



RENEWABLES FIRST

# Light Bulb Tales: Pakistan's Electricity Puzzle

Author: Fatima Naeem  
Artwork: Eiman Nasir









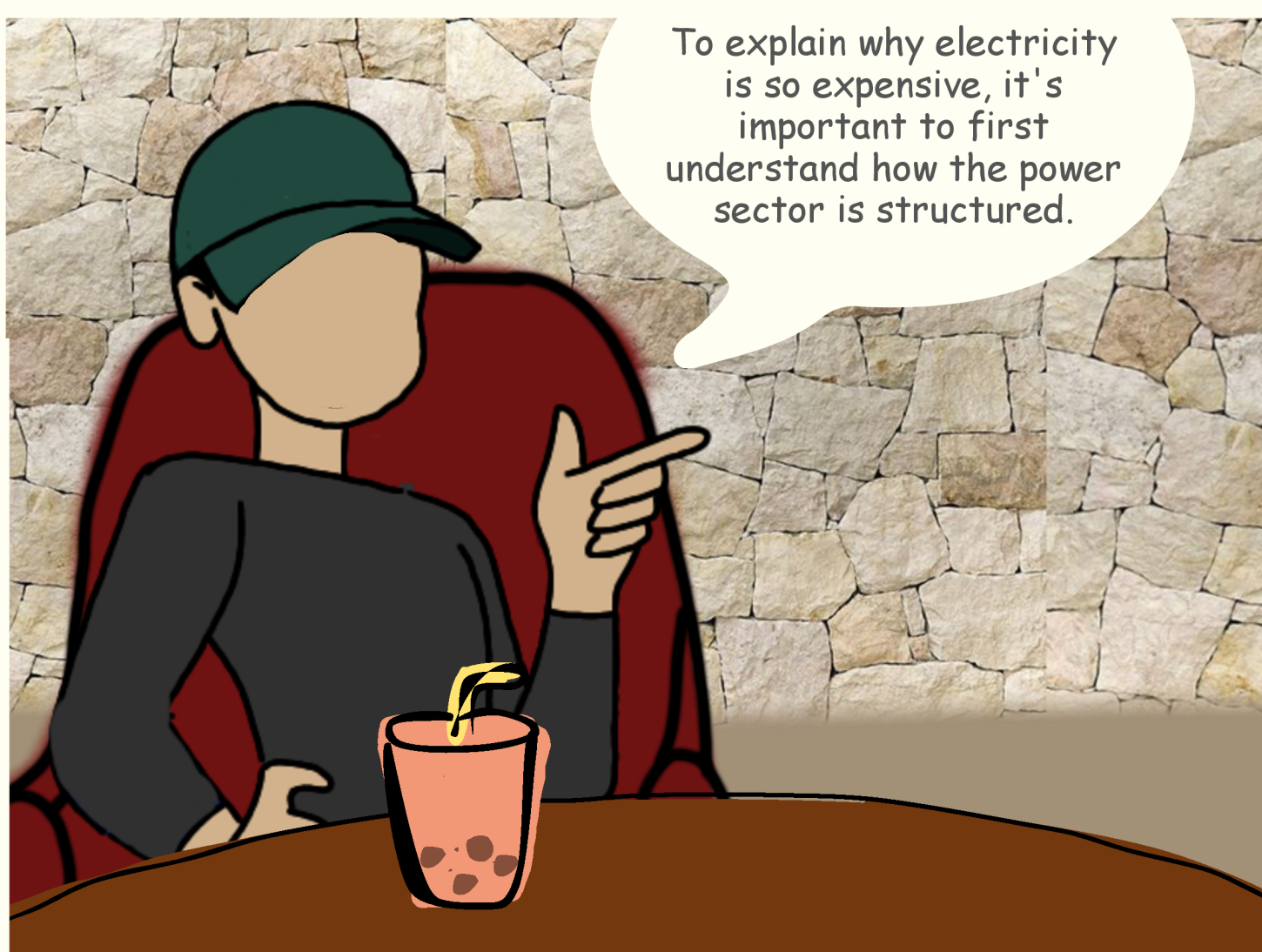
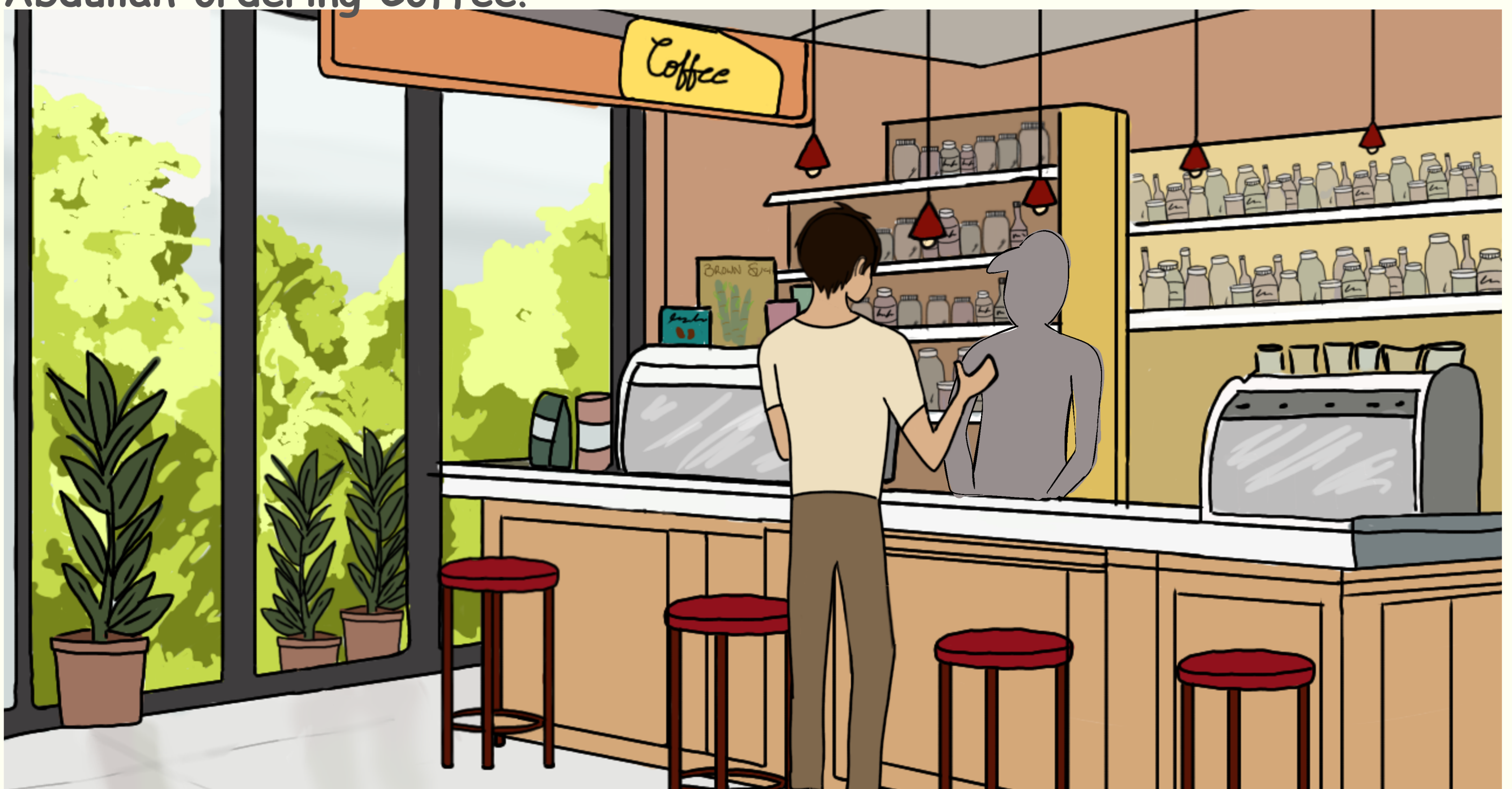
15 minutes later...







