



**Asia-Pacific  
Economic Cooperation**

## **APEC EGEEC 62 & EGCFE 2024 Joint Meeting**

# Clean Energy Utilization and Energy Efficiency in China

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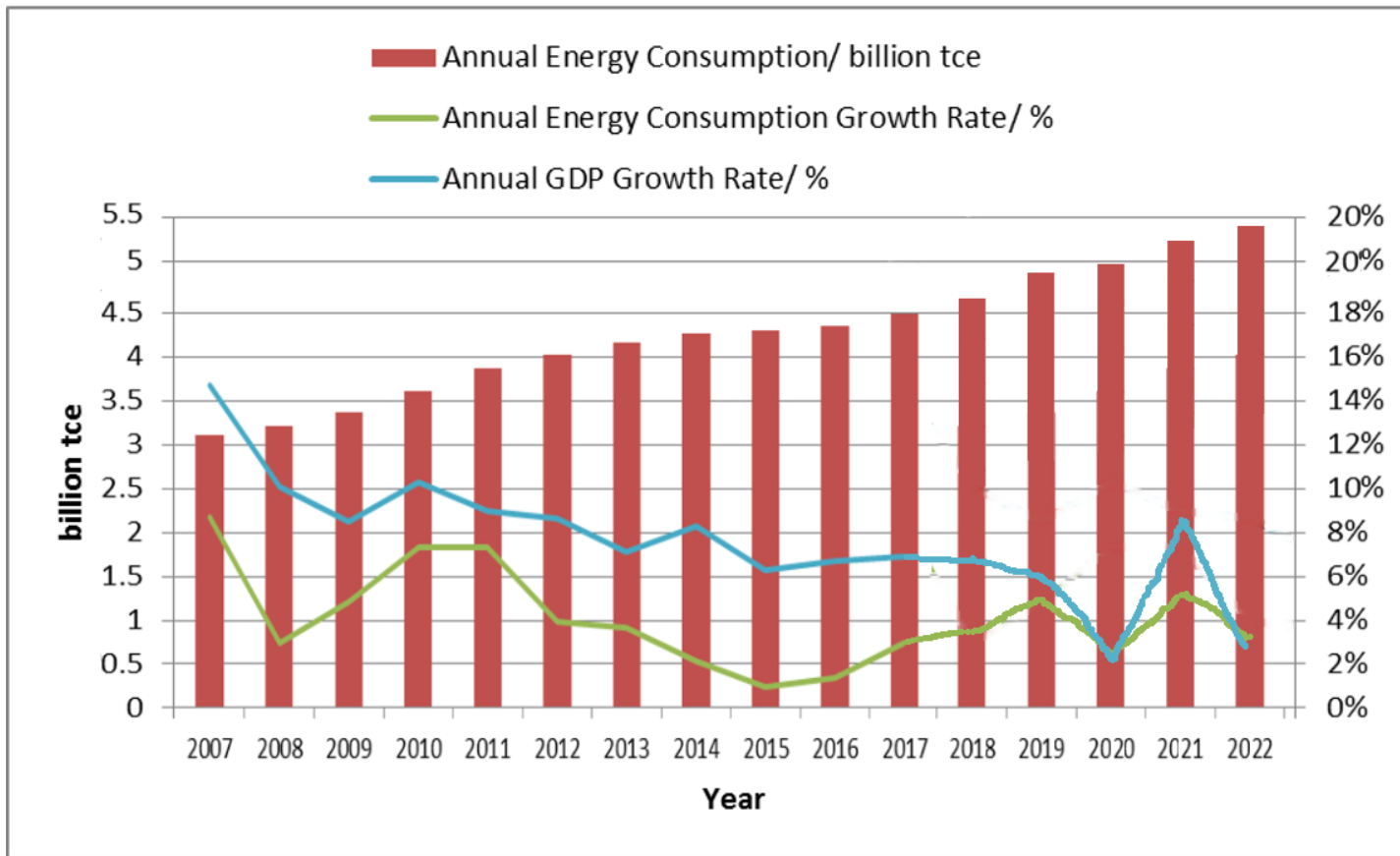
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# Energy consumption in China



- ◆ China is the largest economy in energy consumption.
- ◆ The energy intensity of China has reduced around 26.4% (annual average decrease of 3.3%) during 2012-2021, with the energy savings of 1.4 billion tce (ton of coal equivalent).





