



# Your Guide to Electrification





When I was a kid, I wanted to be “an artist, a farmer, and a dad.” When I was in college, I had the notion that I might be running a green building business sometime before I was 30. Flash forward to 2019 where I took the leap of faith and started Green Projects Group.

For the first two years I focused on converting as many homes in Michigan as I could from incandescent lightbulbs to LEDs through rebate programs many homeowners weren’t aware of.

Now, I am all-in on helping those same homeowners and others take electrification to the next level. I hope this guidebook takes you on an exciting adventure and we can help you make green projects easy projects.



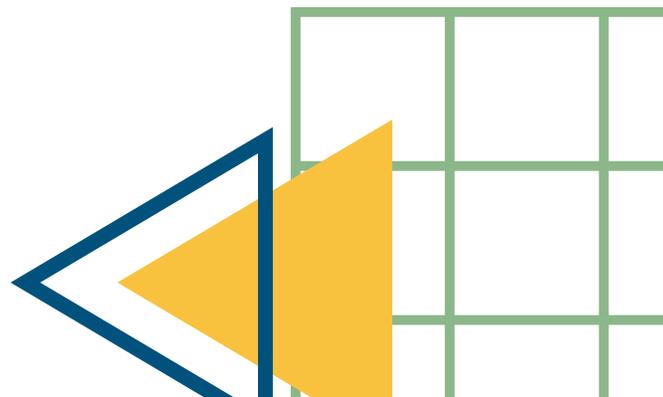
I like to think of electrification as a journey. So, pick a starting point, and keep exploring and learning new areas to electrify your life.

Each stop on this journey will give you:

- Some information about the electrification topic
- A practical challenge if you’re ready to take the next step, and
- Some ways to shop (including some awesome discount codes from some of our friends)

A handwritten signature in black ink that reads "Will Gallmeyer" with a long horizontal flourish extending to the right.

Will Gallmeyer, President





Indoor Air Quality



Weatherization



Smart Panel



Lighting



Cooking



Solar



# Electrification Journey



Micromobility



Clothes Drying



Transportation



HVAC



Lawn Tools



Water Heating

Want to connect about electrification? I geek out about this stuff and would love to chat for 60 minutes. Visit [greenprojectsgroup.com/coach](https://greenprojectsgroup.com/coach) and claim a free 60-minute call on my calendar.





# What is Electrification?

## Electrifi-what? Here are the basics.

Electrification is all about using electricity to power your appliances, cars, and other machines, rather than using fossil fuels like natural gas. For the purposes of this book we are going to talk about electrification as it relates to residential machines like water heaters, furnaces, stoves, etc. Here in Michigan, the majority of these appliances currently run on natural gas, rather than electricity.

## Why does electrification matter?

Our environment is increasingly affected by the rising levels of CO2 in our atmosphere. Without a way to reduce our carbon emissions and/or find a way to “suck” carbon dioxide from the atmosphere, we will continue to increase the negative effects of global warming, which is hurting our planet and its ability to be humanity’s #1 space rock.





## Wait, doesn't electricity come from fossil fuels?

Good question! To be clear: electricity is not necessarily more efficient or somehow “greener” than natural gas. A lot of our electricity comes from burning coal or natural gas. These are not renewable energy sources because they do put CO2 into the atmosphere. The aim of the electrification movement is ultimately to use electricity that can be produced from renewable resources like wind and solar. This is what we call renewable, or “clean” electricity.

### A Renewable Future

This is a really big goal, and it might seem pointless to electrify our machines since we can't control the bigger issues of electricity production and distribution. But the more we take this seemingly small step of electrifying our homes, the better positioned we will be when the grid is producing and distributing 100% renewable energy. My water heater gets more renewable every year!



### CHALLENGE

I encourage you to switch to electric when your appliances need to be replaced, buy electric vehicles when you can, and participate in community discussions about climate change. Together, we can make a difference.

### SHOP

Continue reading and learning in one of my favorite books, *Electrify by Saul Griffith* and continue digging into this book to find the next best step for you and your household.



# Weatherization

*Boring? Nah, essential.*

## What is weatherization?

Weatherization involves making improvements to a home's insulation, air sealing, and ventilation systems to reduce the amount of energy needed to heat and cool your home. Weatherization might sound boring, but it has to remain the cornerstone of residential electrification. By improving the home's building envelope, less energy is needed (gas and/or electric) to maintain a comfortable temperature, resulting in lower energy bills and less energy waste.

## Weatherization is key for three reasons:

### *Your Bills*

Who doesn't love lowering their bills? Weatherization can help with that, whether you're using gas or electric appliances. According to the Michigan Weatherization Assistance Program<sup>1</sup>, "households that receive weatherization services can expect heating costs to be reduced 20 to 25 percent."

