

Energy and Carbon Market

Analysis on the current situation of China' s power system reform

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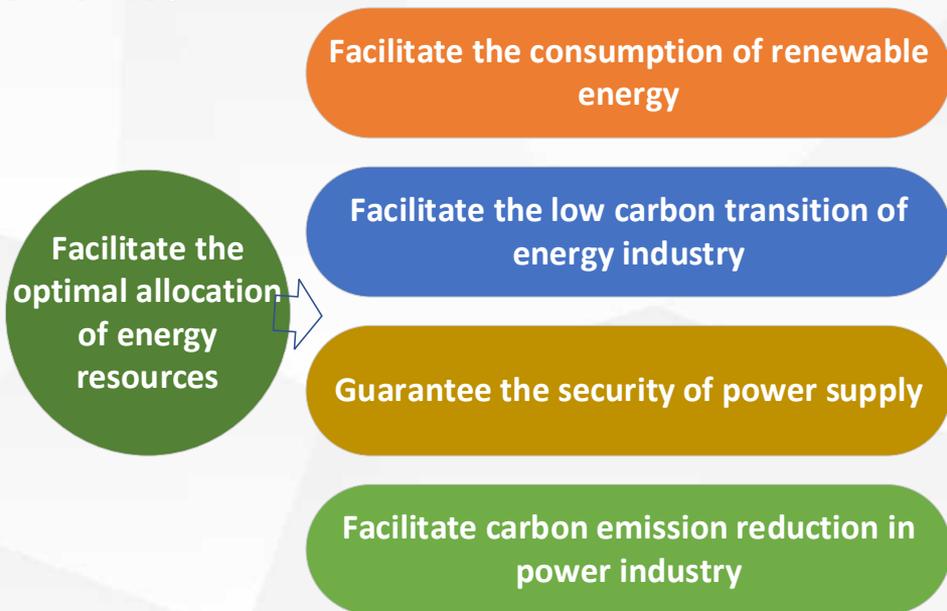
Suggestions

With the goal of “carbon peak and carbon neutralization”, cleaning and marketization have become two major trends in the power industry. After the reform, there are three new changes in China’s power system which are: 1) **More the Market Construction Requirements**; 2) **More Diversified and Complex Market Forms**; 3) **More Detailed Electricity Price Formation Mechanism**.

◆ More the Market Construction Requirements:

With the dual-carbon target, there are more and more factors needed to be considered during the construction of the power market.

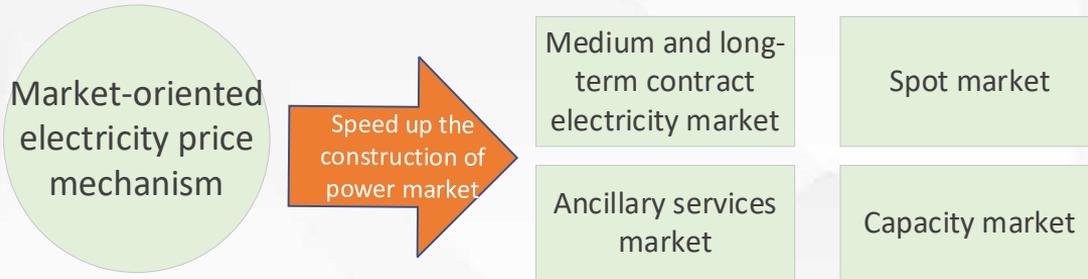
The initial goal of the electricity market wants to achieve is to facilitate the optimal allocation of energy resources. With the rapid development of renewable energy and the gradual retirement of the thermal power units, “**guaranteeing power supply, facilitating power industry transition and improving energy efficiency**” has become the main new requirements of future market construction.



◆ More Diversified and Complex Market Forms :

Through the **medium and long-term market**, give play to the decisive role of market in power resource allocation

Through the **spot market**, the **uncertainty** caused by the fluctuation of new energy power generation can be reduced, and promote the **consumption of new energy**.