# Key Challenges

## Limited energy resources

- Oil and gas reserves is only 6% of average level of the world

## Limited environmental capacity

- Air pollution, water pollution and soil pollution accompanied with the industrialization

## Low energy efficiency

- Energy consumption per GDP is the twice of the average level of the world

## Assurance of energy security

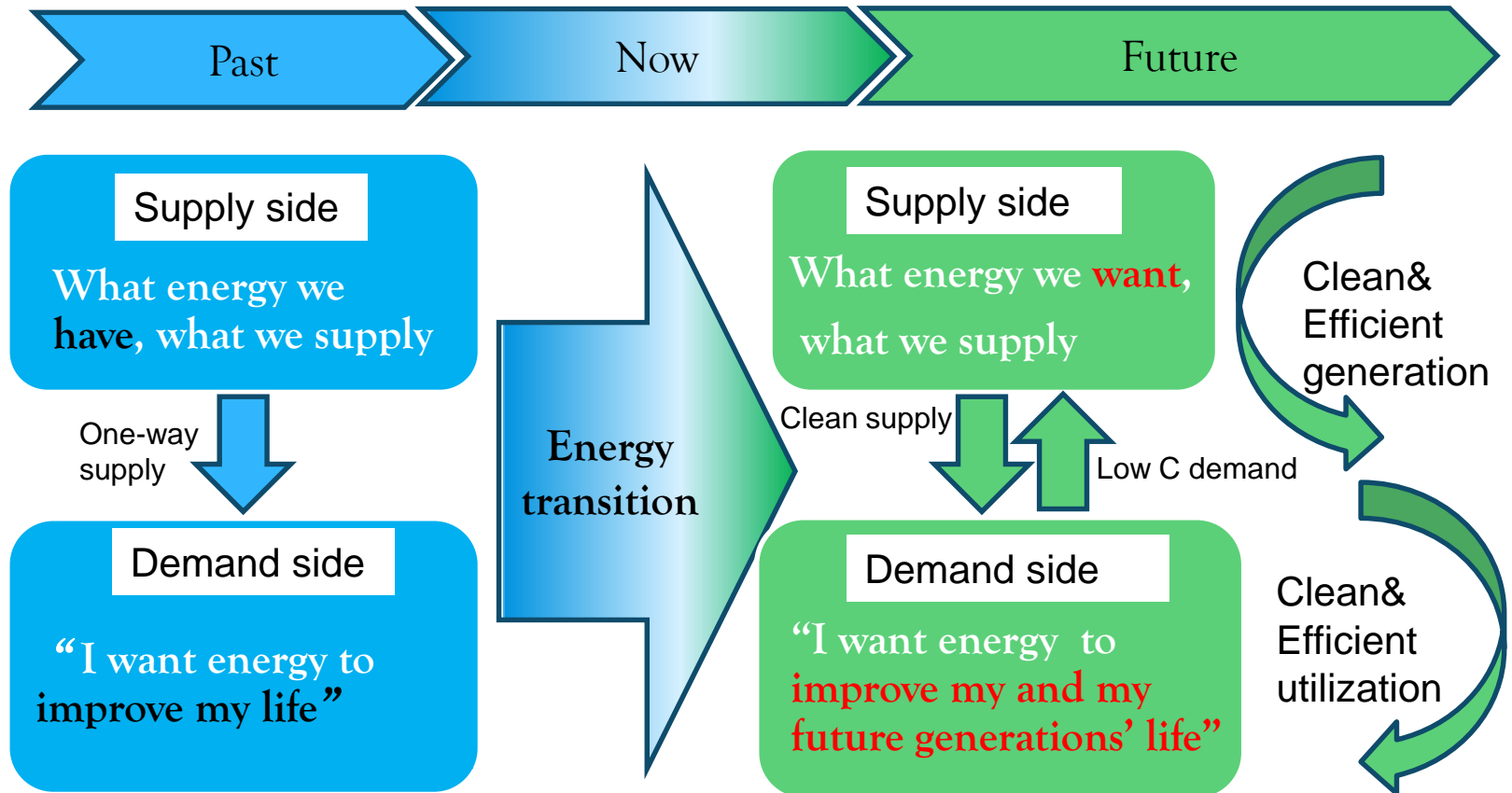
- Around 70% of crude oil is imported





# Key to Sustainable Development

**Meeting theme:** *From the Supply Side to the Demand side, utilization of clean energy and energy efficiency in realizing energy transition*

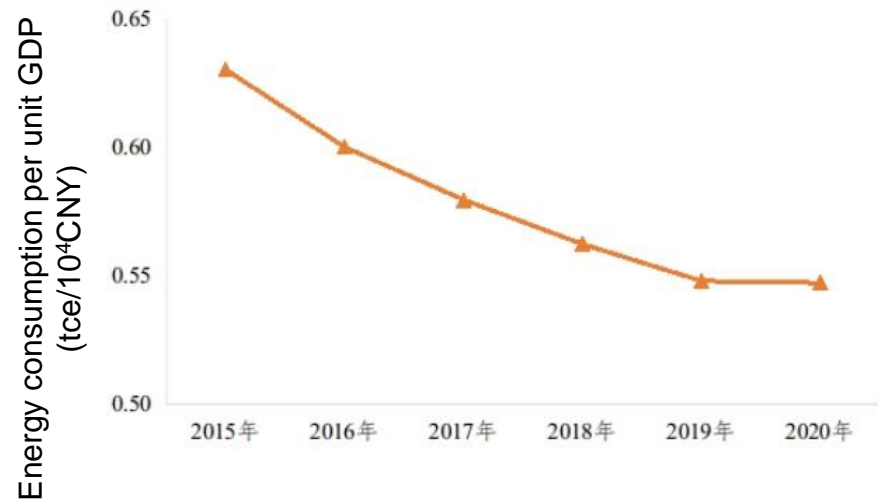


