PJM Designs LLC

SOLAR SYSTEM RECOMMENDATION · Sample plan

Grid-tied with battery backup system for a sample Michigan home

Greenville, MI · Reviewed and approved by Patrick McCarty, October 19, 2026

8.8 kW	4,000 W	10.5 kWh	7,500 W	103%
22 panels of 400 W	inverter, 120/240 V	lithium iron phosphate at 48 V	generator	of your yearly use

FROM PATRICK

This is a sample plan for a made-up home: a 1,900 sq ft ranch near Greenville with four people, propane heat and a well.

The goal here is a grid-tied system that also keeps the fridge, freezer, well pump, furnace blower and lights running in an outage. I picked a kit with a hybrid inverter and 11 kW of panels, a little more than this home's yearly use needs, because Michigan winters cut solar production hard. The battery covers the must-run loads for about a day with no sun, and a propane generator takes over in a long winter outage.

In your own plan, this is where I explain the choices I made for your home.

Your recommended equipment

Picked for your system from OMO Solar (Ozark Mountain Offgrid). Prices are OMO's as of October 19, 2026; their site shows the current price.



10KW Complete Offgrid Solar Kit + EG4 FlexBOSS21 + 14.3KW 48V EG4 Lithium Indoor Wall Battery + 11KW Solar with Roof Mounting Rails and Wiring — **$24,519.00**

Hybrid inverter that works with the grid and keeps the house running in an outage. 11 kW of panels, a little more than the numbers need, to help in Michigan winters.

VIEW AT OMOSOLAR.COM



2 × Solar Panel 10AWG MC4 Cables - 1 Pair - 100 Feet Black + 100 Feet Black — **$381.16**

$190.58 each

Extra PV wire: the kit doesn't list how much it includes, and the 70 ft run needs about 310 ft.

VIEW AT OMOSOLAR.COM

PV wire: the 70 ft run from the panels to the inverter needs about 310 ft. The equipment above includes 400 ft, which covers it.

Kits don't include everything: conduit, roof mounts or footings, the wire to your house panel and more. See "Beyond the kit" in the report for this system's list.

Equipment total, before shipping and tax **$24,900.16**

To order

When you check out at OMO Solar, there's a field asking where you heard about OMO. Type PJM Designs LLC there, so Patrick gets credit for referring you. Use the "Put all of this in an OMO Solar cart" button on your plan at pjmdesigns.biz, or tell OMO that Patrick McCarty at PJM Designs referred you and give them your plan number, Sample plan. PJM Designs is an OMO Solar partner; when you buy through us, OMO pays us a referral fee. We don't sell your information to anyone. When your plan is ready, Patrick gives OMO Solar your name so they can credit his referral if you order from them.

Your generator: buy and install locally

Sergeant Generators LLC

Veteran-owned generator sales, installation, maintenance and repair, run by a fellow Army veteran Patrick trusts. Serves Laingsburg, Lansing, East Lansing, Holt, Waverly, Okemos, Haslett and surrounding areas.

sergeantgenerators-llc.com · sergeantgeneratorsllc@gmail.com · (586) 318-8066 or (586) 257-2633

Patrick recommends them for buying and installing the generator in this plan. They are a separate company: PJM Designs doesn't sell or install generators, and isn't paid for recommending them.

Shopping list

Everything to buy, in one list: your equipment, then the parts kits usually leave out (sizes are in "Beyond the kit").

- ☐ **10KW Complete Offgrid Solar Kit + EG4 FlexBOSS21 + 14.3KW 48V EG4 Lithium Indoor Wall Battery + 11KW Solar with Roof Mounting Rails and Wiring ($24,519.00).** From OMO Solar, using your plan's links.
- ☐ **2 x Solar Panel 10AWG MC4 Cables - 1 Pair - 100 Feet Black + 100 Feet Black ($381.16).** From OMO Solar, using your plan's links.