### Abdullah ordering Coffee!





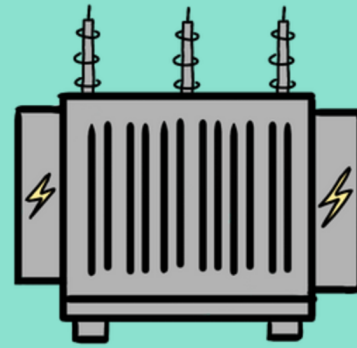
Before that, you need to have a general understanding of how the power sector operates. There are four key sub-sectors:



1 Generation



2 Transmission

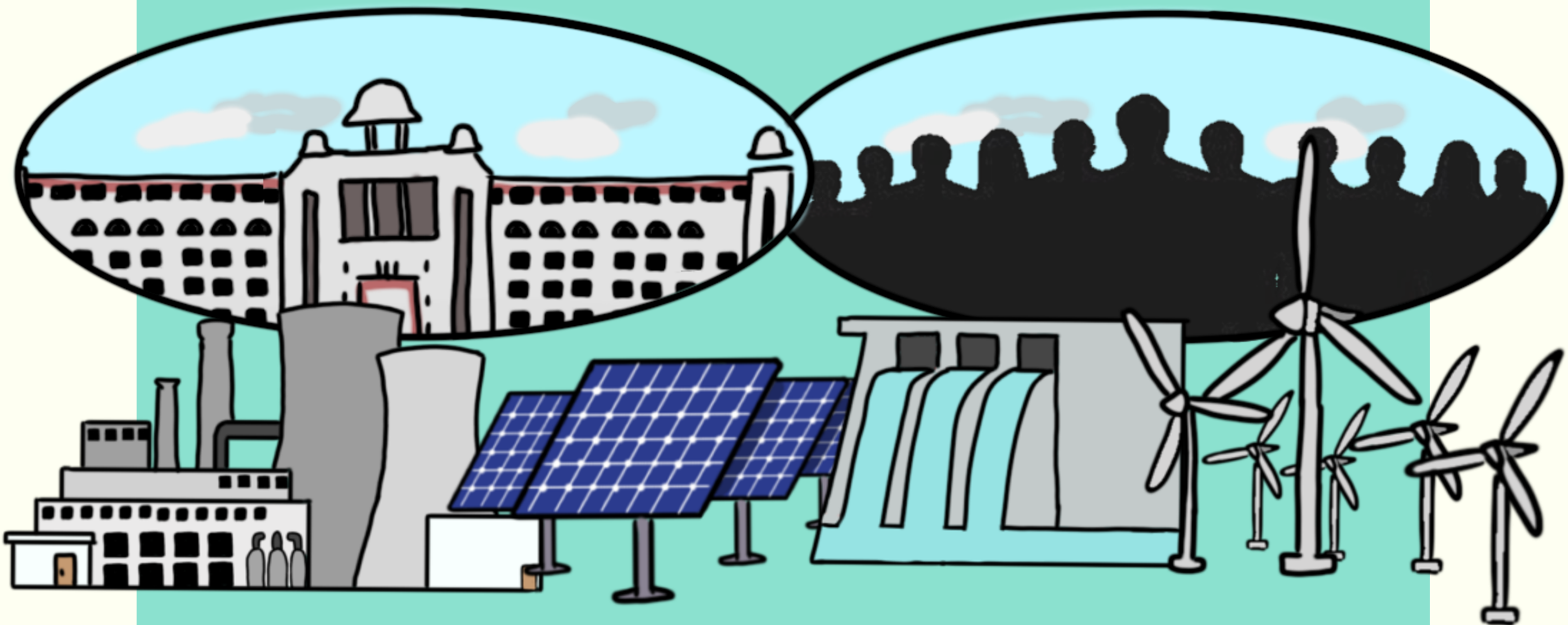


3 Distribution



4 Consumers

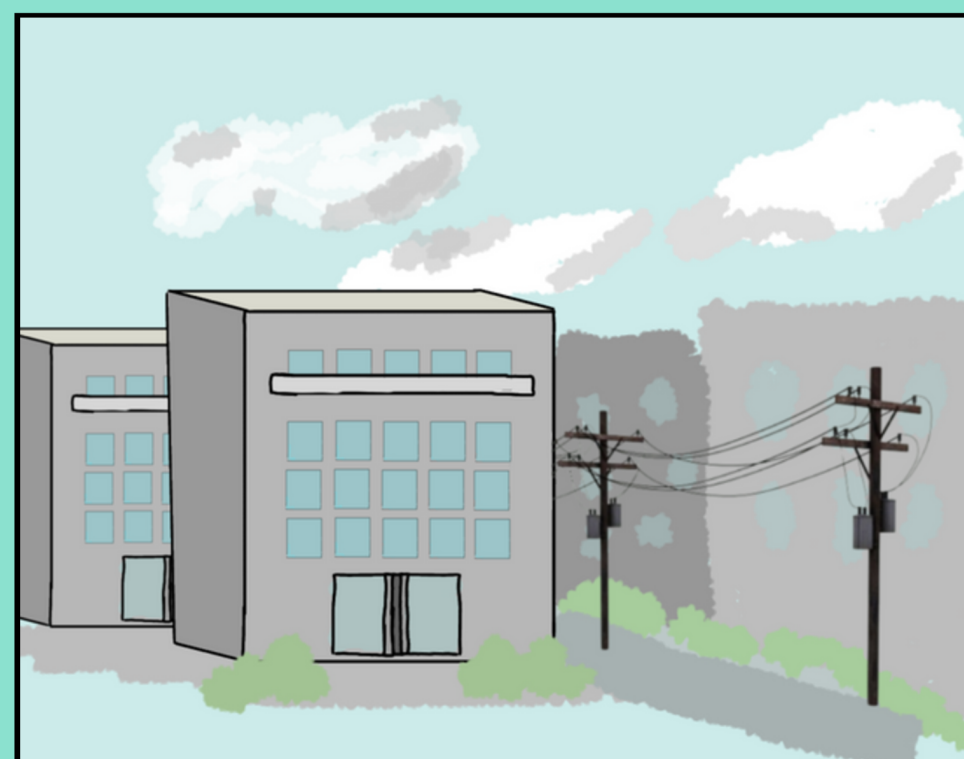
The generation sector is responsible for producing energy and includes various power plants. Some of these plants are owned by the government, while others are privately owned, known as Independent Power Producers (IPPs). These plants generate power using thermal, hydel, or renewable energy sources.



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.

