

Thai households with rooftop solar already save on bills. Raising the net billing cap could mean they save 77% more than households without

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Key points

- As the Iran war pushes up global energy costs, Thailand's Energy Regulatory Commission (ERC) has announced a [2% increase](#) to the electricity tariff for the May to August 2026 billing cycle.
- Rooftop solar PV is growing in Thailand. Installed residential and commercial capacity climbed from 2 MW in 2019 to 3.3 GW in 2024, making up a third of total installed solar capacity by 2024.
- Rising electricity prices and falling technology costs are prompting Thai households to install solar PV. Households with solar save on energy bills by generating their own power, protecting consumers from expensive and fluctuating power bills.
- Between 2021 and 2024, solar households could also sell excess solar power into the grid under a 'net billing' policy at a rate of THB 2.2 per kWh. However, the policy reached its 90MW cap in 2024, meaning solar households can no longer sell their excess power.
- New Zero Carbon Analytics analysis finds that if the net billing cap had been lifted, an average Thai household with solar panels could have saved THB 8340 compared to non-solar users in 2024 – a net saving of 77%.
- ZCA has developed an interactive calculator to estimate the savings different rooftop solar users could achieve if the net billing cap were raised.
- Despite recent growth, solar accounted for only 6% of Thailand's installed power capacity in 2024, meaning the country has tapped into only around 3% of its solar potential.
- Lifting the net billing cap as part of Thailand's new Power Development Plan (PDP) would incentivise rooftop solar installations, contributing towards the country's net zero target. Rooftop solar alone could help Thailand reach – or even surpass – its 2037 renewable energy target of 29.4 GW.

Thai households are increasingly installing rooftop solar PV, driven by rising electricity prices and the falling cost of solar

An increasing number of Thai households are installing rooftop solar PV to generate their own power and reduce bills. According to official sources, rooftop solar for residential and commercial use grew from 2 MW in 2019 to 3.3 GW in 2024 – a 1650-fold increase.

Rooftop solar makes up a major share of Thailand's total solar capacity, accounting for a [third of total installed solar generation capacity](#) by 2024.¹ TransitionZero used satellite imaging to estimate residential solar capacity specifically, and found there to be [around 1.38 GW](#) installed in 2025.²

Residential rooftop solar uptake has been driven by rising electricity prices. The average retail electricity price per unit rose from [THB 3.61 in 2021 to THB 4.18 in 2024](#), making the ability to generate power and avoid the cost of buying it increasingly attractive.

Due to the Iran war impacting global energy supplies, Thailand's Energy Regulatory Commission (ERC) will raise electricity prices to [3.95 THB per unit](#) between May and August 2026, up 2% from [3.88 THB](#) per unit between January and April. The ERC said rates could rise above [4 THB per unit](#) for the September to December 2026 period if the war continues. The increased power prices are a result of rising LNG prices from the [Strait of Hormuz's closure](#), according to the ERC.

At the same time, the cost of installing solar has been falling. Between 2010 and 2024, [installation costs for solar PV fell 87% globally](#). In Thailand, solar is the [cheapest source of electricity generation](#) with rooftop solar achieving 'grid parity' in 2024, meaning the cost of producing electricity from rooftop solar is now [similar to the cost of buying electricity from the grid](#).

¹ Zero Carbon Analytics analysis. Rooftop solar capacity calculated from Energy Regulatory Commission (ERC)'s annual reports from [2019](#), [2020](#), [2021](#), [2022](#), [2023](#) and [2024](#). Total installed solar capacity retrieved from the 2024 ERC report.

² The Energy Regulatory Commission of Thailand has not published official 2024 figures for residential rooftop solar capacity.

Supportive policies have helped make rooftop solar more economical for Thai households and incentivised uptake

Rooftop solar in Thailand has also been supported by financing and government policies, including loans for [residential users](#) and small businesses.

In March 2026, the Thai cabinet [officially implemented a personal income tax deduction](#) for on-grid residential rooftop installations, as published in the Royal Gazette of Thailand.³ This deduction reduces the amount of income subject to tax for solar users by up to THB 200,000, depending on installation cost. Kasikorn Research Center calculated that the new tax deduction means that installing solar panels could [“reduce electricity bills by approximately 50% \(1,500 – 6,000 baht\) and reduce taxes by 2,500 – 96,000 baht.”](#) The study estimates the payback period to be between 2 and 6 years.

