RENEWABLES FIRST

Light Bulb Tales: Pakistan's Electricity Puzzle

Author: Fatima Naeem
Artwork: Eiman Nasir


Ahhh

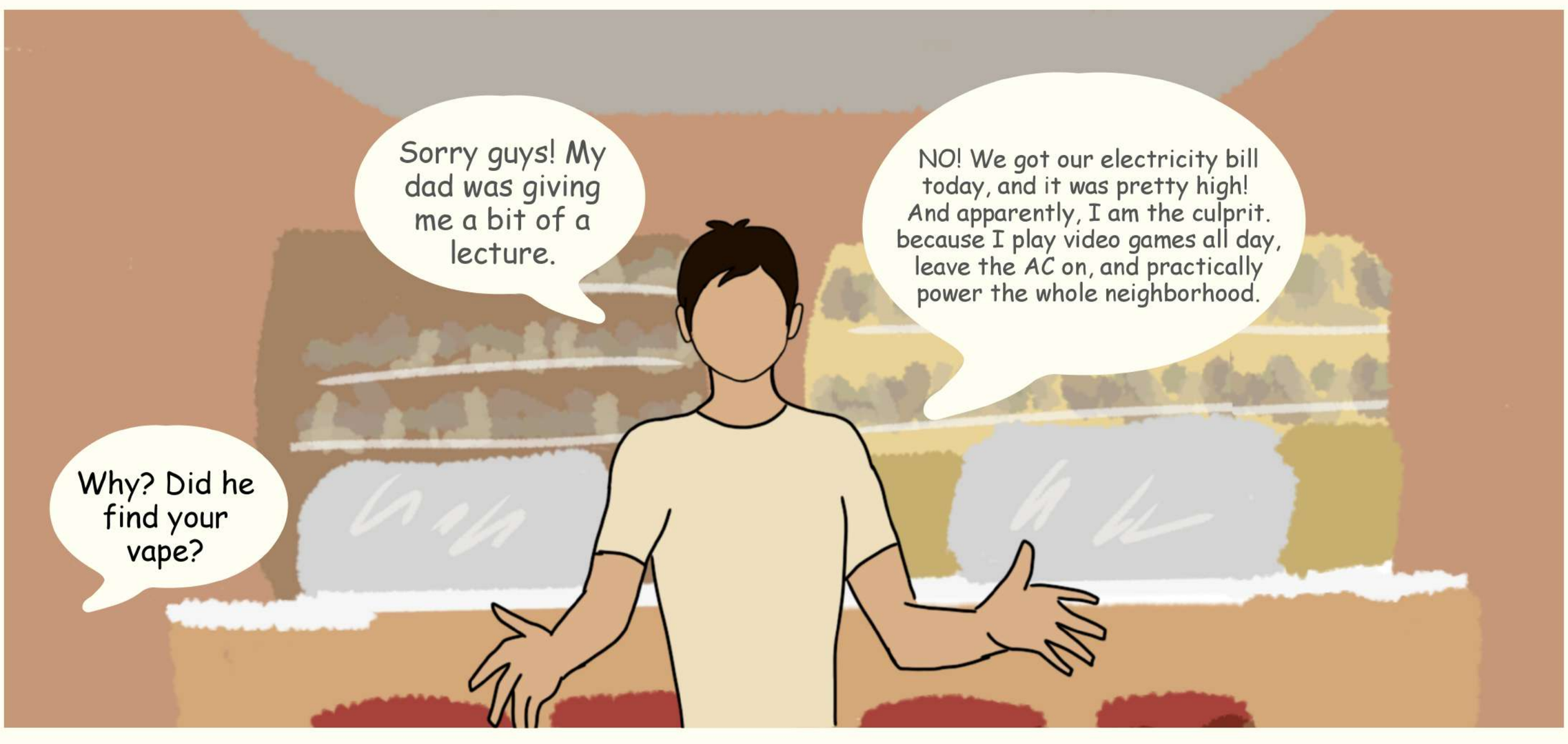

God, Abdullah is always **late**!
Yes!!!! I'm **so done** with him.


I have called him a **1000** times, he isn't picking up. I don't know what's wrong with him!
BZZZ