Through the **capacity cost recovery mechanism**, the **capacity value** can be reflected which are used to guarantee **sufficient power generation investment**.

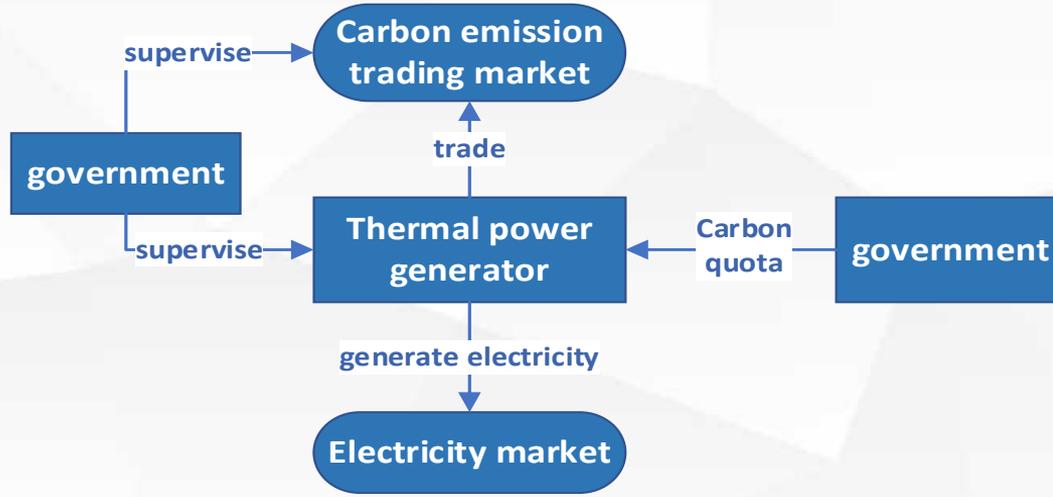
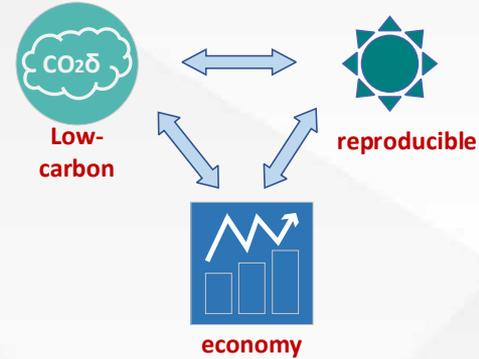
Through the **ancillary service market**, the **security and stability** value of the energy system can be reflected, and the **flexible resources** can be compensated for their contribution.

Electricity Market Reform

How to promote the consumption of renewable energy , and solve the **low-carbon-security-economy-triangle contradiction** in energy transformation?