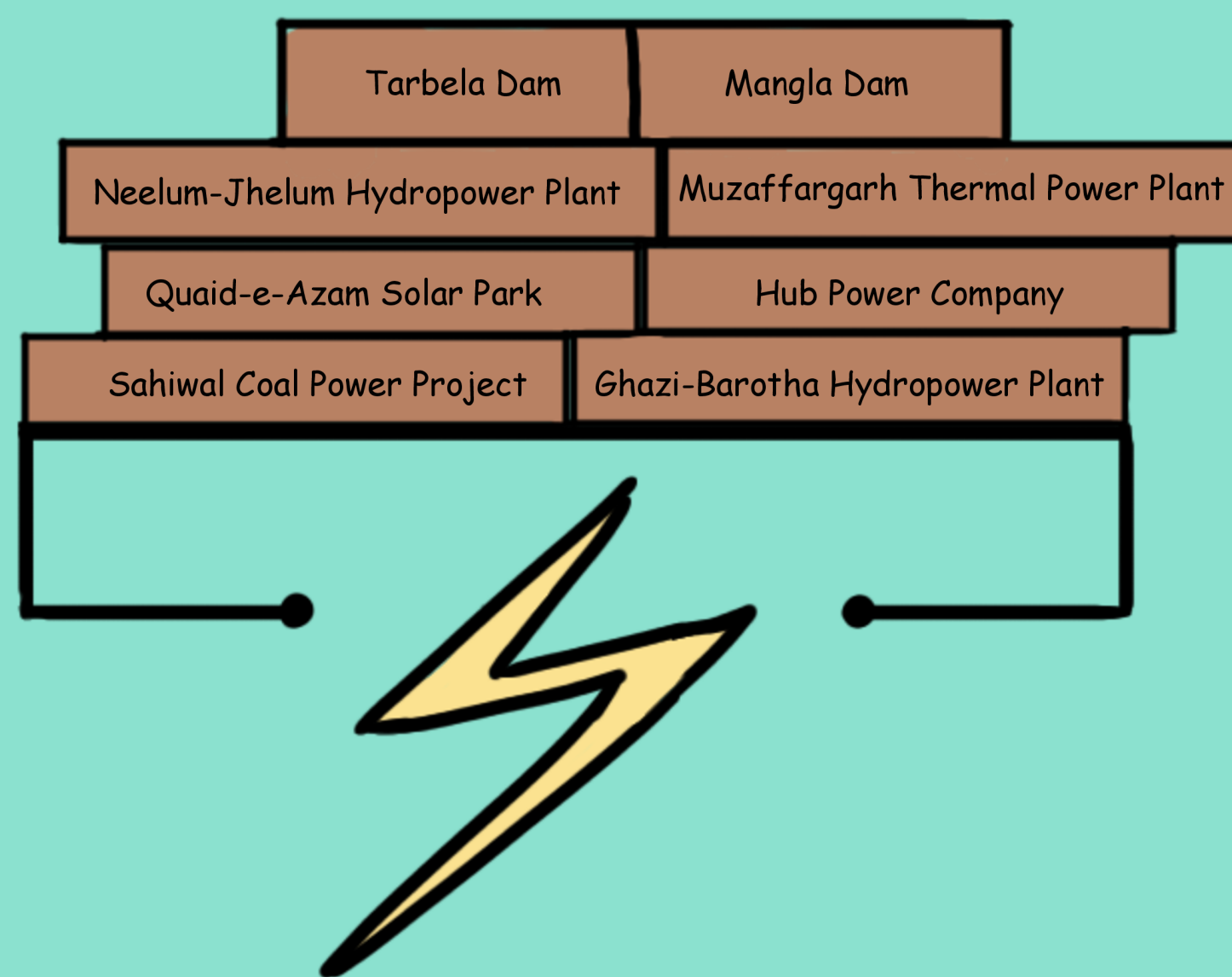




Finally, there are the consumers. This includes us, as well as industries, residential areas, commercial businesses, and the agricultural sector.



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

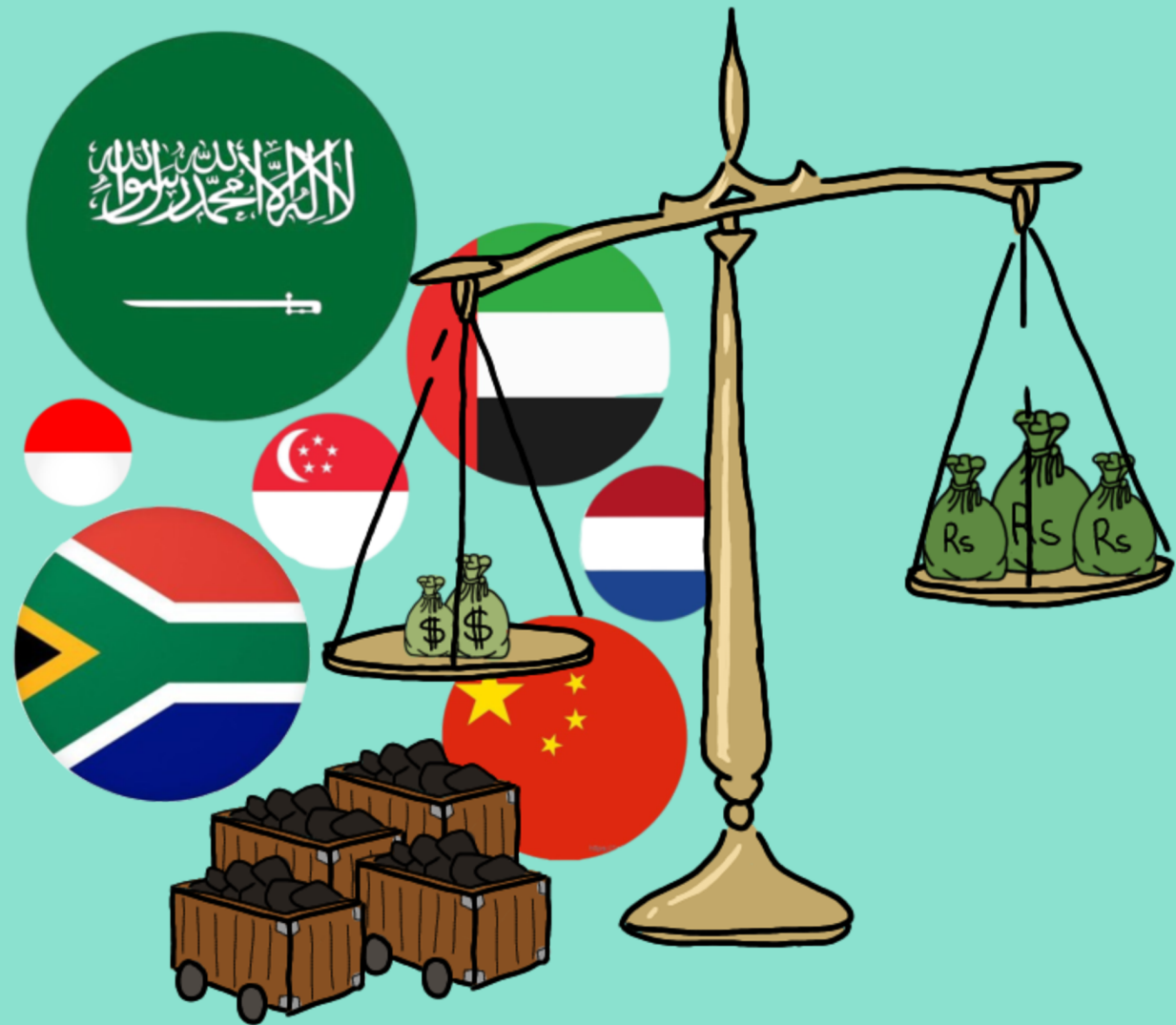


If there's so much generation capacity, why is electricity still **expensive**? We learned in economics that when supply is abundant, prices typically fall.