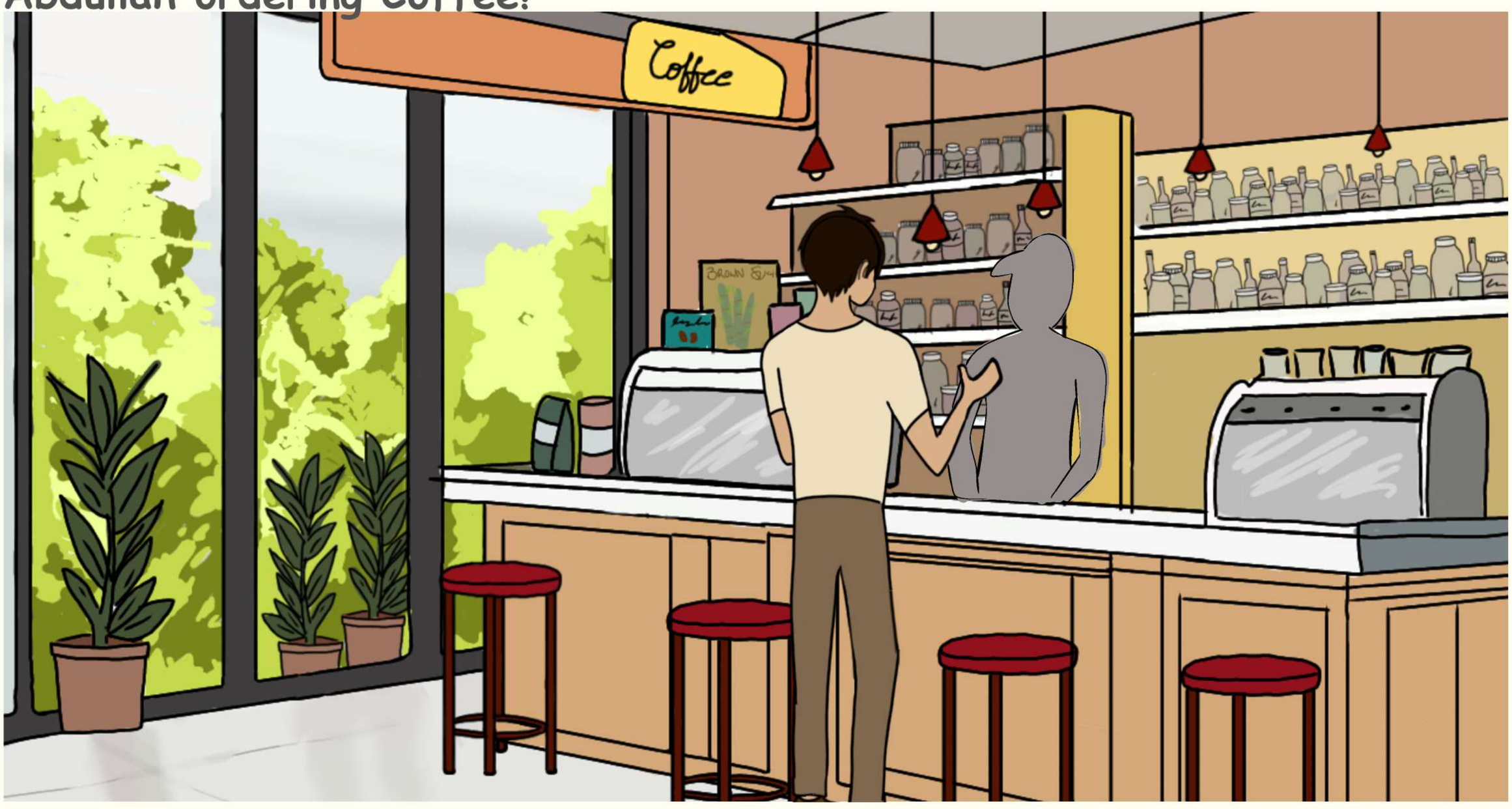

WHERE ARE YOU MAN? We been waiting for **over an hour**!
on my way!
But... Why are you late?
I'll tell you when I get there!
You better have a nice explanation
I do actually. See ya. BYE.

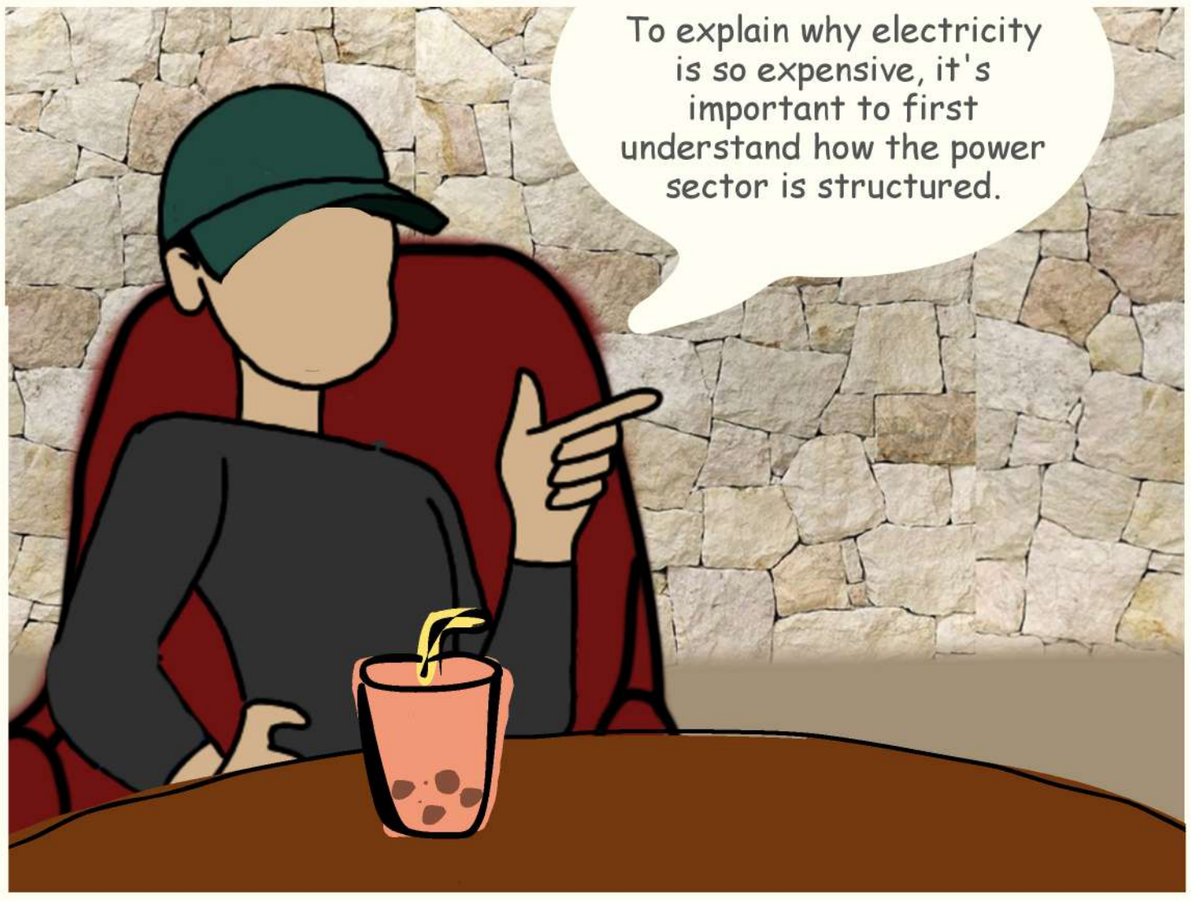

Guess we should order for ourselves. He'll be here in a while.

15 minutes later...



Abdullah ordering Coffee!

