozen for decades while your utility monopoly continues to inevitably raise rates. b) Commit to a higher monthly payment, and carry a no interest principal balance in the amount of the 30% ITC. If you decide to sell the home before the loan term is over, and the new buyer doesn’t want to assume the loan terms, then you must pay whatever principal is left on the loan at closing, including the full amount of the 30% ITC due in lump sum. This higher payment option should still be lower than what the utility monopoly charges you, plus you get to keep the lump sum tax credit in your pocket, understanding that you must pay it back in full if you have any remaining principal balance when you sell your house. Your solar loan will probably consist of the following parts:

   Equipment/Installation Principal + Lender Fee Principal + Loan Interest + Investment Tax Credit Amount (Due Up Front or Until $0 Principal Balance/At Home Sale)

   There are a few solar loans that don't charge lender fees, but these usually come with the highest interest rates. Generally speaking, the lowest monthly payment terms come with

the highest lender fees and the highest monthly payments come with the lowest lender fees. And all but one of our lenders expects you to pay them the value of the ITC at some point, either up front or over time/home sale, as a condition of the loan. Failure to understand the concepts above can result in you owing more money than you saved with solar at closing if you sell your house in the short term. If you go with option a) above, make sure you plan on staying in the home long enough to save the value of the tax credit that you paid to the loan company up front. This can be as long as 7-9 years, but each situation is unique. If you go with option b) above, you're likely to pocket some savings within 1-2 years, once you apply the ITC to your tax obligation. Just don't forget that you will be paying back the value of the ITC over the entire loan term or in lump sum if you transfer your loan before the principal balance is paid off prior to a home sale.

If you sell your home and the buyer does not want to assume your solar loan terms, then you are obligated to pay the remaining Equipment/Installation Principal + Lender Fee Principal + Investment Tax Credit Amount (Due Up Front or Until $0 Principal Balance/At Home Sale)

If you sell your home and the buyer does want to assume your solar loan terms, then you are still obligated to pay the Investment Tax Credit Amount (Due Up Front or Until $0 Principal Balance/At Home Sale). The new buyer would pay the remaining Equipment/Installation Principal + Lender Fee Principal + Loan Interest.

Now, don't forget, your increase in home equity due to the addition of the solar system should also increase the value of your home, so some of these costs can be offset by the additional money you pocket in home equity. Don't forget to check out my FAQs section on my website for a list of renewable energy certified home appraisers. They have additional training to be able to put a proper value on your solar system.

3. **Solar lease.** The loan company retains ownership of the solar system, so they receive any of the immediate ITC benefits. They charge you a rate for electricity that is lower than the utility monopoly, but usually increases annually. There can be significant savings here as well, just make sure you understand how much the leasing company is charging you and how much your monthly payments will increase annually over the life of the lease. They may also offer terms for you to buy the solar equipment at some point. You'll also want to confirm what happens if you use more energy than the solar panels produce.
4. **Home equity line of credit.** These loans are available from time to time from your local banks and credit unions, usually depending on the condition of the real estate and lending markets. You use the equity in your home as collateral to borrow money to pay for your solar system. You're only bound by the payback terms and interest rate of this line of credit. The banks usually require an appraisal to determine your home equity eligibility.
5. **Cash out refinance.** Depending on the lending environment, this can be a good option to lump your solar system purchase into your monthly mortgage payment. It does come with closing costs just like when you bought your home the first time. So, if your mortgage rate is higher than you like and you decide to refinance to a lower rate, it may be a good time to consider rolling a solar system into the loan.

6. **Personal loan.** All lenders have their own requirements to qualify for a personal loan. It may be worth a look to see if you can find a competitive rate at your local lending institution.