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<sup>1</sup> <https://www.benefits.gov/benefit/1861#:~:text=According%20to%20national%20studies%2C%20households,even%20greater%20savings%20will%20result.>



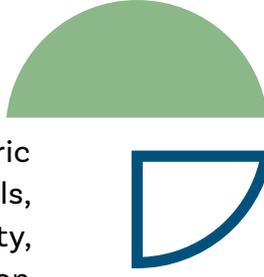


### Your Electrification

Switching from gas to electric is crucial for lowering your bills, improving indoor air quality, and reducing our carbon emissions. But just switching to electric appliances isn't as helpful without weatherization. Ready to hear something wild? Electrifying might lead to higher electricity bills if your home is not properly weatherized. By reducing your total need for energy, weatherization will make sure switching from gas to electric is cost-effective.

### The Grid

In addition to saving money at the individual level for homeowners, weatherization plays a key role for the electricity grid. Because weatherization reduces the total amount of electricity needed, it also reduces the strain on the grid. During times of high energy usage (especially for homes that aren't weatherized), increased demand can lead to brownouts and blackouts.



## CHALLENGE

Want to see how you could reduce your energy use based on the numbers? Complete a residential energy audit!

## SHOP

Coupon Code: **GPGGUIDE10** for 10% off your order.

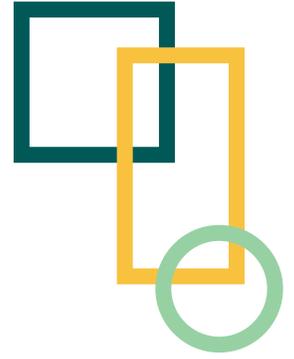
Grab things like insulated pipe wraps, a smart power strips, and furnace sealers all at [shop.greenprojectsgroup.com](http://shop.greenprojectsgroup.com).





# Smart Panels

*Elevate your Smart House*



## *Electrical Distribution Hub*

Smart panels (aka electrical distribution panels) are innovative hubs that are paramount in helping manage and control electricity in our homes as we move towards more and more electric household items.

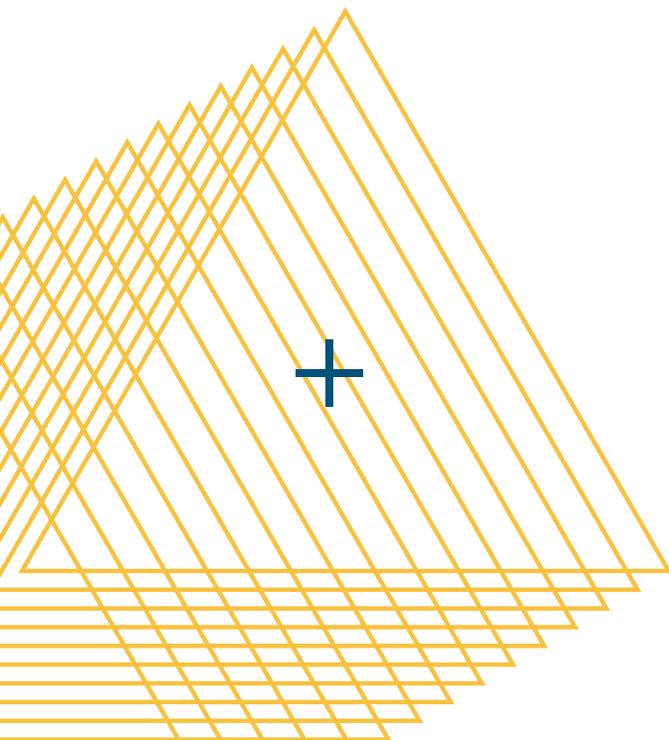
The superpower of smart panels is their ability to seamlessly integrate with the growing ecosystem of smart and sustainable technologies that may pop up in your home including solar panels, energy storage solutions, electric vehicle chargers, and home automation systems.

In an electrified home, where the reliance on electricity for heating, cooling, transportation, and various other tasks is significantly increased, smart panels play a crucial role in managing the increased demand. They can actively monitor energy usage patterns and distribute power efficiently, reducing wastage and minimizing electricity bills. Moreover, these panels can help homeowners take advantage of off-peak electricity rates, which can be particularly beneficial for electric vehicle charging or large appliances.

As electrification continues to shape the future of homes and communities, smart panels will undoubtedly play a pivotal role in this transformation.

## SHOP

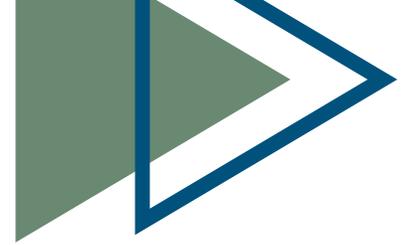
Our friends over at Michigan Solar Solutions will take great care of all of your smart panel and solar panel needs. Tell them we sent you for some sweet discounts.





