

Electricity pricing in the residential sector of Thailand

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1. Component of electricity bill

In Thailand, an electricity bill for residential consumers consists of three components: base tariff, fuel adjustment charge (Ft), and the tax (7% VAT).

1.1 Base tariff

The first component is the base tariff, which reflects the costs of power-plant constructions, distribution lines, management systems, electricity imports, and other expenses from generating electricity to delivering to the end users. The base tariff is calculated under certain assumptions, such as, constant energy demand, fuel cost, exchange rate, and inflation rate.

The base tariff depends on three organizations, which are Electricity Generating Authority of Thailand (EGAT), Metropolitan Energy Authority (MEA) and Provincial Electricity Authority (PEA). EGAT is a state-owned enterprise obligated to acquire sufficient electricity supply to meet the national demand, while MEA and PEA receive electricity from EGAT and distribute to the end users in all sector throughout the country¹. Therefore, decisions from these organizations on energy production and distribution, for example, building a new power plant or on importing electricity from Lao PDR, will heavily affect the cost of electricity and the first component of the electricity bill. There are two type of base tariff for residential electricity consumers in Thailand; one is the progressive rate and the other is Time of Use Tariff (TOU tariff).

(a) Progressive rate

Progressive rate charges consumers at higher price when the more electricity is consumed. There are two main levels of electricity consumption; the consumption lower than 150 kWh per month, and higher than 150 kWh per month. The tables below show the price per unit of the electricity in each level².

Table 1: The price per unit of electricity for the consumption lower than 150 kWh/month

	Price per unit (baht/kWh)	Price per unit (USD/kWh) ³
The first 15 kWh (1-15 kWh)	1.8632	0.0565
The next 10 kWh (16-25 kWh)	2.5026	0.0758
The next 10 kWh (26-35 kWh)	2.7549	0.0835
The next 65 kWh (36-100 kWh)	3.1381	0.0951
The next 50 kWh (101-150 kWh)	3.2315	0.0979
Plus service charge (fixed cost)	8.19 baht per month	0.2482 USD per month

¹ The jurisdictions of MEA and PEA will be further explained in the latter section.

² This information is from MEA's website,
www.mea.or.th/profile/index.php?tid=3&mid=111&pid=109

³ Using exchange rate of 33 baht per 1 USD

Table 2: The price per unit of electricity for the consumption higher than 150 kWh/month

	Price per unit (baht/kWh)	Price per unit (USD/kWh)
The first 150 kWh (1-150 kWh)	2.7628	0.0837
The next 250 kWh (151-400 kWh)	3.7362	0.1132
Units above 400 kWh	3.9361	0.1193
Plus service charge (fixed cost)	28.22 baht per month	0.8585

For example, a household that uses 140 kWh will have to pay 450.13 baht as calculated below.

$$\begin{aligned}
 \text{Base tariff} &= (15 \times 1.8632) + (10 \times 2.5026) + (10 \times 2.7549) + \\
 &\quad (65 \times 3.1381) + (40 \times 3.9361) + 8.19 \\
 &= 450.13 \text{ baht or } 13.64 \text{ USD}
 \end{aligned}$$

(b) TOU Tariff

Households can also apply to utility companies for TOU tariff. This tariff charges various electricity prices based on the time that electricity consumed as shown below.

On peak time: 09.00 – 22.00; Monday to Friday
 Off peak time: 22.00 – 09.00; Monday to Friday
 00.00 – 24.00; Saturday, Sunday, and national holidays
 (excluding substitution holiday and Royal Ploughing Day)

Table 3: The tariff charges various electricity prices based on the time

Voltage	On peak		Off peak		Service charge	
	Baht/kWh	USD/kWh	Baht/kWh	USD/kWh	Baht/month	USD/month
12 – 24 kV	4.5827	0.1389	2.1495	0.0651	312.24	9.4618
Below 12 kV	5.2674	0.1596	2.1827	0.0661	38.22	1.1582

The advantage of TOU tariff benefits the Energy Generating Authority of Thailand (EGAT), a state enterprise responsible for matching the electricity supply to the national demand, can reduce the peak demand during the on-peak time to avoid the costs from running another power plants or finding other sources of electricity.

Some consumers use this tariff as a strategy to save electricity bills as well. For example, a household can avoid consuming electricity during the on-peak period and use their appliances on the off peak time instead. This is suitable for a household that usually has no one home during the on peak time because they have to go to work or school. A household wishing to use this tariff has to apply to public utility and pay fee for TOU meter. However, a household using TOU tariff cannot switch back to the progressive rate for at least 12 months.

1.2 Fuel adjustment charge

The second component is fuel adjustment charge, or float time (Ft), which is an automatic tariff adjustment mechanism coping with the variation occurred beyond control of Thai authorities. The fluctuation in fuel price and other factors is a common condition in the real market, and this is why it is necessary to have the Ft charge to reflect the actual cost of fuels. It is adjusted for every 4 months to reduce the impact of fuel price volatility, so the electricity price can reflect the changes in the fuel cost and power-purchasing price, which includes the following:

1) The fuel costs of power plants faced by EGAT, for example, fuel oil, diesel, natural gas, lignite, imported coal, etc.