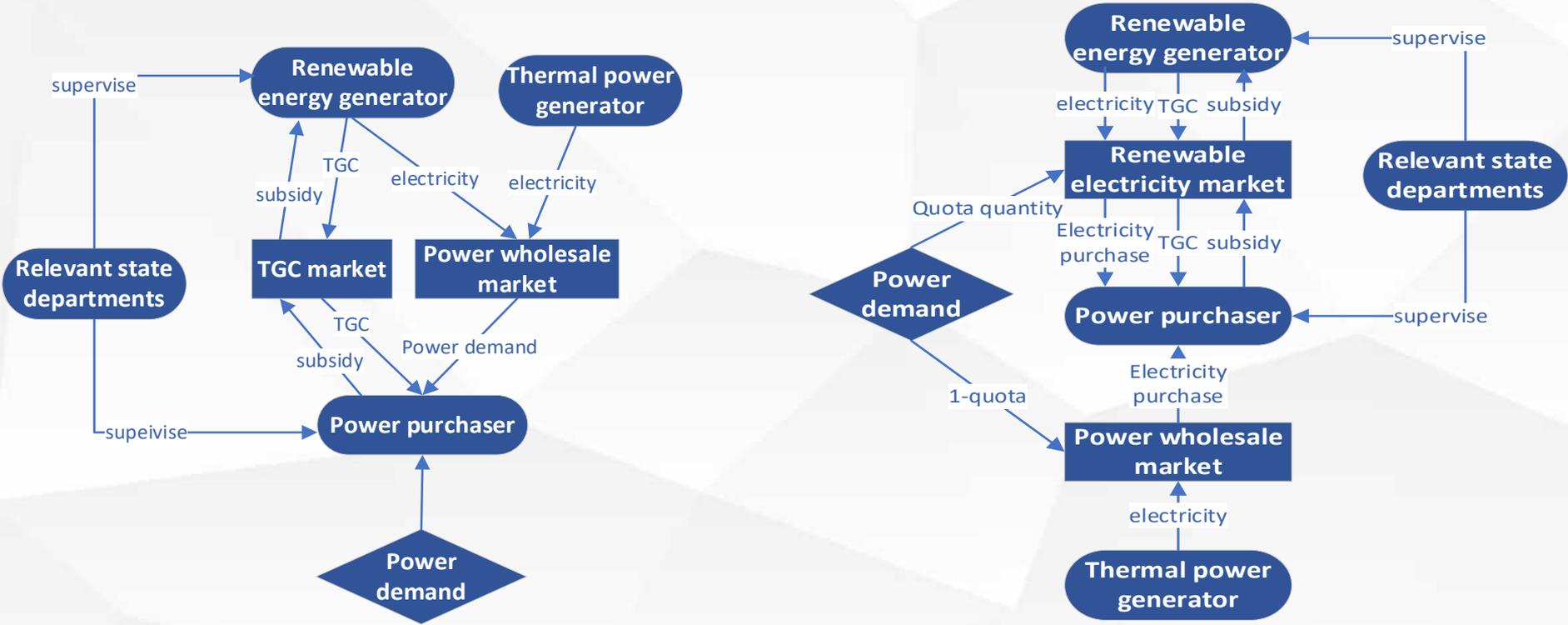
Carbon Emission Trading market(CET):

Taking carbon dioxide as a commodity makes the implicit cost of carbon emission explicit and the external cost internalized, so as to promote low-carbon-green economy.



Green Certificate Trading market(GCT):

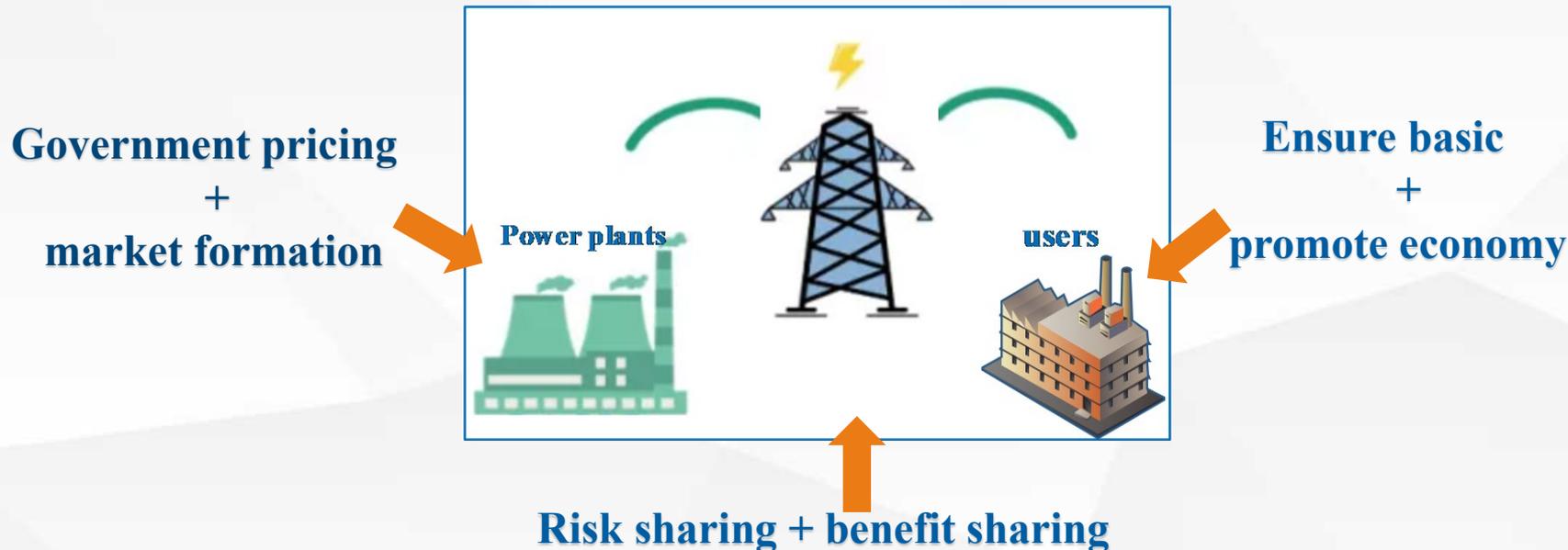
Through the green power trading market, the **environmental value** of low-carbon electricity is reflected which can facilitate the transition towards a clean and low-carbon energy system.