The most comprehensive government support has been through a long-standing policy framework for rooftop solar. Thailand introduced a [rooftop PV program](#) in 2013, which included a [feed-in tariff scheme](#) for residential and commercial renewable energy installations to [sell power into the national grid](#) under long-term purchase agreements.

In 2019, a new [household solar scheme](#) was introduced to [incentivise homeowners](#) to install rooftop solar. Under a mechanism called ‘net billing’, residential rooftop solar users could [sell back any extra electricity generated to the grid](#), up to a 90 MW national cap.

³ [This incentive is available for systems](#) up to 10 kW peak (KWp) on-grid solar installed between 2025 and 2028, and requires taxpayers to be the registered owner of the electricity meter (Residential Type 1) and provide full e-Tax invoices from VAT-registered suppliers.

What is net billing for household solar PV in Thailand?

Net billing is a mechanism that compensates household solar users for any excess solar power they produce:

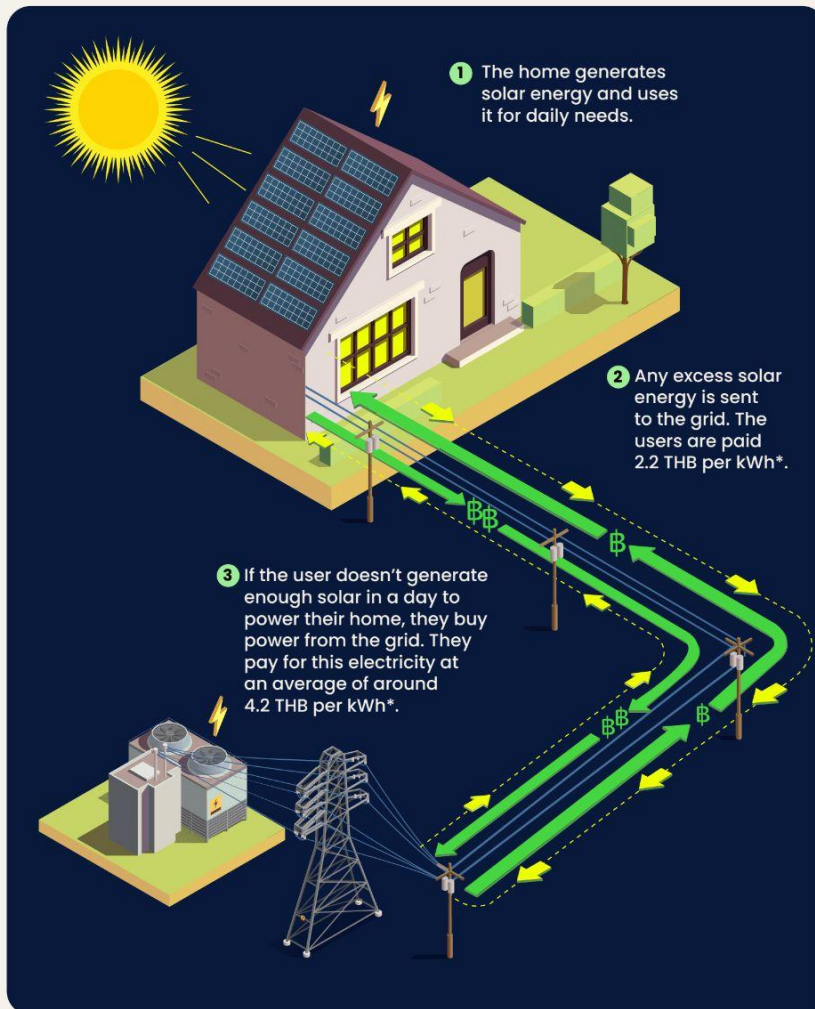
- When a household is generating more power than it needs, the excess can be sold to the grid, contributing to the country's power supply.
- When the household is not generating enough solar power for its needs, it can buy electricity from the grid to make up the difference.
- Users are charged for the electricity they buy from the grid at the retail rate, and credited for the solar electricity they send to the grid [at a different net billing rate](#). The net billing rate is [almost always lower than the retail rate](#).