2) The cost of power purchase from Independent Power Producers (IPPs) and Small Power Producers (SPPs)⁴, covering both the availability payments and the energy payment.

3) The cost of power purchase from neighboring countries (Lao PDR, Malaysia and others)

Ft charge does not only take into account of fuel expense and fluctuated external factors, but does also include the costs derived from implementing energy policy, aside from the costs included in the base tariff. For example, a short-term subsidization on electricity generated by SPPs from renewable energy would result in the higher price of Ft charge to end-use consumers.

The cabinet has approved the Ft charge in 1991, and to date, the formulas for calculating the Ft charge have been revised many times by Energy Regulatory Commission of Thailand (ERC). The last revision was in 2005, which has set the Ft formula as in the equation below.

$$\begin{aligned} \text{Ft} &= (\text{EFC} - \text{BFC}) + \text{AF}, \\ \text{where} \quad \text{EFC} &= \text{Estimated fuel costs and energy payments for current 4-} \\ &\quad \text{months period} \\ &= \Sigma (P_i * Q_i)_t / U_i \\ \text{BFC} &= \text{Base Fuel Costs and Energy Payments as of May -} \\ &\quad \text{August 2011 (2.1028 Baht/kWh)} \\ P_i &= \text{Price of purchased fuel } i \\ Q_i &= \text{Quantity of purchased fuel } i \\ t &= 1^{\text{st}}, 2^{\text{nd}}, 3^{\text{rd}}, \text{ and } 4^{\text{th}} \text{ month} \\ U_i &= \text{Sum of all quantities of purchased fuel } i \text{ in the period } t \end{aligned}$$

ERC is the organization that is responsible for regulating the energy industry operation and securing energy system in order to create fair, efficient, and reliable conditions for both energy consumers and energy suppliers. Therefore, ERC has decision power on the Ft charge so that the charge is appropriate for current energy policies and national energy situation. The charge is revised for every four months,

⁴ IPPs and SPPs are private electricity producers that sell electricity to the national grid owned by Electricity Generating Authority of Thailand (EGAT). They are different in capacity of the generation; SPPs have capacity between 10-90 MW, while IPPs have capacity over 90 MW.

and the statistic of Ft charge since 1992 is available in the website of MEA⁵. The latest update of Ft on May to August 2015 is 0.4961 baht per kWh or 0.015 USD⁶.

1.3 Value Added Tax (VAT)

VAT is a type of indirect tax collected from a person who purchases goods and services. Thailand set the VAT at 10%; however, since 1997, the cabinet has launched the Royal Decree on VAT⁷ to reduce it to 7%. There has been a constant attempts from the Royal Thai Government to lift this tax relief and adjust VAT from 7% to 9% instead on this upcoming October 2015. However, according to Bangkok Post in March 2015, the VAT increase tends to be prolonged for at least another year due to the sluggish economy⁸. Therefore, the VAT component of the electricity bill will likely to be constant for the next few years.

2. Examples of how to calculate electricity bill

According to the household surveys in Thailand⁹, the low-income households in Bangkok spend 790 baht (24 USD) per month on average for electricity, while those in rural areas pay 374 baht (11 USD) per month. The tables below show the examples of how to break down the electricity expense into different components.

Table 4: The examples of how to break down the electricity expense into different components.

Low income households in Bangkok		Price per unit (baht/kWh)	kWh	Amount
1	The first 150 kWh (1-150 kWh)	2.7628	150	414.42
	The next 250 kWh (151-400 kWh)	3.7362	52.3	195.40
	Units above 400 kWh (each unit above 400 kWh)	3.9361	0	0.00
	Plus service charge (baht/month)			28.22
Base tariff				638.04
2	Ft charge	0.4961	202.3	100.36
Base tariff + Fuel adjustment charge				738.40
3	VAT (7%)	7%		51.69
Total electricity bill (baht)				790.09
Total electricity bill (USD)				23.94

⁵ Available at <http://www.mea.or.th/content/detail.php?mid=2987&did=487&tid=3&pid=2985>