◆ More Detailed Electricity Price Formation Mechanism :

The construction of new power system is an all-round reform of the traditional power system, which will bring some transformation costs and will inevitably be transmitted to the power price.

“open both ends and control the middle”

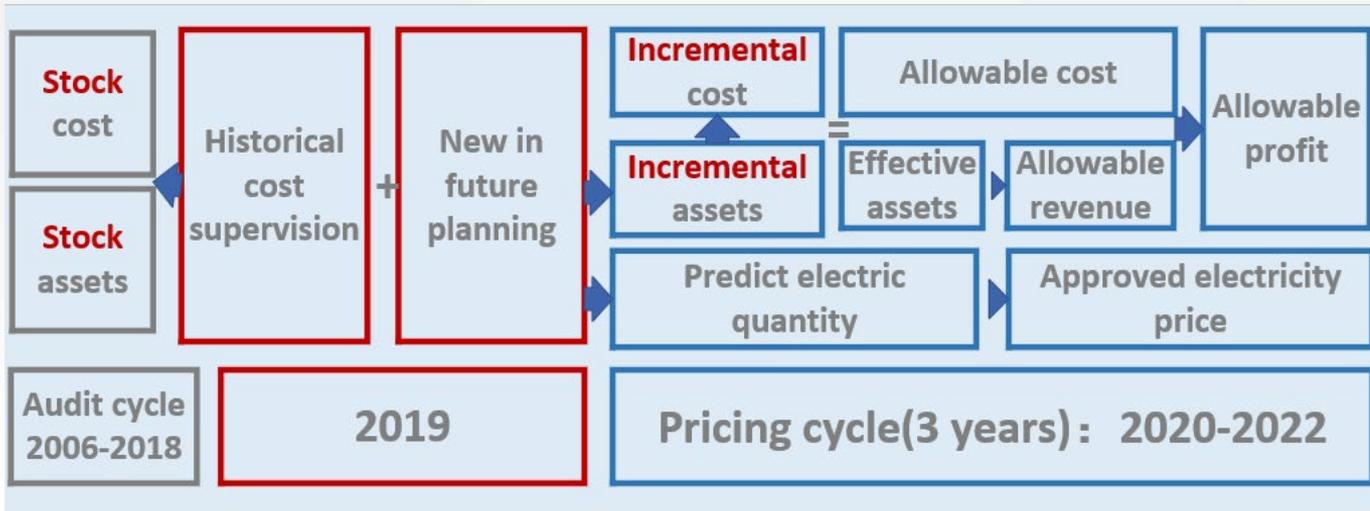


- **Feed-in tariff:** According to different types of power generation, the formation mechanism of on-grid electricity price is also different. With the promotion of power system reform, the policy mechanism of on-grid electricity price is constantly changing.