- [ ] **Conduit for the PV run.** About 80 ft, with fittings, straps and pull boxes.
- [ ] **PV wire to match.** About 310 ft of 10 AWG. OMO sells these.
- [ ] **MC4 connectors and a crimp tool.** Plus a few spare connectors, for joining the panel leads to the run. OMO sells these.
- [ ] **Equipment ground.** A bare copper ground wire with the PV run, grounding lugs or clips for the panel frames and rails, and bonding to the house grounding system.
- [ ] **Rapid shutdown.** The electrical code requires roof arrays to shut down at the panels, and inspectors check for it. OMO sells these.
- [ ] **PV disconnect or combiner box.** Where the run reaches the inverter, if your inverter doesn't have one built in. OMO sells these.
- [ ] **Surge protection.** On the PV input and on the AC side. OMO sells these.
- [ ] **Roof attachments.** Flashed roof mounts (L-feet with flashing) for every attachment point, lag screws long enough to bite into the rafters, and roof sealant rated for asphalt shingles. OMO sells these.
- [ ] **Wire clips or ties.** To keep the panel leads off the roof or ground and away from sharp edges.
- [ ] **Battery cables.** Short 1/0 AWG copper cables between the batteries and the inverter, with lugs and heat-shrink. OMO sells these.
- [ ] **Battery fuse and disconnect.** A 150 A Class T fuse with its holder, and a battery disconnect switch, unless your battery has a breaker built in. OMO sells these.
- [ ] **Bus bars.** If more than one battery is wired to the inverter, plus the battery communication cable if it isn't in the box. OMO sells these.
- [ ] **Inverter to the house panel.** 10 AWG copper wire (or cable) and conduit for that run, and a 25 A breaker.
- [ ] **Inlet box and cord.** A weatherproof generator inlet on the outside wall, a cord to match the generator's outlet, and 8 AWG wire with a 40 A two-pole breaker to the inverter's generator input.
- [ ] **The gas line.** Piping, a regulator and a shutoff for the generator, put in by a licensed gas installer (your propane supplier often does this).
- [ ] **Warning labels.** Solar label kits cover the disconnects, panels and conduit.
- [ ] **Permit.** From your township, city or county building department.

Your system in plain English

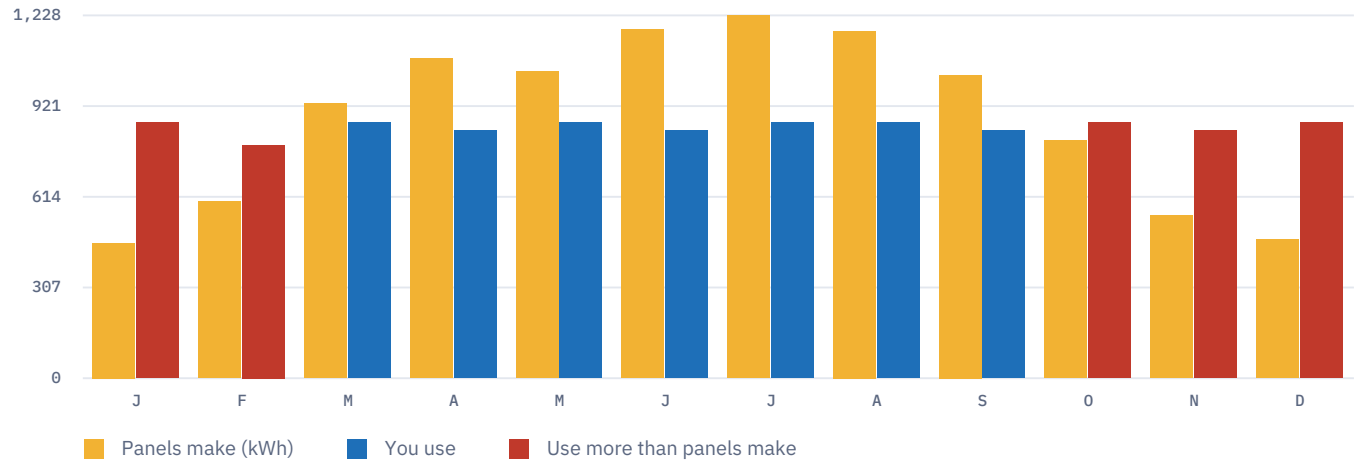
- **What you're getting.** 22 solar panels (8.8 kW) make electricity whenever the sun is up. Batteries (10.5 kWh) store it for night and cloudy days. The inverter (4,000 W) turns it into the same 120/240 V power as your wall outlets. A 7,500 W propane generator takes over in a long outage when the batteries run low.
- **How much of your power it makes.** Over a year, about 103% of what you use. It swings with the seasons: about 141% in June and about 54% in December.
- **In a power outage.** Your backup circuits keep running from the batteries for about 26 hours with no sun, and longer when the sun is out; the generator can recharge them.
- **What to do next.** 1. Read Patrick's note and your equipment list above. 2. Start the permit and the utility paperwork (it takes the longest). 3. Order using the links in your plan. 4. Follow "Install order" below. The sections marked "For you and your electrician" have the numbers your electrician will want.