# History and Achievements



## Energy efficiency

- ◆ Since 1980s, energy efficiency has been set as the primary energy policy
- ◆ Since the 11th FYP period (2006-2010), the mandatory target for energy intensity reduction has been set in national FYP continuously.
- ◆ During the 13th FYP(2016-2020), China achieved a 5.7% of the average annual economic increase rate along with a 2.8% average annual increase in energy consumption, and resulted to the energy savings of over 650 million tce, 18.8% reduction in CO2 emission intensity.



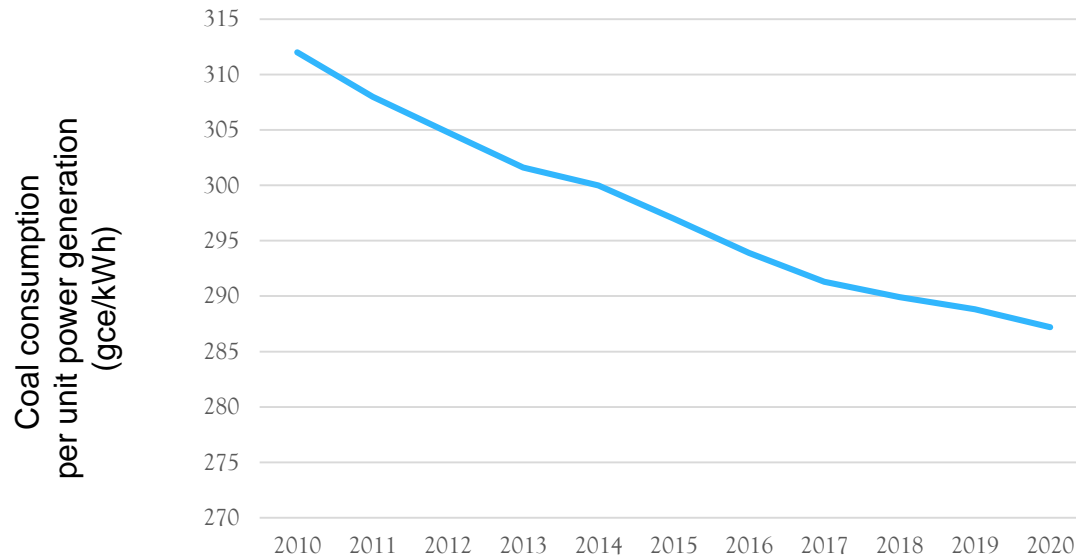
Energy intensity change during the 13rd FYP