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?

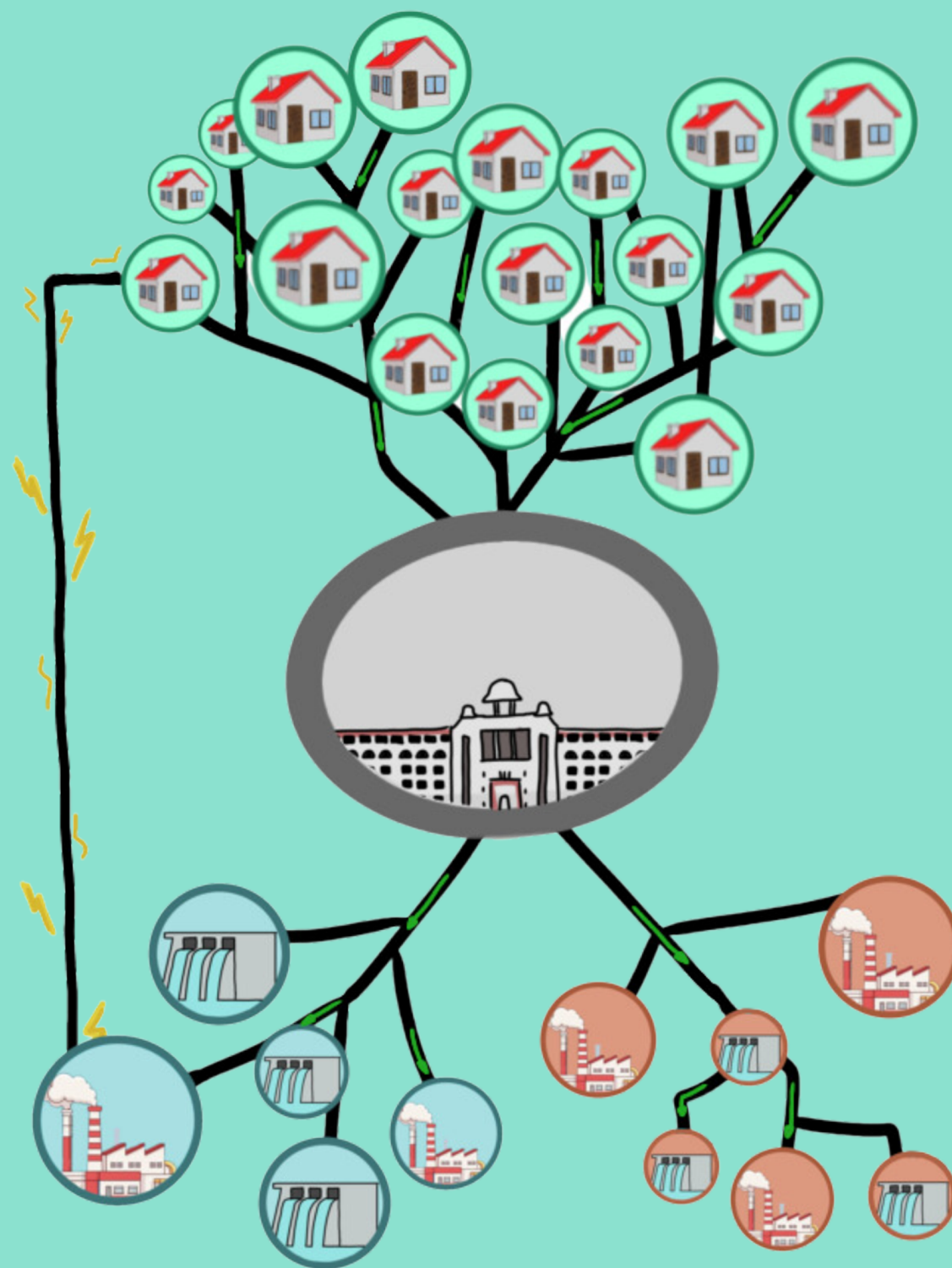


## Let me explain this using an example.

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.



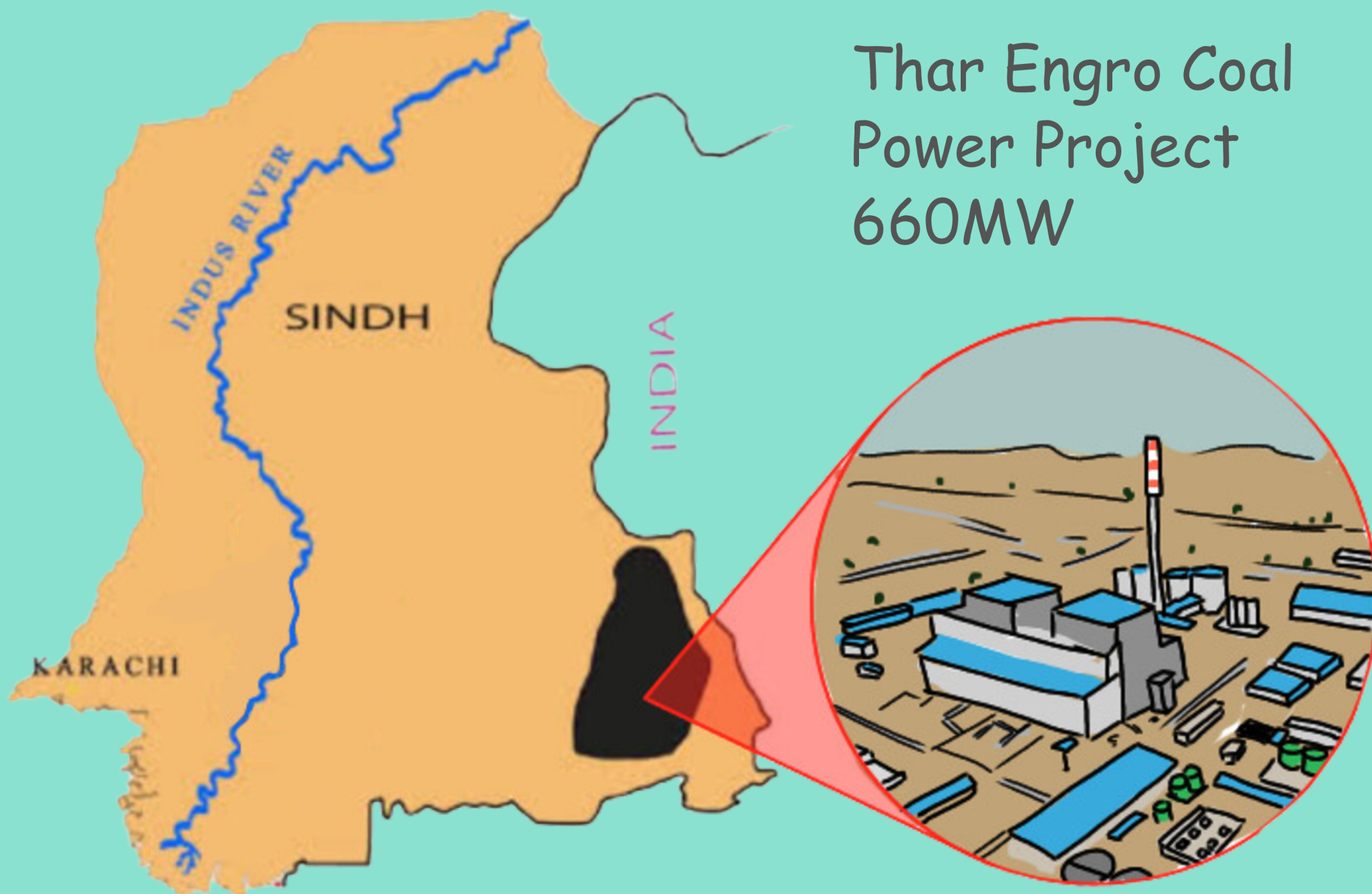
Lastly, there are **inefficient** DISCOs, they are often poorly managed. Just last year in 2023, they reported losses of Rs. 160 billion due to distribution inefficiencies alone.