Generation type	Feed-on tariff	remarks
Coal-fired power	Price formation by market	Benchmark price plus floating up and down; Bring all power generation into the market
Natural gas power	Benchmark price	Implement differentiated on grid price mechanism
hydropower	Province: Benchmarking electricity price ; Cross province: be determined by both parties through negotiation	Pumped storage adopts two-part electricity price
wind power ; Photovoltaic power	Benchmark price of coal-fired power generation, or formed by market-oriented transactions	grid at an equal price
nuclear power	Benchmark price	It is not allowed to be higher than the benchmark price of coal-fired units

Transmission-distribution price:

Provincial Power Grid: The mode of "stock cost supervision + incremental planning prediction" is adopted, and the transmission and distribution electricity price is verified according to the mode of "allowable cost + reasonable income"



Regional Power Grid: according to the mode of "allowable cost + reasonable income"; Implement two-part price

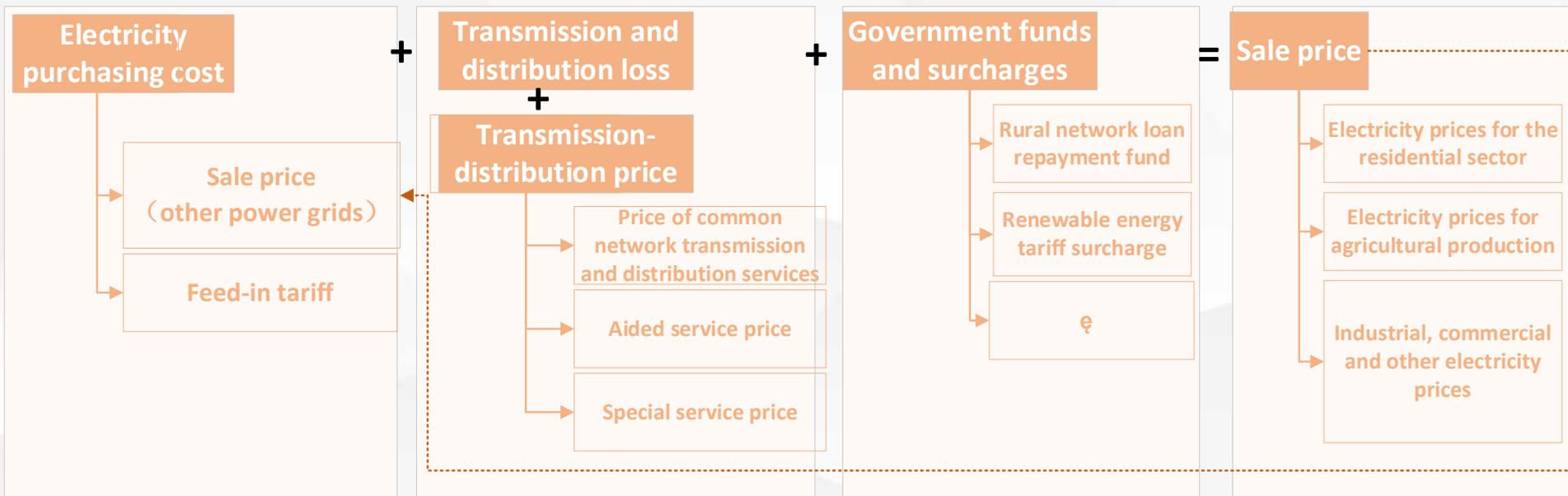
Trans provincial and trans regional Power Grid: Implement single electricity price; the operating period pricing method is adopted.

$$\text{Transmission price(excluding VAT)} = \frac{\text{average annual income}}{\text{design transmission capacity} \times (1 - \text{pricing line loss rate})}$$

□ Sale price(electricity price):

Sales price refers to the final electricity price of power users, which is composed of **power purchase cost**, **transmission and distribution loss**, **transmission and distribution price** and **government funds**.

