Residential Solar Seminar
5/8/2026

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Residential Solar Owners

Disclaimers

- Our views and opinions do not necessarily represent the views and opinions of the Edisto Island Open Land Trust
- We are not licensed and trained experts in solar power, we are just homeowners with solar who want to share their experiences
- We might get something wrong
- We do not represent manufacturers or installers, though we can recommend some if asked
- We are not receiving any compensation for this seminar

Understanding kW and kWh

Two essential units for evaluating any solar or battery storage system

Kilowatt (kW)

Rate of power — how fast energy flows right now

Think of kW like water flow rate from a faucet (gallons per minute) — it tells you how fast power is being generated or consumed at any given moment.

Where you'll see it:

- Solar array size (e.g., a 6.57 kW system)
- Inverter output capacity
- Battery charge / discharge rate
- Appliance power draw (microwave, AC unit, etc.)

Kilowatt-Hour (kWh)

Amount of energy — how much has accumulated over time

Think of kWh as how much water has collected in a bucket — it accumulates over time and measures total energy used or produced.

Where you'll see it:

- Your electric bill (monthly consumption)
- Solar panel production reports
- Battery storage capacity (e.g., 13.5 kWh per Powerwall)
- Net metering credits earned and banked

The relationship: 1 kW of power flowing for 1 hour produces (or consumes) 1 kWh of energy.

Net Metering and Time-of-Use Billing

How solar homeowners earn credit for the electricity they generate

Net Metering

When your solar panels generate more electricity than your home is using at that moment, the surplus flows out to the utility grid.

The utility credits your account for that energy. At billing time, you pay only for the ***net*** amount: grid draws minus your solar credits.

Key advantages:

- Credits valued at the retail electricity rate
- Unused credits roll forward to future billing periods
- Can reduce or eliminate monthly electricity costs

Time-of-Use Billing

Electricity rates vary by time of day, based on grid demand.

On-Peak	Seasonal peak hours (Oct-Apr 6-9am, May-Sep 4-8pm M-F except holidays)	**Highest rate**
Off-Peak	Any time other than On-Peak or Super Off-Peak	**Moderate rate**
Super Off-Peak	Early morning (1-5am daily)	**Lowest rate**

Solar panels generate during daylight, earning credits at on-peak or off-peak rates, while EV charging or other overnight loads can draw power at the lowest rates.

Dominion Energy SC, Solar Choice (Rate 5): A time-of-use net metering plan that banks credits separately by tier. Credits that remain unused at year-end are settled at avoided-cost rates (well below retail), so right-sizing your system matters.

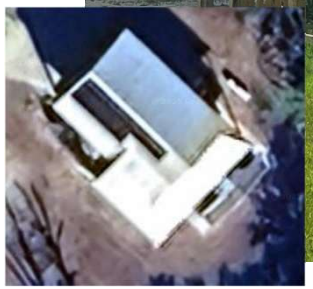
CASE STUDY

Goll Residence

Framptons Inlet Rd
Edisto Island, SC

The System

- Installed 2022
- 1600 ft^2 house w/metal roof
- 6.57 kW system with 18 panels (365W each)
- Time of Use rates with Net Metering
- No battery backup
- Installed by Renu Energy Solutions



System Cost

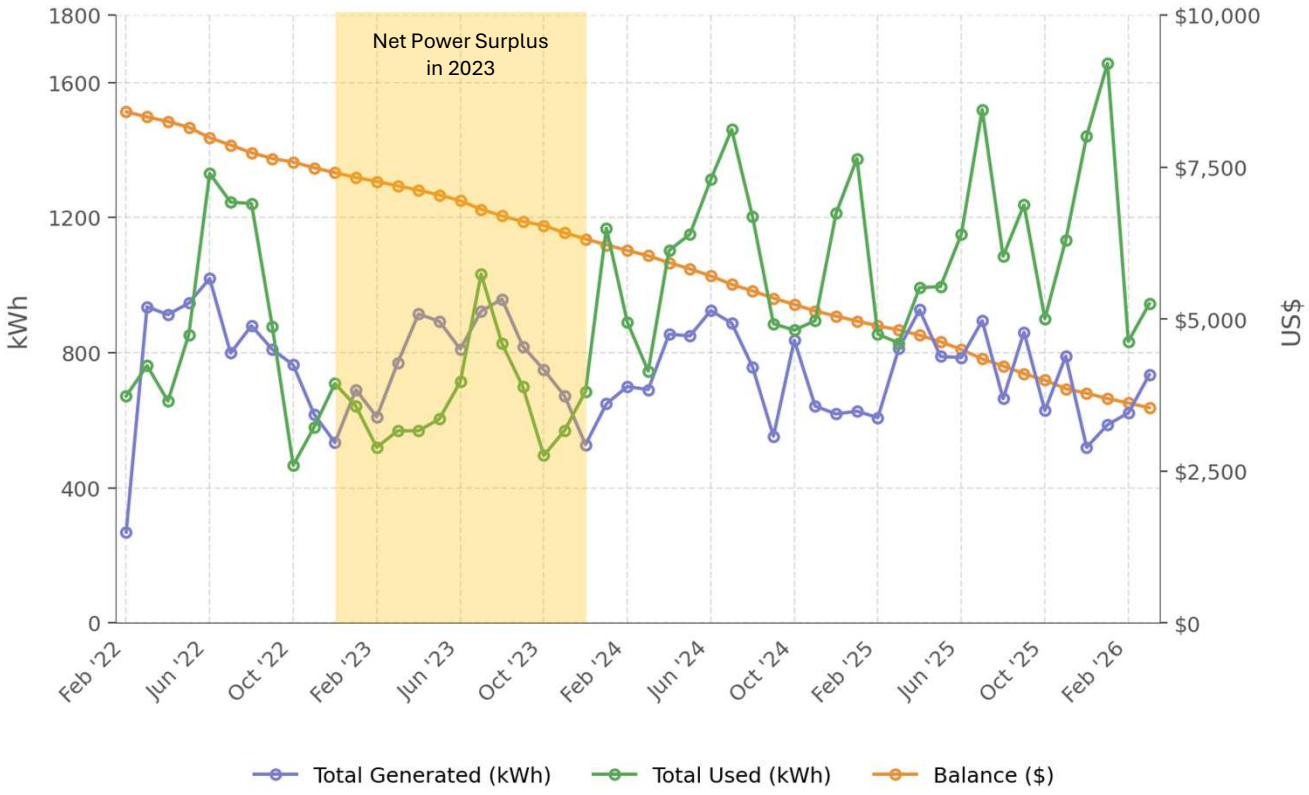
2022 prices and credit percentages

Total system cost	$19,980
Incentive rebate from installer	- 1,000
Manufacturer rebate (through EnergySage.com)	- 250
Net cost for tax credit calculation	$18,730
30% Federal Tax Credit	- 5,619
25% SC Tax Credit	- 4,683
Cost after rebates and tax credits	**$8,429**

◀ **$2.85/Watt**

Real-World Numbers

- System went live mid-February 2022
- Trend shows payoff in 2029 (7.6 years from start)
- Net power surplus for all of 2023
- What is going on in the other years?



Summer of 2022 (One Simple Trick)

- Our thermostat was set to 77 during the day and 72 at night
- It takes a lot of energy to cool to 72
- Changing the thermostat to 74 at night significantly reduced our usage in 2023
- Did we suffer? No. The trick was to start the cool-down earlier in the evening.
- DON’T GO TO BED HOT!

Why did usage go up in 2024?

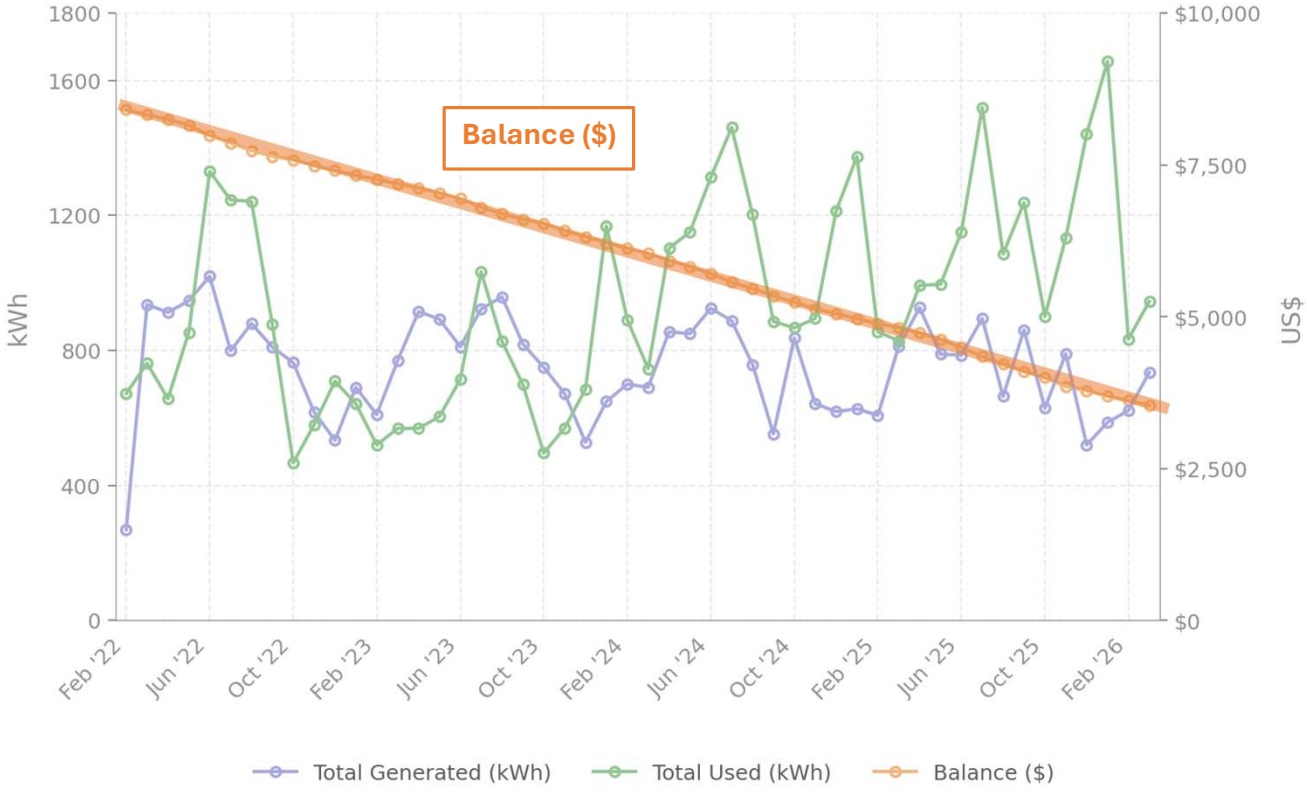
- We purchased an EV at the end of 2023…
- … and began charging at home in January 2024
- The impact of charging an EV dwarfs the impact of seasonal energy demands
- Our system is now under-sized…
- … but electricity (miles/kWh) is much cheaper than gasoline (miles/gallon)

Progress to Payoff

- Starting point: system cost minus incentives and tax credits
- Monthly savings: the difference between the cost of total energy *used* at residential rate and total energy *billed* at Solar Choice rate

Despite the system being under-sized after purchase of the EV, the progress towards payoff remains unaffected:

Solar generation will offset the same amount of energy regardless of how much energy is used