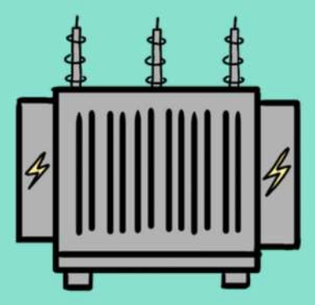




Before that, you need to have a general understanding of how the power sector operates. There are **four** key sub-sectors:

1 Generation

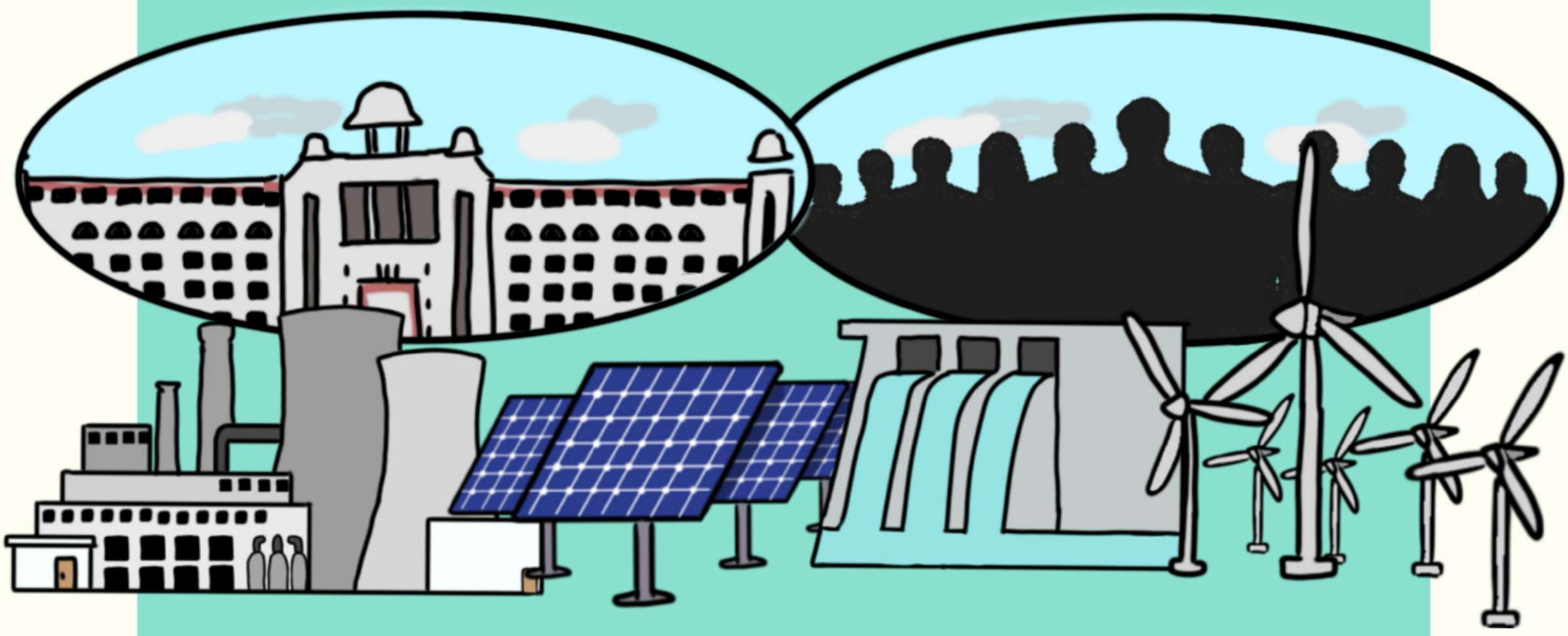
2 Transmission



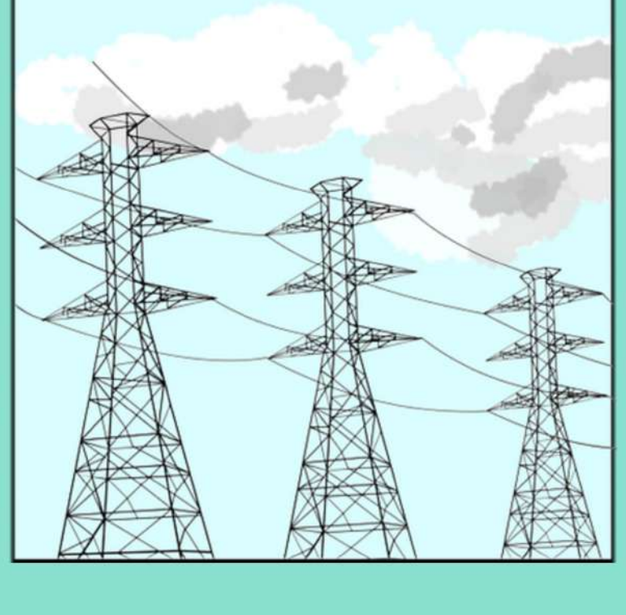
3 Distribution

4 Consumers

The generation sector is responsible for producing energy and includes various power plants. Some of these plants are owned by the government, while others are privately owned, known as Independent Power Producers (IPPs). These plants generate power using thermal, hydel, or renewable energy sources.