Net billing – as well as similar policies such as [net metering](#) – is an additional way for households to save money with solar power. If payback rates are high enough, such schemes incentivise users to install solar PV, thereby helping [integrate renewables into the grid](#) and decarbonise the country's power system.

However, a net billing policy that does not adequately pay for excess power is [not work an effective incentive](#). Initially, Thailand's scheme only paid THB 1.68 per kWh for excess power between 2019 and 2021, compared to an average electricity price of 3.64 THB per kWh. As a result, only a [limited number of users](#) applied for rooftop solar.

The net billing rate increased to [THB 2.2 per kWh](#) from 2021 to 2024, although the average retail rate remained higher at [THB 4.18 per kWh](#).

What is net billing in Thailand?



Your power bill with rooftop solar


PEA

POWER BILL

Energy sold to the grid	x 4.2 THB
Energy bought from the grid	x 2.2 THB
Amount Due	

*2024 Rate

Thailand's net billing policy reached its quota in 2024, disincentivising new rooftop solar installations

Although rooftop solar adoption has accelerated in recent years, Thailand's supportive policies have reached a critical cap. The [household solar scheme](#) aimed to buy a total of [90 MW of electricity](#) from residential rooftop solar across the country between [2021 and 2030](#). It was announced that the quota was [reached in 2024](#), meaning households producing excess solar can no longer benefit from the program.

Households with solar panels [already save on their energy bills](#) compared to most power consumers and are less affected by expensive and fluctuating power bills, but net billing provides an additional income stream that [reduces the payback period](#) for new installations.

90 MW is equivalent to just 0.16% of Thailand's 2024 installed capacity across all generation technologies, indicating that the cap is primarily a policy constraint rather than a technical constraint on the grid.⁴

Low net billing rates and cumbersome permitting may also put off prospective solar households

When net billing was in place, households with rooftop solar were paid less than the retail rate for their power. Between 2019 and 2021, Thailand agreed to pay rooftop solar users [THB 1.68 per kWh](#) for their excess electricity under a ten-year contract. Starting in 2021, the country paid a [higher rate of THB 2.2](#). However, both rates are much lower than the [average electricity price of THB 3.61 to THB 4.69 per kWh](#) for 2019 to 2024.

Thailand's low rates initially [failed to attract](#) consumer interest, with most savings coming from household solar coming from self-consumption rather than selling excess power.

Administrative procedures and installation permits are also [time-consuming](#) and [complicated](#), preventing new users from quickly benefiting from rooftop solar. This, combined with confusion caused by the [lack of policy continuity](#), may deter interested households from investing.

⁴ Cumulative installed power generation capacity in Thailand was [55,831.76 MW](#) as of 31 December 2024, according to the Energy Regulatory Commission (ERC). 90 MW accounts for 0.16%.

Raising Thailand's net billing cap on rooftop solar would lower energy bills for solar households

We calculated the amount of money households with rooftop solar could save if the 90 MW cap was raised and net billing was restarted.⁵

According to our analysis, a solar household consuming 84% of the power generated by solar panels would have avoided buying THB 7580 worth of grid power at 2024 electricity rates, compared to the average annual household [electricity bill of THB 10,860](#).⁶ Selling excess power at the 2024 net billing rate of THB 2.2/kWh would have resulted in an additional income of THB 760.

Combining money saved through self-generation with net billing income, Thai households with solar panels would have been THB 8340 better off than the average non-solar household, a saving of nearly 77%.

Our interactive calculator can be used to estimate how much an average Thai household with rooftop solar could have saved in 2024 if the 90MW cap had been lifted, compared to households without solar.

⁵ For full methodology and sources, see Annex.

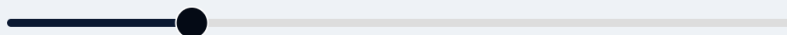
⁶ Aksornchan Chaianong et al., "Customer Economics of Residential PV–Battery Systems in Thailand," *Renewable Energy* 146 (2020): 297–308, <https://doi.org/10.1016/j.renene.2019.06.159>. 84% is the self-consumption ratio of a PV-only system in Thailand. The self-consumption ratio is the ratio of total self-consumed electricity to total electricity generation from a PV system. The annual electricity bill takes the average monthly electricity bill multiplied by 12.