Conclusions

- Have a sunny location and roof orientation favorable for solar generation
- Use tax credits and incentives to reduce initial cost
- Net Metering allows use of the grid as a battery to smooth out power generation and consumption
- Realize additional savings by understanding and adapting to the Time-of-Use rates inherent in the Solar Choice plan:
  - Charge an EV only during Super Off-Peak hours if possible*
  - Avoid using power-hungry appliances (e.g., electric clothes dryers) during On-Peak hours

*If you have surplus energy stored on the grid, charge during Off-Peak hours September-November

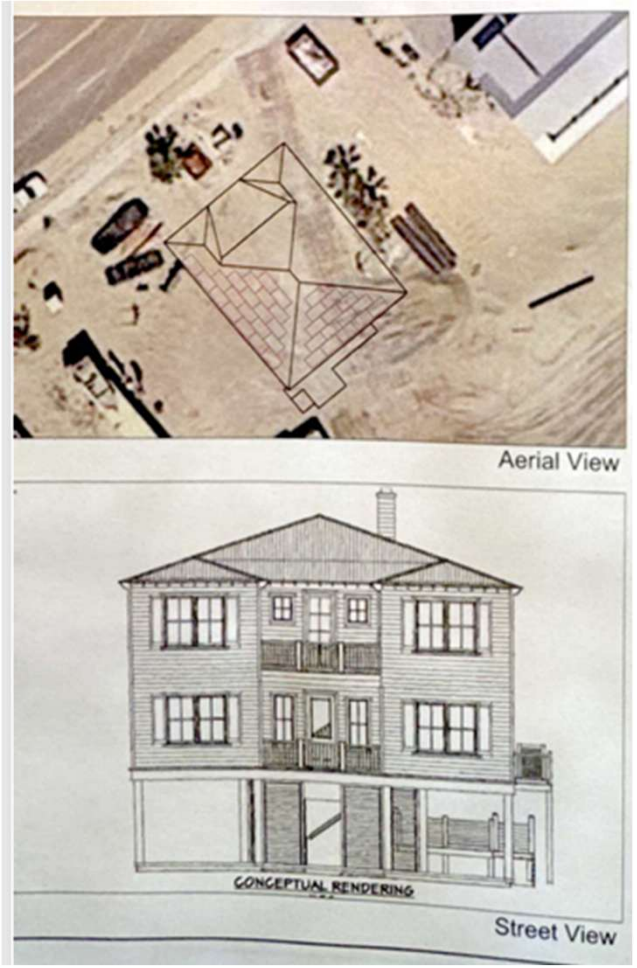
CASE STUDY

Watts Residence

Palmetto Blvd
Edisto Beach, SC

The System

- Installed 2018
- 3,098 ft^2 house w/metal roof (new construction)
- 10.8 kW system with 36 panels (300W each)
- No battery backup
- Installed by Southern Current (no longer doing residential)



System Cost

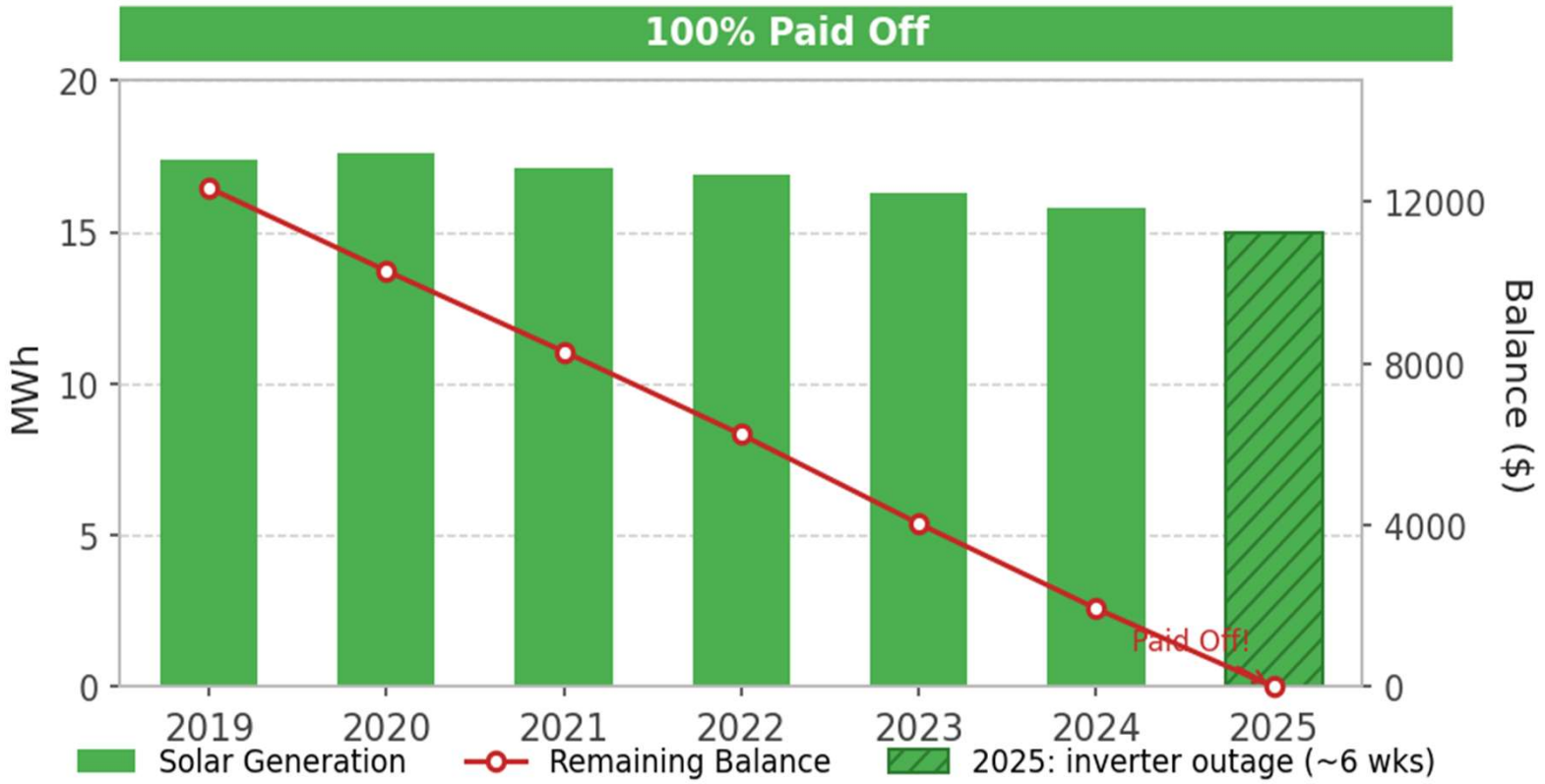
2018 prices and credit percentages

Total system cost	$32,000	
Rebates and incentives	- 0	
Net cost for tax credit calculation	$32,000	◀ $2.96/Watt
30% Federal Tax Credit	- 9,600	
25% SC Tax Credit	- 8,000	
Cost after rebates and tax credits	**$14,400**	

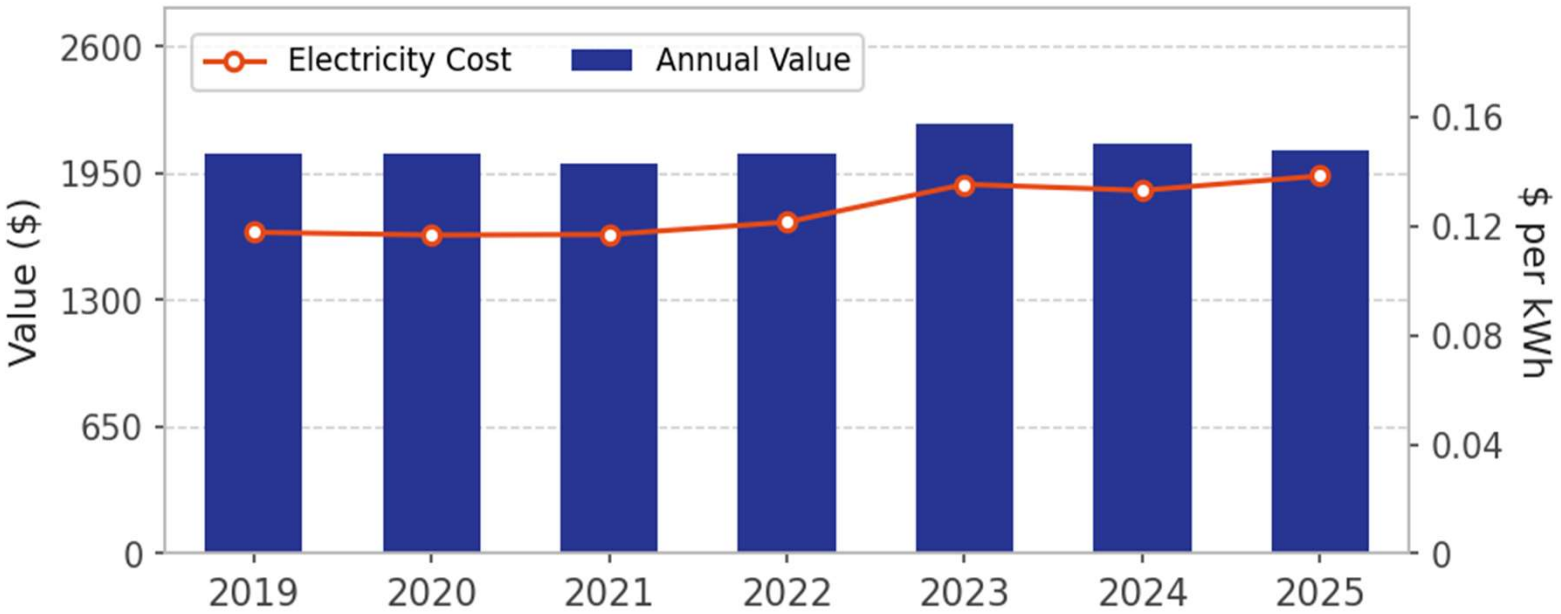
Return on Investment

- Initial Investment: $14,400 (after tax credits)
- Current Status: Fully paid off as of 2025 (7 years)
- Total Power Generated: 116.1 MWh over 7 years
- 2025 Generation: 14.98 MWh (14,980 kWh) valued at $2,072.93
- Note: ~1,500 kWh uncaptured in Aug-Sep 2025 due to inverter disconnect during propane generator installation

Generation & Payoff Progress



Electricity Cost & Annual Generation Value



Conclusions

- Very happy with the system
- Solar panel investment is analogous to a single premium annuity… Wrote a big check up front that "pays me dividends" monthly for a couple of decades
- Electricity rate increases are offsetting the greater-than-expected decline in generation
- Would have liked to have included battery backup at time of construction
- Ultimately chose propane backup due to lower cost, familiarity and battery placement concerns