NET METERING

All homes have an electric meter that tells the utility monopoly how much electricity you took from the grid to power your home. For most homeowners, this has always been a one-way relationship. When you go solar, your utility will install a bi-directional meter that will also tell them how much electricity generated by your solar panels is sent back into the grid. If you used 1,500 kWh in a month, but sent 1,800 kWh back into the electric grid, the net difference is +300 kWh in your favor. The new electric meter allows them to keep track of these credits as they build up on your account, so you can use them in the summer months, when your solar panels won't make enough electricity to power your home. If you size your system to offset at least 100% of your annual electricity usage, your panels will likely make more electricity than you use from November thru May. You will likely use more electricity than you make from June thru October, thanks to your air conditioner working overtime in the Florida heat. Unfortunately, this net metering policy is subject to change with the winds of politics as well, but for now, this system allows homeowners to be credited 1:1 for excess electricity made and sent to the electric grid. Net metering credits expire at year's end and start accruing again after the new year. Any additional electricity generated more than the amount your home uses in a year will be paid back to the homeowner on an annual basis at the utility COG-1 rate, usually only a few cents per kWh.

HOME EQUITY

Anyone that has ever owned or sold a home knows that their equity can fluctuate significantly, depending on the condition of the real estate market and health of the economy when the decide to sell. That said, Florida will not increase your property taxes if you install a solar system, even though it is likely to add 10s of thousands of dollars in value to your home. There are a couple of famous studies done by Zillow and Lawrence Berkeley National Labs. Both determined that solar is an asset that increases the home value and likelihood of selling your home faster than homes without solar. Links and downloads are available on my website if you want to see for yourself. To make sure that you get an accurate appraisal of the value added to your home, I recommend contacting someone at the Appraisal Institute. They have additional training in the valuation of green energy assets on residential properties. Their contact information is available on my website FAQs section. One point of technicality here, appraisers cannot add the value of your solar system to your home if there is an active UCC-1 filing on your solar system. This is not a home lien, but it does give the lender the right to repossess your solar system if you default on the loan payments. It rarely, if ever, happens, but it is in your best interest to contact your solar lender prior to your home appraisal and have them relinquish the UCC-1 filing so you can get the maximum appraised value for your solar home.

MAINTENANCE

Permitting, installation, system monitoring, maintenance, workmanship, roof penetrations, and repair/replacement of equipment under manufacturer warranty are covered for 25 years. Be

advised, some very large and well-known solar companies only cover their workmanship for 10 years, before the homeowner may have yet seen any solar savings. Make sure that these activities and responsibilities are covered by whatever solar company you choose. This helps ensure that the homeowner has peace of mind and doesn't have to worry about any ongoing hassle by switching to solar energy.

WARRANTIES

Permitting, installation, system monitoring, maintenance, workmanship, roof penetrations, and repair/replacement of equipment under manufacturer warranty are covered for 25 years. Since solar systems don't have any moving parts, they are almost entirely maintenance free. There are generally 2 types of warranties at play, those provided by the manufacturer of the equipment and those provided by the solar installation company. Manufacturers of equipment are confident in providing warranty coverage for 25 years. Should a solar panel or microinverter fail, your solar company should facilitate all repairs with the manufacturer at no cost to the homeowner. As discussed above, several major solar companies only provide 10-year warranties for their workmanship and roof penetrations. So, make sure you are comfortable with the terms of the warranty before you buy.

SOLAR SYSTEM SIZE

How do you know how many solar panels your home will need? This is one of the more technical aspects of a solar system. And since there are many variables at play, it can be one of the more difficult concepts to grasp. You must first understand the difference between the size of your solar system and the number of kilowatt hours of electricity your home uses. You will likely be surprised to learn that a 7.2 kilowatt system doesn't make 7.2-kilowatt hours of electricity. So, if your home uses 18,000 kWh of electricity annually, you won't need an 18-kW system to generate that many kilowatt hours of energy. You have to be able to wrap your brain around these 2 separate, but related, concepts. The system size is the sum total of the kilowatt capacity ratings of the individual panels comprising your solar system. So, if you have 20 solar panels each with a capacity of 340 watts, your system size is 6.8 kW. Now you should be wondering, how many kWh of electricity can a 6.8 kW size system generate in a year? Solar system design software programs account for many variables, including PV watts power production data, manufacturer specific panel degradation, shading from trees/your roof/neighboring houses, latitude, longitude, daily temperature fluctuations, azimuth, roof tilt angle, panel power rating, inverter capacity, DC to AC power conversion loss, etc. By figuring for a dozen or so variables, some of which are unique to your home layout and location, we can accurately estimate your roof insolation (sunlight) and subsequent expected electricity production. And now the answer to the question; a 6.8 kW system in central Florida could produce a range of 7,684 kWh to 11,084 kWh, give or take, depending upon which variables are at play and to what extent. The direction that your main solar panel roof faces largely determines this productivity. Due to the way the sun travels in the sky in the northern hemisphere, solar panel roofs that face south, east, or west are best. North facing roofs are least efficient at turning sunlight into savings. This is why we size each system specific to your home and energy needs.