# Cooking

*Not your grandma's kitchen*



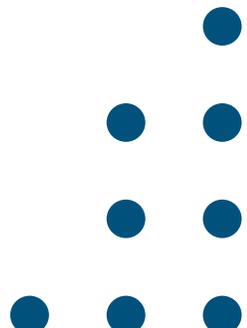
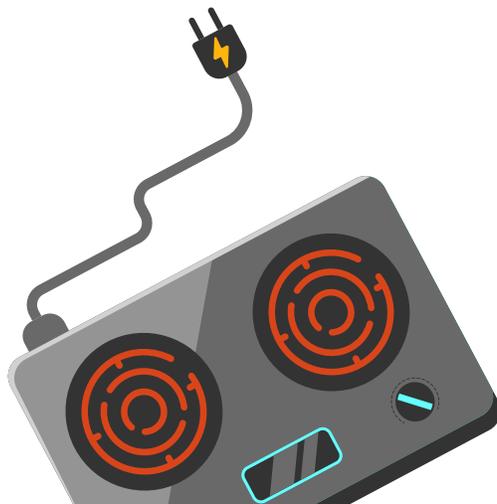
## From Open Fire to Gas Ranges (and Beyond!)

From cooking on open fires, to wood stoves, to natural gas and electric ranges, we humans have dramatically improved the precision and efficiency of our cooking. But there are big issues with the most popular stoves today (natural gas); new evidence suggests that gas ranges are more dangerous than we originally knew. They release dangerous pollution inside our homes. And electric ranges aren't much better. As you might have experienced, electric ranges are slow to heat, slow to cool, and they are hot to the touch for a while after you've turned them off. (And both types of stoves are difficult to clean!)

## There's a better way

Induction stoves solve all these problems, all while saving energy and minimizing the impact on the environment.

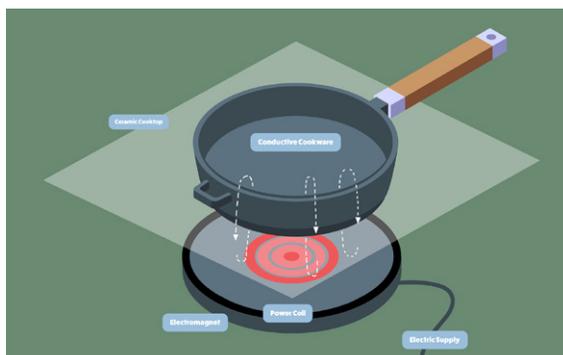
- Air quality: Induction stoves don't emit any harmful pollutants into our indoor air.
- Precision and speed: they heat up very quickly, and the temperature is highly accurate.
- Quick to cool: Induction stoves are quick to cool, since they don't get very hot in the first place! (See more about how induction works below.)
- Easy to clean: they look like a flat cooktop, but because they don't get as hot, food doesn't get caked on as easily as it does on an electric cooktop.
- Saving energy: the magic of induction uses much less power than a typical electric appliance, and they don't use harmful gases to function.



## How Induction Cooking Works

Induction stoves work by running an electric current through a coil, which generates a fluctuating magnetic field. This field doesn't create heat until it touches your ferrous (iron) cookware. Once you put an iron pot or pan on the stove, the magnetic field induces many smaller electric currents in the cookware. And since iron is a poor conductor of electricity, these smaller "eddy" currents produce heat in your pot or pan.

This technology is fundamentally different from the conduction used by



old-fashioned electric stoves; you're not heating the cooktop to then heat the pot or pan. Rather, you're inducing a current that will only heat your iron cookware. A small amount of heat does conduct back down to the cooktop from the pan, but it dissipates much more quickly than with an electric stove.

## Iron Pots & Pans

Before you start cooking, make sure you have the right equipment. In order

for the induction technology to work, your pots and pans need to be made of a magnetic material like iron or steel. Since induction heating happens when iron atoms dance around, there needs to be enough iron in your cookware for the heat to build up.

## CHALLENGE

Snag a counter-top induction stove if you aren't ready to replace your entire stove-oven combo and see the difference it can make.

## SHOP

Use Coupon Code: GPGGUIDE10 for 10% off your order through **shop.greenprojectsgroup.com**

### Other ways to shop

*(We are not affiliate partners with the organizations listed below but we believe wholeheartedly in induction cooking)*

- Join the wait list at Cooper or Impulse for their battery induction stoves (umm these are pretty sweet)
- Start shopping for a full induction stove range at your local box hardware or appliance store

Don't forget to see if your stove can get you rebates through the Inflation Reduction Act. For a brief primer on the technology of induction cooking, and the basics on the IRA rebates, check out section 2 of our other blog at [greenprojectsgroup.com/IRA](https://greenprojectsgroup.com/IRA).



# Micromobility

*They see me rollin' (on my e-bike)*

## eBikes > Gas

The math for ebikes is pretty simple: more biking = less gasoline. Also, can I just say from personal experience that e-bikes are one of the least expensive, most fun ways to join the electric revolution? You (probably) already know how to ride a bike, so just... electrify it!

In 2022 I got a secondhand e-bike on Facebook Marketplace for \$1,200 and it was absolutely the best purchase of the year for me. I use it to take my daughter to daycare, quick trips to the store, and honestly just for some cruisin' on nice days. Pedaling is easier, biking is faster, and guess what... if you're feeling lazy you can just hold down the throttle and fly! \*insert screech sound here\*

Now I get it, even \$1,200 for a used bike is not nothing! Keep in mind this is intended to offset some of the expense of driving a car. This isn't the right next step for everyone, but it might be for you.

