

SOLAR WATER PUMPING · SYSTEM 1 · OPTION B · ON-GRID

Solar for the whole home, pump included

Instead of a dedicated solar pump inverter, 8 × LONGi 650 W panels feed a Solis 6 kW on-grid inverter connected to the home main board. The TORQUE 1.5 HP pump becomes one of the home loads, so solar power is used all day: by the pump while it fills the hilltop tank, and by the rest of the home when it is not pumping.

TN-20261019-PUMP-03-S1B

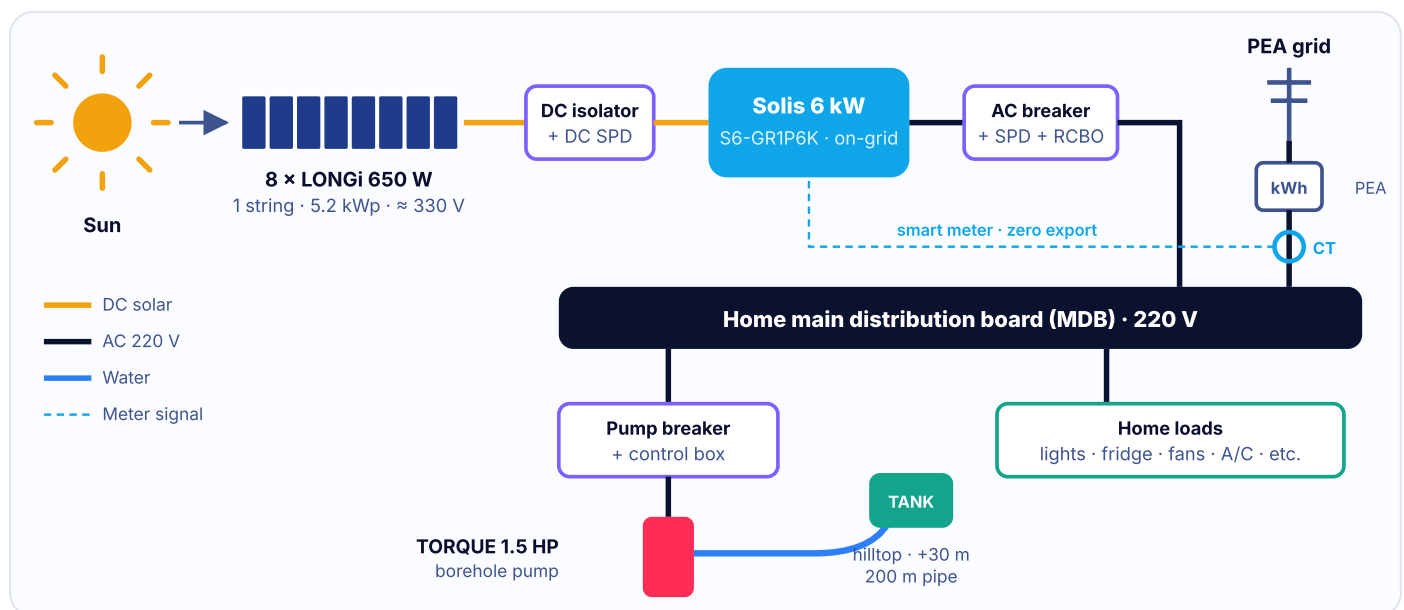
Rev01

20 October 2026

Chiang Rai, Thailand

Prices in THB, confirmed at order

Single-line diagram



B On-grid system

Sun → 8 panels → Solis 6 kW on-grid inverter → home main board → pump + home loads, with zero-export metering.

5.2 kWp
8 × 650 W, 1 string

6 kW
Solis on-grid, 1-phase

≈ 21 kWh
Solar per sunny day

9 kWp
Max PV on inverter

OPTION B PRICE
144,350 THB excl. VAT
 154,455 THB including 7% VAT

OPTION A OR OPTION B?

Where the day's solar energy goes

8 × 650 W panels make about 21 kWh on a sunny day. In Option A that energy can only drive the pump; once the tank is full the rest is lost. In Option B every kWh goes to the home board, so the pump and the rest of the home share it.