CASE STUDY

Lamb Residence

Peters Point Rd
Edisto Island, SC

The System

- Installed June 2024
- 8.58 kW system with 22 panels (390W each)
- SolarEdge HD-Wave inverter
- 7.5 kWh LG ESS battery backup
- Installed by RENU Energy Solutions

kWh LG ESS battery unit

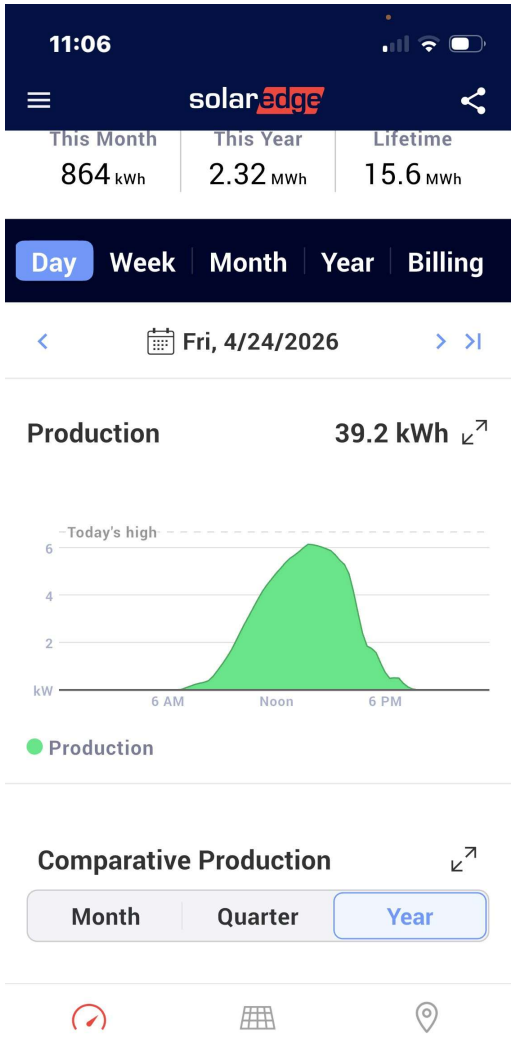
System Cost

2024 prices and credit percentages

Total system cost	$36,992
Solar panels + inverter only	$18,992 ◀ **$2.21/Watt**
Battery (LG ESS 7.5 kWh)	~$18,000
30% Federal Tax Credit	– ~$11,098
25% SC State Tax Credit (est., multi-year)	– ~$9,248
Net cost after all tax credits	**~$16,646**

Panel Placement and Shading

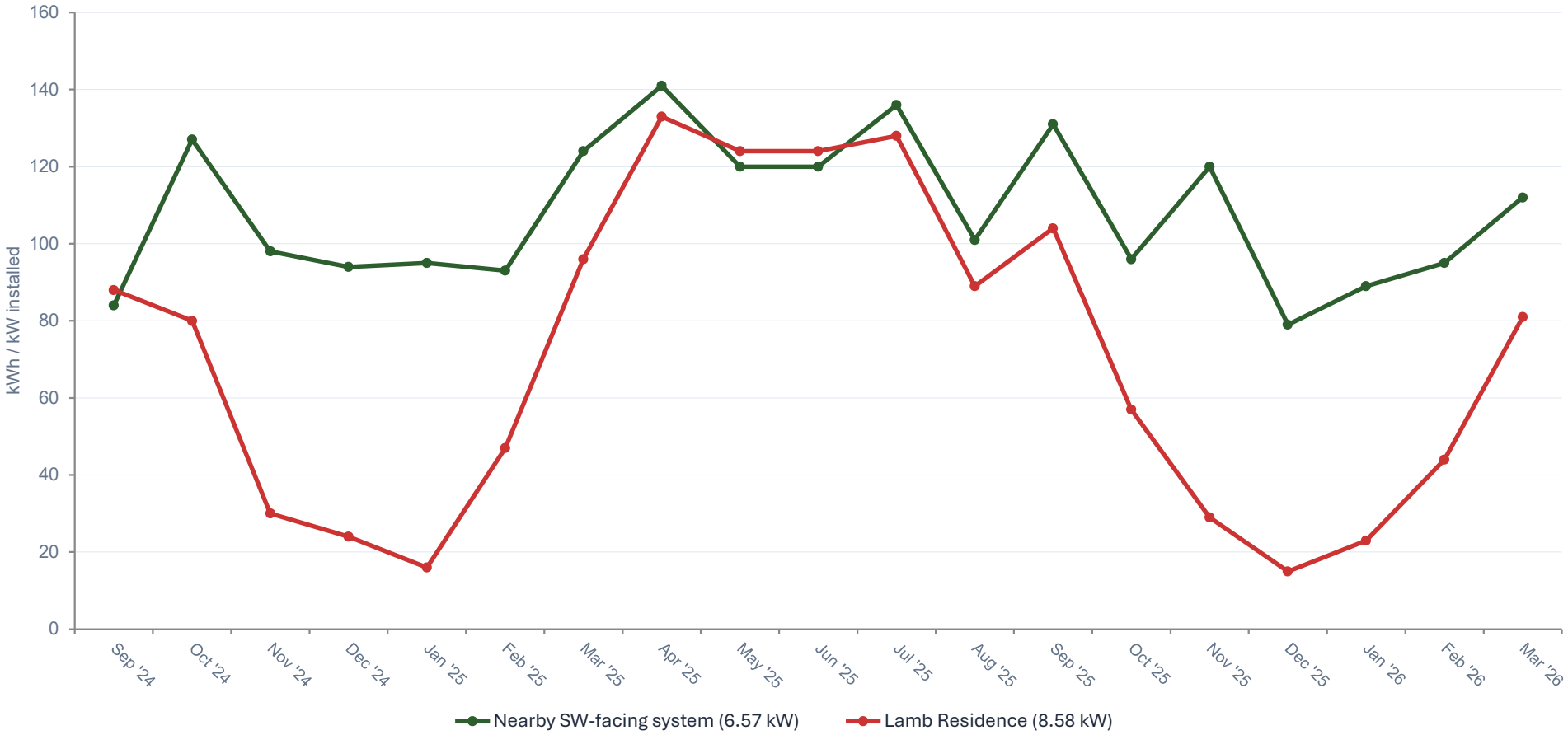
- Panels are on a southwest-facing porch roof — a favorable afternoon-sun orientation
- A palmetto tree stands to the southwest of the array, shading the panels in the afternoon (more-so in the fall and winter months)
- The main house roof sits higher and to the northeast, shading the panels in the mornings (more-so in the summer months)
- Together, these factors reduce the potential generating capacity of the system



Screenshot of the SolarEdge monitoring app

The Seasonal Impact

Monthly generation per installed kW — Lamb Residence vs. a nearby SW-facing 6.57 kW system on Edisto Island



Battery Backup

- 7.5 kWh LG ESS battery provides partial-home backup during outages (HVAC is on a separate circuit)
- On Solar Choice, grid-stored kWh cannot be shared across rate tiers — On-Peak consumption must be offset by On-Peak generation or drawn from the grid at the highest rate; the battery can supply stored solar energy to cover On-Peak demand directly
- This reduces On-Peak grid draws (costly) and helps relieve grid stress during peak demand periods

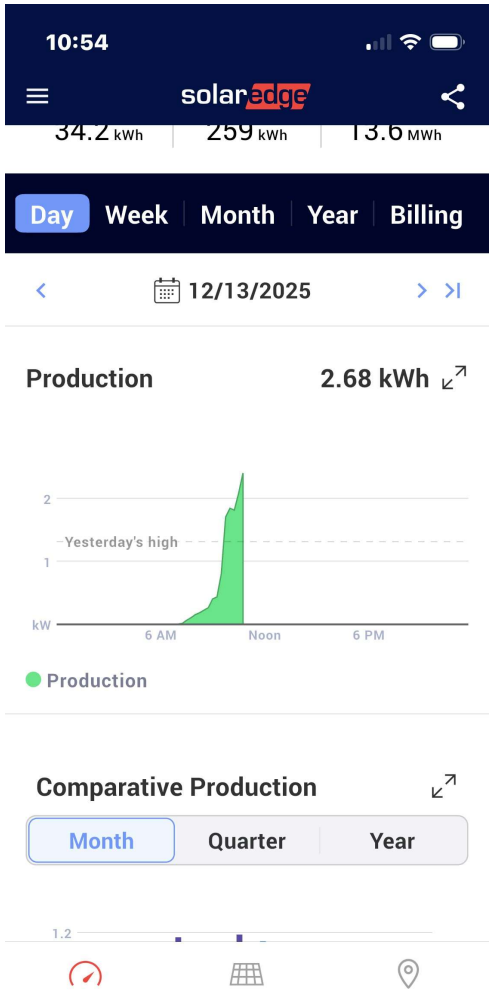
The Inverter

- The inverter converts DC power from the panels into AC power usable by the home; it also manages the grid connection and controls battery charging and discharging
- SolarEdge uses power optimizers at each panel to maximize individual output, with all DC flowing to the central inverter — a cost-effective and widely used residential architecture

A problem:

- When grid power dropped, even momentarily, the inverter would shut off and not self-recover until the following morning — a recurring fault that persisted for over 18 months
- RENU and SolarEdge recently diagnosed the issue and were able to fix it via a firmware update — SolarEdge pushed a remote fix

"When the power from Dominion blinks or shuts off, our inverter will shut off or flatline at a low level and not reset until the next morning. 1½ years into the problem and the issue still [was] not resolved." — Bill Lamb



Dec 13, 2025: inverter fault before noon

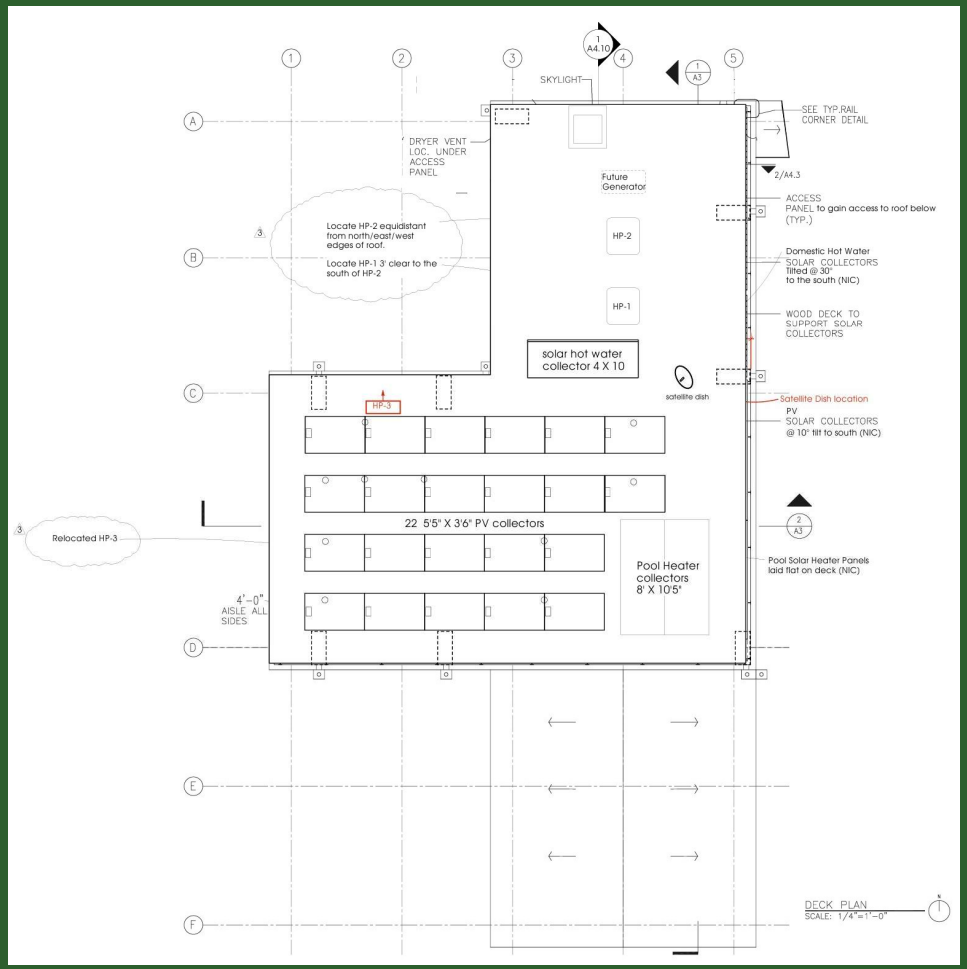
Conclusions

- Panel placement was constrained by available roof space
- Considered ground-based solar but ultimately chose the rooftop for aesthetic reasons
- Loves the seamless switch to battery power during grid outages (notwithstanding the inverter issue)
- Weighed the cost of more battery capacity against the temporary discomfort without AC and decided to save on cost
- Twenty-twenty hindsight: should have escalated the inverter issue sooner