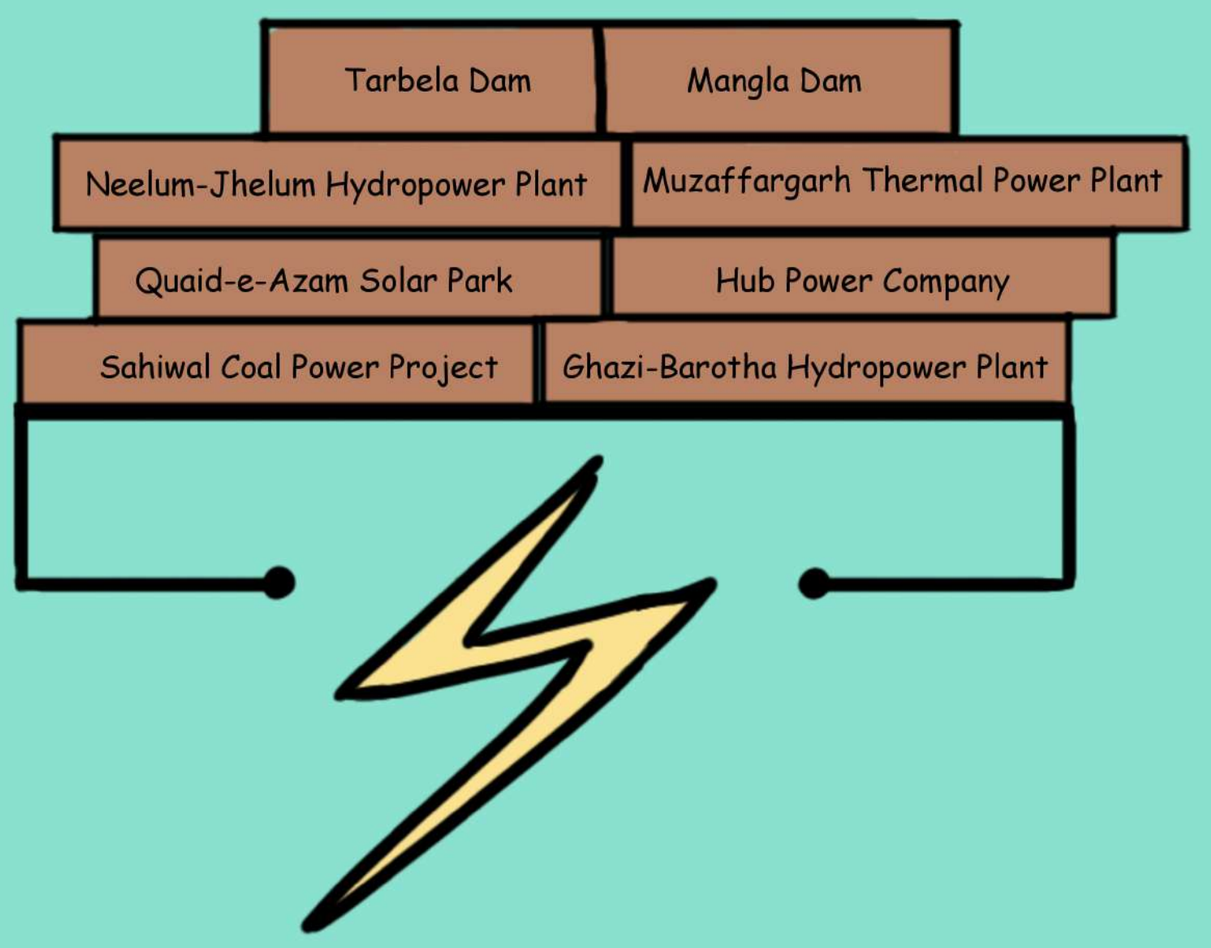
The transmission sector consists of lines that carry electricity nationwide at very high voltages.



The distribution sector includes distribution companies, or DISCOs, which deliver electricity to consumers at a lower voltage. Currently, there are 11 DISCOs operating in Pakistan.

Finally, there are the consumers. This includes us, as well as industries, residential areas, commercial businesses, and the agricultural sector.

Currently, there are many power plants generating electricity, with a total installed capacity of about 46,000 MW. Interestingly, our peak electricity demand in the summer is only around 30,000 MW, and in winter, it's even lower, at just 17,000 MW



If there's so much generation capacity, why is electricity still**expensive**?
We learned in economics that when supply is abundant, prices typically fall.

There are several reasons for this, but the three main factors are the import of **fuels**, payment of **capacity charges**, and the **inefficiency** of DISCOs.

Did you know that a significant portion of Pakistan's power sector relies on thermal power plants that use imported fuels? These fuels are purchased in dollars, which makes them quite expensive for us. A better option would be to transition to local fuels, such as wind, solar, or local coal, which do not require imports.

To understand the second reason, it's important to grasp two key terms in the energy sector: **Energy Charge and Capacity Charge.**

The Energy Charge is what we pay for the actual amount of electricity we consume over the year. In contrast, the Capacity Charge is the cost associated with maintaining the total installed capacity of electricity generation, regardless of whether we use any electricity or not.