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?

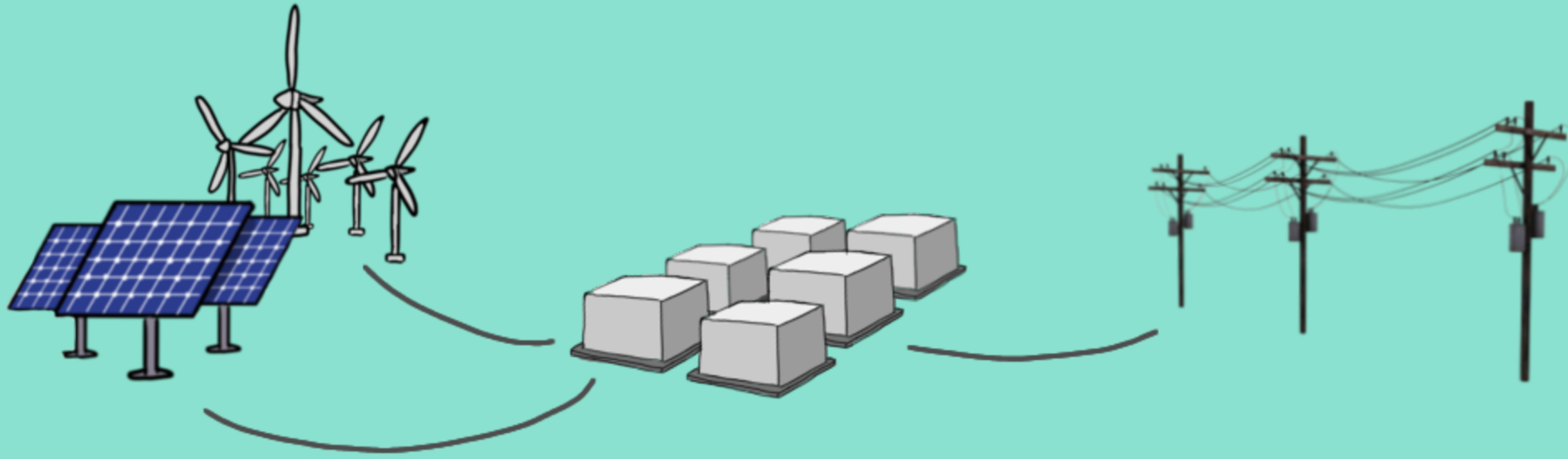
Honestly, it's not easy, and there isn't a single solution that can address all these issues. But we can start by moving away from expensive imported fossil fuels. Renewable energy is not only cheap, it is also abundant in Pakistan and we need to have more of it in our electricity grid. We should also 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.



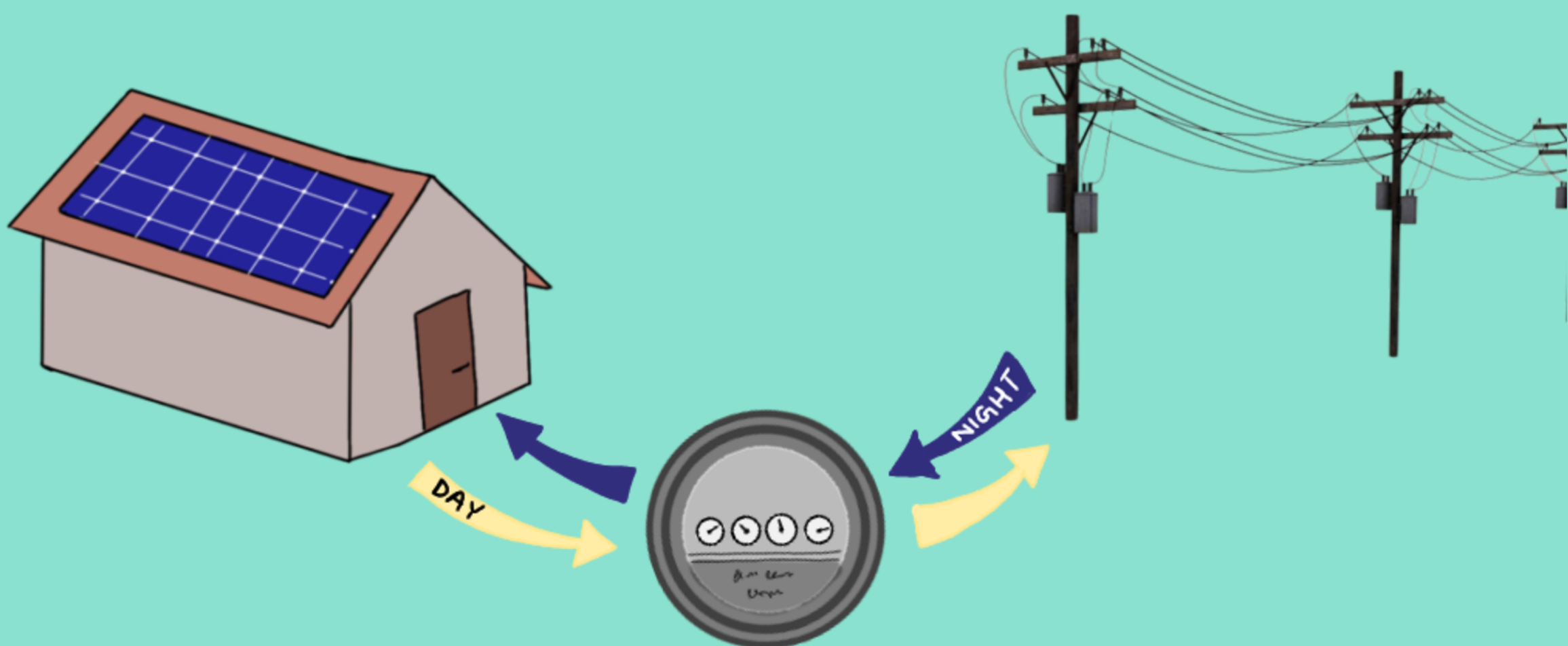
The most sustainable way to generate electricity that will reduce your electricity bill is switching to a Net Metering System.



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.