CASE STUDY

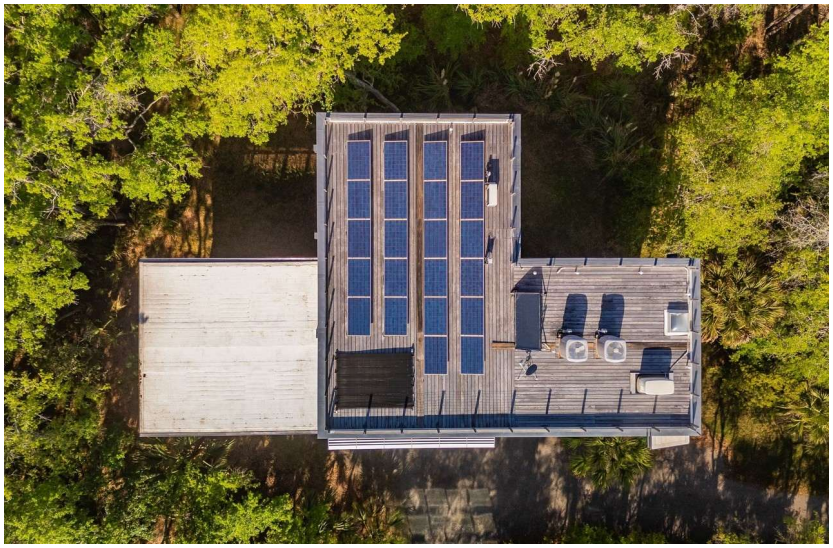
Bray Residence

Russell Creek Road
Edisto Island, SC



The System

- Installed February 2012
- 5.17 kW system with 22 panels (235W each, Yingli YL235P)
- Also includes solar domestic hot water and solar pool heating systems
- No battery backup
- Coastal design: panels at 10° to minimize wind uplift; stainless steel and aluminum hardware throughout



Aerial View

Roof Detail — PV panels, hot water collector, and pool heating mat

System Cost

2011 prices and credit percentages · PV system only, excluding solar hot water and pool heating

Total system cost	$28,500

◀ **$5.51/Watt**

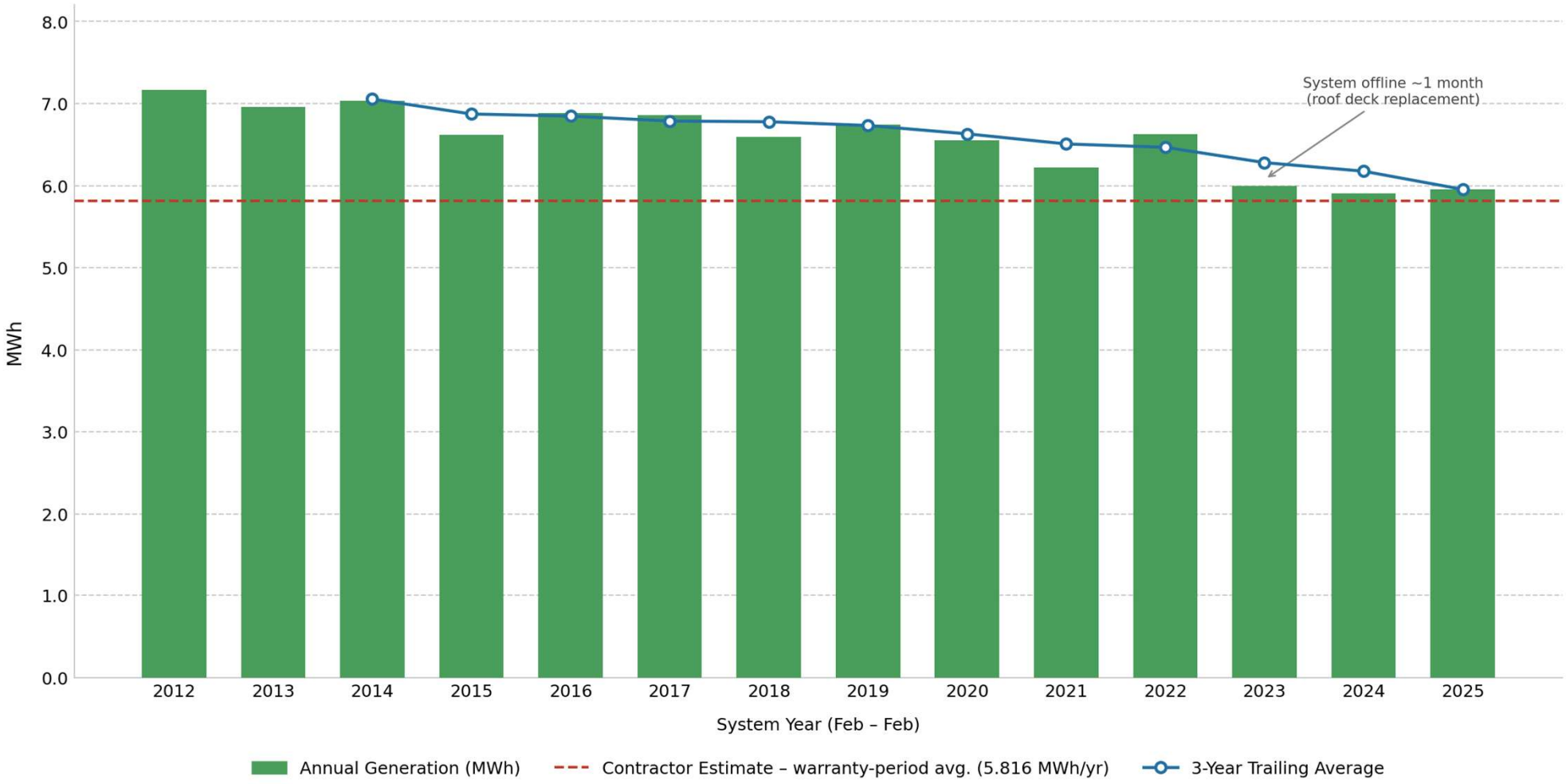
For comparison, typical residential systems today cost $2.50 – $3.50 per watt before incentives.

30% Federal Tax Credit	– $8,550
25% SC State Tax Credit (est., multi-year)	– $7,125
Net cost after all tax credits	**$12,825**

Net Metering

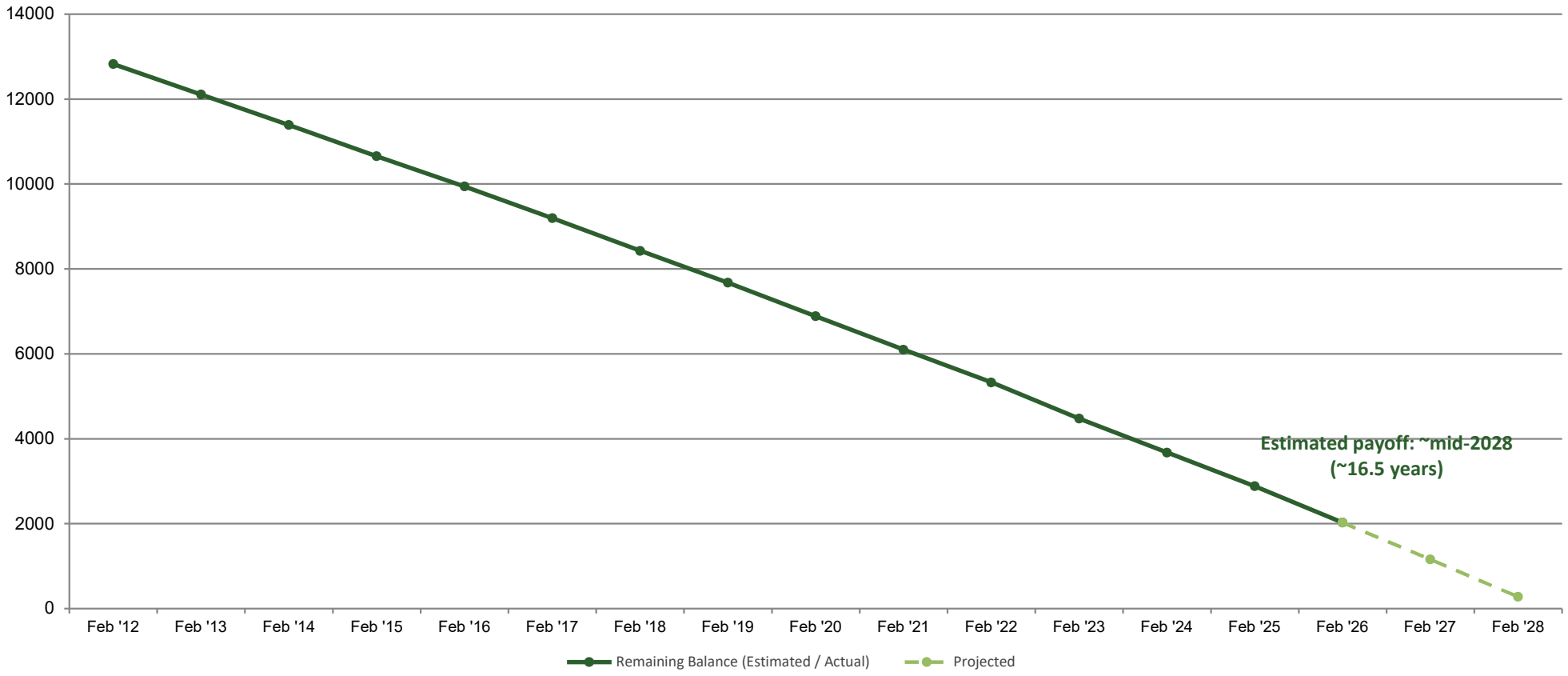
- Interconnected under traditional 1:1 net metering — every kWh exported to the grid offsets one kWh of future consumption at full retail value
- Grandfathered on that plan for over a decade as Dominion transitioned new solar customers to its Solar Choice time-of-use structure
- Transitioned to Dominion Energy Solar Choice (Rate 5) on January 1, 2026

14 Years of Generation



Payoff Progress

Years 1–12: savings estimated from generation data × historical SC electricity rates · Years 13–14: from actual bills · Years 15–16: projected



Conclusions

- Contractor's production estimate right on target
- Year-to-year variability is normal and largely driven by cloud cover; the 3-year trailing average shows the underlying trend clearly (panels degrading over time)
- The gradual convergence toward the contractor's estimate in later years is consistent with normal panel degradation
- No corrosion or physical degradation reported after 14 years — the coastal-specific hardware choices have held up
- A 2023 roof deck replacement is a useful reminder: solar is a long-term commitment that interacts with your home's maintenance cycle
- System is on track to pay off around mid-2028 — a longer timeline than newer systems, driven primarily by the higher net cost per watt at the time of installation