Energy Charge

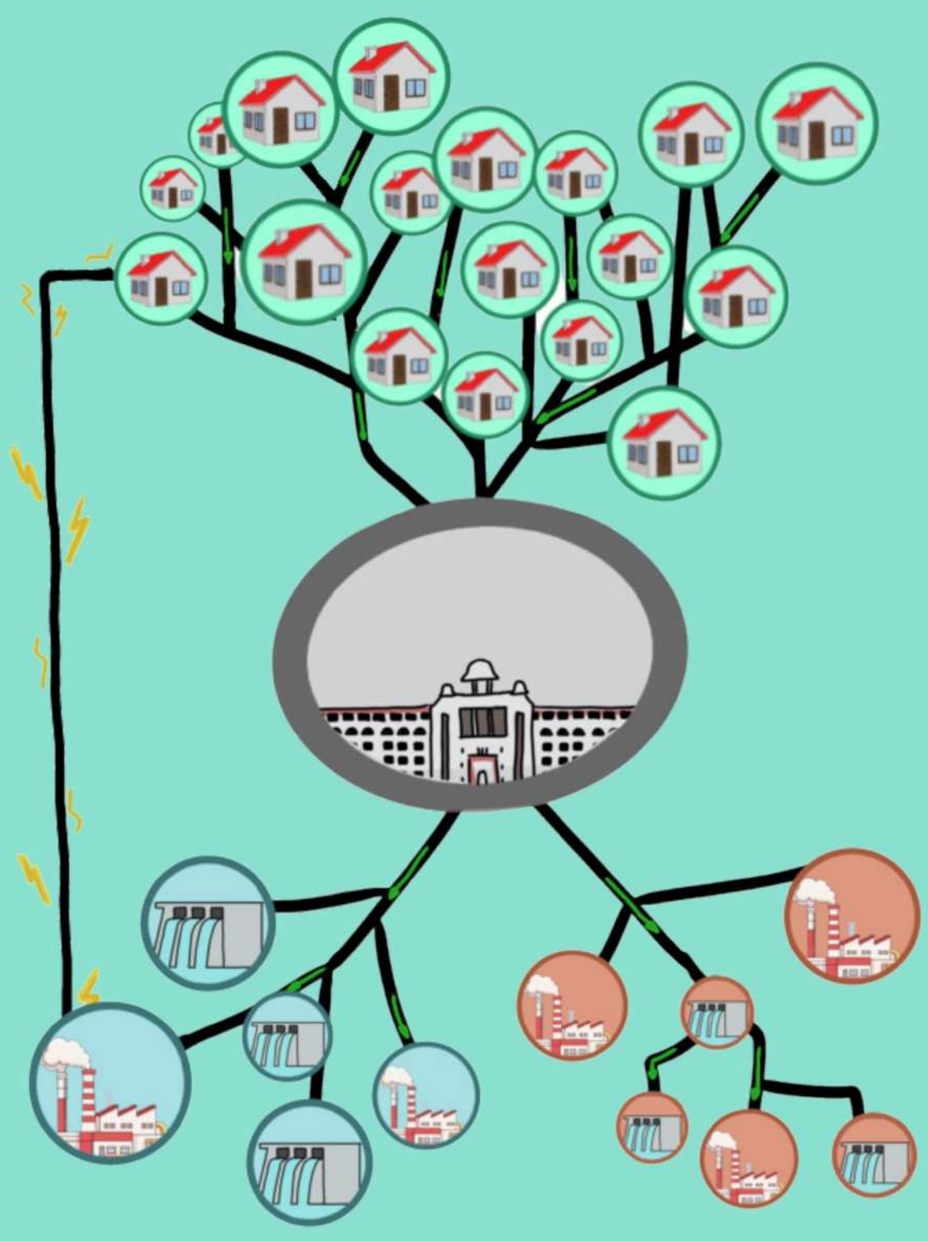
Capacity Charge

Why do we have to pay capacity costs even when we don't purchase electricity?

Let me explain this using an example.

For example, you buy a car on installments from a bank. Each month, you have to pay the car installments, regardless of whether you use the car or not. The bank has nothing to do with that. But in case you're using the car, you also have to pay for its maintenance, fuel, etc.

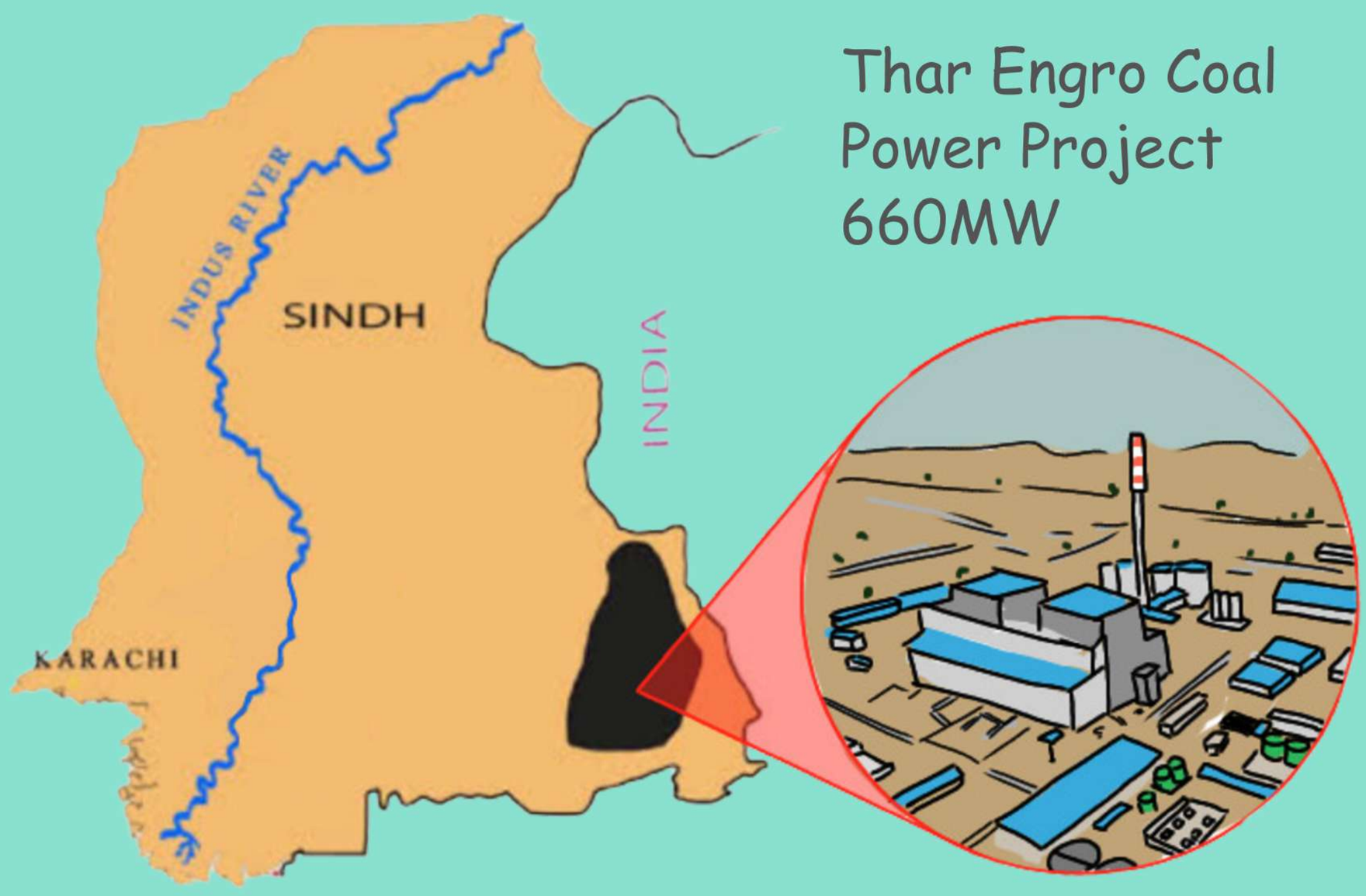
The installments you pay for the car represent the capacity charge, while the money spent on fuel and maintenance represents the energy charge. Similarly, with power plants, we use the electricity generated by some of them but pay for all of the installed power plants, including their associated costs and interest. This is because the owners of these plants have invested heavily, and if we don't cover these costs, they will incur significant losses.



Lastly, there are **inefficient** DISCOs, they are often poorly managed. Just last year in 2023, they reported losses of **Rs. 160 billion** due to distribution inefficiencies alone.