Summary

SYSTEM	Grid-tied with battery backup
LOCATION	Greenville, MI (NREL PVWatts sun data)
PANELS FACE	south (180°) at a 35° tilt, 5% shade, 15% winter snow loss
SUN	1,198 kWh a year from each kW of panels
YOUR USE	10,199 kWh a year (27.9 a day)
PANELS MAKE	10,542 kWh a year, 103% of your use
INVERTER	4,000 W continuous, 5,055 W surge, split-phase 120/240 V (from your appliance list)
BATTERIES	10.5 kWh lithium iron phosphate (9.5 kWh usable), 219 Ah at 48 V
IN AN OUTAGE	About 26 hours of your backup loads with no sun, longer when the sun is out
CHARGE CONTROLLER	229 A MPPT at 48 V (often built into a hybrid inverter)
GENERATOR	7,500 W dual-fuel inverter generator on propane for long outages: runs the backup loads and recharges the batteries

Month by month

Production versus use. In an outage the batteries and panels carry your backup loads.



MONTH	USE KWH	USE A DAY	PANELS KWH	PANELS A DAY	SURPLUS / SHORT
January	866	27.9	458	14.8	-431
February	789	27.9	598	21.2	-220
March	866	27.9	930	30.0	+17
April	838	27.9	1,083	36.1	+192
May	866	27.9	1,039	33.5	+122

MONTH	USE KWH	USE A DAY	PANELS KWH	PANELS A DAY	SURPLUS / SHORT
June	838	27.9	1,181	39.4	+284
July	866	27.9	1,228	39.6	+301
August	866	27.9	1,175	37.9	+251
September	838	27.9	1,026	34.2	+137
October	866	27.9	804	25.9	-102
November	838	27.9	550	18.3	-315
December	866	27.9	469	15.1	-420
Year	**10,199**	**27.9**	**10,542**	**28.9**	**-185**

Winter in Michigan

December makes about 40% of what June does here. This shows how much of your backup loads the panels can carry through a December outage.

OPTION	PANELS	MADE A DECEMBER DAY	BACKUP LOADS A DAY	COVERED BY THE PANELS
Carries the backup loads in December	13 × 400 W = 5.2 kW	8.9 kWh	8.7 kWh	Yes, on an average day
This plan	22 × 400 W = 8.8 kW	15.1 kWh	8.7 kWh	Yes, on an average day
25% more panels	28 × 400 W = 11.2 kW	19.3 kWh	8.7 kWh	Yes, on an average day
50% more panels	34 × 400 W = 13.6 kW	23.4 kWh	8.7 kWh	Yes, on an average day

- Panels are the cheapest part of a solar system and keep paying back every winter. In Michigan, adding panels is usually a better buy than more batteries or more generator hours: from November to February the sun is low, days are short and snow covers panels.

FOR YOU AND YOUR ELECTRICIAN

Panels and strings

Panels are wired together in "strings". This makes sure each string stays within what the inverter can take, even on a freezing morning when panel voltage runs high.

