

SOLAR PACKAGES BY HOUSE SIZE · grid-tied hybrid, zero export · Chiang Rai · 22 Oct 2026

Small, medium and large houses: loads, packages and bill of materials

Three typical customer profiles, each sized for a grid-tied hybrid system that stays connected to PEA, does not sell power back, and uses a modest battery only to keep the daytime surplus for the evening.

House	Connected load	Use / day	Package	Solar share	Saving THB/mo
Small house	6.9 kW	20 kWh 603 kWh/mo	3.9 kWp (6 panels) Solis 6 kW 1-phase hybrid battery 5.12 kWh	44%	≈ 1,241
Medium house	30.6 kW	75 kWh 2,250 kWh/mo	10.4 kWp (16 panels) Solis 10 kW 3-phase hybrid battery 16 kWh	36%	≈ 3,821
Large house	47.7 kW	104 kWh 3,129 kWh/mo	13.0 kWp (20 panels) Solis 15 kW 3-phase hybrid battery 16 kWh	32%	≈ 4,653

Price: please ask Solar ESS for a quotation for your house – call 063 151 6694 or 089 429 6832, or email kris@solar-ess.org. The quotation is based on your roof, your meter and your actual loads.

How the packages are sized

- **Most of the load is at night.** Air conditioners make up 70–80% of each house's energy and run mainly in the evening and at night, when there is no sun.
- **Zero export caps what solar can do.** Power that is not used or stored is simply not produced, so the array is sized to the daytime load plus what the battery can hold. A bigger array mainly adds unused energy: for example, four more panels on the medium house add less than 1 kWh a day of real use.
- **A modest battery doubles the value.** It stores the midday surplus and releases it in the early evening; without it, solar covers only about 17–21% of each house.
- **Room to grow.** Each inverter can take more panels and a second battery later, and the three-phase models handle unbalanced phase loads.
- **The biggest saving costs nothing:** moving flexible loads (EV charging, pumps, laundry, water heating, pre-cooling) into 09:00–15:00.

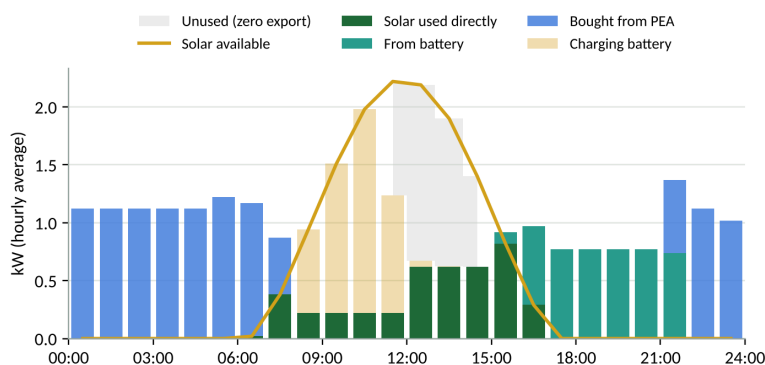
Small house · 1-phase

Loads

Load	Qty	Connected kW	kWh / day	Use assumed
Air conditioner 12,000 BTU (inverter)	2	2.00	13.6	≈6.8 full-power hours a day, mostly at night
LED lights 10 W	10	0.10	0.6	6 h a day
Sockets (fridge, TV, fans, chargers)	10	1.80	3.9	12 W each continuous + 25 W each 18:00–22:00
Rice cooker 700 W	1	0.70	0.7	2 × 30 min
Electric kettle 2,000 W	1	2.00	0.6	2 × 9 min
Water pump 350 W	1	0.35	0.7	2 h a day
Total		6.9 kW	20.1 kWh	≈ 603 kWh a month · peak hourly demand ≈ 1.4 kW · daytime (08–17) use 5 kWh

Recommended package

3.9 kWp 6 × 650 W panels	6 kW Solis 6 kW 1-phase hybrid inverter, zero export	5.12 kWh battery to store the daytime surplus	44% of daily use covered by solar (9 of 20 kWh)
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Typical sunny day (≈ 14 kWh of solar available). Solar used directly 4.2 kWh, from battery 4.6 kWh, bought from PEA 11.2 kWh, unused because of zero export 4.6 kWh.

- **Estimated saving** ≈ 1,241 THB a month (≈ 14,892 THB a year) at 4.7 THB/kWh.
- **Without the battery** the same array would cover only 21% (4.2 kWh a day), saving ≈ 592 THB a month.