EQUIPMENT

There are 2 types of solar panel in the residential market. Monocrystalline panels are more expensive, but they are also much more efficient. This means far fewer panels are needed on your roof. They are black in color and do better in high temperature conditions. Polycrystalline panels tend to be cheaper, less efficient, and blue in color. There are also 2 options for inverters, whose function is to turn the direct current electricity generated by your solar panels into alternating current for use in your home appliances. Microinverters are the gold standard of today's technology. They sit behind each panel and invert the electric current from DC to AC. If a microinverter goes bad, it only impacts the one panel where it is attached. String inverters are still available, but they have a few drawbacks. If one panel were to have a problem or encounter shady conditions, attaching panels in series now limits all of the panels to the performance of the lowest performing panel in the string. Usually, multiple string inverters are deployed on different sides of the home to help minimize this phenomenon, but that means you are paying for several string inverters, which tend to need replacing in 10-15 years. You can purchase a device called an optimizer which helps counteract the string inverter shortcomings. But now you're adding several additional components and points of failure in an effort to mimic the performance of microinverters. Whatever initial cost savings string inverters offer may be offset by panel performance loss and equipment/labor costs to replace them halfway through the life of the panels. Your utility company is responsible for installing the net meter for free, which allows tracking of the electricity that your home uses from the grid and the electricity that your solar system sends to the grid. Your solar system will also come with an Enphase phone/web app, which tracks your system performance, electricity production, electricity use, and offers a range of reporting features. A demo video is available on my website on the System page or you can take a look at my app for my home when we sit down to talk about solar. While not required, we also install whole home battery backup systems from several major brands. These come in handy during hurricanes and power outages.

ROOF LEAKS

Roof penetrations and workmanship are covered under warranty for 25 years. We use the K2 mounting system which withstands hurricane force winds. It is attached to your roof by a K2 splice foot that has a butyl rubber weather barrier with self-tapping, self-sealing roof rafter bolts. This mounting system eliminates the need to remove and re-seal your roof shingles, thereby minimizing opportunities for leaks. When installed over the top of your shingles, the butyl rubber weather barrier is stretched and pulled into the hole made by the rafter bolts, sealing behind itself as it is screwed into the roof. There are also deep channels in the mounting system rails that allows the wiring to be run in a clean manner so the look of the solar system is not compromised. Videos are available on the System page my website if you'd like more information.

SOLAR VARIABLES

Just a quick word on variability in general terms. With solar, we make several assumptions, estimates, or best guesses. Nobody knows exactly what the future will look like, nevertheless, we try to make reasonable predictions knowing that none of them will be perfectly accurate. I came up with a very simple way to look at this concept of uncertainty. It's not meant to scare anyone,

just to make clear how we arrive at certain ‘conclusions’ in the modern-day solar industry. All of these variables can impact the long-term cost of your solar system and consequently, your solar savings. As a homeowner, just make sure you are comfortable with these variables before you go solar as some are easier to predict than others.

Basic Solar Equation: Averages + Assumptions = Approximations

Variables: Home Energy Usage, Insolation, Panel Degradation, Utility Rates/Policies, Politics, Labor Rates, Insurance Costs.