ARRAY	22 × 400 W = 8.80 kW, about 473 sq ft
PANEL FIGURES USED	Voc about 37.0 V, Vmp about 31.0 V, Imp about 12.9 A (typical for 400 W panels; read your panel's label)
COLD-WEATHER VOLTAGE	Panel voltage rises in the cold. On a Michigan winter morning each panel can reach 43.7 V (NEC 690.7 factor 1.18). Strings are sized to that.

INPUT	MAX IN SERIES	LAYOUT	WORKING VOLTAGE	COLDEST VOLTAGE	TOTAL CURRENT
150 V charge controller	3	8 strings of 3 (24 panels: add 2 so the strings match)	93 V	131 V	103.2 A
250 V charge controller	5	5 strings of 5 (25 panels: add 3 so the strings match)	155 V	218 V	64.5 A
Hybrid inverter, 500 V input	11	2 strings of 11	341 V	480 V	25.8 A

- Panels in one string must face the same way. Split the array into separate strings (or controller inputs) for different roof faces.

FOR YOU AND YOUR ELECTRICIAN

Battery bank

How big the battery bank is, how to connect it, and how fast it can safely charge and discharge.

SIZE	10.5 kWh lithium iron phosphate, 9.5 kWh usable (90% depth of discharge)
COVERS	1 day of backup loads with no sun
LAYOUT	3 × 51.2 V 100 Ah (5.12 kWh each) in parallel = 15.4 kWh
BANK VOLTAGE	48 V nominal
PEAK CURRENT	101 A at full inverter load
CHARGING	About 109 A maximum charge rate for this bank

- Rack or wall batteries at 48 V usually come as 5 kWh modules; 3 of those does the same job.
- Wire parallel batteries to bus bars with equal-length cables, positive from one end and negative from the other, so each battery shares the load evenly.

FOR YOU AND YOUR ELECTRICIAN

Charge controller

The charge controller feeds solar power into the batteries without overcharging them. Many hybrid inverters have one built in.

SIZE	229 A MPPT at 48 V (array watts ÷ bank volts × 1.25)
COMMON CHOICES	3 × 100 A controllers, each on its own part of the array, or a hybrid inverter with 11.0 kW of solar input
INPUT VOLTAGE	Must handle the coldest string voltage in the panels table

FOR YOU AND YOUR ELECTRICIAN

Wiring and protection

Each wire has to be thick enough for the current it carries, with a fuse or breaker to protect it. These are the minimum sizes for your system. Minimum sizes from NEC Table 310.16 at the current each run must carry. Long runs need bigger wire to keep voltage drop under 3%.

RUN	DESIGN CURRENT	COPPER WIRE (75 °C)	PROTECTION	NOTES
Panel strings to combiner or controller	21.3 A per string	10 AWG	25 A fuse per string	PV wire, outdoor rated
Charge controller to batteries	229 A	250 kcmil	250 A breaker or fuse	Within 18 in of the battery
Batteries to inverter	126 A	1/0 AWG	150 A Class T fuse + disconnect	Keep it short: under 10 ft
Inverter to house panel	21 A	10 AWG	25 A two-pole breaker	To a critical-loads subpanel or a whole-home transfer switch
Generator to inverter input	39 A	8 AWG	40 A two-pole breaker	Inlet box outside

Panels to the inverter

DISTANCE	70 ft one way (your answer)
PV WIRE NEEDED	About 310 ft: 2 strings × 2 conductors (+ and -) × 70 ft, plus 10% for routing
VOLTAGE DROP	0.7% on 10 AWG at 341 V per string, which is fine (under 2%).

- OMO kits come with a set amount of PV wire (often one 500 ft spool). Patrick checks it against what this run needs and adds spools if it falls short.

Beyond the kit: what else you'll need

Kits cover the big equipment; this is everything else you'll need to buy, sized for your system. Complete kits cover the main equipment. These are the parts and jobs they usually leave to you, for this system.