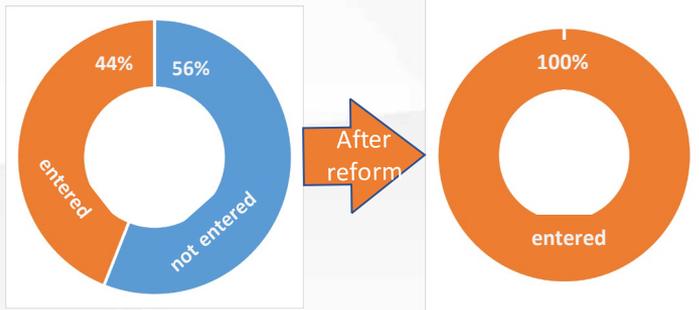
The sales price of power grid in China is classified price and time of use price



- ❑ **The step tariff is adopted for household electricity:** The residential step tariff divides the monthly power consumption of urban and rural residents into three grades according to meeting the basic power demand, normal and reasonable power demand and higher quality of life, and implements step-by-step increase.
- ❑ **Preferential policies are implemented for the use of electricity in agricultural production:** Agricultural production adopts a single electricity price, that is, the electricity fee is calculated and charged according to the amount of electricity consumption.

All localities should give priority to using low-cost power supply to ensure residents and agricultural production

❑ Promote industrial and commercial users to enter the market:

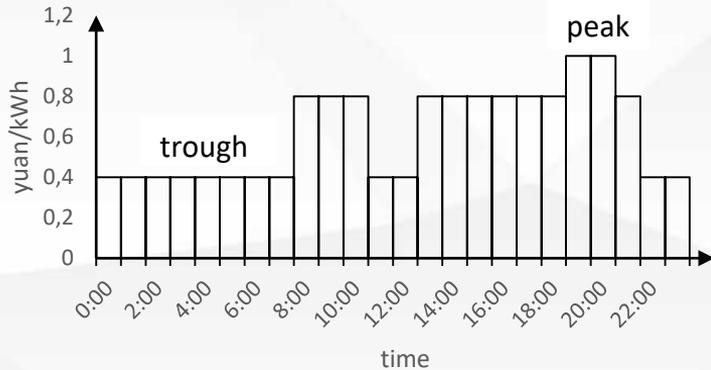


Orderly promote all industrial and commercial users who do not enter the market to enter the power market, and cancel the sales price of industrial and commercial catalogue. For users who have not purchased electricity directly from the power market for the time being, power grid enterprises shall purchase electricity on behalf of them.

□ Demand side price policy

- Strengthen the connection with time-of-use power price policy:

Accelerate the implementation of the **time-of-use price** policy, establish a **peak price** mechanism, guide users to use electricity at different peaks, **cut peaks and fill valleys**, and do a good job in the connection between market transactions and the time-of use price policy.



- **Interruptible price:**

Enable the user to interrupt or reduce the load according to the contract requirements during system peak or emergency

- **High-reliability price:**

Reduce the power consumption cost of low reliability users and ensure the power supply reliability of high reliability users



mainly for large industrial users.
Promote industrial restructuring and improve energy efficiency

01

Improve differentiated tariff policies

on the one hand, it is necessary to regularly evaluate and adjust the catalog time-of-use price. On the other hand, it is necessary to accelerate the construction of competitive power market, promote the formation of market-oriented time-of-use price system

02

Improve flexibility and security

Build a two-way interactive power market mechanism with the participation of both power generation and power users, improve the power ancillary service market and capacity cost recovery mechanism, fully explore the potential flexibility on both demand-side and generation side. And promoting efficient interaction and coordinated development of power grids, resources, load and energy storage.

03

Reflect the externalities

Improve renewable energy quota trading, explore green power trading, establish the price linkage mechanism between electricity and carbon market, promote the formation of market-oriented green energy consumption and circulation system, and facilitate the transition to clean and low-carbon energy.

Thank you for listening

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