Solar providers assume that your home electricity use will be similar to what your usage was in the past, unless you tell us any differently during the design phase of your solar system. While Florida gets nearly a month more sunny days than the average state, some years may have a few more or a few less, but on average, based on historic weather data, we assume the future sunshine (insolation) will look very similar to the past. This can also vary by month, so if your electricity production last May was somewhat different than this May, it doesn’t mean that your solar system is malfunctioning as much as it is just responding as one would expect to more or less sunshine in a given month. Still, over long periods of time, these things tend to average out. Your solar panel manufacturer is very confident in the maximum amount of degradation that your panels will experience, so this variable should be fairly predictable. We tend to look back at utility rates for a long enough period of time to make assumptions about the future rates, still, these rates vary for many reasons, all of which are beyond our control. The same goes for Public Service Commission policies and state or federal politics. Rules and laws are inspired, drafted, and adopted for many different reasons and subject to change over time. And since labor rates and insurance costs are 2 potential expenses associated with your solar system, they can also fluctuate due to future economic and market pressures. To some, this stuff may seem obvious, or nebulous, or nefarious, but that beats being oblivious to the concept any day, in my book. I had salespeople saying and promising and insisting all sorts of things, without much reasoning. So, when I investigated it all for myself, and compiled my research on my website, I reached the aforementioned understanding of things. In short, Sol Man isn’t of the mindset to make false promises or spin far-fetched fairy tales; he just wants to give his impression of things in the most transparent, logical, and homeowner friendly way possible. As always, Sol Man respects your time, privacy, and money.

SOLAR ADVOCATE

The Sol Man Solar difference. Solar salespeople tend to disappear after you sign the contract; I know from my experience. This means that their focus is on to the next sale and is not to make your solar installation project a priority. Sol Man remains available 12 hours a day to help with any ongoing questions that may come up throughout the project. Sol Man provides weekly project status updates, so you can be kept in the loop as your solar installation moves forward. Sol Man also sets up an electronic portal, that provides automated updates as things change with your project. This portal allows you to follow along with each stage of the project and check in at your convenience. Sol Man makes sure that your solar equipment serial numbers are entered into the Enphase app, so their performance can be tracked individually for the life of your solar system. Sol Man also follows up with your local utility monopoly to make sure that they are

doing their part to schedule and install your new net meter so we can get to the final stage of the project called PTO, permission to operate. Sol Man had to do all these things himself when he bought solar panels in 2020, even though these things were the responsibility of the solar company. Sol Man's project was delayed nearly 3 months because the solar company dropped the ball and the salesperson didn't follow up as promised. Sol Man was not happy about this, but it helped inspire Sol Man to do much better for the next person. Sol Man looks forward to being your point of contact before, during, and after your solar system is installed. Sol Man is happy when his customers are happy. If you want a better experience going solar than the one I had, you better call Sol Man. And, please, don't forget to tell a friend.

