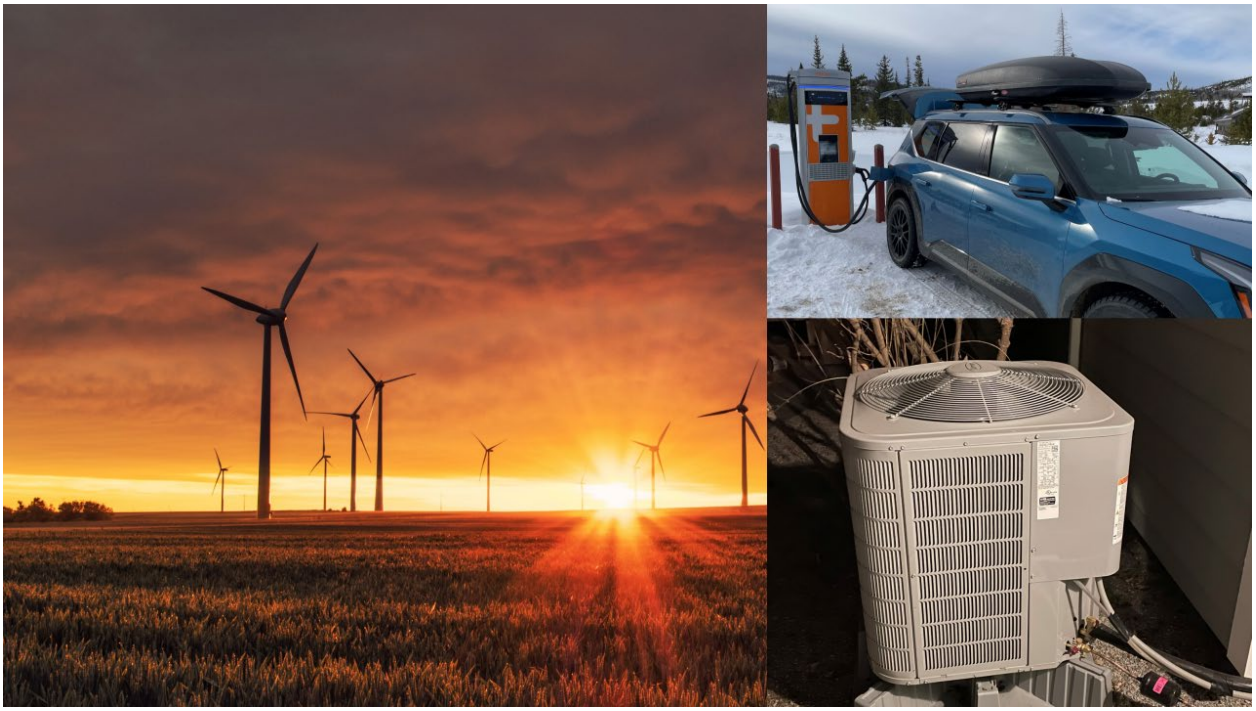

Photos by Karsten Wurth, Justin Spencer. The sun rises on a decarbonized future.

Decarbonization Journey Part II: What's the Big Idea?



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I've seen a lot of folks write about their own efforts to decarbonize their households, etc. As somebody who works in the energy efficiency / decarbonization space, I had my own ideas about how to do this most cost-effectively, aligned with the same kind of advice I give my

clients trying to decarbonize buildings or communities. While I might build out a more formal decarbonization measure supply curve with clients, the same principles can be applied to a more informal approach to household decarbonization.

First, assess where your emissions lie. Second, figure out best opportunities for cost-effective decarbonization within each of these areas that are acceptable to your stakeholders (the people you share a house with in this case) and make a plan. Third, implement projects as you can arrange financing and stakeholder approval. Last, invest in carbon removal to handle the hard-to-decarbonize portions of your emissions. By my calculations, I've more or less decarbonized my household, using a few different choices than other people make.

Assess where your carbon emissions lie.

For us, this boiled down to:

- Fossil fuel consumption in the home for heat and hot water.
- Electricity consumption in the home.
- Fossil fuel consumption for ground-based transport.
- Fossil fuel consumption for long distance travel (airplanes, but also buses and trains).
- Emissions from food/diet.
- Refrigerant emissions from appliances.

Make a plan and start implementing decarbonization projects

I started my decarbonization journey quite a while ago. The plan has been formed and reformed many times and it has accelerated this year. If possible, you put your planned investments in order according to the bang for the buck, but it’s worth at least writing down the opportunities. These were the key strategies in our household’s plan. Not surprisingly, we did the easier stuff first and now we’re getting to the harder parts.

Reduce energy use through low cost energy efficiency.

15 years ago, we bought a Prius and a pile of efficient lighting. 5 years ago, we bought a higher efficiency water heater and gas furnace when the old ones needed to be replaced.

Reduce energy use through changing behavior to consume less.

There are all kinds of ways to consider consuming less in order to reduce emissions impacts: Keep your thermostat set lower; combine trips; carpool; use mass transit;

consider vacationing more locally and/or with a lower footprint – compare a local camping trip to a trip across the country or across the globe; eat (and drink) more planet-friendly foods - more beans, less meat, especially beef.