From the panels to the inverter

- **Conduit for the PV run.** About 80 ft, with fittings, straps and pull boxes. From a roof array, a roof-penetration junction box (flashed into the roof) and EMT or PVC conduit down to the inverter. 3/4 in conduit usually fits the 4 PV wires and a ground wire.
- **PV wire to match.** About 310 ft of 10 AWG (worked out above). Kits that list a spool are checked in your equipment list.
- **MC4 connectors and a crimp tool,** plus a few spare connectors, for joining the panel leads to the run. Use the same brand of connector on both halves of each joint.
- **Equipment ground.** A bare copper ground wire with the PV run, grounding lugs or clips for the panel frames and rails, and bonding to the house grounding system. A ground or pole mount may need its own ground rod.
- **Rapid shutdown.** The electrical code requires roof arrays to shut down at the panels, and inspectors check for it. Many hybrid inverters do this with a compatible device under each panel or string, sold separately; check which one your inverter works with.

- **PV disconnect or combiner box** where the run reaches the inverter, if your inverter doesn't have one built in.
- **Surge protection** on the PV input and on the AC side. Some inverters have it built in.

Mounting

- **Roof attachments.** Flashed roof mounts (L-feet with flashing) for every attachment point, lag screws long enough to bite into the rafters, and roof sealant rated for asphalt shingles. Kits often include rails, splices and clamps but not the flashing.
- **Finding the rafters.** A stud finder or pilot holes from the attic. Mounts go into rafters, not just roof decking.
- **Wire clips or ties** to keep the panel leads off the roof or ground and away from sharp edges.

Inverter, batteries and the house panel

- **Battery cables.** Short 1/0 AWG copper cables between the batteries and the inverter, with lugs and heat-shrink. Battery and inverter kits sometimes include these; check the length you need.
- **Battery fuse and disconnect.** A 150 A Class T fuse with its holder, and a battery disconnect switch, unless your battery has a breaker built in.
- **Bus bars** if more than one battery is wired to the inverter, plus the battery communication cable if it isn't in the box.
- **A warm, dry spot.** Lithium batteries can't charge below freezing. In a Michigan garage or shed, plan on a heated space or batteries with built-in heaters.
- **Wall space and backing.** Plywood or a cement board on the wall for the inverter and batteries, with the clearances their manuals ask for.
- **Inverter to the house panel.** 10 AWG copper wire (or cable) and conduit for that run, and a 25 A breaker. For backup you also need a critical-loads subpanel and its breakers, or a whole-home transfer switch, so the backed-up circuits run from the inverter.

Generator hookup

- **Inlet box and cord.** A weatherproof generator inlet on the outside wall, a cord to match the generator's outlet, and 8 AWG wire with a 40 A two-pole breaker to the inverter's generator input.
- **The gas line.** Piping, a regulator and a shutoff for the generator, put in by a licensed gas installer (your propane supplier often does this).
- **A level pad** for the generator, at the distance from doors and windows its manual gives.

Paperwork, labels and tools

- **The utility's go-ahead.** Before turning on a grid-tied system, apply to Consumers Energy for interconnection (and net metering, if you want credit for extra power). It can take weeks, so start early.
- **Permit and inspection.** Your township, city or county building department issues the electrical permit and inspects the work. PJM Designs doesn't handle permits, stamped drawings or installation.
- **Warning labels.** The code requires labels on the disconnects, panels and conduit. Solar label kits cover them.
- **Tools.** An MC4 crimper and wrench, a lug crimper for battery cables, a torque wrench or screwdriver (connections must be torqued to spec), a multimeter with a DC clamp, and a fish tape for the conduit.

Kits differ, so compare this list with your kit's parts list before you order. Sizes here follow the wiring table above; a licensed electrician should check the final design, especially the connection to the house panel.

Install order

In the order it's usually done, with who does each part (you said you'll have an electrician for the hookup).