⁶ Available in Thai at <http://www.erc.or.th/>

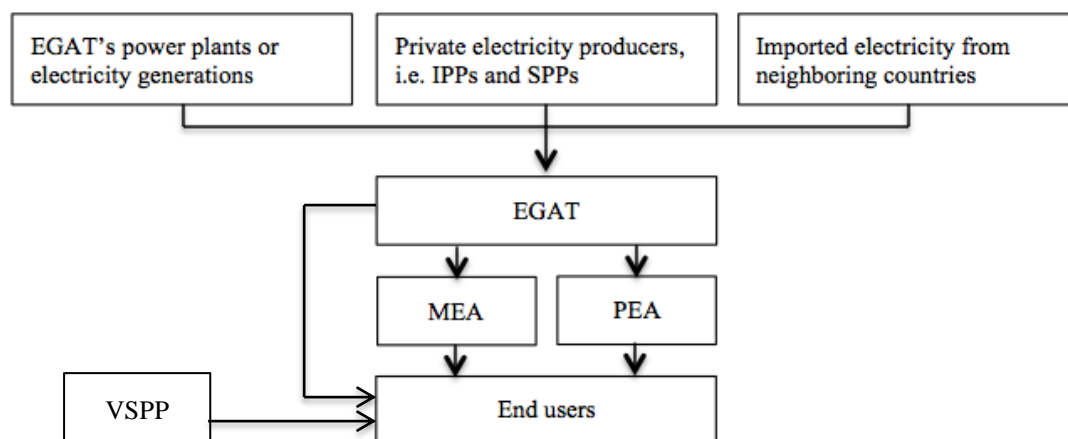
⁷ The Royal Decree is available in Thai at <http://www.rd.go.th/publish/32403.0.html>

⁸ See the Bangkok Post’s news at <http://www.bangkokpost.com/news/general/503544/sluggish-economy-forces-prayut-to-keep-vat-at-7> and <http://www.bangkokpost.com/business/news/503378/pridiyathorn-vat-to-remain-at-7> (retrieved on 30 June 2015)

⁹ For more detail, please see Thailand’s Task 3 report, “Household energy efficiency: a socio-economic perspective: Thailand”

Low income households in rural areas		Price per unit (baht/kWh)	kWh	Amount
1	The first 15 kWh (1-15 kWh)	1.8632	15	27.95
	The next 10 kWh (16-25 kWh)	2.5026	10	25.03
	The next 10 kWh (26-35 kWh)	2.7549	10	27.55
	The next 65 kWh (36-100 kWh)	3.1381	65	203.98
	The next 50 kWh (101-150 kWh)	3.9361	1.6	6.30
	Plus service charge (baht/month)			8.19
Base tariff				298.99
2	Ft charge	0.4961	101.6	50.40
Base tariff and fuel adjustment charge				349.39
3	VAT (7%)			24.43
Total electricity bill (baht)				373.85
Total electricity bill (USD)				11.33

3. Electric utility in Thailand



Abbreviations: VSPP = Very Small Power Producer, SPP = Small Power Producer, IPP = Industrial Power Producer

Figure 1: Thailand’s electric utilities

The figure above explains Thailand’s electric utilities, which engages in the generation, transmission, and distribution of electricity in a regulated market. Electricity Generating Authority of Thailand (EGAT) is state-owned electricity supplier, which generally has three sources of electricity supply deriving from EGAT’s generations, and outsource productions from private producers or other countries.

Electricity consumers in Thailand receive the bills from either Metropolitan Electricity Authority (MEA) or Provincial Electricity Authority (PEA). Both MEA and PEA are state-owned enterprises focusing on electricity distribution in urban and rural areas under the supervision of the Ministry of Interior.

The core business of MEA is to supply electric power to Bangkok Metropolis which includes Bangkok and its surrounding provinces; namely, Nakhon Pathom, Pathum Thani, Nonthaburi, Samut Prakan, and Samut Sakhon, covering the service area of 3,200 square kilometers, almost 4 million consumers, and electricity sale of around 48,000 million kWh in 2014 (MEA, 2015). These provinces are the most urbanized areas of the country, and consume electricity heavily. On the other hand, PEA distributes electricity to consumers in the rest of the country, over a nationwide area of 510,000 square kilometers (99.4% of the total area), 17 million customers, and electricity sale unit (excluding free of charge units) were around 112,600 million kWh in 2013 (PEA, 2015).

Energy consumers in Thailand usually receive and pay the electricity bill on the post-paid basis; in other words, they pay after receiving the bills. The consumers can pay the bills at various locations, for example, MEA’s or PEA’s offices, commercial banks, automatic transaction machine (ATM), Internet or mobile banking.

References

[MEA] Metropolitan Electricity Authority. (2015). *Annual Report 2014* [in Thai, online]. Available at <http://www.mea.or.th/upload/magazine/216/index.php?ref=oGM3BRj3oGWapKESnHE4FKOIoH53EHkAoFMaAaDknGW4pKOSoHE3FHkuoKEaLKERNFM4AaNkoGW3pHkSoHEaFKEynJ54nKO6oJS3M0kuoH1aK3EmnKy4HjoSo3QoSo3Q> (retrieved on 5 June 2015)

[PEA] Provincial Electricity Authority. (2015). *Annual Report 2014* [in Thai, online]. Available at <https://www.pea.co.th/introduction/Documents/Annual-28-5-58.pdf> (retrieved on 31 May 2015)