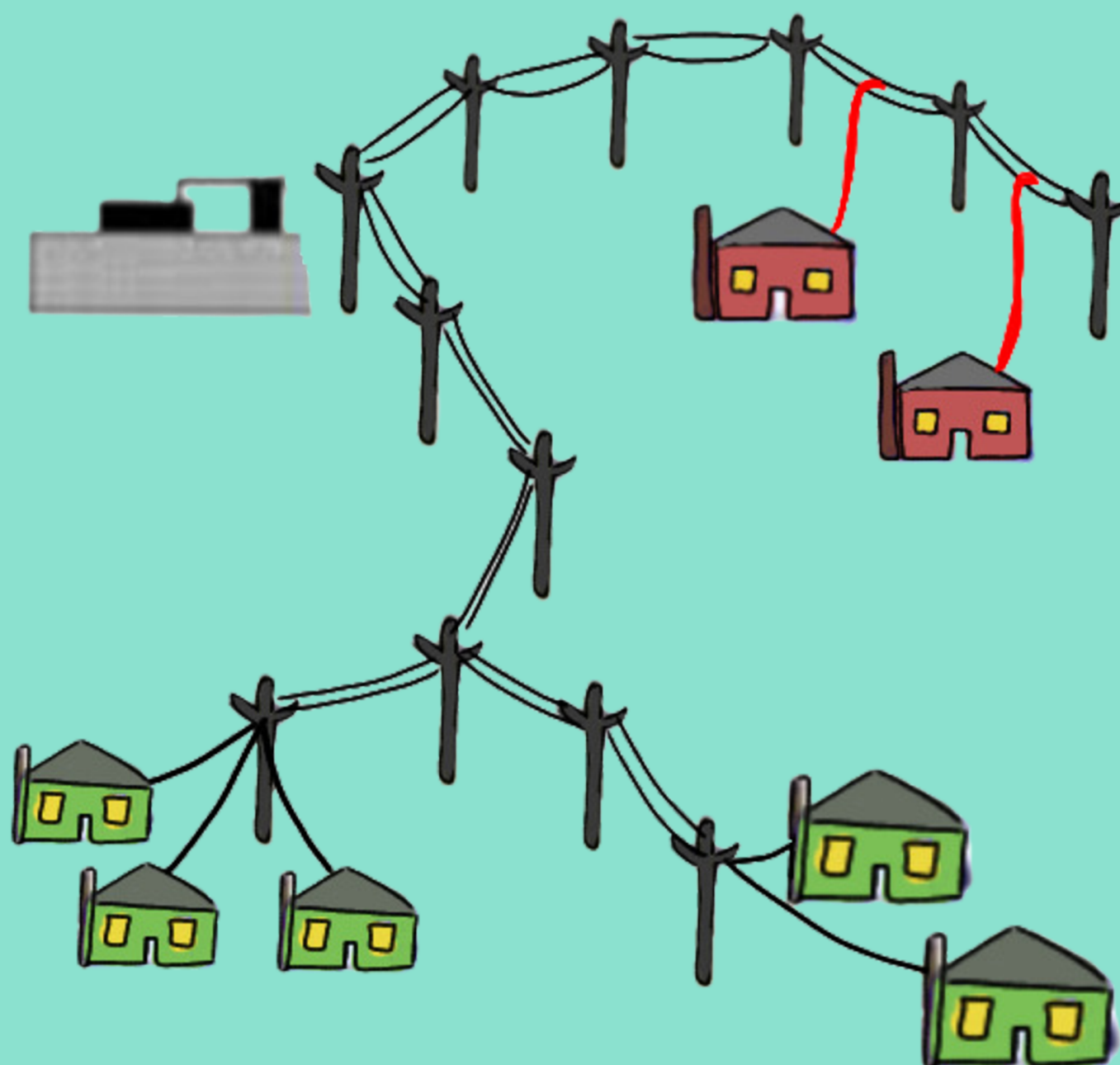
Great! Now I'm gonna ask my parents to switch to the **Net Metering System**.



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.









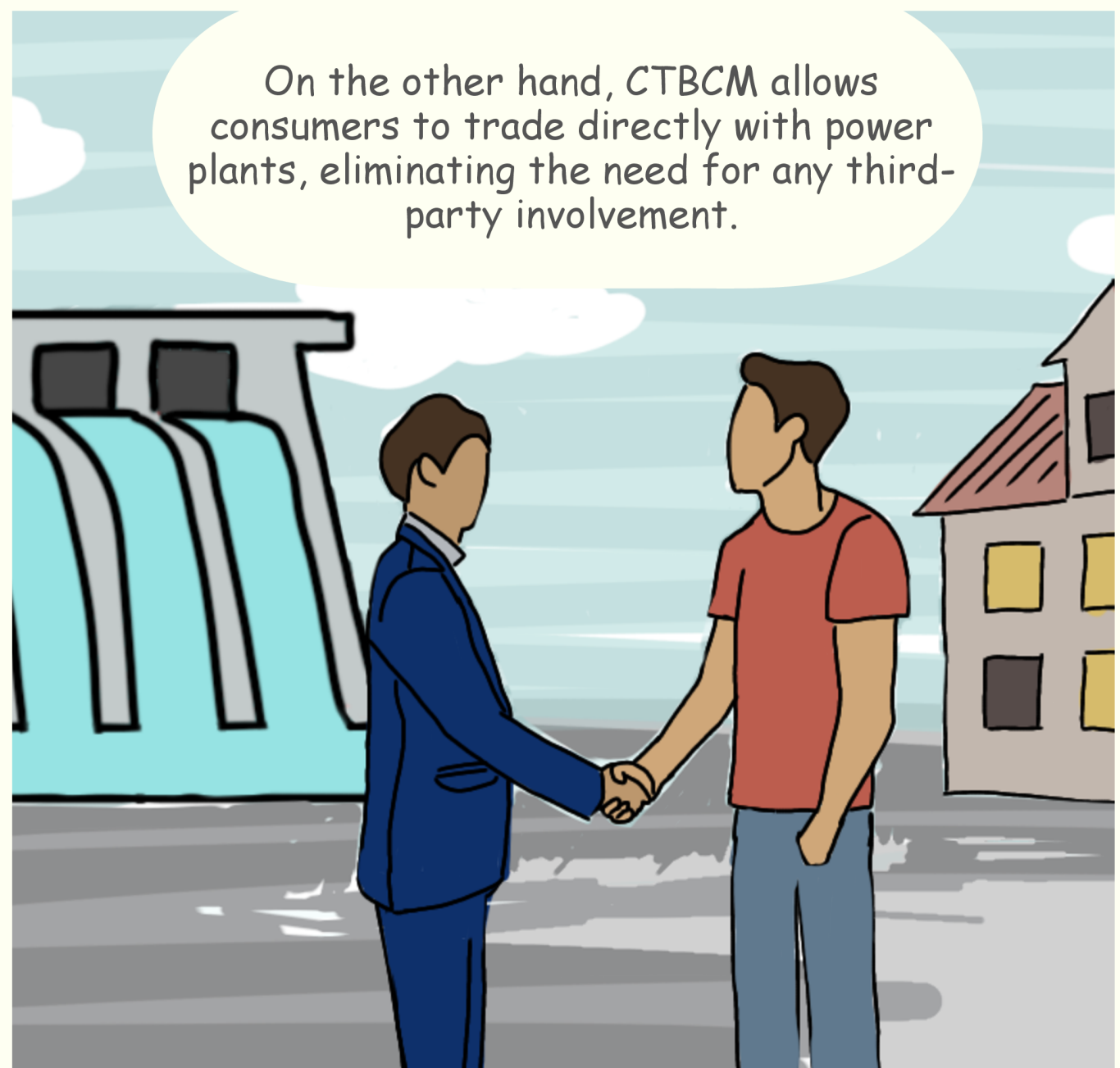
There is no direct communication between consumers and power plants.