Rooftop solar savings calculator

This calculator shows how much the average Thai household could have saved in 2024 by installing solar panels if the 90 MW cap had been lifted.

Household annual electricity bill

฿10860 THB



Hit this button ↓ to see your results

Submit

ZCA analysis, Global Solar Atlas (2026), Agora, Case for SEA (2024), ScienceDirect, Customer Economics of PV–Battery Systems in Thailand (2020) • This is assuming a household installs a 1.5kW solar system with a net billing rate of 2.2THB/kWh. Estimated savings are relative to a household without solar panels.
See briefing for full methodology.

Sunny Thailand has high potential to lower bills and meet its decarbonisation goals through rooftop solar

Thailand has high solar potential due to its [high levels of solar irradiation](#), especially in the central plains and northeast plateau. Exact estimates vary widely, potentially due to the [varying levels of sunlight](#) across the country, but a study using Geographic Information System (GIS) data found that the country has [more than 300 GW](#) of solar potential. The National Laboratory of the Rockies⁷ estimates that Thailand has [10,538 GW of generation potential](#), the highest in ASEAN.

Despite this, solar accounted for just 6% of the country's installed power capacity in 2024.⁸ Thailand's cumulative installed solar capacity [stood at 9.9 GW](#) in 2024, according to the Energy Regulatory Commission (ERC), meaning the country has only tapped into around 3% of its solar potential.⁹ [Less than 3%](#) of Thailand's total electricity generation came from distributed energy, including rooftop solar, in 2024.

The technical potential for rooftop solar in Thailand is high. A study published in the journal Sustainability found that [34 GW of additional rooftop solar could be installed](#). This amount could help Thailand reach – or even surpass – its [2037 renewable energy target of 29.4 GW](#).¹⁰

⁷ Formerly the National Renewable Energy Laboratory (NREL).

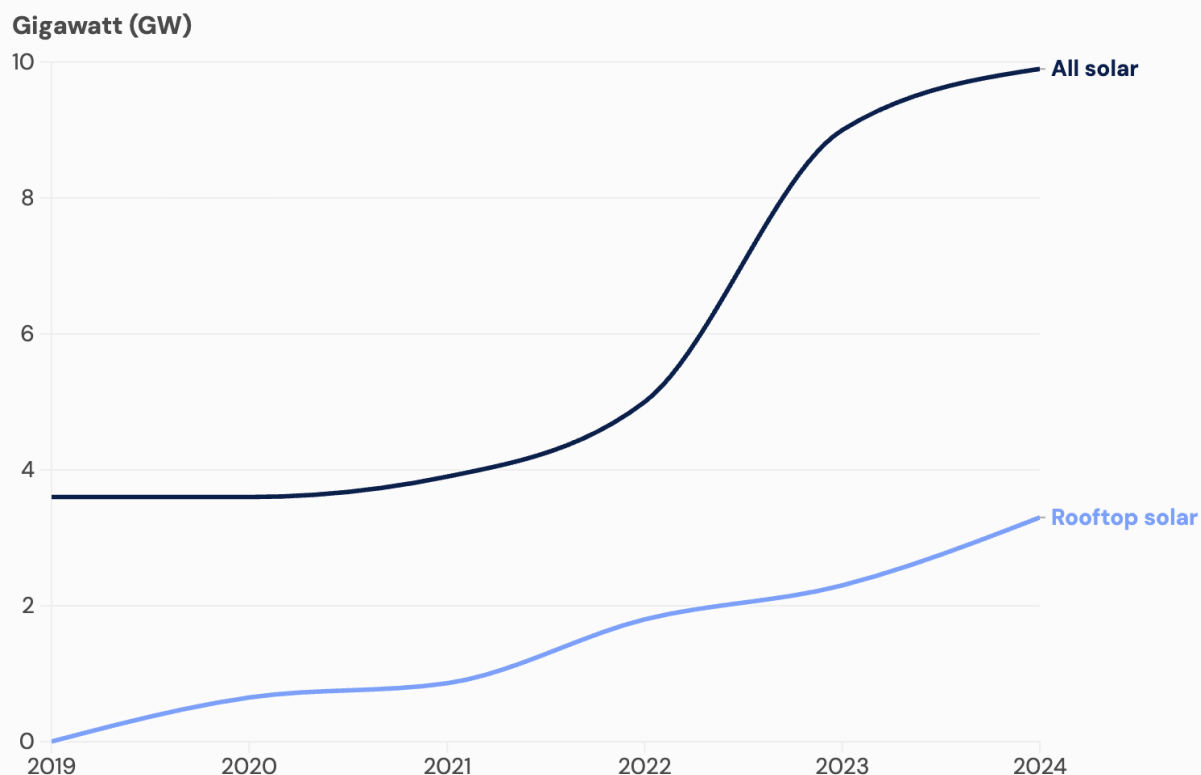
⁸ Taken from [Ember's Electricity Data Explorer](#) (accessed 20/3/2026).