CASE STUDY

Sira Residence

22 Osprey Lane
Edisto Island, SC

The System

- 8.8 kW system with 20 panels (JA Solar N-Type bifacial, 440W each, 26% efficiency, 25-year warranty)
- Tesla Powerwall 3 — integrated solar inverter + 13.5 kWh battery
- Tesla Powerwall Expansion — 13.5 kWh additional storage (battery only, no inverter)
- Tesla Backup Gateway — The system controller and grid interface

System Cost

2025 prices and credit percentages

Total system cost	$54,000	
Solar array + system components (excl. batteries)	~$31,000	◀ **$3.52/Watt**
Battery backup (Tesla Powerwall 3 + Expansion, 27 kWh)	$23,000	

30% Federal Tax Credit	– $16,200
25% SC State Tax Credit (est., multi-year)	– ~$13,500
Net cost after all tax credits	**~$24,300**

Panel Placement

- 20 panels mounted on south and west-facing roof sections of a new-construction elevated home
- Low roof pitch and south-southwest (combined) orientation provides strong year-round solar exposure with peak production in afternoon hours
- Surrounding cleared lot with no mature trees nearby means minimal shading risk during the system's early life
- N-Type bifacial panel design provides a modest additional yield from light reflected from the roof plane

Aerial view — panels visible on porch roof

Battery Backup

- Powerwall 3 with integrated solar inverter + 13.5 kWh battery in a single wall-mounted unit
- Powerwall Expansion provides 13.5 kWh of additional storage, no inverter of its own
- Combined: 27 kWh storage with 11.5 kW continuous discharge
- Expandable to 3 Expansion units (54 kWh maximum)
- During outages home “islands” from the grid and continues recharging from solar

Powerwall 3 (left, with integrated inverter) and Powerwall Expansion (right)

System Controller

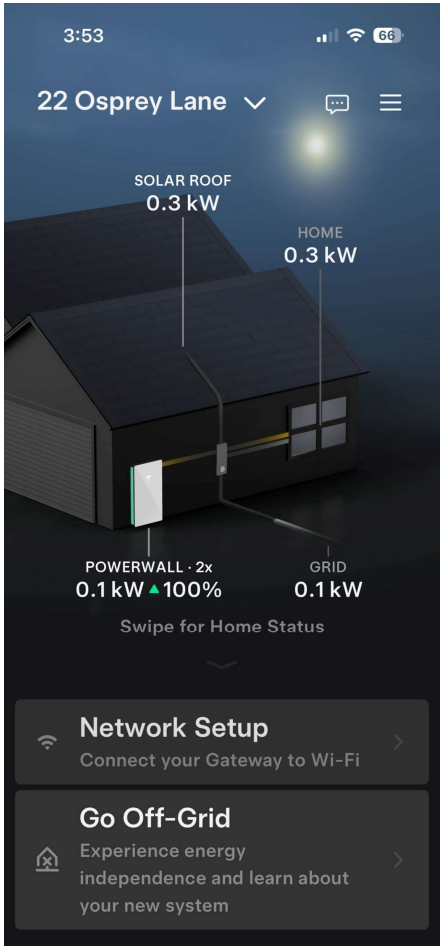
- Tesla Backup Gateway: manages all energy flows between solar, batteries, home, and grid
- Provides grid interface, outage detection, energy metering, and app connectivity
- Detects outages in milliseconds and switches home to battery power automatically
- Storm Watch: prioritizes charging batteries to 100% when NWS issues a severe weather warning
- Backup Reserve: configurable minimum charge below which the batteries will not discharge
- Go Off-Grid: manual mode — fully disconnected from the utility, running on solar and battery
- Wi-Fi connected: all app monitoring and remote-control routes through this component

Grid meter, Eaton disconnect switch, and Tesla Backup Gateway

Rate Plan & the Insurance Decision

- Two solar options: Solar Choice (net metering, Dominion Rate 5) and Offset Only (Rate 8) — the Siras chose Offset Only
- Reason: Frontline, their homeowners insurer, would not underwrite a net metering rate plan
- Alternative insurers willing to underwrite net metering quoted premiums that wiped out any benefit
- On Offset Only, surplus generation beyond battery capacity goes to the grid at no credit

Monitoring with the Tesla App

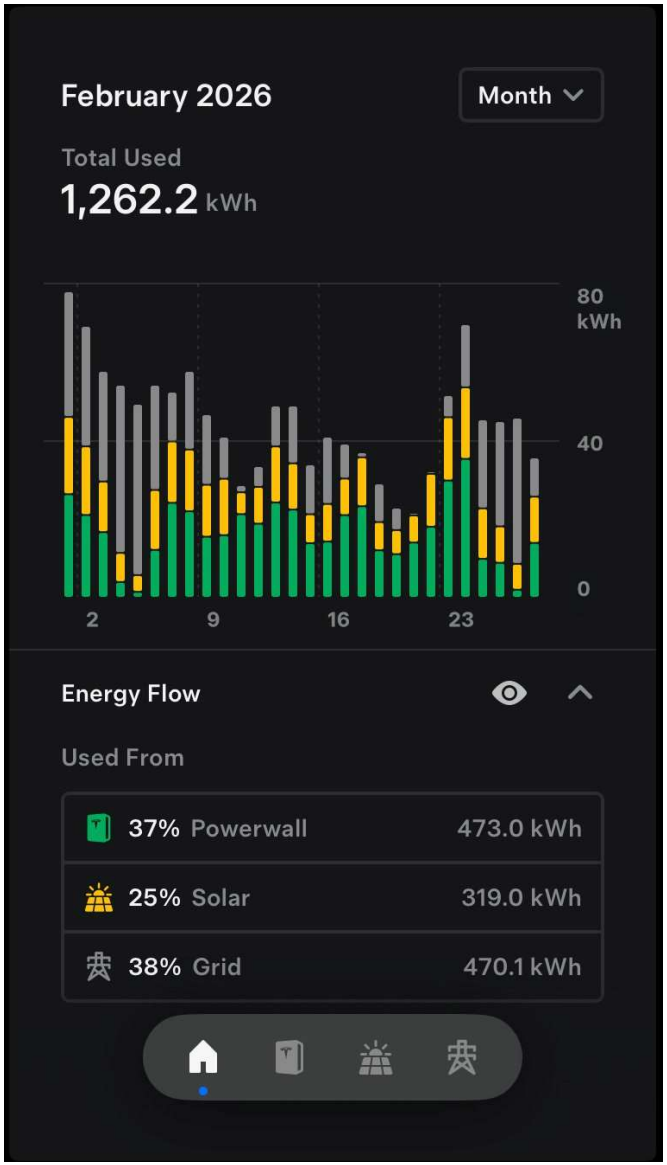


Real-time view: solar generation, home load, Powerwall charge level, and grid connection

February 2026

1,262 kWh consumed — 62% self-supplied, 38% grid

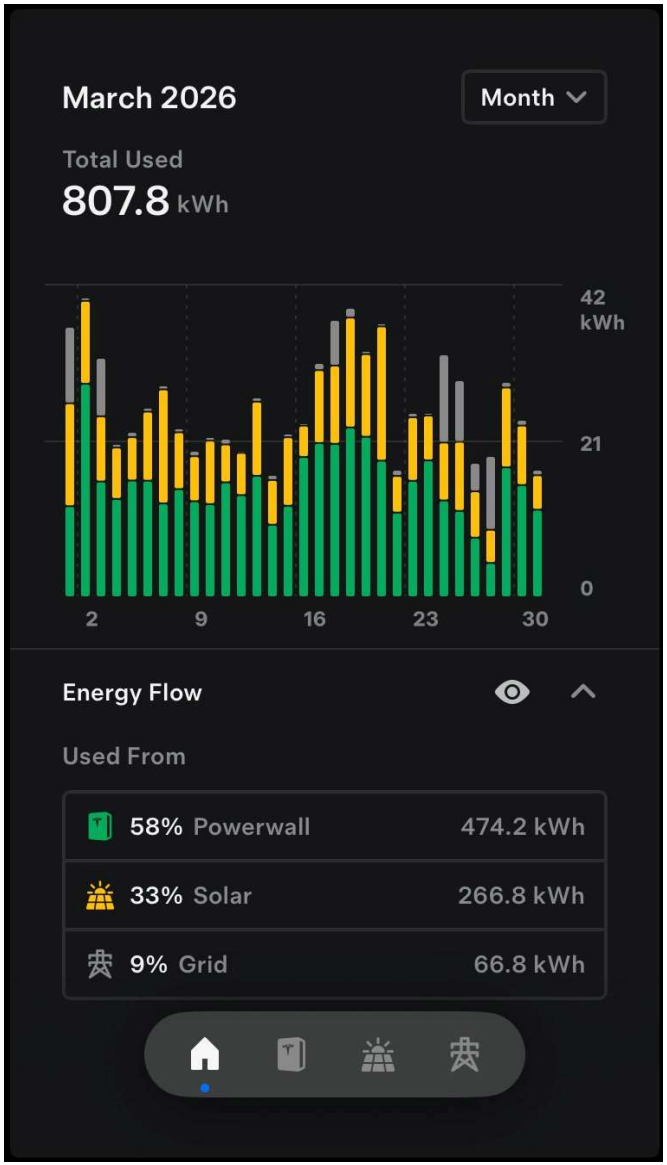
- Peak demand month: short days, low sun, high heating load
- Powerwall provided 37% of household power
- Direct solar provided 25%
- Grid provided 38%
- 62% self-supplied — a strong result for the system's most difficult month
- Heating pattern foreshadows summer HVAC needs



March 2026

808 kWh consumed — 91% self-supplied, 9% grid

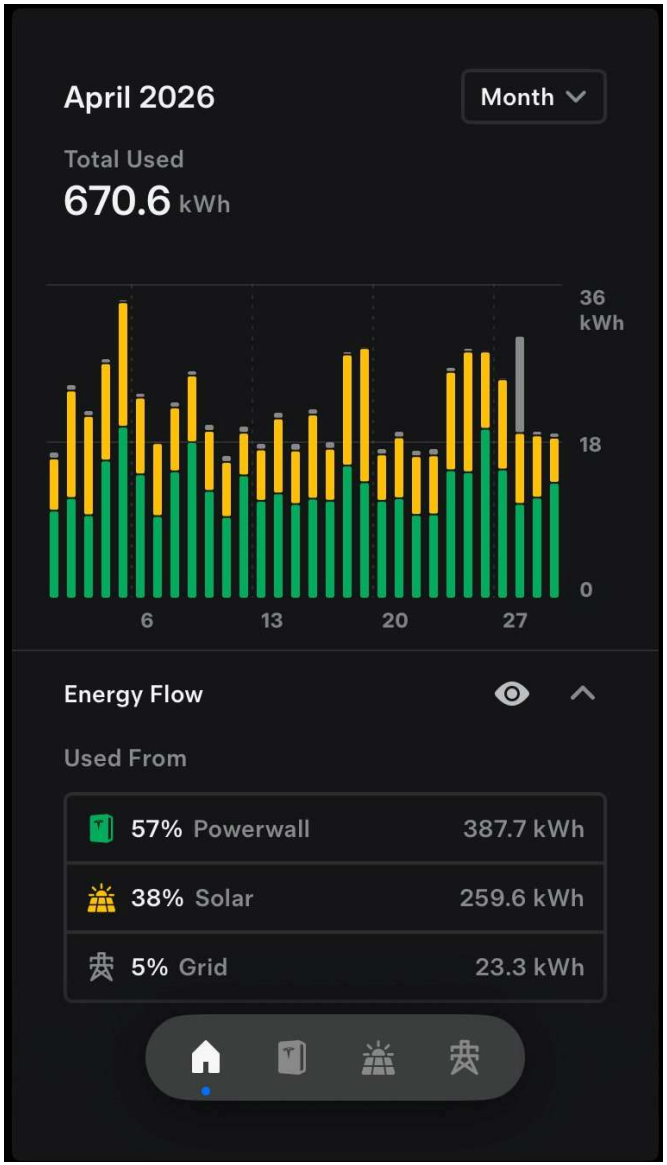
- Heating season ending: consumption drops 36% vs. February
- Solar output nearly unchanged — the improvement is load-driven
- Powerwall at 58%: full daily charge/discharge cycles, highest share yet
- Grid: only 67 kWh — limited to occasional cloudy days