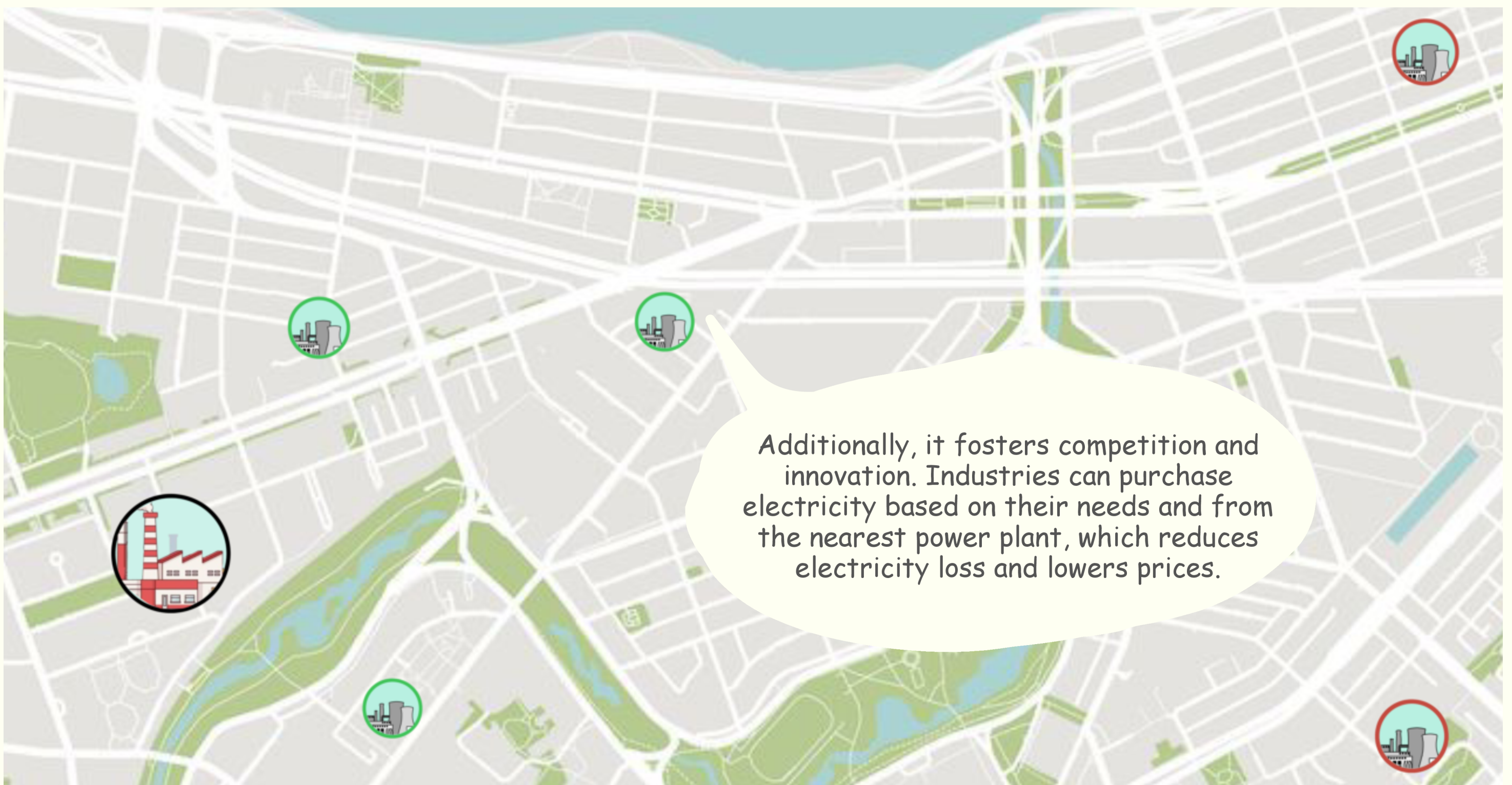
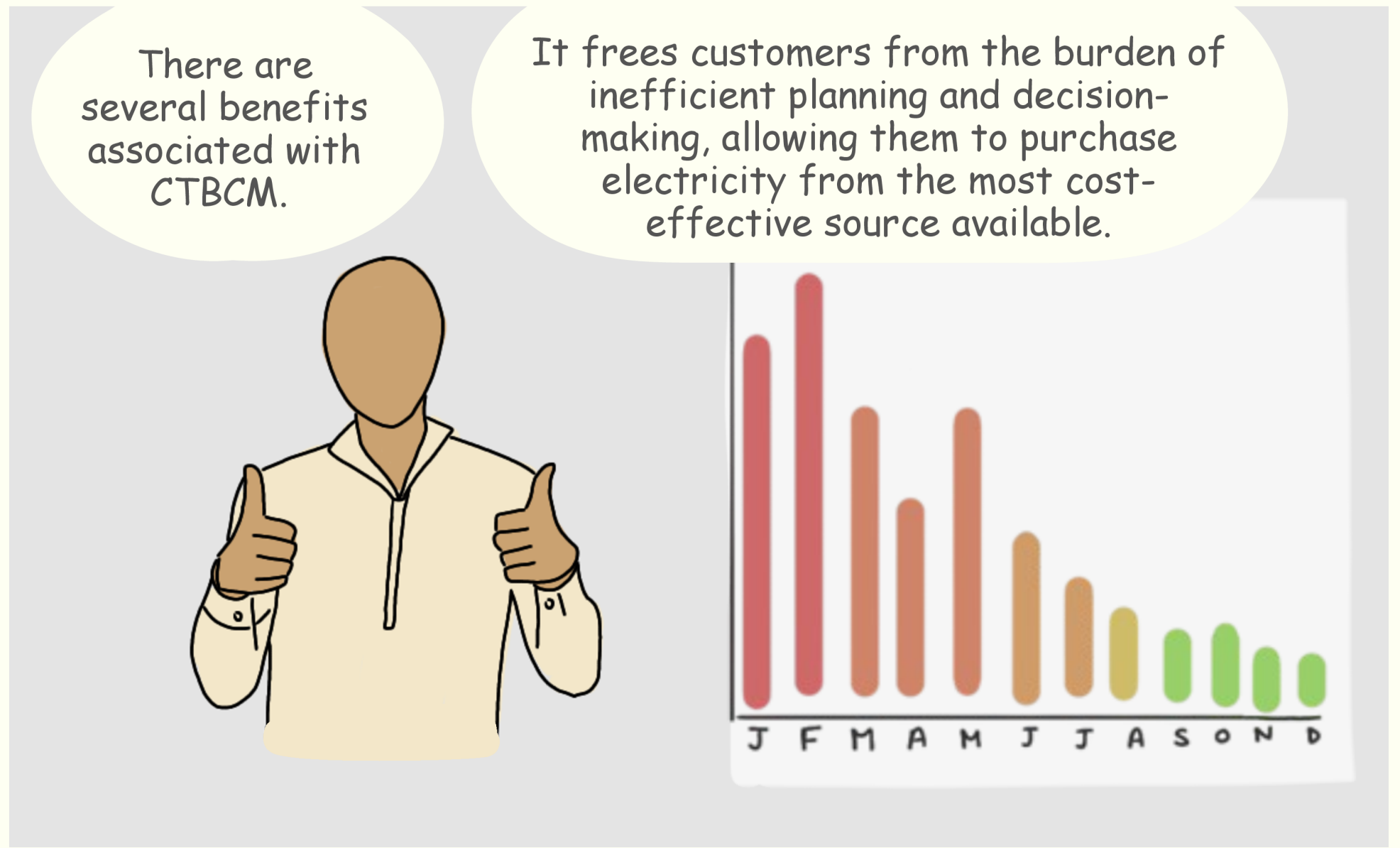
—because of the involvement of a third party: the government.