⁹ Zero Carbon Analytics analysis. 9.9 GW includes the installed capacity and contracted capacity for solar in 2024. For this figure, we divided Thailand's cumulative installed solar capacity by [300 GW](#), one estimate of its solar potential.

¹⁰ The 2037 renewable capacity target for 2037 was 29.4GW under the draft Alternative Energy Development Plan (2018–2037).

In 2024, rooftop solar made up a third of Thailand's total solar capacity

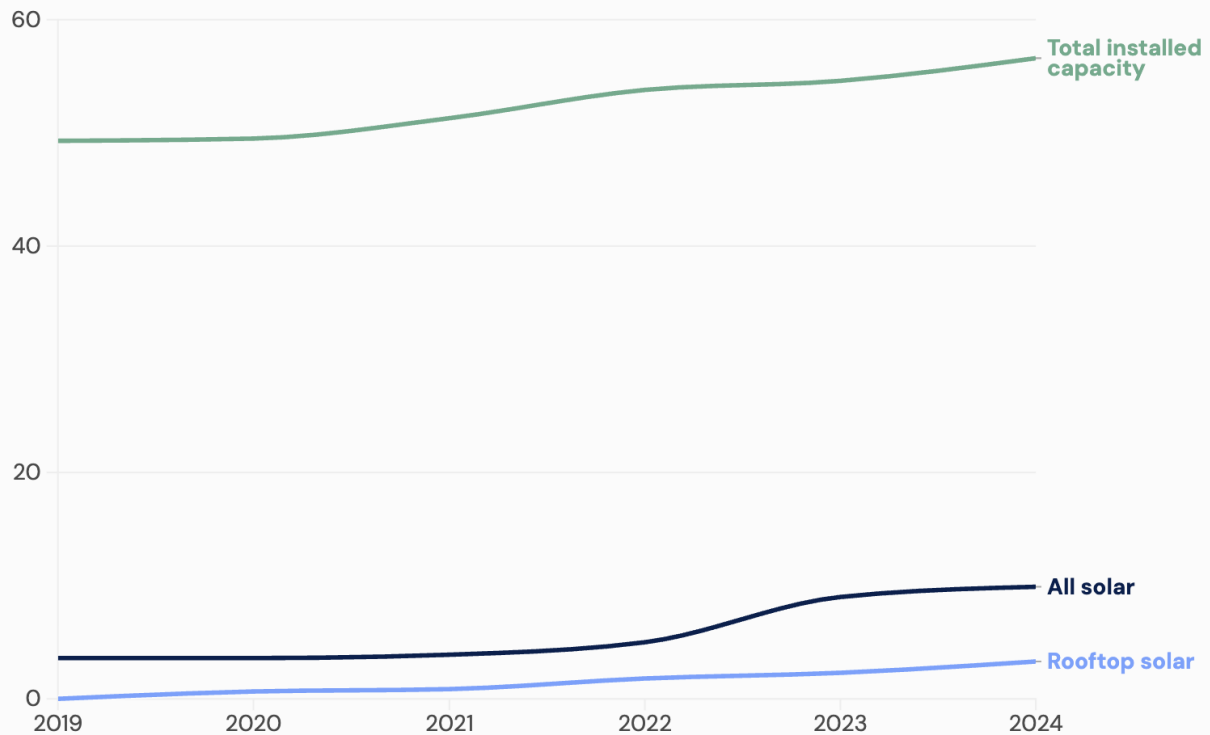
Rooftop solar installations grew from 2 MW to 3.3 GW in just five years



Source: ZCA analysis, Energy Regulatory Commission, Thailand • Rooftop solar capacity is for both residential and commercial users.