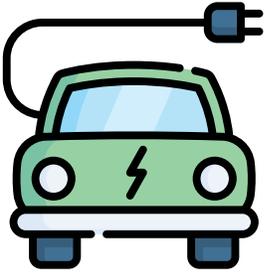
## CHALLENGE

If cruisin' around on an ebike sounds like the perfect day to you, start saving up for an ebike or snag one off of a resale site.

## SHOP

Mention GPG to scoop up your purchase with 5% off through Pedego eBikes Grand Rapids's location. Shop now at [pedegoelectricbikes.com/dealers/grand-rapids/](https://pedegoelectricbikes.com/dealers/grand-rapids/)





# Transportation

*Six degrees of Kevin Bacon?  
Your EV could get you closer.*

## EVs Aren't Only Teslas

Listen, I know, this is a big one. But hear me out. In almost all of the 3,000 counties in the US, electric vehicles (EVs) have a smaller carbon footprint than gasoline-powered cars. Oftentimes when someone thinks about an EV they picture a top-of-the-line Tesla (and if you've ever driven a Tesla, you know the acceleration is... \*chef's kiss\*) but nearly every manufacturer including Chevrolet, Nissan, and Volvo are investing in electric cars. And as time goes on it's going to become more and more available to the middle-class household.

## IRA Funds

The Inflation Reduction Act (IRA) is also stepping in to help reduce that initial investment by offering Clean Vehicle Tax Credits through the end of 2032. That means up to \$7,500 in rebates for new EVs (and support for used EV purchases as well). Heads up, only certain EVs qualify, so read the fine print. Here's how it breaks down:

Purchasing an EV is a big investment, but the benefits – environmental, financial, and in terms of electrification happiness – are incredible. This is a step that may take a few years to plan for. Since the tax credit will be available for a decade, you have time to prepare.



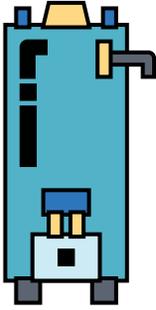


## CHALLENGE

Do your own research, assess where your household is in terms of transportation, and consider other options to help support this decision when the time is right (I suggest some solar power to charge that puppy).

## SHOP

Use **GPGFRIEND** for 5% off your purchase of a EV Charger (restrictions apply) from Blink at [blinkcharging.com](https://blinkcharging.com).



# Water Heating

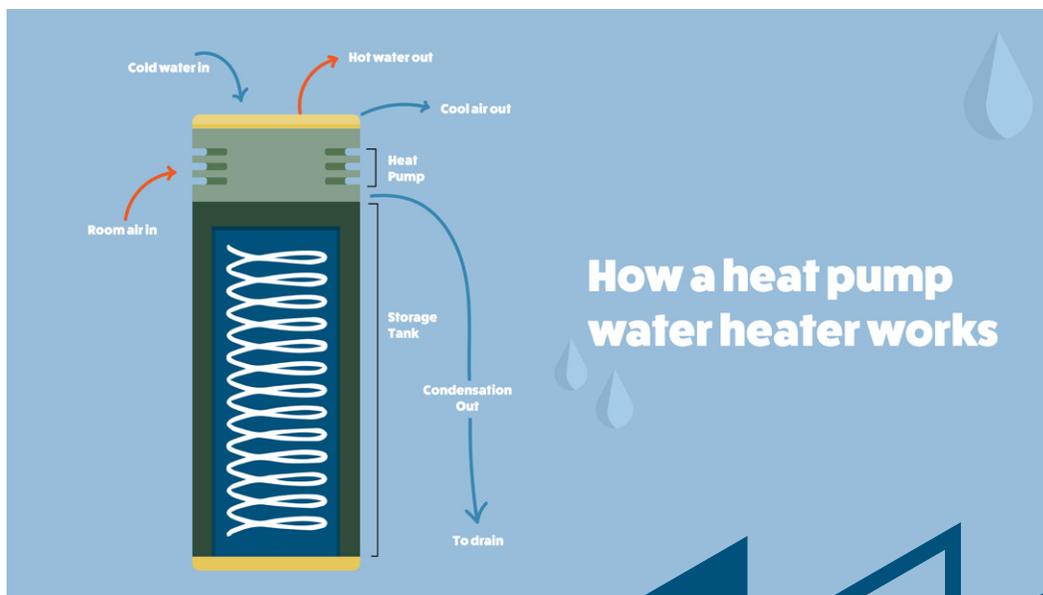
*How much heat would a heat pump pump if a heat pump could pump heat?*

## What is a heat pump?

Heat pump water heaters or, HPWH's as we'll be calling them, use refrigerants to move heat from the surrounding air into water, rather than creating heat through the use of electricity or gas.

Sound complicated? It's not really! Think about it like this... HPWH's move heat instead of creating heat.

While a typical electric water heater “burns up” electricity by running it through a resistance rod (“heating element”), a HPWH uses a small motor to run refrigerant between an evaporator coil and a compressor. By expanding and contracting the refrigerant, the HPWH simply moves heat into your water (think of this like a refrigerator working in reverse).