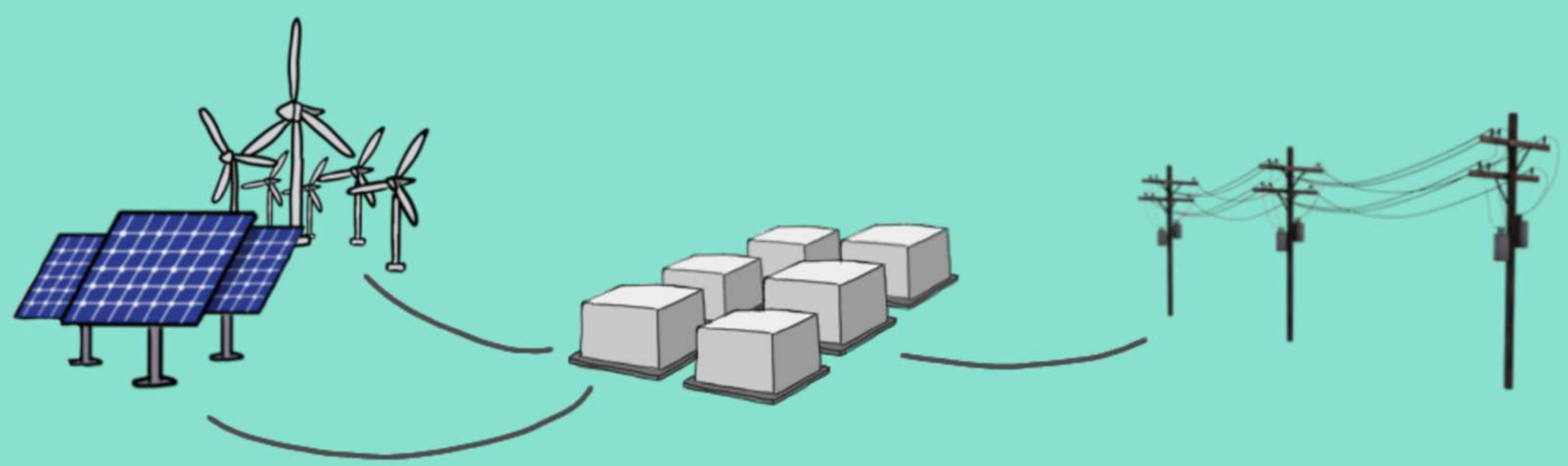
So how can we address these issues? How can we reduce our reliance on imported fuels? How do we avoid building power plants that are underutilized but still incur costs? And how can we improve the performance of DISCOs?

Honestly, it's not easy, and there isn't a single solution that can address all these issues. But we can start by moving away from expensive imported fossil fuels. Renewable energy is not only cheap, it is also abundant in Pakistan and we need to have more of it in our electricity grid. We should also make it easy for small scale and local developers to set up their power plants as that brings more opportunities and growth for our own citizens.



We should prioritize converting power plants that currently use imported coal to utilize local coal, as building new plants for local coal is no longer practical. Additionally, transitioning to renewable energy sources such as solar, wind, and biofuels is a viable solution for reducing our reliance on imported fuels.

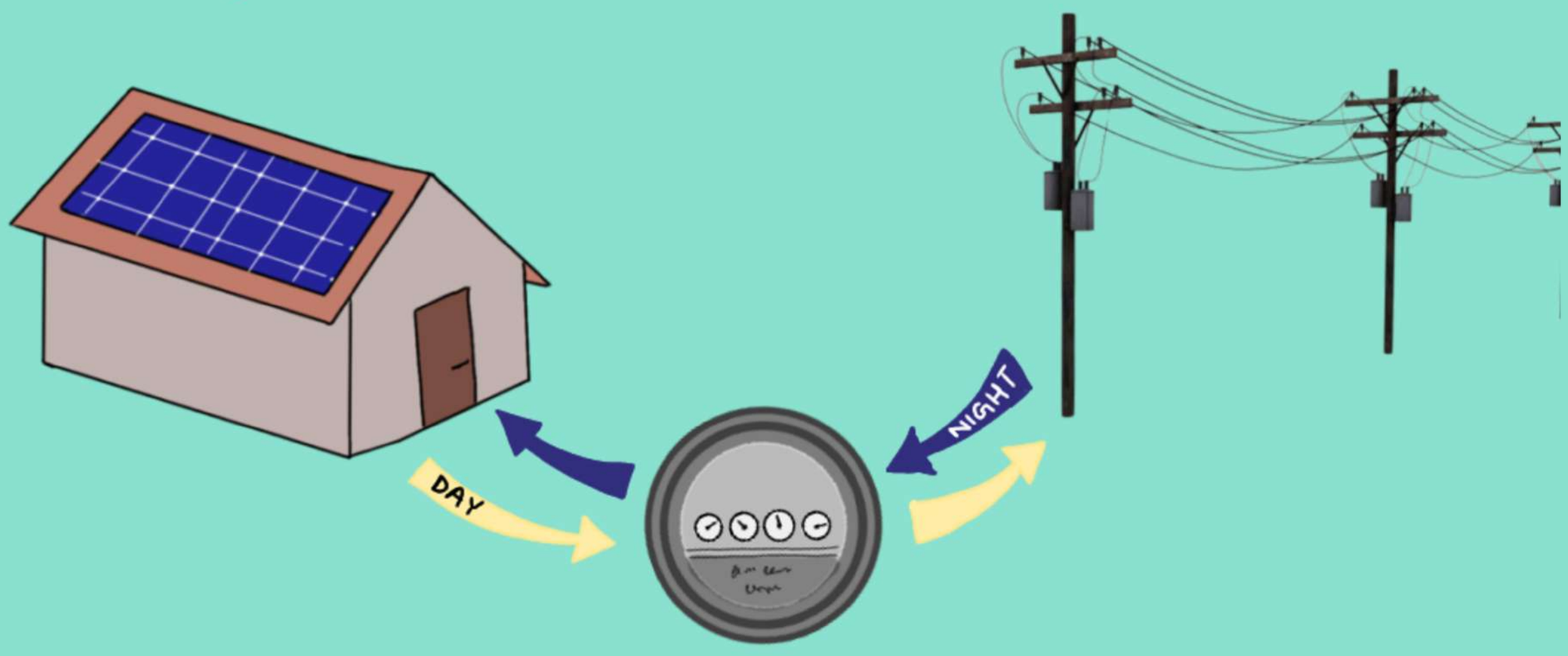
Utilizing energy storage systems is another option. These systems store electricity generated from sources like solar panels or wind turbines for later use. They allow us to store excess energy when it's available and provide it when demand is high or generation is low.