1. **Permit and paperwork first (You).** Apply for the electrical permit and send the utility's interconnection application before you start, so the inspection and the utility's approval aren't holding you up at the end.
2. **Order and check the equipment (You).** Order from your plan's links. When it arrives, check every box against the packing list and the "Beyond the kit" list, and look for shipping damage before you sign for it.
3. **Roof mounts and rails (You).** Find the rafters, install the flashed mounts and seal them, then the rails. Check the roof is sound before it's covered for 25 years.
4. **Panels on the racking (You).** Mount the panels, ground the frames and rails, and plug each string together. Leave the string ends unconnected (or covered) until the end: panels make power whenever there's light.
5. **Conduit and the PV run (You, with your electrician).** Run the conduit (about 80 ft) and pull the PV wire and ground to where the inverter goes.
6. **Inverter and batteries (You, with your electrician).** Mount them on the backing board with the clearances in their manuals, in a spot that stays above freezing. Connect the batteries through the fuse and disconnect, torqued to spec.
7. **Connection to the house panel (Electrician).** The critical-loads subpanel (or transfer switch), the inverter feed and moving the backed-up circuits.
8. **Generator hookup (Electrician).** The inlet box and wiring to the inverter. The gas line goes to a licensed gas installer.
9. **Test before turning it on (You, with your electrician).** With everything off, check each string's voltage and polarity at the inverter against the panels table above, check the battery voltage, and check every connection is tight.
10. **Inspection (You).** Book the inspection. Have the manuals, the panel datasheet and this plan on hand.
11. **Turn it on (You).** Only after the utility gives permission to operate. Then follow the inverter's start-up order and set up its monitoring app.

Looking after it through the year

- **Before winter (October).** Check the batteries are in a space that stays above freezing and the heater (if they have one) works. Service the generator, fill or book the propane, and do a test run under load. Look over the panels, wiring and conduit for damage from the summer.
- **After snow.** Panels usually shed snow on their own within a day or two of sun. Never climb on a snowy roof to clear them, and don't chip ice off the glass.
- **Spring.** Rinse off pollen and dust if output looks low, check the mounts and flashing after the freeze-thaw season, and trim any new tree growth shading the array.
- **Every month.** Glance at the inverter app: compare this month with the same month last year and with the month-by-month table above. A sudden drop usually means shade, a tripped breaker or a loose connection.
- **Once a year.** With the system shut down, re-torque the battery and inverter connections and check for heat discoloration, and exercise the generator.
- **Generator.** Run it under load for 20 to 30 minutes every month so it starts when you need it.

Generator

Fuel price assumed: $2.60 per gallon of propane. Generators make about 0.7 of their rated watts over a long run.

TYPE	Dual-fuel inverter generator (propane or gasoline) running from your propane tank. Home standby generators start at about 10,000 W, so at this size a portable costs far less.

- Propane: about 1.5 gallons a day of cloudy outage. A 100-pound cylinder (about 23 gallons) lasts about 15 days; a 500-gallon tank lasts weeks.

SIZE	7,500 W
A CLOUDY OUTAGE DAY	About 1.7 hours of running to carry the backup loads and refill the batteries, using about 1.5 gal of propane ($4)
CONNECT	To the inverter's generator input, so the inverter manages charging and switches over automatically

Your appliances

Your use comes from your bill; this list sizes the inverter and the backup loads.

APPLIANCE	WATTS	HOURS A DAY	WHEN	KWH A YEAR	SHARE	COUNTED IN
Well pump (1 hp)	1,000	1.5	All year	548	16%	Backup, Together
Furnace blower (gas or propane furnace)	500	7.0	Nov to Mar	529	16%	Backup, Together
Dishwasher	1,300	1.0	All year	475	14%	
Refrigerator	150	8.0	All year	438	13%	Backup, Together
Chest freezer	90	9.0	All year	296	9%	Backup, Together
LED lights (10 bulbs)	100	5.0	All year	183	5%	Backup, Together
TV	100	4.0	All year	146	4%	Together
Laptop or computer	80	5.0	All year	146	4%	Backup, Together
Wi-Fi router and modem	15	24.0	All year	131	4%	Backup, Together
Microwave	1,200	0.3	All year	131	4%	
Washing machine	500	0.7	All year	128	4%	
Sump pump (1/3 hp)	600	0.5	All year	110	3%	Backup, Together
Coffee maker	900	0.2	All year	66	2%	
Phone and device charging	20	4.0	All year	29	1%	Backup, Together
Garage door opener	500	0.1	All year	18	1%	Backup
Total				**3,375**	**100%**	