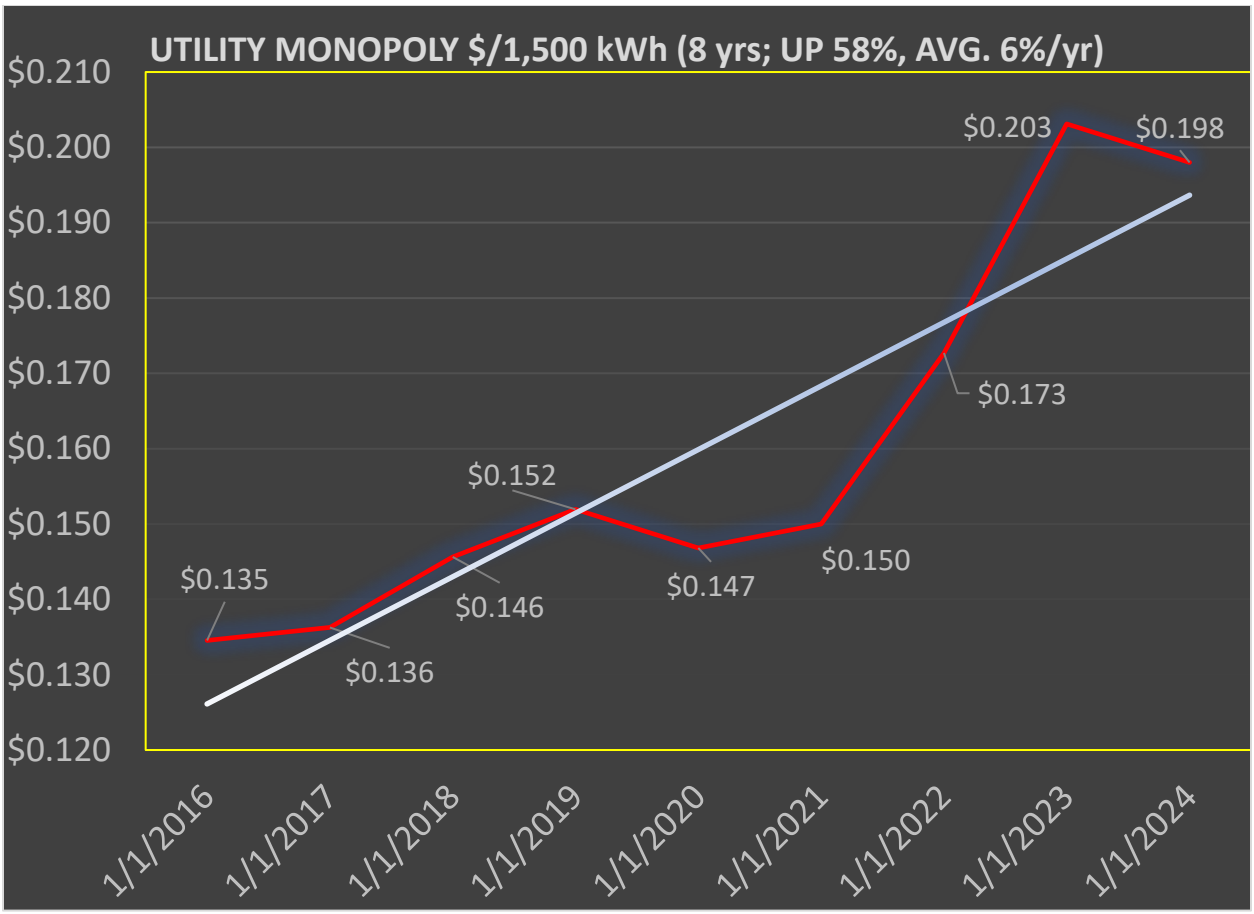
ENVIRONMENTAL IMPACT

Many studies have confirmed that solar energy is much better for the planet, than burning fossil fuels. Solar panels reduce air pollution and greenhouse gas production by more than 90% compared to fossil fuel combustion. The studies that confirmed this looked at the entire greenhouse gas lifecycle of the various electricity generation methods. They added up the CO2 contributions from extracting the raw materials, manufacturing, operating, dismantling, and disposing of all equipment needed to create the electricity. This is why solar energy is considered a green energy. You can check your home's carbon footprint on my website. For example, if your home uses 1,500 kWh of electricity per month, or 18,000 kWh/year, then going solar would eliminate nearly 28,000 lbs. of CO2 emissions annually. There's not an easier way to lower your carbon footprint than by going solar.

PRICE CHART

This cash price chart shows the cost of a solar system based on your average monthly utility bill. It figures an average amount of sunlight on your roof and a utility monopoly that currently charges 18 cents per kilowatt hour for electricity.

Utility Bill	$200	$250	$300	$350	$400	$450	$500
kWh/m	1111	1389	1667	1944	2222	2500	2778
kWh/yr	13,333	16,667	20,000	23,333	26,667	30,000	33,333
Size (kW)	8.9	11.1	13.3	15.6	17.8	20.0	22.2
# Panels	**22**	**28**	**33**	**39**	**44**	**50**	**56**
Price	$23,556	$29,444	$35,333	$41,222	$47,111	$53,000	$58,889
Less ITC	**$16,489**	**$20,611**	**$24,733**	**$28,856**	**$32,978**	**$37,100**	**$41,222**



Just to illustrate how much cheaper solar energy is than paying your utility monopoly, simply multiply your average monthly bill by 300 months to get what you would pay in 25 years, assuming your utility monopoly never raises their rates. For example, if your average bill is $200/month x 300 months= $60,000 over 25 years. Notice that the price of installing a solar system that would produce that amount of electricity is under $17,000 after you recoup the 30% tax credit. That's a difference of $43,000 over 25 years. Now, if your utility monopoly raises their rates a modest 4% annually, you will spend $104,000 over 25 years, which is $87,000 more than the cost of the solar system installation. You can also see from the graph trendline of real-world data taken directly from a Florida utility monopoly website, their rates have been increasing at closer to 6% annually over the last 8 years. Since we just figured 4% in the example above, it's entirely conceivable that your savings could be even more than shown here.