The most sustainable way to generate electricity that will reduce your electricity bill is switching to a Net Metering System.

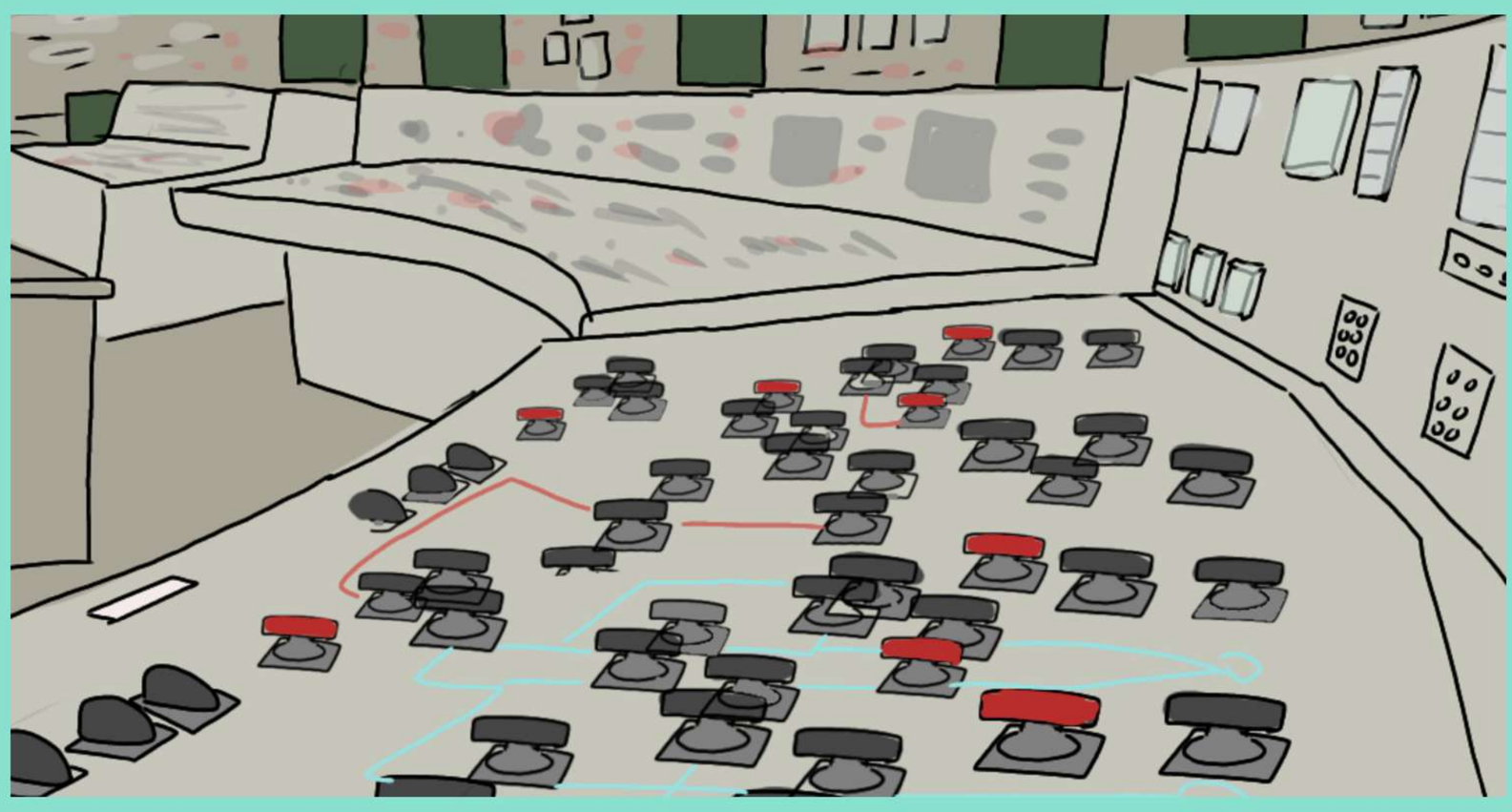
Now what is that?

Oho! Let me explain!
When we install solar panels in our homes, they absorb solar energy during the day to power our homes. If the panels generate more electricity than we can use, the excess energy is sent back to the grid, and our electric meter runs backward, earning us credits on our electricity bill. At night, when there's no sunlight, we purchase electricity from our respective DISCO. The credits accumulated during the day help reduce our electricity bill. This system, known as Net Metering, is both sustainable and economical.