Where to save

- **Well pump (1 hp)** is 16% of your list. A larger pressure tank cuts how often the pump starts, and a soft-start lowers its surge. Cutting it 30% would need 0.1 kW fewer panels.
- **Furnace blower (gas or propane furnace)** is 16% of your list. Cutting its hours by a third saves about 176 kWh a year. Cutting it 30% would need 0.1 kW fewer panels.
- **Dishwasher** is 14% of your list. Cutting its hours by a third saves about 158 kWh a year. Cutting it 30% would need 0.1 kW fewer panels.
- Always-on loads (Wi-Fi router and modem) run all night from the batteries; small cuts there matter most off-grid.

Notes and warnings

- Generators burn more propane than most people expect. Check the tank size against the fuel figures in the report.
- Michigan winters are the hard part of solar here. Plan for more panels than the yearly numbers suggest: extra panels are the cheapest way to cut winter generator hours and keep the batteries charged.
- A motor in your list needs about 2,500 W extra to start. Check the inverter's surge rating, or fit a soft starter to the pump or AC.
- You have 240-volt appliances, so the inverter must be split-phase (120/240 V), or those loads stay on the grid or generator.
- Lithium batteries can't be charged below freezing. Keep them in a heated space or choose a model with built-in heating.
- Put the 240 V loads you want in an outage on the critical-loads panel, or leave them off backup to keep the system smaller.
- Consumers Energy and DTE need an interconnection application approved before a grid-tied system is switched on.
- A permit and inspection are required for most systems in Michigan. You or your installer arrange them with your township or county building department.

Solar words, in plain terms

- **kW (kilowatt).** How much power something makes or uses at one moment. 1 kW is 1,000 watts. Panel size is given in kW.
- **kWh (kilowatt-hour).** An amount of energy: 1 kW for one hour. Your electric bill and battery size are in kWh.
- **Inverter.** Turns the panels' and batteries' DC power into the AC power your house uses.
- **Charge controller (MPPT).** Manages charging the batteries from the panels. MPPT is the efficient kind.
- **String.** Panels wired one after another, like links in a chain, so their voltages add up.
- **Voc / Vmp.** A panel's voltage with nothing connected (Voc) and while working (Vmp). Printed on the label on the back.
- **AWG.** Wire size. The smaller the number, the thicker the wire: 4 AWG is thicker than 10 AWG.
- **Breaker / fuse.** Safety devices that cut power if a wire carries more current than it should. A Class T fuse is the kind used right at a battery.
- **LiFePO4 (lithium iron phosphate).** The battery type most home systems use now: long-lasting, safe, and usable down to a low charge.
- **Depth of discharge.** How much of the battery you use before recharging. Using less of it makes it last more years.
- **Critical-loads subpanel.** A small breaker panel holding just the circuits you want running in an outage, fed by the inverter.

- **Interconnection / net metering.** The utility's approval to connect a system to the grid, and how they credit power you send back.
- **Rapid shutdown.** A required safety feature that turns roof panels' wiring off quickly for firefighters.
- **Combiner box.** A box where several strings join before the long run to the inverter, with a fuse for each.

Planning estimates from the PJM Designs solar calculator. Sun data: NREL PVWatts (or PVGIS from the EU Joint Research Centre when NREL is unavailable) with 14% system losses, plus your shade and snow settings. Wire, fuse and string sizes come from standard tables and typical panel figures; confirm them against your equipment's labels and the National Electrical Code, and have a licensed electrician review the system before it is connected. PJM Designs provides equipment recommendations only. We don't install systems, provide stamped or engineered drawings, handle permits, or take part in any part of the installation.