**How a heat pump water heater works**





A typical electric water heater is 100% efficient. Now, you may be thinking that sounds really good, but HPWH's blow that out of the water (pun intended). Because these creative machines just use a small motor to move refrigerant back and forth, they are ~300% efficient. How is that possible? Due to the magic of refrigerants, for every unit of energy you put into the motor, you can transfer 3 units of energy into the water. In other words, HPWH's are described as 300% efficient (now if only I could be 300% efficient).

## Benefits of Switching to a Heat Pump Water Heater:

### *Lower energy costs*

HPWH's save ~60% on electricity costs compared to traditional electric water heaters, making them a cost-effective choice in the long term. While the initial cost of a HPWH is higher than that of a traditional water heater, the energy savings over time can more than make up for the difference. Plus, if you know how to apply for IRA incentives and local utility rebates, you're even farther ahead.

### *Improved performance*

HPWH's are creative and efficient, but they can't keep up with a huge drain on your tank, like two hot showers back-to-back. Fortunately, most water heaters are hybrid units; they use a heat pump but they still have the heating element for times of peak demand. This means no waiting for hot water when it's urgent, but overall low energy use when

the heat pump is keeping up with more common daily uses of hot water—the absolute best of both worlds.

### *Environmental benefits*

By reducing the amount of energy needed to heat water, heat pump water heaters reduce greenhouse gas emissions and lower your carbon footprint. And if you're switching from gas to electric, you get dual benefits: using less energy and switching to a fuel source that gets greener and greener, since the electric grid transmits more renewable resources every year.

In conclusion, switching to a heat pump water heater can offer significant benefits in terms of energy savings, long-term cost savings, and environmental impact. If you're in the market for a new water heater, it's definitely worth considering the benefits of a heat pump water heater.

## CHALLENGE

Check out some of the awesome resources from GreenHome Institute..

## SHOP

Use coupon code GPGFRIEND for 5% off your installation when you work with Hendricks Heating Check out their website at [hendricksheating.com](http://hendricksheating.com)



## Lawn Tools

*Never spill gas on your shoes while filling up your mower again*

### Electric yard tools...do they even work?

For some reason, there is this big stigma for some folks that electric yard tools can't do the job of their gas powered cousins. Yet, if I asked you right now what you use to power your drill or your refrigerator you'd say "electricity", right? In reality, there are so many reasons why switching to electric tools is beneficial.

#### Let me share just four:

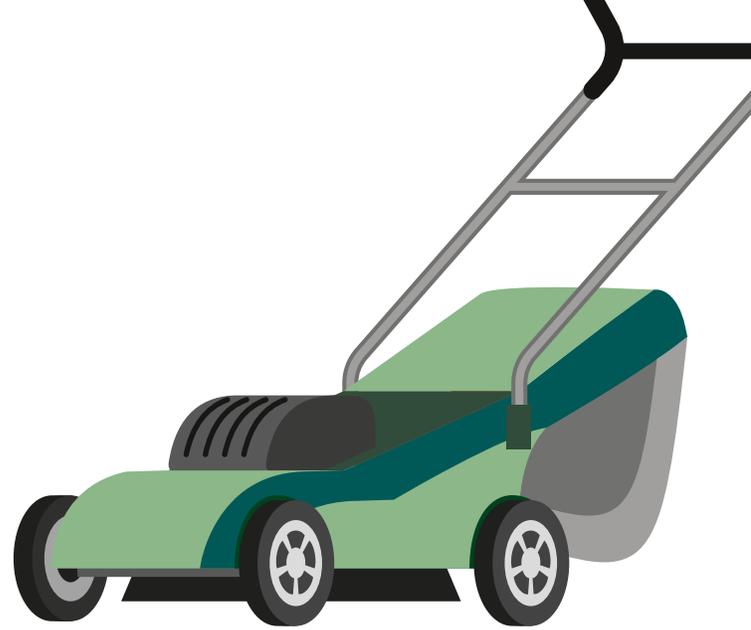
- There's almost zero maintenance involved with electric lawn tools since you don't have to deal with oil changes and other problems that come up with gas products.
- Everything is easy to start—charge your battery, push the button, get to work.
- You can save money on gas and take advantage of the electric grid.
- Electric mowers tend to be 10-20 dBA (decibels) quieter than their gas counterparts. Many people who previously wore hearing protection when working decide they don't need them after switching to a battery.





## CHALLENGE

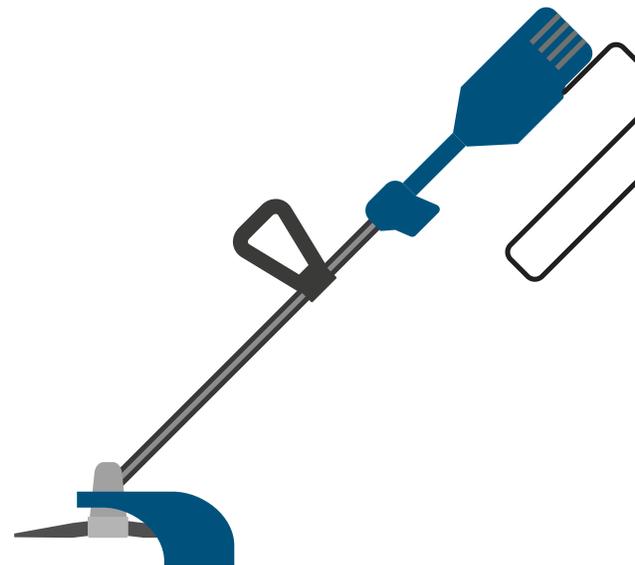
Write out all of the different tools you use in your home, from your coffee pot to your car and map out which ones are electric and which ones are gas powered. Then, determine which ones could be electric that aren't and make it a goal to switch at least one of those items in the next year.