Option A · Solar pump

Novem pump inverter



9 kWh
used per sunny day

Option B · On-grid

pump + home loads



up to 21 kWh
used per sunny day

SOLAR PER SUNNY DAY
≈ 21 kWh
 5.2 kWp × 4.0 h

PUMP USE
≈ 9 kWh
 1.5 kW × 6 h

VALUE · OPTION A
≈ 15k THB/yr
 pump energy only

VALUE · OPTION B
up to 34k THB/yr
 if the home uses it all

Side by side

	OPTION A · SOLAR PUMP INVERTER	OPTION B · ON-GRID SOLIS 6 KW
How the pump is powered	Solar first, grid backup through the Novem pump inverter	From the home board: grid and solar together
Solar energy when the tank is full	Not used: the panels only drive the pump	Used by lights, fridge, fans and A/C
Pumping at night / cloudy days	Yes, on grid backup	Yes, on grid
During a power cut	Can still pump in daylight on solar	Stops: on-grid inverters switch off for safety (anti-islanding)
PEA approval	Not needed (no connection for solar export)	Needed: Solar ESS files the PEA application with an engineer-certified SLD
Monitoring	Inverter display	Solis app: daily kWh, alarms, history
Room to grow	Pump only	Inverter accepts up to 9 kWp: about 5 more panels later
Price excl. VAT	120,850 THB	144,350 THB

Option B costs about 23,500 THB more, but can put up to 12 kWh more solar to work each day (≈ 19k THB a year), so the difference can pay for itself in about 15 months if the home uses that power in daytime. Option A is the better choice if the pump must keep running during power cuts.

Assumptions & limits

≈ Energy figures assume 4.0 kWh per kWp per day (Chiang Rai average), the pump drawing ≈ 1.5 kW for about 6 hours, and grid power at ≈ 4.5 THB/kWh. Savings depend on how much power the home uses in daytime.

! In a power cut the on-grid inverter switches off, so the pump stops until the grid returns. If pumping during outages matters, keep Option A, or add a hybrid inverter with battery later.

OPTION B · BILL OF MATERIALS

On-grid system · price

TOTAL EXCL. VAT 144,350 THB	VAT 7% 10,105 THB	TOTAL INCL. VAT 154,455 THB	PEA APPLICATION Included engineer-certified SLD
---	---------------------------------------	---	---

Where the money goes

14%	19%	32%	11%	10%	14%
Pump & control 20,500	On-grid inverter & meter 27,500	Solar array & frame 46,400	Piping & valves 15,300	Electrical & protection 13,850	Safety accessories 800
Installation 20,000					

Itemised list

#	ITEM	QTY	UNIT (THB)	AMOUNT (THB)
1	TORQUE TQ-SP-2DLBM20-4/S borehole pump, 1.1 kW (1.5 HP), 1-phase 220 V, 1½" outlet, 20 impellers, for 4" well	1 set	17,000	17,000
2	Pump control box: start capacitor, overload and dry-run protection, float-switch input	1 set	3,500	3,500
3	Solis S6-GR1P6K on-grid inverter 6 kW, 1-phase 220 V, 2 MPPT, with WiFi monitoring (budget price)	1	24,000	24,000
4	Solis smart meter + CT for zero export (export power manager)	1 set	3,500	3,500
5	LONGi 650 W solar panel	8	3,800	30,400
6	Galvanised ground-mount frame, 8 panels	1 set	16,000	16,000
7	HDPE pipe OD 50 mm PN10 (well drop + 200 m uphill line)	240 m	45	10,800
8	HDPE fittings, 1½" → OD50 adaptor, check valve, gate valve	1 lot	4,500	4,500
9	Submersible pump cable 4 × 2.5 mm ²	50 m	55	2,750
10	PV cable 4 mm ² red/black + MC4 connectors	1 lot	2,000	2,000
11	DC isolator + DC SPD + steel enclosure	1 set	3,500	3,500
12	AC side: inverter breaker + AC SPD + RCBO + enclosure	1 set	3,000	3,000
13	Pump circuit breaker in home main board	1	800	800
14	Earth rod and earth cable	1 set	1,200	1,200
15	Tank float switch	1	600	600
16	Stainless safety rope + pump clamps + well cap	1 set	800	800
17	Installation, pipe laying and commissioning	1 lot	20,000	20,000
Total (excluding VAT)				144,350
VAT 7%				10,105
Total including VAT				154,455

Notes

B Prices are budget figures excluding VAT unless stated. The Solis inverter price is a budget figure to be confirmed with our supplier; other items are market estimates. Final prices are confirmed at order.

An on-grid system must be approved by PEA before it is switched on. Solar ESS processes the application and supplies an SLD certified by a qualified electrical engineer (included). Selling surplus power back to PEA is an optional extra (2,140 THB application, if PEA allows); otherwise the smart meter keeps export at zero.

One string of 8 × 650 W gives ≈ 330 V at maximum power (the inverter's rated 330 V) and ≈ 395 V open-circuit, well under its 600 V limit. The panel current will be checked against the inverter's 14 A per MPPT; any excess is clipped, not a safety issue.

All electrical work uses copper cable, proper DC and AC protection and earthing, installed by a certified electrician.