April 2026

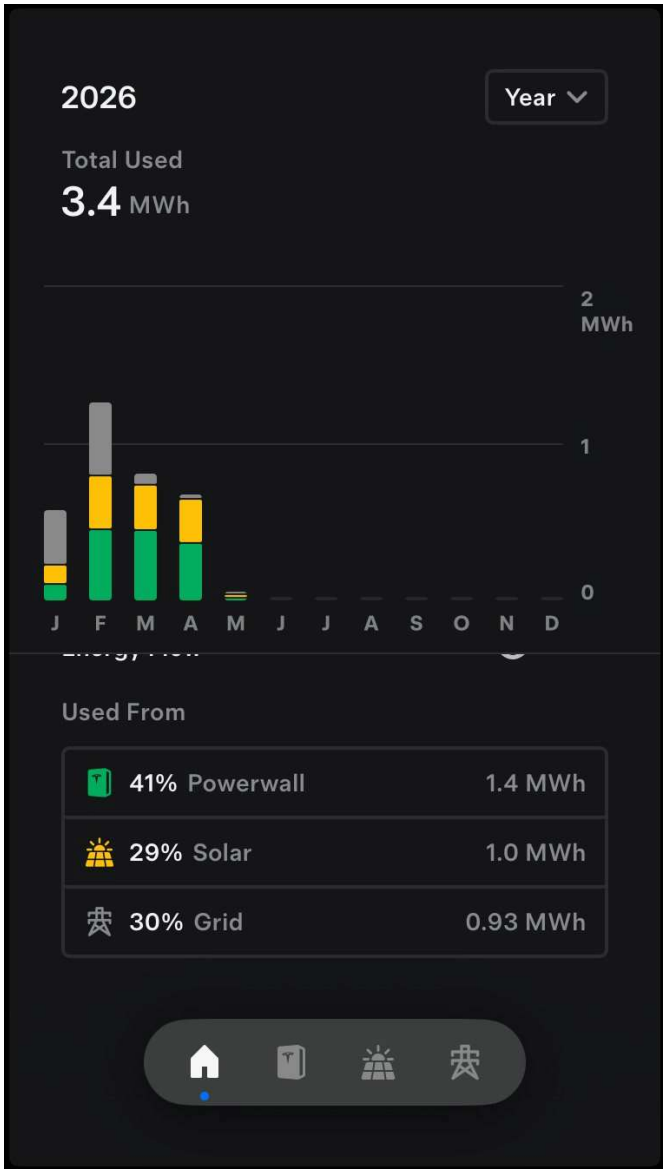
671 kWh consumed — 95% self-supplied, 5% grid

- Low heating or cooling load: consumption at baseline only
- Grid: 23 kWh all month — less than one day's draw in February
- Steady daily cycling: Powerwall 57%, direct solar 38%
- Bar chart: almost no gray — the system in equilibrium
- Sets the fall benchmark; February to April shows the full seasonal range



2026 Performance Summary

- 38% → 9% → 5% grid share: declining load, not rising production
- March and April solar generation nearly identical (267 vs. 260 kWh) — load is the variable
- Spring self-sufficiency: 91–95%; grid draws limited to overnight shortfalls only
- Summer test: near continuous HVAC load will increase grid dependency
- On Offset Only, the battery is the only way to capture surplus solar



Two Ways to Handle Surplus Solar

Offset Only (Rate 8)
current plan

- Solar powers the home directly during daylight hours
- Surplus charges the batteries (up to capacity)
- Any surplus beyond battery capacity flows to the grid at no credit — given away for free
- At night: batteries discharge first, then grid supplies the remainder
- No banking: each billing period stands alone, nothing carries forward

Solar Choice (Rate 5)
alternative

- Solar powers the home directly during daylight hours
- Surplus charges the batteries (same as Offset Only)
- Surplus beyond battery capacity is exported and credited at the applicable ToU rate: On-Peak, Off-Peak, or Super Off-Peak
- Banked credits offset future grid draws within the same tier
- Year-end: unused banked surplus settled at avoided-cost rate (~$0.038/kWh)

Offset Only vs. Solar Choice: Side by Side

	Offset Only	Solar Choice
Rate type	Flat-rate metered	Time-of-use
Battery compatibility	Full — battery is essential	Full — battery still valuable
Credit for surplus	None — surplus is forfeited	Retail ToU rate (On/Off/Super Off-Peak)
Year-end settlement	None	Avoided cost (~$0.038/kWh)
Where the battery helps	Prevents most surplus from escaping	Same, plus grid credits backstop any overflow
Key risk	High-production days may overflow battery and surplus generation is lost	Availability of homeowner insurance over time

What the Numbers Suggest

~0 kWh	27 kWh	Summer
April grid export	**Total battery capacity**	**Season to watch**
Battery absorbed virtually all surplus	*Largest single factor in limiting export loss*	*Peak production days most likely to overflow battery*

- The large battery (27 kWh) captures nearly all daily surplus before it can escape — April 2026 shows essentially zero grid export; most of the grid draw in that month was for overnight loads on a handful of low-production days
- Peak summer days when the panels can generate 32–40 kWh may fill the batteries to capacity before midday and send the remainder to the grid at no credit under Offset Only
- February illustrates the other extreme: low winter production meant no overflow, so Offset Only and Solar Choice would have performed identically that month
- A full annual comparison requires 12 months of data. Modeling Offset Only based on generation and consumption data from a real system shows that the financial cost of Offset Only (vs. Solar Choice) is modest but real — approximately $100 per year with the current battery capacity
- Adding more load (e.g., charging an EV over night) improves the situation for Offset Only; adding battery capacity has no effect
- The insurance market has improved: a new carrier now offers net-metering coverage at rates reportedly below Frontline's. However, switching to Solar Choice does not make financial sense — the cost of adding a second meter and re-certifying with Dominion Energy will erase any savings gained by using Solar Choice

Conclusions

- Chose Offset Only due to insurance constraints
- Invested in 27 kWh of battery backup to maximize self-consumption given the lack of net metering credit
- The Powerwall 3's integrated inverter enables solar generation during grid outages unlike many conventional grid-tied systems
- Insurance market has improved — a new carrier may open the door to Solar Choice for more customers, eliminating the surplus credit gap
- Switching from Offset Only to Solar Choice after the fact does not make financial sense

The Decision to go Solar

Is it possible and is it worth it?

Is Solar Right for You?

- You need sufficient space that receives direct sunlight for most of the day for a solar panel array, whether on your roof or on the ground
- You need to be the homeowner (a Dominion Energy requirement)
- Homeowners' associations (HOAs) often restrict placement of solar panels
- Know your goal…

Reduce carbon footprint? Save money? Outage resilience?

- Not mandatory, but…

You should be staying in the house long enough to enjoy the benefits

What if the HOA says no?

- Solar roof tiles
  - A mix of photovoltaic and non-photovoltaic tiles for flexibility in capacity and installation
  - More expensive than traditional solar panels
  - Can be cost effective if you need to replace your roof before installing solar panels

Financial Outlay

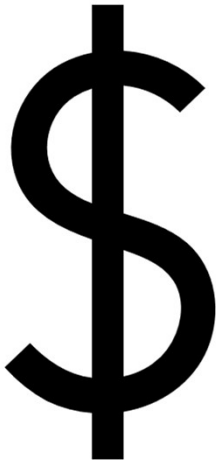
Installation costs start at $15,000 for a small system up to $55,000 for a large system including battery backup

SC state tax credit can offset 25% of the cost

You may need to re-roof before solar can be installed

Ground-based solar adds cost

Financing or leasing options are available if you are unable to purchase up-front



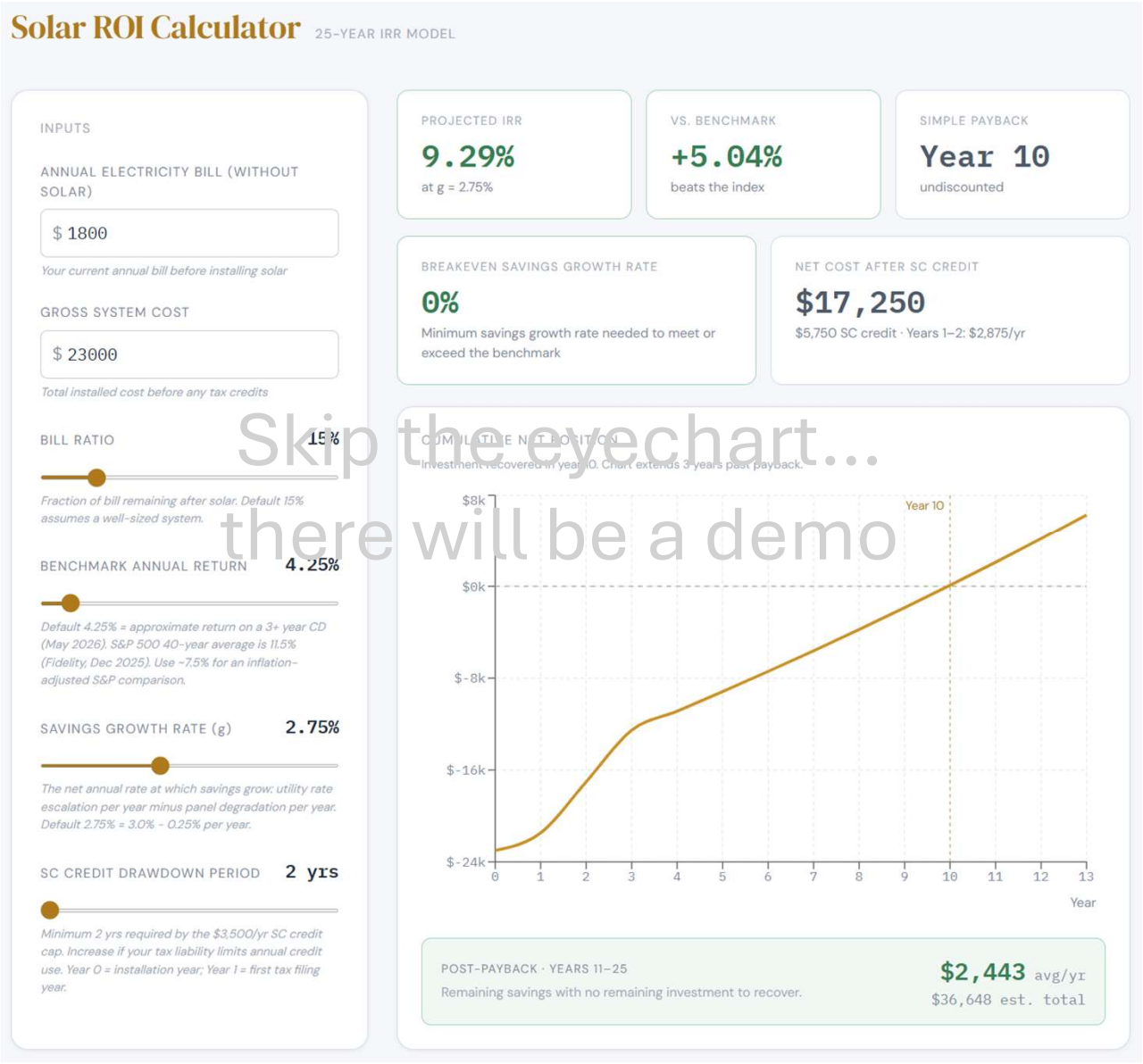
Opportunity Cost?