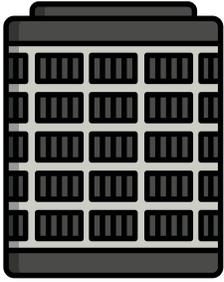


## SHOP

Some fun news for you: we've made shopping for Greenworks products easy peasy by offering some of our favorite commercial-grade products right on our online store.

Use **GPGGUIDE10** for 10% off your order when you shop at [shop.greenprojectsgroup.com](http://shop.greenprojectsgroup.com).





# Heating, Ventilation, and Air Conditioning

*Heating and cooling can go beyond just energy efficiency.*

## Electric > Gas

For years the big push in the HVAC industry has been to make sure you have an energy-efficient furnace or AC unit, and while that is still a great step, there's one more step you can take to take your heating and cooling game even further: Electrify your HVAC.

## Heat or Cool, Why Not Both

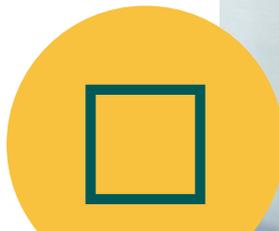
Now, earlier in this guide we already talked about heat pumps and how they can be used for water heaters, but the same technology can be used to heat and cool your home. The really neat part is that heat pumps can be used to both heat and cool your home, not one or the other, making it an extremely versatile choice for your home.

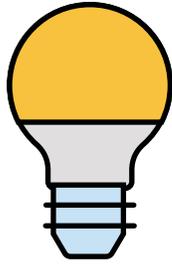
## IRA Rebate

Depending on when you are reading this, you could take advantage of tax credits offered in the Inflation Reduction Act (IRA) for up to a \$2,500 rebate on your heat pump installation.

## SHOP

Use coupon code **GPGFRIEND** for 5% off your installation when you work with Hendricks Heating [hendricksheating.com](https://hendricksheating.com).





# Lighting

*Light up the night (with LEDs)*



## Which Kinds of Bulbs Are Best?

With so many options out there, you might be wondering about the differences between the various lightbulbs on the market. We happen to be very biased about LED (Light Emitting Diode) bulbs because they are safer, last longer, and are more energy efficient.

[Check out this video](#) for a quick summary of the main types; how they work, their main benefits, and their drawbacks. (Be sure to stick around for an embarrassing confession at the end.)

## More About LEDs

LEDs work by passing an electric current through a semiconductor material (specifically, a diode). Pure silicon is a poor conductor, but silicon with specific impurities is able to conduct... “semi.” The type of impurity gives these semiconductors specific properties.

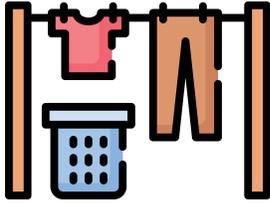
LEDs are even more energy efficient than fluorescent bulbs, have a longer lifespan, contain no toxic materials, and are more durable. They also offer a range of colors and can be dimmed easily, making them very versatile.

## CHALLENGE

Go through your home and count the number of lightbulbs in your home. If you can, determine which ones are LEDs and which ones can still be converted.

## SHOP

Use coupon code **GPGGUIDE10** for 10% off your order at **shop.greenprojectsgroup.com**