Small house • bill of materials

#	Group	Item	Qty
1	Solar panel	LONGi Hi-MO X10 650 W mono-facial (LR7-72HVVH-650M)	6 pcs
2	Hybrid inverter	Solis S6-EH1P6K-L-PLUS, 6 kW single-phase, low-voltage battery	1 pcs
3	Battery	Dyness DL5.0F 51.2 V 100 Ah, 5.12 kWh, 10-year warranty	1 pcs
4	Monitoring	Solis S2-WL-ST WiFi stick	1 pcs
5	Monitoring	Solis ACR10R-D16TE single-phase meter (zero export)	1 pcs
6	Mounting	Aluminium rail mounting kit, metal-sheet roof (up to 8 panels)	1 set
7	DC side	PV cable H1Z2Z2-K 6 mm ² red/black	40 m
8	DC side	MC4 connector pair	4 pair
9	DC side	DC MCB 2P 600 V 20 A	1 pcs
10	DC side	DC SPD 2P 600 V 20–40 kA	1 pcs
11	Battery side	DC MCCB 2P 500 V 125 A (battery isolator)	1 pcs
12	Battery side	Battery cable 25 mm ² red/black	4 m
13	AC side	AC MCB 2P 32 A (grid and backup outputs)	2 pcs
14	AC side	AC SPD 2P 275 V 20–40 kA	1 pcs
15	AC side	THW cable 6 mm ² (Yazaki)	45 m
16	Enclosure	Breaker enclosure 13-way (AC)	1 pcs
17	Enclosure	Breaker enclosure 8-way (DC)	1 pcs
18	Grounding	Ground rod copper-clad 5/8 in × 8 ft	1 rod
19	Grounding	Ground cable 10 mm ² green/yellow	15 m
20	Conduit	IMC conduit 1 in (3 m length)	4 length
21	Conduit	Waterproof flexible conduit connector	4 pc
22	Service	Installation, testing and commissioning	1 job
23	Service	PEA connection application and engineer-certified SLD	1 job
24	Service	Site survey and transport (Chiang Rai area)	1 job

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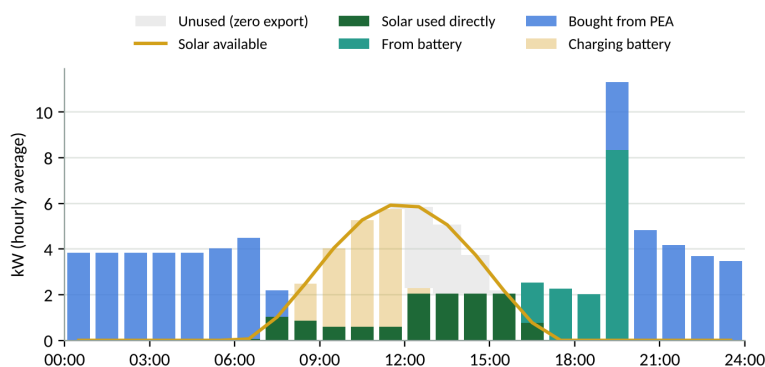
Medium house • 3-phase

Loads

Load	Qty	Connected kW	kWh / day	Use assumed
Air conditioner 12,000 BTU (inverter)	4	4.00	27.2	≈6.8 full-power hours a day
Air conditioner 18,000 BTU (inverter)	2	3.20	21.8	≈6.8 full-power hours a day
LED lights 10 W	20	0.20	1.2	6 h a day
Sockets (fridges, TVs, fans, chargers)	20	3.60	7.8	12 W each continuous + 25 W each 18:00–22:00
Rice cooker 700 W	2	1.40	1.4	2 × 30 min
Water heater 3,500 W	3	10.50	4.2	2 showers × 12 min each
EV charger 7.2 kW	1	7.20	10.0	≈10 kWh a day (≈60 km)
Water pump 500 W	1	0.50	1.5	3 h a day
Total		30.6 kW	75.0 kWh	≈ 2,250 kWh a month • peak hourly demand ≈ 11.3 kW • daytime (08–17) use 13 kWh

Recommended package

10.4 kWp 16 × 650 W panels	10 kW Solis 10 kW 3-phase hybrid inverter, zero export	16 kWh battery to store the daytime surplus	36% of daily use covered by solar (27 of 75 kWh)
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Typical sunny day (≈ 36 kWh of solar available). Solar used directly 12.7 kWh, from battery 14.4 kWh, bought from PEA 48.0 kWh, unused because of zero export 8.6 kWh.