Goll Residence case study:

- **13.8% average annualized return** through end of 2025 (annual savings vs. same usage without solar, divided by original system cost minus tax credits and rebates)
- **Outperforms S&P 500** benchmarks (~10.5% historical average pre-inflation, ~7.5% real return post-inflation)
- **Return trending up:** 13.2% (2022) → 15.1% (2025), driven by rising utility rates and increased energy use (charging an EV)
- **Built-in inflation hedge** as electricity rates rise
- **Like an annuity** that pays out tax-free through the life of the system through lower monthly electricity cost
- **Main tradeoff:** liquidity - solar panels can’t be sold like stocks

Cost and Payback Scenarios

- The Goll case study is not representative of every system's potential return on investment
- The elimination of the Federal tax credit pushes the payoff period out for any new system
- Battery backup will push the payoff period yet farther out, or even result in a net negative for the life of the system
- If savings are top priority, consider what your money will be invested in if you don't install solar
- *Calculator Demo*



Solar continues to be a good investment

- Consider solar generation separately from battery storage
- Typical payoff period still within the first half of the total system life span (solar without batteries)
- Internal Rate of Return (IRR) is robust for solar without battery backup
- Battery storage is a “nice-to-have” that gives you seamless backup during power outages… especially if you don’t already have another form of backup

If you finance…

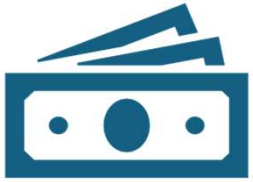
- A home equity loan will often have the best terms
  - https://www.energysage.com/solar/solar-loans/financing-solar-home-equity-loan/
- Make sure your loan allows you to pay additional principal
- Strategies for paying down the principal
  - Rebates often come as gift cards… Use the card(s) and apply the same amount towards paying down your principal (you were going to spend that money anyway)
  - If you get a tax refund in the year(s) you claim a credit, direct all or part of the refund towards paying down your principal
  - Consider directing the savings on your monthly electricity bills towards paying down your principal

Leasing (aka Power Purchase Agreements)

Pros

Zero up-front cost

Leasing company maintains the panels and equipment



Cons

Can negatively impact home resale value

Disqualification from solar tax credits and incentives

Difficult and expensive to end the lease early

Lower long-term savings

Monthly payments can escalate over the life of the lease (20 to 25 years)

Still missing that federal tax credit?

- So-called “Pre-paid Lease” plans continue to benefit from the federal tax credit
- The leasing company claims the federal tax credit and shares the savings with the customer through a negotiated lease agreement
- You pay up front to guarantee ownership after 6 years
- Construction must start before July 4, 2026
- Removes uncertainty of traditional buy-out provisions
- Not worth it: neither the leasing company nor the customer can claim the 25% South Carolina tax credit
- After the leasing company’s cut, the potential savings are unlikely to be better than owning the system up front and claiming the SC credit

Getting Started With Solar

Get Educated (but not too educated)

- Don’t obsess… if it all seems too complicated, a reputable installer will offer choices and help you make the right decisions based on your situation
- Resources:
  - This presentation
  - Energy Sage (www.energysage.com) and Solar.com
    - Each provides a lot of educational material
    - Also act as referral services for installers
    - Each offers free consultation to review installer proposals
  - Home Advisor (https://www.homeadvisor.com/cost/energy-efficiency/install-solar-panels/)
  - Solar.com (https://www.solar.com)
  - Dominion Energy SC (https://www.dominionenergy.com/south-carolina/save-energy/solar-for-your-home)
  - Government websites
    - www.energy.gov/topics/solar-energy
    - solar.sc.gov

Check with your insurance agent

- Installation of solar can have insurance implications that will need to be considered
- Some insurance carriers will not issue coverage for systems with “net metering” (Dominion Energy’s “Solar Choice” rate plan)
- You can either choose a different carrier or an alternative rate plan
  - Choosing a different carrier may mean having a higher premium that negates savings
  - The alternative rate plan (Dominion Energy’s “Offset Only”) practically necessitates using battery storage if long-term financial savings is your goal

Choose an Installer

- Finding an installer
  - Use referral services such as EnergySage, HomeAdvisor, Solar.com, etc.
  - Get referrals from people who have solar already
  - Use Google to “find solar installers near me”
- Look up each installer at the BBB
  - If there are complaints, look to see whether the installer has been responsive to each reported issue. A responsive installer will have an A+ rating
  - Read the reviews
- Get proposals from multiple installers
- Get references from each installer and *talk* to those references
- Ask if the installer offers a performance guarantee
- EnergySage offers free consultation to review installer proposals

Decisions you will need to make

- The big ones:
  - Decide which Dominion Energy rate plan you will use
  - Battery backup or not?
  - How will you pay for the system (purchase, finance or lease)?
- Consider replacing your roof if it has less than 10 years of useful life left
  - Panels are typically warranted for 25 years
  - Cheaper to replace now than doing it after panels have been installed
  - Can be even cheaper if your solar installer coordinates the replacement
  - Simply walking on an asphalt shingle roof can damage it and there will be a lot of walking during the installation
- Your installer can help with these decisions

Choosing a Dominion Energy Rate Plan

- “Solar Choice”
  - Tailored for residential solar - offers the most flexibility in system configuration and highest potential return on investment
  - Some insurance carriers will not write policies for Solar Choice due to its implied use of net metering
- “Offset Only”
  - No compensation for excess generation
  - Practically necessitates having battery storage if return on investment is a priority
- “Buy All/Sell All”
  - Not recommended due to its unfavorable financial terms
  - Suffers from the same insurance underwriting issues as Solar Choice

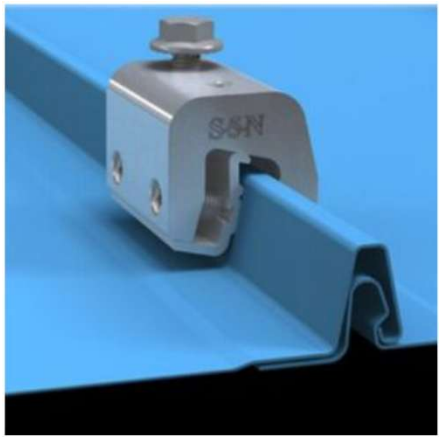
Battery Backup or Not?

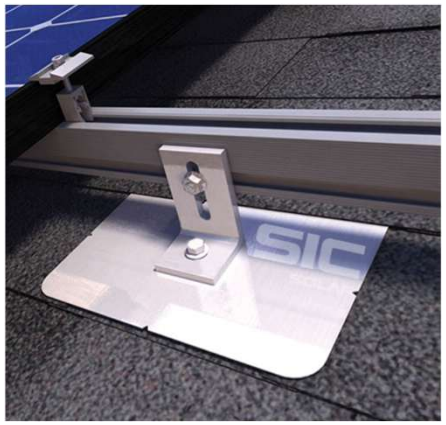
- Makes the most sense if you don't currently have a backup generator for your home (beyond a using portable generator)
- Can help even out solar generation with demand, especially if using a Dominion rate plan that does not pay for excess generation
- Can coexist with an existing backup generator
- Don't expect to charge your EV using your backup batteries (an EV car battery has much more capacity than all but the most extreme examples of home battery backup capacities)

Frequently Asked Questions

Will the installers need to pierce the roof sheathing?

- If you have a standing seam metal roof, the answer is “No”
  - Metal clips will be used to attach mounting rails to the metal roof
- If you have a shingle roof, the answer is “Yes”
  - Integrated flashing systems mitigate the risk
- Consult with your installer for other roof types





Will the backup batteries burn my house down?

No

- The predominant battery chemistry for residential use is Lithium Iron Phosphate (LFP)
- LFP batteries will burn if the house burns, but they will not burn your house down by themselves
- LFP batteries can be submerged and not burst into flame (although they will probably stop working)

What is this Community Solar thing I've heard about?

- Community Solar is the general term for shared ownership of solar panels in a utility grade solar farm
- Ideal for people who cannot install residential solar where they live
- Administered via a partnership between the solar farm operator and the utility, where the former installs and maintains the solar farm and the latter manages the billing
- The customer can either purchase or rent solar farm capacity
- Unfortunately, Dominion Energy does not currently have any community solar capacity to offer to the public

Others?

Slides and video are available on-line at
https://edisto.org/solar-power

Financial Details

Federal and State Tax Credits

Federal Residential Clean Energy Credit

Overview

- 30% tax credit through 2032
- Phases out starting in 2033: 26% in 2033, 22% in 2034
- Claim in installation year
- Excess credit carries forward
- No annual or lifetime dollar limit
- No longer available

South Carolina Solar Energy Tax Credit

- Similar to the Federal tax credit with the following differences:
  - 25% of total costs
  - $3,500 annual limit per location
  - Limited to 50% of tax liability each year
  - 10-year carry-forward period

Technical Details

Dominion Energy Rate Plans

Dominion Energy Residential Solar Programs

Overview

- Dominion Energy South Carolina (DESC) claims to offer 6 separate rate programs for residential solar, but only three are currently available to new participants:
  - Solar Choice
  - Buy All/Sell All
  - Offset Only
- Available to homeowners only
- These programs are described on the following slides
- Full details at https://www.dominionenergy.com/south-carolina/save-energy/solar-for-your-home

Dominion Energy Residential Solar Programs

Solar Choice

You will move to the Residential Rate 5 – Time of Use Rate. You will consume self-generated power and be credited for excess energy delivered to DESC based upon the on-peak, off-peak and super off-peak periods defined by the Time-of-Use (TOU) Rate.