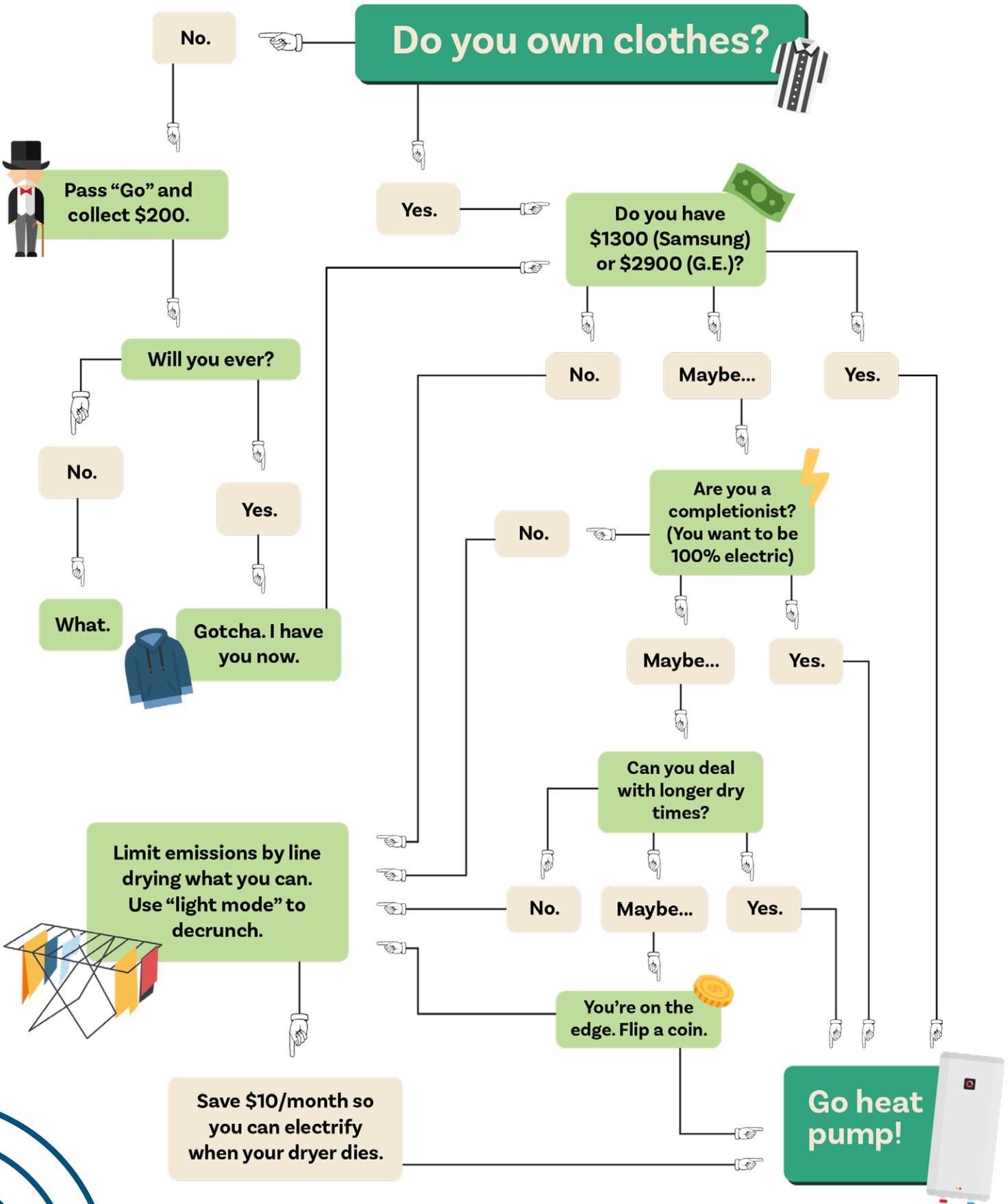
# Clothes Drying

*Just like grandma used to do.*

*Do you really need a heat pump dryer? Probably not*

It's a universal truth: we all have clothes and clothes get dirty. The truth is you could switch to a heat pump dryer (but they are super duper expensive). If you look at the numbers, only 3% of your home emissions comes from your dryer (which is probably at least energy-efficient). Other options are hang drying, running your dryer less or on a lower mode and during non-peak energy hours. Let's use this handy lil chart to determine your next step:

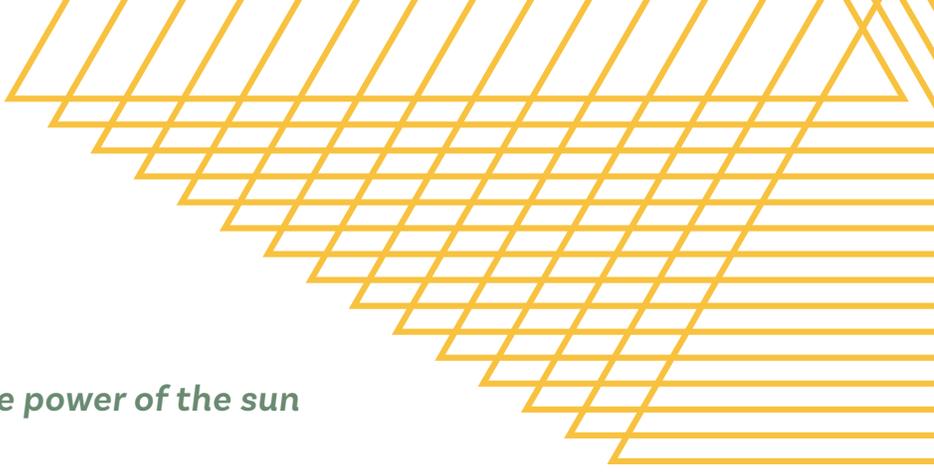






# Solar

*Harness the power of the sun*



## Benefits of Solar

### Cost Savings

We're talking benjamins, baby. One of the primary reasons for getting residential solar energy is its potential for long-term cost savings. Of course, there's an up-front investment, but financing can offset that.

### Environmental Sustainability

Solar energy is a clean and renewable energy source that produces no greenhouse gas emissions at the point of energy production. Important note here: If most of your major appliances are still running on gas, solar isn't going to make a big impact on your carbon footprint.

### Energy Independence:

Installing a residential solar energy system makes you less susceptible to rising energy costs, grid failures, and other disruptions in the power supply.