- **Estimated saving** ≈ 3,821 THB a month (≈ 45,852 THB a year) at 4.7 THB/kWh.
- **Without the battery** the same array would cover only 17% (12.7 kWh a day), saving ≈ 1,791 THB a month.
- **Charge the EV during the day** (10:00–15:00 when the car is home) and solar covers 47% of the house, saving about 5,020 THB a month.

Medium house • bill of materials

#	Group	Item	Qty
1	Solar panel	LONGi Hi-MO X10 650 W mono-facial (LR7-72HVVH-650M)	16 pcs
2	Hybrid inverter	Solis S6-EH3P10K02-NV-YD-L, 10 kW three-phase, low-voltage battery, unbalanced output	1 pcs
3	Battery	Solis IntelliHome 16 kWh low-voltage battery, outdoor	1 pcs
4	Monitoring	Solis S2-WL-ST WiFi stick	1 pcs
5	Monitoring	Three-phase smart meter with CTs, 40 mA (zero export)	1 pcs
6	Mounting	Aluminium rail mounting kit, metal-sheet roof (16 panels)	1 set
7	DC side	PV cable H1Z2Z2-K 6 mm ² red/black	80 m
8	DC side	MC4 connector pair	6 pair
9	DC side	DC MCB 2P 800 V 20 A (one per string)	2 pcs
10	DC side	DC SPD 2P 800 V 20–40 kA (one per string)	2 pcs
11	Battery side	DC MCCB 2P 500 V 250 A (battery isolator)	1 pcs
12	Battery side	Battery cable 50 mm ² red/black	4 m
13	AC side	AC MCB 4P 32 A (grid and backup outputs)	2 pcs
14	AC side	AC SPD 4P 385 V 20–40 kA	1 pcs
15	AC side	THW cable 6 mm ² (Yazaki)	75 m
16	Enclosure	Breaker enclosure 15-way (AC)	1 pcs
17	Enclosure	Breaker enclosure 13-way (DC)	1 pcs
18	Grounding	Ground rod copper-clad 5/8 in × 8 ft	1 rod
19	Grounding	Ground cable 10 mm ² green/yellow	15 m
20	Conduit	IMC conduit 1 in (3 m length)	6 length
21	Conduit	Waterproof flexible conduit connector	6 pc
22	Service	Installation, testing and commissioning	1 job
23	Service	PEA connection application and engineer-certified SLD	1 job
24	Service	Site survey and transport (Chiang Rai area)	1 job

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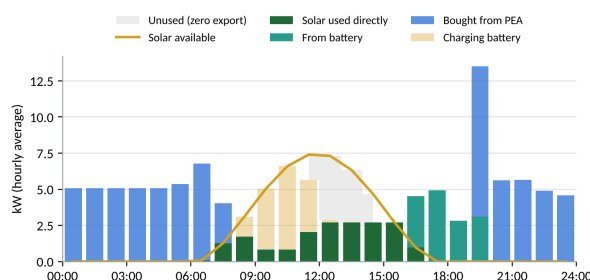
Large house • 3-phase

Loads

Load	Qty	Connected kW	kWh / day	Use assumed
Air conditioner 12,000 BTU (inverter)	4	4.00	27.2	≈6.8 full-power hours a day
Air conditioner 18,000 BTU (inverter)	2	3.20	21.8	≈6.8 full-power hours a day
Air conditioner 24,000 BTU (inverter)	1	2.20	15.0	≈6.8 full-power hours a day
Water heater 3,500 W	5	17.50	7.0	2 showers × 12 min each
Water pump 900 W	2	1.80	5.4	3 h a day each
LED lights 10 W	30	0.30	1.8	6 h a day
Sockets (fridges, TVs, fans, chargers)	30	5.40	11.6	12 W each continuous + 25 W each 18:00–22:00
Rice cooker 700 W	3	2.10	2.1	2 × 30 min
Induction cooker 2,000 W	2	4.00	2.4	2 × 30 min at 60% power
EV charger 7.2 kW	1	7.20	10.0	≈10 kWh a day (≈60 km)
Total		47.7 kW	104.3 kWh	≈ 3,129 kWh a month • peak hourly demand ≈ 13.5 kW • daytime (08–17) use 21 kWh

Recommended package

13.0 kWp 20 × 650 W panels	15 kW Solis 15 kW 3-phase hybrid inverter, zero export	16 kWh battery to store the daytime surplus	32% of daily use covered by solar (33 of 104 kWh)
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Typical sunny day (≈ 46 kWh of solar available). Solar used directly 18.6 kWh, from battery 14.4 kWh, bought from PEA 71.3 kWh, unused because of zero export 11.8 kWh.