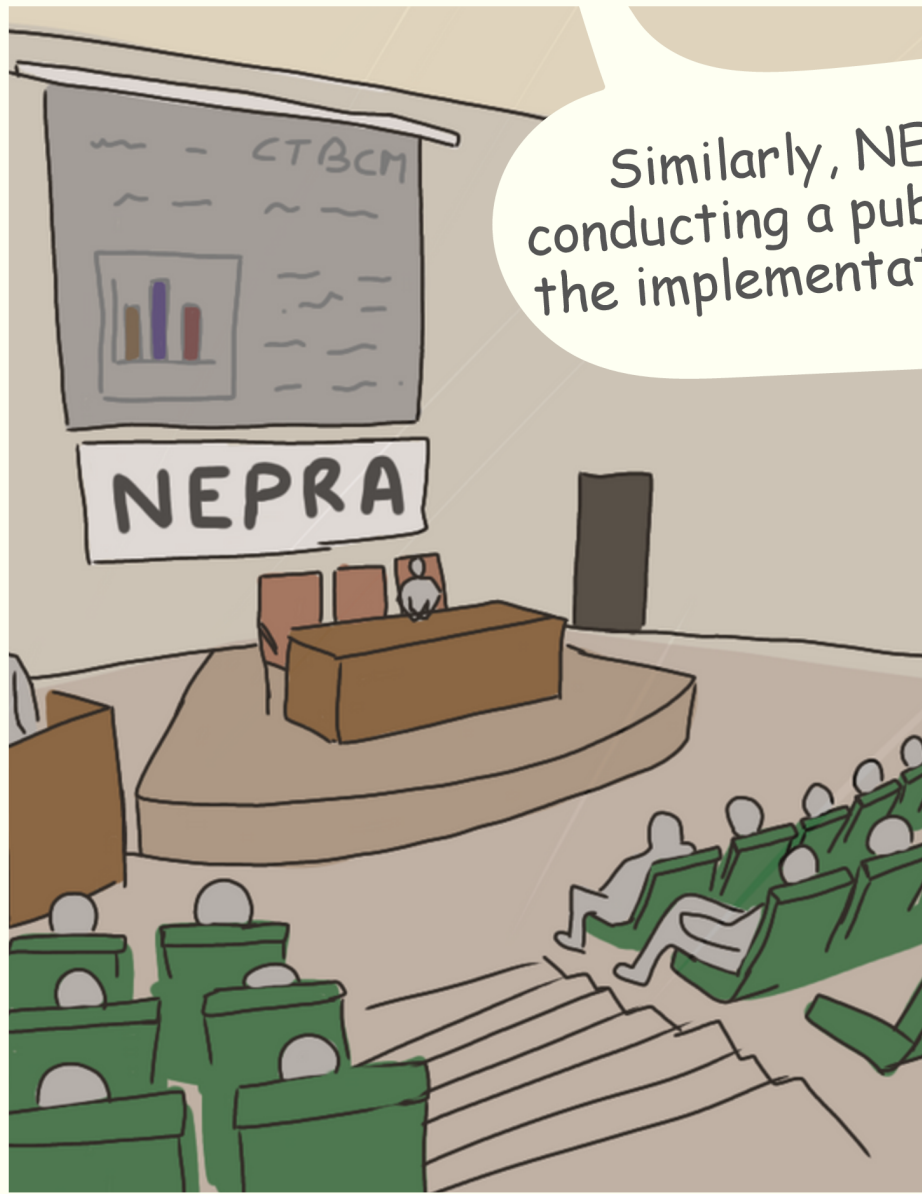
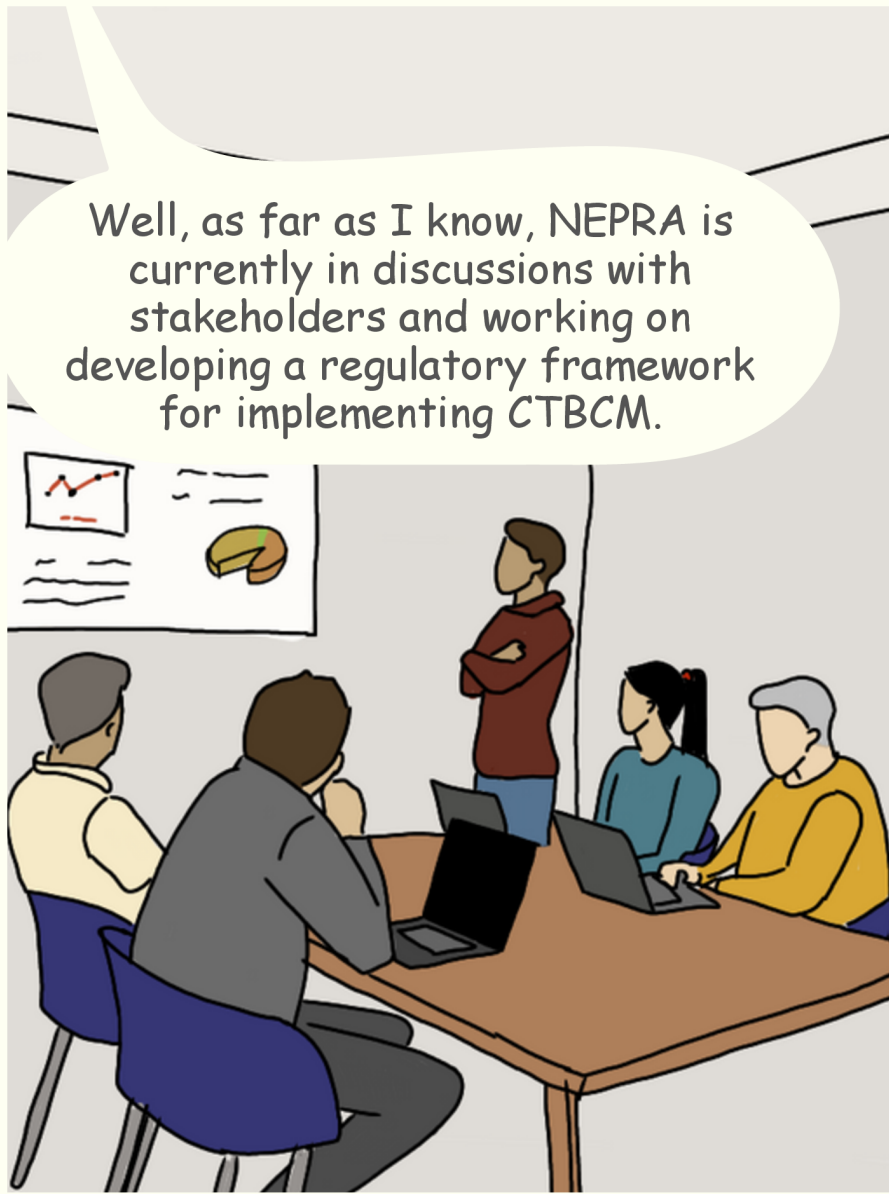
On the other hand, CTBCM allows consumers to trade directly with power plants, eliminating the need for any third-party involvement.













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](mailto:info@renewablesfirst.org)