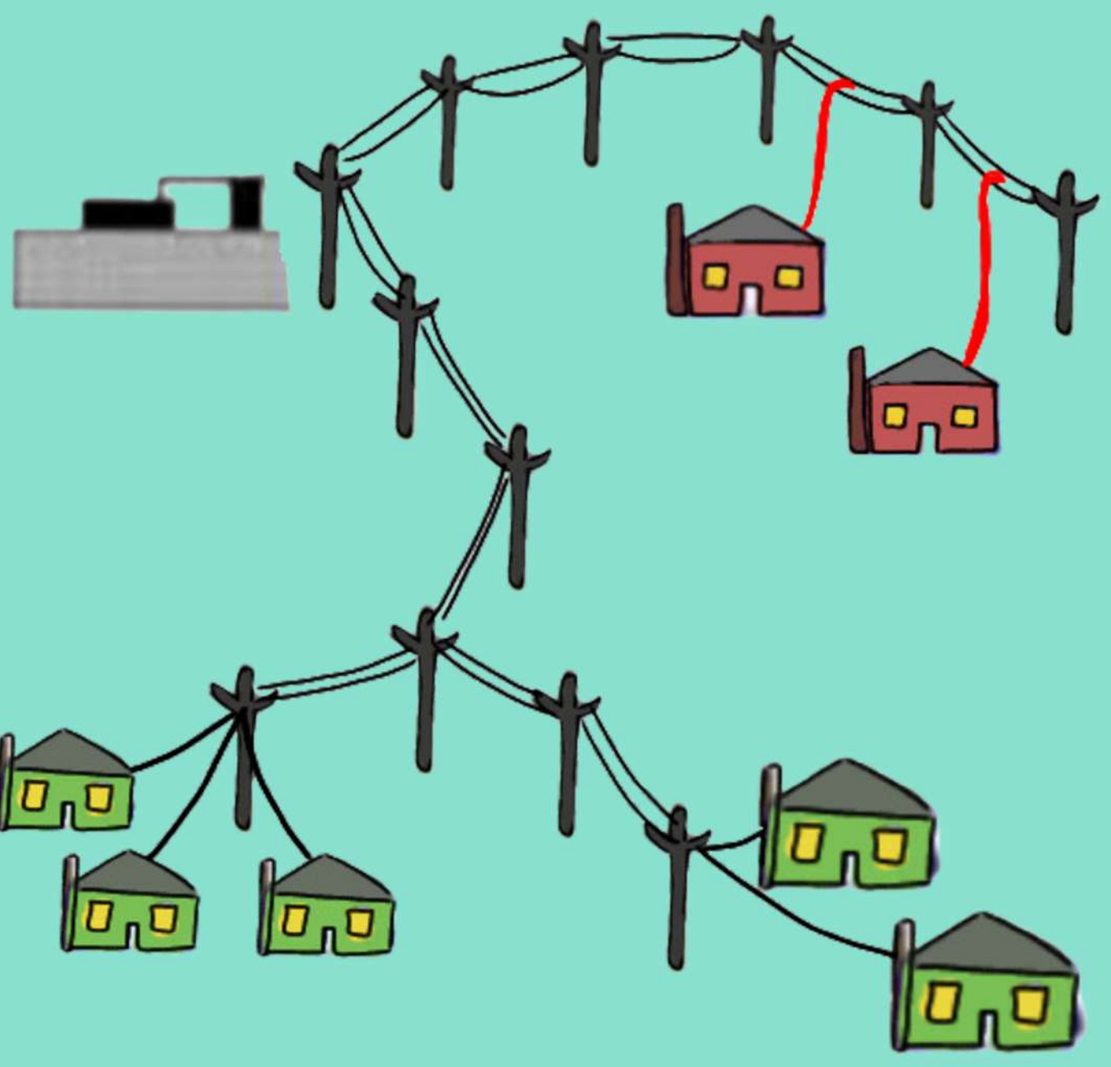


Great! Now I'm gonna ask my parents to switch to the **Net Metering** System.

About your second question, how can we stop building power plants that we don't use but still have to pay for them, it's important first to upgrade the transmission infrastructure of power plants and remodel the system. Necessary augmentation of the transmission sector is required. We should change from a system where buyers have to either buy the product or pay a penalty (take or pay system) to a system where buyers don't have to pay a penalty if they don't buy (take and pay system).



Lastly, to improve DISCO performance, addressing governance issues is crucial. This involves making DISCOs more efficient and transparent. Additionally, measures need to be implemented to prevent electricity theft. Did you know that around 17% of all electricity is lost or stolen?



Privatizing DISCOs could also lead to better performance. For instance, K-Electric has shown significant improvements since its privatization.


So, what should my parents do to reduce electricity costs for their industry?
I personally believe that industries should aim to implement the **CTBCM** system in the industrial sector.
Hold on, I know about **CTBCM**. Let me explain it.


How do you know about **CTBCM**?
So what is it all about?
The news agency I'm working at covered a conference on **CTBCM**, and I was part of the team covering it.


CTBCM or Competitive Trading Bilateral Contracts Market is a system for trading electricity directly between power plants and consumers.
Ummmm, let me explain the **current system** that exists in Pakistan first.

The government currently controls the buying and selling of electricity. A government agency, CPPA-G purchases electricity from power plants and then sells it to consumers.

There is no direct communication between consumers and power plants.

—because of the involvement of a third party: **the government.**

Consumers pay a price to buy this electricity, which includes several components: the Power Purchase Price for the electricity bought from power plants, the Use of System Charge for the transmission of power through transmission lines, the Distribution Margin paid to DISCOs, and the Market Operation Fee charged by the government. All of this is regulated by the National Electric Power Regulatory Authority (NEPRA).

And FYI, WAPDA is not regulating this so stop swearing at WAPDA every time there's a power outage.

On the other hand, CTBCM allows consumers to trade directly with power plants, eliminating the need for any third-party involvement.

So what are the perks of **CTBCM**?

There are several benefits associated with CTBCM.

It frees customers from the burden of inefficient planning and decision-making, allowing them to purchase electricity from the most cost-effective source available.

Additionally, it fosters competition and innovation. Industries can purchase electricity based on their needs and from the nearest power plant, which reduces electricity loss and lowers prices.

The trade will be more transparent, leading to a flourishing industrial sector. Healthy competition will emerge among industries, and new investors and entrepreneurs will be encouraged to enter the market.

How can we implement the **CTBCM** system in Pakistan?

Well, as far as I know, NEPRA is currently in discussions with stakeholders and working on developing a regulatory framework for implementing CTBCM.

CTBCM

NEPRA

Similarly, NEPRA is also conducting a public hearing for the implementation of CTBCM.

And as I mentioned earlier, I attended a conference on CTBCM.

There are conferences, workshops, and seminars being held to facilitate the implementation of CTBCM in Pakistan.

Additionally, we can raise awareness among the general public, particularly within the industrial sector, and encourage them to pressure the government and relevant stakeholders for its implementation. Since this concept is not widely known yet, increasing awareness is crucial.

Thank you, Hania and Ali, for all the information you've shared today. Who said these meetups are useless for kids? My parents are going to be impressed.

Also, I have to go now—Baba is here to pick me up.

My pleasure!

ALLAH HAFIZ!

You're welcome.

Renewables First (RF) is a think tank for energy and environment. Our work addresses critical energy and natural resource issues with the aim to make energy and climate transitions just and inclusive.

RENEWABLES FIRST

10 - 11, 3rd Floor,
Executive Complex,
G-8 Markaz,
Islamabad
+9251 - 8773676
info@renewablesfirst.org