Consuming less is asking people to sacrifice at least a little bit and not everybody is willing to sacrifice. I don't ask my household to make giant sacrifices here. I've at least thought about the GHG impacts of long haul travel and we don't take it lightly. I try to cook plant protein forward at least 2 nights a week. Note that this isn't vegetarian – my homemade chicken stock makes any vegetarian recipe taste a lot better with minimal increase in emissions. The other easy button on the food front is to waste less - if an extra trip to the store allows you to waste less.

What's a reasonable level of sacrifice and asking your household to consume less? There's a different answer to that question for every family and I'm going to applaud whatever actions you do take, rather than shame you for the things you don't do.

Get smart about refrigerant emissions.

DO NOT recharge your aging air conditioner unless your contractor can guarantee they found the leak(s) and repaired them well. The loss of refrigerant charge of my air conditioner has the greenhouse gas emissions impact equivalent to all of my natural gas for heating and hot water for three years. Getting your AC recharged can double your carbon footprint for the year. DO recycle your used appliances properly.

Decarbonize your electricity source. 10 years ago, we purchased a 5 kW solar PV array for our house. This costs a little more for us, so now we're talking about things that cost more money, investments that don't necessarily pay off. I've worked with my local utility and town off and on for years, advocating for decarbonization of electricity in a way that will continue to be reliable and affordable.

Fuel switch to low carbon electricity.

Last fall, we made two big fuel switch purchases, adding a heat pump to displace our natural gas heating usage and buying an electric vehicle to reduce our gasoline emissions. The timing was right for both of them. My air conditioner was failing and needed replacement, so the additional cost to get a heat pump instead was relatively low. And we wanted a new car for a variety of silly reasons and partially offset those silly reasons by getting an EV. I already wrote about my heat pump purchasing decision **here**. Soon, I'll write more about how I maximized my heat pump's decarbonization potential while keeping costs in check. And I'll also have something to say about the EV ownership experience, when I hit the one year mark.

Go back and make additional investment in low carbon electricity to account for growth in electric loads.

This is what's next on my list. Our EV and heat pump are now our two largest electricity loads and have doubled our electricity consumption. I'd like to add more solar to my home, so that's what I'm saving up for next.

Invest in carbon removal to handle the hard-to-decarbonize portion of the load.

After you've made the decarbonization investments that make sense for your household, you're still left with a pile of stuff that's hard to decarbonize. You still like to eat cheeseburgers, you still like to fly to visit friends or family or experience other parts of the world. You still ride the the bus to work. Even if you've stopped all of everything, unless you're off the grid, odds are you still have some household emissions left. And odds are, the more comfortable your lifestyle is, the more carbon you have left after you've tried to decarbonize. For us, the leftovers are related to extra electricity emissions (could be reduced with more solar), still using gas for hot water (could be changed to HPWH, but there are some complications), 2010 Prius gasoline, electricity emissions associated with charging a car away from home, flying, and food. For us, we're still leaving something like 5-10 tons of CO2e. I think we can trim this by another 2 or 3 pretty soon and the electricity grid gets greener every day. But I think we'll still be left with close to 5 tons that are hard to mitigate cost-effectively.

So now we're entering a highly uncertain realm, the realm of carbon offset investments or carbon removal investments. There are lots of opportunities for these investments. Some are better than others, baselines matter, and it's all hard to figure out. We need more and better and lower cost ways to do this and transparent accounting frameworks. Does preserving forestland in a fire prone landscape save anything? Probably not. What about the additionality problem? I paid for the offsets. The offsets went to a company who installs green stuff. Somebody else bought the green stuff, partially with my money. We all claim to have done something green.

If you want the biggest bang for your buck in this space, consider donating to a climate charity. Determine how much carbon you have left after doing your decarbonization, or at this particular point in your decarbonization journey, decide how much you're willing to pay per ton of carbon dioxide equivalent, and make a donation to one of these.

I am personally affiliated with one of these that I really like, Fertile Soils Fund, where I currently serve on the board as Secretary and Treasurer. Fertile Soils Fund was founded by a buddy of mine from college, Dr. Thomas "T.J." Pray. We were both interested in environmental topics during college – while my path led to clean energy, TJ's path led to soil

microbiology and ultimately to Fertile Soils Fund. Fertile Soils Fund invests in helping farmers apply soil amendments to encourage microbial growth, which effectively increases production of soil organic carbon and soil mineral carbon. The primary goals of the organization are twofold:

1. Help farmers in America preserve the health of their soil over the long term.
2. Remove carbon from the atmosphere by increasing carbon deposition in the soil.

How will it achieve these?

1. **Apply findings from academia to practical use**, figuring out how to most cost-effectively work with farmers to get more carbon-friendly fertilizer application. The organization is piloting these new methods in different specific farming applications. The organization recruits farmers to participate, then works with the farmer to deliver and apply additional soil nutrients formulated to promote soil and soil microbe health, paying for the additional costs of doing this.
2. T**est and document what's working.** Measuring soil carbon deposition is a difficult, but conquerable problem. The organization is paying for more significant soil testing at participating farms over many years to prove what works and doesn't work. The organization will work with partners in academia when possible to collect and analyze this data.
3. **Spread the word about what works**, so it can be replicated all over the US, North America, and the world.

If you want to follow what Fertile Soils Fund is up to, follow them on LinkedIn. If you want to learn more about how you can get involved, get in touch.