Despite strong solar potential, solar accounts for just 7% of total installed capacity in 2024

Gigawatts (GW)



Source: ZCA analysis, Energy Regulatory Commission, Thailand, Ember Electricity Data Explorer • Rooftop solar capacity is for both residential and commercial users. Total installed capacity is for all energy sources, and refers to Ember data.

Data table: Thailand solar capacity 2020–2024

GW

Year	All solar	Rooftop solar	Total installed capacity
2019	3.60	0.00	49.30
2020	3.60	0.65	49.50
2021	3.90	0.86	51.30
2022	5.00	1.80	53.80
2023	9.00	2.30	54.60
2024	9.90	3.30	56.60

Source: Energy Regulatory Commission, Thailand • Rooftop solar capacity is for both residential and commercial users. Total installed capacity is for all energy sources.


**Zero Carbon
Analytics**

Thailand's new Power Development Plan is an opportunity to raise the net billing cap and reinforce rooftop solar policy

Thailand's [proposed new Power Development Plan \(PDP\)](#) presents the opportunity for policymakers to update policy to incentivise rooftop solar. Changes included in the PDP will be foundational in defining the future of rooftop solar PV, as it will forecast electricity demand, determine the generation mix and set the timing and volume of new generation capacity to be added.

The government is reportedly [considering raising the cap to 400 MW](#) as part of the PDP. Raising or removing the 90MW cap would be a simple first step to spur rooftop solar uptake – with it surpassed, [prospective customers face uncertainty](#) about whether they can participate, and installation costs look like a bigger hurdle. The government could also consider raising the net billing rate, further increasing the incentive.

The government would also benefit from lifting the net billing cap, which would help the country meet its emissions-reduction goals. Research shows that policies that allow consumers to sell power to the grid, when paired with a compelling buyback rate, [lead to more rooftop PV installations](#). More solar generation would help Thailand reach

its target of [51% renewable electricity generation by 2037](#) and its updated Nationally Determined Contribution (NDC) commitment to [reduce emissions by 47% by 2035](#), compared to 2019 levels.

We thank Dr Chalie Charoenlarnopparut for his insightful comments on earlier drafts of this briefing.

Annex

Methodology

We calculated the average savings for a Thai household with rooftop solar compared to a household without rooftop solar, if net billing were reestablished at the 2024 rate of [THB 2.2/kWh](#).

Our scenario considers a household with a small, residential-size 1.5 kW solar system comprising 3–5 panels, depending on the panel wattage, in line with [Global Solar Atlas](#)' assumption that 1 kW is a small residential PV system. The load factor for residential panels is also taken from [Global Solar Atlas](#), using an average from nine key regions in Thailand for a 1 kW residential system.

We assume the household consumes 84% of the power generated by solar panels, the residential solar self-consumption ratio for a PV system without batteries from [Chaianong et al. \(2020\)](#).

At the 2024 electricity unit price of [4.18 THB/kWh](#), the home would have avoided buying THB 7580 worth of power from the grid over the course of a year. Selling excess solar generation back to the grid at the 2022–2024 net billing rate of [THB 2.2/kWh](#) would have resulted in an income of THB 760.

The average annual electricity bill per household in 2024 was THB 10,860. This was calculated using the [average monthly household electricity bill](#) from Thailand's National Statistics Office Ministry of Digital Economy and Society, multiplied by 12.

Therefore, a Thai household with a small residential-sized solar array would have been THB 8430 better off in this simulation than a household without solar if net billing had been in place, saving nearly 77% compared to those without.

A payback period for installing solar is not accounted for in our simulation, as we focus on one production year, not the installation year. A 1–3 kW solar system is estimated to cost between THB 60,000 to 150,000, which means some consumers would be eligible for up to THB 200,000 under the tax reduction scheme. [Installation costs are also expected to decline](#).