- **Estimated saving** ≈ 4,653 THB a month (≈ 55,836 THB a year) at 4.7 THB/kWh.
- **Without the battery** the same array would cover only 18% (18.6 kWh a day), saving ≈ 2,623 THB a month.
- **Charge the EV during the day** (10:00–15:00 when the car is home) and solar covers 41% of the house, saving about 6,049 THB a month.

Large house • bill of materials

#	Group	Item	Qty
1	Solar panel	LONGi Hi-MO X10 650 W mono-facial (LR7-72HVVH-650M)	20 pcs
2	Hybrid inverter	Solis S6-EH3P15K02-NV-YD-L, 15 kW three-phase, low-voltage battery, unbalanced output	1 pcs
3	Battery	Solis IntelliHome 16 kWh low-voltage battery, outdoor	1 pcs
4	Monitoring	Solis S2-WL-ST WiFi stick	1 pcs
5	Monitoring	Three-phase smart meter with CTs, 40 mA (zero export)	1 pcs
6	Mounting	Aluminium rail mounting kit, metal-sheet roof (20 panels)	1 set
7	DC side	PV cable H1Z2Z2-K 6 mm ² red/black	100 m
8	DC side	MC4 connector pair	6 pair
9	DC side	DC MCB 2P 800 V 20 A (one per string)	2 pcs
10	DC side	DC SPD 2P 800 V 20–40 kA (one per string)	2 pcs
11	Battery side	DC MCCB 2P 500 V 250 A (battery isolator)	1 pcs
12	Battery side	Battery cable 70 mm ² red/black	4 m
13	AC side	AC MCB 4P 32 A (grid and backup outputs)	2 pcs
14	AC side	AC SPD 4P 385 V 20–40 kA	1 pcs
15	AC side	THW cable 6 mm ² (Yazaki)	75 m
16	Enclosure	Breaker enclosure 15-way (AC)	1 pcs
17	Enclosure	Breaker enclosure 13-way (DC)	1 pcs
18	Grounding	Ground rod copper-clad 5/8 in × 8 ft	1 rod
19	Grounding	Ground cable 10 mm ² green/yellow	15 m
20	Conduit	IMC conduit 1 in (3 m length)	8 length
21	Conduit	Waterproof flexible conduit connector	8 pc
22	Service	Installation, testing and commissioning	1 job
23	Service	PEA connection application and engineer-certified SLD	1 job
24	Service	Site survey and transport (Chiang Rai area)	1 job

Price: please ask Solar ESS for a quotation for your house – call 063 151 6694 or 089 429 6832, or email kris@solar-ess.org. The quotation is based on your roof, your meter and your actual loads.

Assumptions and what is not included

Solar yield ≈ 3.5 kWh per kWp per day in Chiang Rai (clear-sky average); cloudy and smoky days will be lower.

Appliance power Inverter air conditioners ≈ 1.0 kW (12,000 BTU), 1.6 kW (18,000 BTU), 2.2 kW (24,000 BTU), about 6.8 full-power hours a day, mostly at night. Sockets: 180 VA connected each, 12 W continuous + 25 W in the evening on average. Water heaters: two 12-minute showers each per day. EV: about 10 kWh a day, charged in the evening (daytime charging shown as an option).

Battery 90% usable, 95% round-trip; charged only from solar surplus.

Savings 4.7 THB/kWh average; no income from export (zero export, no sell-back to PEA).

Price Not shown. Each package is quoted for the actual house after a site survey; please ask Solar ESS for a quotation.

Not included Changes to the house's own wiring or distribution board, PEA meter upgrade fees (e.g. a new three-phase meter), the EV charger itself, roof repair or structural work, and anything not listed in the bill of materials.

On-grid reminder. When PEA power is off, the system switches off for safety (anti-islanding); only circuits wired to the inverter's backup output stay on from the battery.