In conclusion, solar energy is your only choice if you want to protect yourself from energy price inflation. As you can see, the potential future savings is not a small amount. And when you think about what else you could purchase in the next 25 years with the many thousands of dollars you would otherwise give to your utility monopoly, it makes the thought of going solar even more attractive. For example, you could use your solar savings to go on vacation every year, put it towards a swimming pool for your home, help pay college tuition for your children, go out to dinner a lot more frequently, subscribe to every streaming movie app, pay for your whole family cell phone accounts, buy a new car or truck, donate it to your favorite charity, or invest that much more money into your savings so you can retire sooner. At the end of the day, if you're

going to spend money on something, you may as well spend it on something that you and your family can enjoy together rather than just overpaying for electricity. After all, electricity is electricity; going solar lets you get your electricity at a massive discount.

Thank-you for your time and opportunity to serve you.

Sincerely,

Casey Diedring

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C/T: 314-315-2552

Congratulations! You made it to the end of the guide. If you have any questions, please feel free to reach out by whatever means you like. And as a reward for completing your intrepid journey, I have saved one of the most important topics for last. This one can make or break the piggy bank, so pay close attention to the various savings scenarios below. Sol Man is happy to discuss in more detail in person.

SAVINGS SCENARIOS (LOANS)

When it comes to figuring out your solar savings after purchasing a solar system with a loan, there are only 3 basic scenarios at play. Your solar savings will vary depending upon which payment option you choose (lower or higher) and which scenario below occurs. This is one of the least understood concepts in residential solar, and it is rarely, if ever, brought up or discussed by solar sales people. Most homeowners don't think to ask about the impact of their loan amortization schedule on their solar savings, and it is the #1 reason that your actual solar savings may occur further into the loan than you might realize. See table below.

1) **Staying in your home and paying the loan off over the full term of the loan, usually amortized over 25 years.** As with most loans, they require the borrower to pay the most interest towards the beginning of the loan. As the years go by, more of your monthly payment goes towards paying down the principal balance. This is why most of your actual solar savings likely happens in the last 10 years of your loan term as your utility monopoly has had time to raise electricity rates significantly and you are finally paying down your loan principal balance faster than your loan interest obligation.
2) **Selling your home before the loan term is over, and transferring the loan terms to the new home buyer.** Remember, if this scenario occurs, and you did not pay the ITC amount in full to the loan company within the first 15 months of the loan, then you must pay it in full when you sell the home. Unlike the remaining lender fee, principal balance, and interest, the ITC payment obligation <u>cannot</u> be transferred to the new home buyer. Keep in mind, if your principal balance is lower than the ITC amount when you sell your home, then it makes more sense to simply pay off the balance of the loan.
3) **Selling your home before the loan term is over, and paying off the loan before you sell the home.** This would most likely occur if the new buyer of your home does not want

to assume the terms of your solar loan, therefore you are unable to transfer it prior to closing. You would then owe the lender the remaining principal balance, but not the ITC amount. If you haven't recouped enough solar savings before this scenario happens, then you will have to write a check to pay off your loan in an amount that exceeds your solar savings thus far. This is how people lose money with solar, going underwater on their solar loan. Keep in mind, your home should sell for more with a solar system, so the home equity increase can help offset this worst-case scenario.

Loan Interest Rate vs. Cumulative Payments to Loan Principal

Interest			Cumulative % Payment to Principal		
Rate	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**25 yrs**
1%	80%	82%	84%	86%	88%
2%	64%	67%	71%	75%	79%
3%	51%	55%	60%	65%	70%
4%	41%	45%	50%	56%	63%
5%	33%	37%	43%	49%	57%
6%	26%	31%	36%	43%	52%
7%	21%	25%	31%	38%	47%
8%	17%	21%	26%	34%	43%
9%	13%	17%	22%	30%	40%
10%	11%	14%	19%	26%	37%

For example, a 25-year loan with a 4% interest rate would take you 15 years to where you've paid half of all your monthly payments towards principal and half towards interest. This means that for the first 15 years of your solar loan, most of your payment goes towards paying interest. If you sell your home in this period, your loan balance may be larger than you expect simply because of how your loan is structured behind your monthly payment.

[Updated 2/28/24]