- Most like classic net metering
- System size limited to 20kW (note that typical system sizes are seldom over 10kW)
- Complicated TOU rates impact the ability to realize full benefit of net metering
- Best plan if you don’t opt for battery storage, but battery storage will help avoid the pitfalls of TOU rates
- Check with your insurance agent to make sure your insurer will cover net metering

Energy Flows:
Solar Choice rate plan

Dominion's Solar Choice program has three time-of-use rates in decreasing order of cost: On-Peak ($0.26/kWh), Off-Peak ($0.11/kWh) and Super Off-Peak ($0.08/kWh)

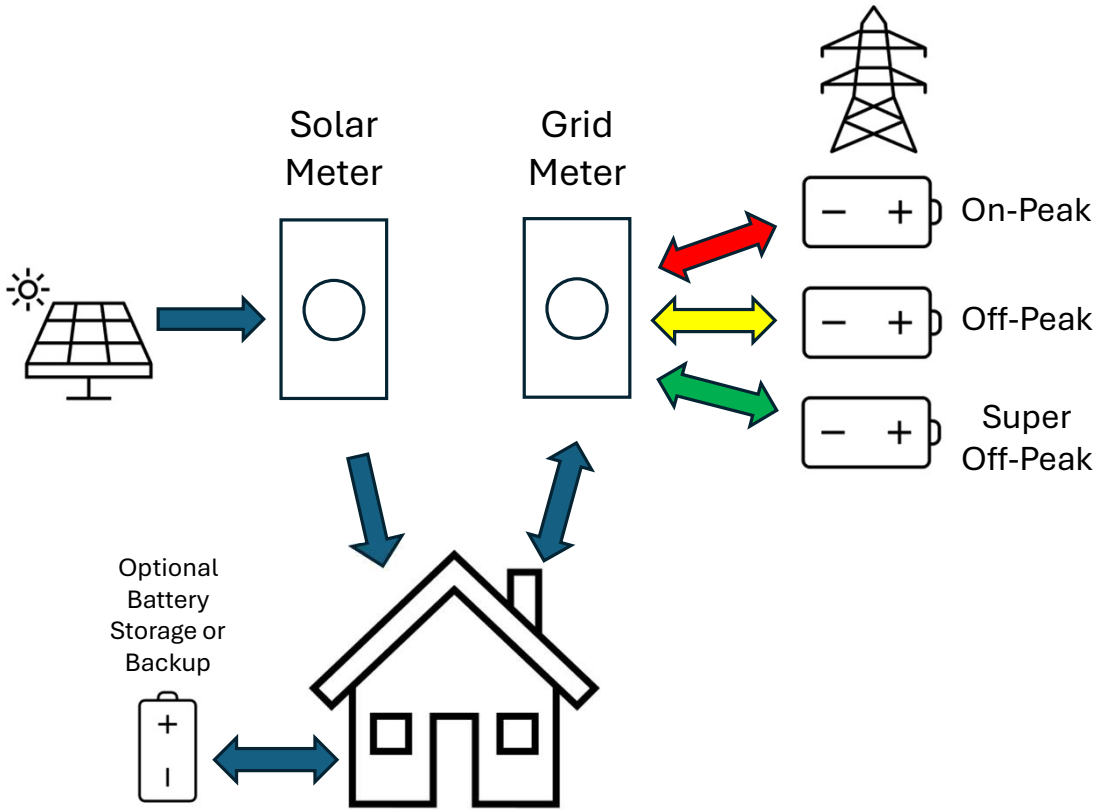
For comparison, the standard residential rate is a tiered rate varying from $0.13 to $0.15 according to the amount of use and time of year

The On-Peak rate is in effect M-F from 6-9am in cooler months (October through April) and 4-8pm in warmer months (May through September)

The Super Off-Peak rate period is 1-5am daily

Off-Peak is any other time

Banked energy is not shared across rates



Simple, right? Let me break it down…

- During On-Peak hours, there is limited ability to offset energy use, particularly in winter, and costs can be high. It's important to monitor your energy consumption during these times.
- Super Off-Peak hours will not benefit from solar energy generation, but they are cost-effective. This time will be ideal for charging your EV until you have accumulated sufficient excess Off-Peak energy.
- Off-Peak hours present the greatest potential for solar generation to offset energy usage and for accumulating surplus energy. If you have accumulated enough excess Off-Peak energy from earlier months, consider charging your EV during this period.
- Dominion’s Solar Choice rate plan dilutes the benefits of net metering, but programmable thermostats and intelligent battery back-up can help

Dominion Energy Residential Solar Programs

OFFSET ONLY

Your home uses self-generated power, as needed. Any self-generated power your home does not use is considered excess energy. DESC will not net, bank, or credit your account for any excess energy. This program is suitable for solar installations that are sized to not send excess energy to the grid.

- Unlimited system size
- Battery storage is a practical necessity to realize financial benefit of solar generation
- Beware the energy needs of EV charging (no cheaper rate for charging, residential battery capacity is dwarfed by EV battery capacity)

Energy Flows:
Offset Only rate plan

Blue arrows show AC current flow

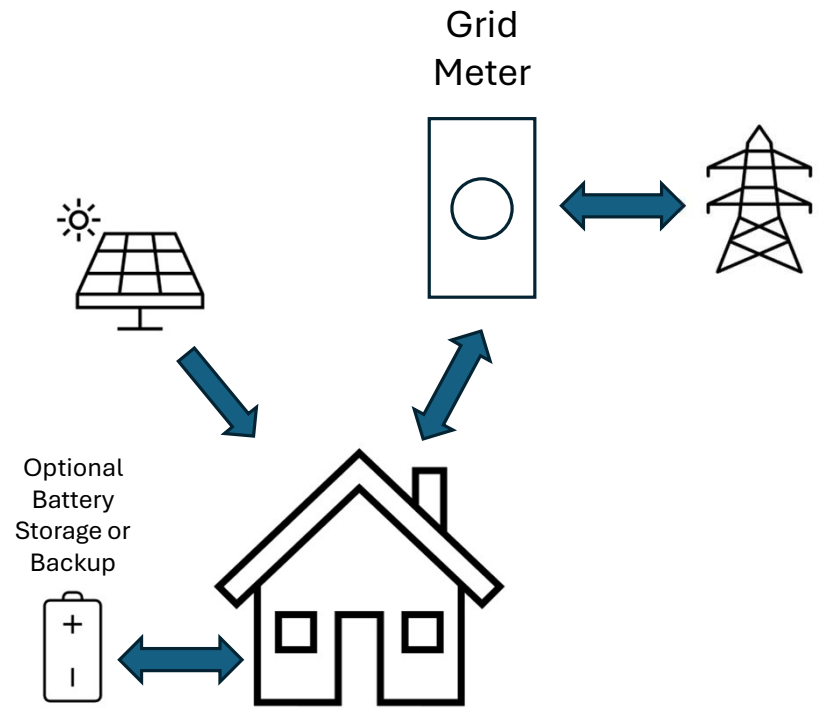
There is one meter for the grid

The Grid Meter does not “run backwards” and the grid does not act like a battery

The meter is used solely to measure energy drawn from the grid

All generated energy is used first to provide household power and recharge batteries

Excess energy is sent to the grid and is available only by re-purchasing at the residential rate



Dominion Energy Residential Solar Programs

Buy All/ Sell All (PR-1)

Buy at the standard residential rate for electric service. Sell *all* renewable energy to DESC at PR-1 Rate.

- Another form of net metering
- Approved for larger system sizes (limited to 100kW)
- Battery capacity cannot be used to even out demand and consumption
- The PR-1 rate you will receive is a fraction of the rate you would pay to purchase the same energy at the standard residential rate*
- This rate plan is effectively a discount on your consumption that will not take full advantage of your solar investment
- Check with your insurance agent to make sure your insurer will cover net metering

*energy generated between 6-9am M-F in winter months has an excellent rate, but will not be enough in practice to make this plan attractive

Energy Flows:
Buy All/Sell All rate plan

Blue arrows show AC current flow

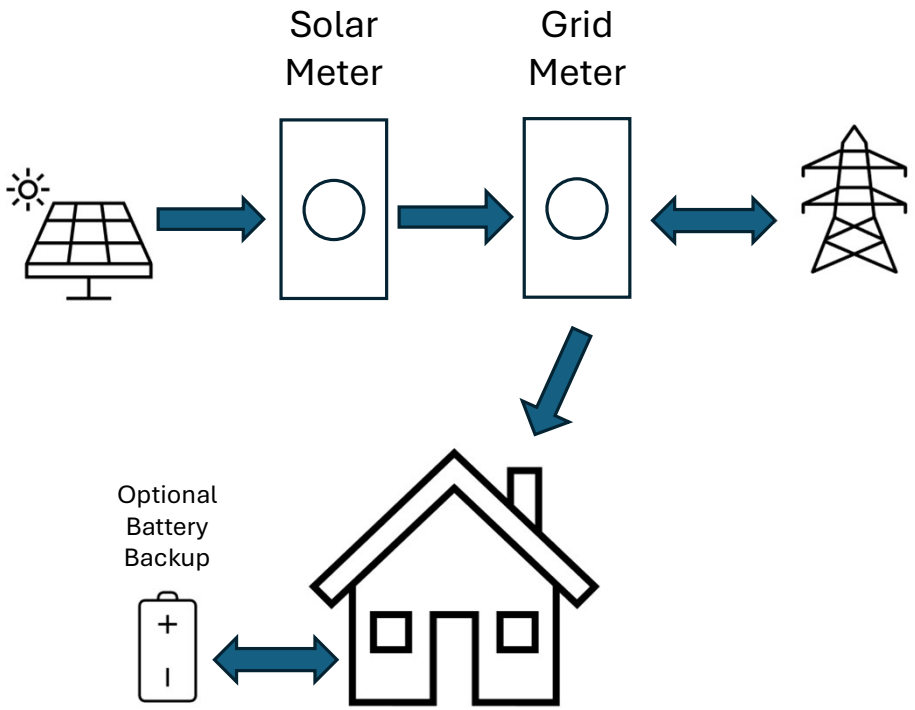
There are two meters: one for the solar panels and one for the grid

The Grid Meter does not “run backwards” and the grid does not act like a battery

The meters are used independently to calculate generated energy and energy drawn from the grid

All generated energy is purchased at the PR-1 rate, regardless of whether it is consumed locally or sent to the grid

Excess energy sent to the grid is available only by re-purchasing at the residential rate



Technical Details

Volts, amps, watts, watt-hours... what does it all mean?

Electric Power vs Electric Energy

POWER (Volts x Amps = Watts) represents what can or will be consumed or generated *at a given point in time.*

A solar panel **can** generate up to 400W (watts) of power when the sun is shining.

A microwave oven **will** draw 1100W of power while it is running.

ENERGY (Power x Time = Watt-Hours) represents how much power was generated or used *over a given period.*

A solar panel array generated 25kWh (kilowatt-hours) of energy on Tuesday.

The same microwave running for 5 minutes will have consumed 1,100 * 5 / 60 watt-hours (92.67Wh) of energy.

Batteries and Energy

Batteries are described by their energy *capacity*

Capacity is another term for energy, represented using the same units (e.g., watt-hours)

- An EV car battery might have a capacity of 135kWh
- A residential backup battery might have a capacity of 11.5kWh
- A pumped storage reservoir might have a capacity of 10GWh (gigawatt-hours)

Capacity is sometimes given in amp-hours. This is just short-hand when the voltage is known for a particular application (e.g., a power tool battery)

Batteries and Power

The amount of power a battery can produce or consume at a given moment is dependent upon its physical characteristics, NOT on its capacity	A 13.5kWh residential backup battery might offer continuous power of 11.5kW
	The same battery might only recharge at a maximum continuous power of 5kW
	A 135kWh EV battery might sustain a discharge rate of 100kW
	A 135kWh EV battery might recharge at continuous power of 300kW
	A 10GWh pumped storage reservoir might only offer maximum continuous power of 10MW

Technical Details

Batteries

Battery Chemistries for Residential Backup

One battery chemistry dominates residential battery storage:

Lithium Iron Phosphate (LFP) - ***Offers good safety and cycle life.***

Less common:

Nickel Manganese Cobalt (NMC) – Seen most often in EVs due to higher energy density. ***The solid gold toilet of home battery storage… and it can burn your house down.***

Lead-acid - Used in budget systems. Significantly lower performance and cycle life. ***Don't even bother.***

Technical Details

Solar Panels

Desirable Solar Panel Characteristics

- Warranted for 25 years
- 92% power output by year 2025 (annual degradation <= 0.25%)
- Monocrystalline Cell Technology
- Salt mist certification
- Good performance at high temperatures (P_{max} <= 0.24%/C^0)
- High energy density means fewer panels, but if you have the roof space, not a differentiating factor