### *Increased Property Value*

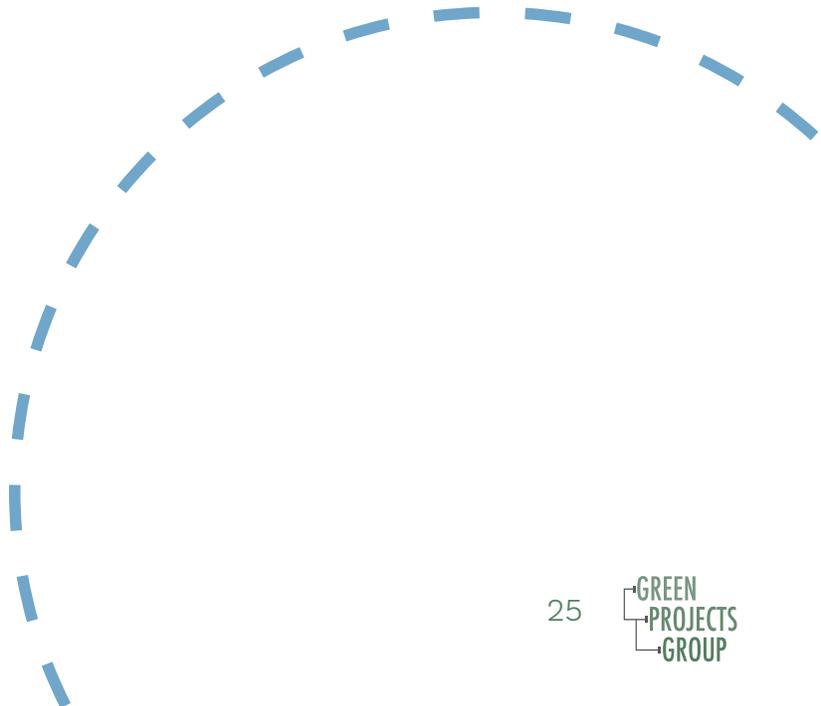
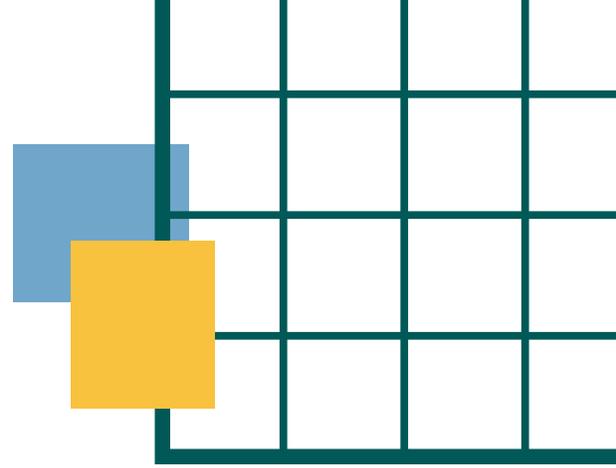
Homes equipped with solar panels tend to have higher property values. Studies indicate that residential solar energy systems can provide a return on investment above and beyond the energy savings, by increasing the resale value of a property.

### *Longevity and Low Maintenance*

Solar panels have a typical lifespan of 25 to 30 years, and they require minimal maintenance; mainly just an occasional cleaning.

## **SHOP**

Use Coupon Code: **GPGFRIEND** for 5% off your order through Michigan Solar Solutions at **[michigansolarsolutions.com](http://michigansolarsolutions.com)**.





# Indoor Air Quality

*How's your air?*

## The Missing Piece

After being in residential and commercial energy efficiency for nearly a decade now, indoor air quality was not on my radar until the recent brouhaha over gas stove (so sorry to IAQ fans!). I've recently changed my tune after I finally got an air quality monitor!

## Real-Time Indoor Air Quality Data

The Awair Element has real-time indoor air quality data, with changes tracked over time. It monitors temperature, humidity, CO2, VOCs, and PM2.5 in a simple visual. And it lives right over there on my kitchen countertop, so I can immediately see the impact of any activity in my house from a central location.



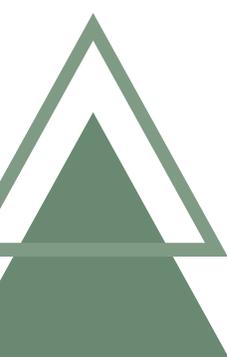
In addition to seeing the ups and downs across the five different measurement parameters, and being able to adjust with fresh air, or the kitchen vent, or changing the thermostat, one really fun development for me was just developing an intuitive sense for why a certain reading would make sense.

### Real Life Example

Cooking can spike humidity, PM2.5, and sometimes VOCs. Having lots of people in the house (or even just a concentration of our family of four) in the kitchen can spike CO2. Spiked humidity is very common throughout the summer in Michigan, and that was one of the most common contributors to flagging IAQ numbers for us this year.

### SHOP

Get your own Awair Element for your home and take 10% off your order at [shop.greenprojectsgroup.com](https://shop.greenprojectsgroup.com) with GPGGUIDE10.





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