# History and Achievements



## Clean fossil energy use: Coal

- ◆ During 2010-2020, the average coal consumption per unit power generation in China achieved an 8% decrease from 312 to 287 gce/kWh, which has reached the int'l advanced level. By 2020, the global biggest clean coal fired power generation system has been built up, that is, over 950000 MW installed capacity with ultra low emission.



Change in coal consumption for per unit power generation during 2010-2020 (for all the coal-fired power plants with capacity of over 6000kW)

# History and Achievements

## Clean fossil energy use: Oil and NG

- ◆ Oil:
    - Oil production and refinery: the energy system optimization has been doing in the oil industry since 2006, also mandatory standard for oil refinery energy intensity was revised in 2024, the industry energy intensity has been improved to the international level.
  - ◆ Natural gas:
    - City heating system, CNG as vehicle fuel
    - Industrial fuel and raw material
    - Gas fired power plant
- NG is much cleaner than other fossil energy, so the efficiency improvement and CO<sub>2</sub> reduction will be the major challenge for NG



# Strategy for Energy Conservation Within the 3060 Context



3060 targets were set for peaking CO<sub>2</sub> emission by 2030 and achieving carbon neutrality by 2060 in China. Important policies released containing the mid&long term strategy for energy conservation.

- ◆ *Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China* (released in 2021)
- ◆ *Guidance on effectively achieving peaking CO<sub>2</sub> emissions and carbon neutrality through following new development concept* (released in 2021)
- ◆ *Action plan for peaking CO<sub>2</sub> emissions by 2030* (released in 2021)
- ◆ *National Comprehensive Plan (2021-2025) for Energy Conservation and Emission Reduction* (released in 2021)
- ◆ *Guidance on improving the mechanism and policies for green-oriented transition of energy* (released in 2022)



# 3060 Targets for Energy Conservation and Carbon Reduction in China



Metrics	Targets for the 14 <sup>th</sup> five-year plan(2021-2025)	Targets for 2030 (peak the CO <sub>2</sub> emission)	Targets for 2060 (carbon neutrality)
Reduction of energy intensity (tce/GDP)	[13.5%]	Energy efficiency of the major heavy industrial sectors with huge energy consumption reached international advanced level	Energy efficiency reached international advanced level
Reduction of CO <sub>2</sub> emission intensity (ton CO <sub>2</sub> /GDP)	[18%]	Peak the CO <sub>2</sub> emission	Carbon neutrality
Share of non-fossil energy consumption	~ 20%	~ 25%	Over 80%

# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context



Main measures in the key sectors and areas

- ◆ *Energy industry transition*
- ◆ *Industrial sectors restructure*
- ◆ *Green transition of energy system*
- ◆ *Green transportation*
- ◆ *Green building*
- ◆ *Technology innovation and demonstration*
- ◆ *Regulations and standards*
- ◆ *Supporting policies*

# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

## ◆ *Energy industry transition*

### ➤ *Smart energy production and supply*

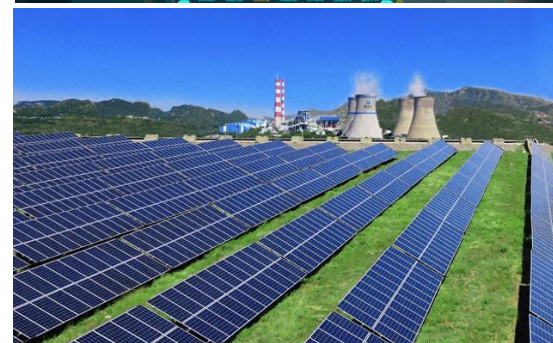
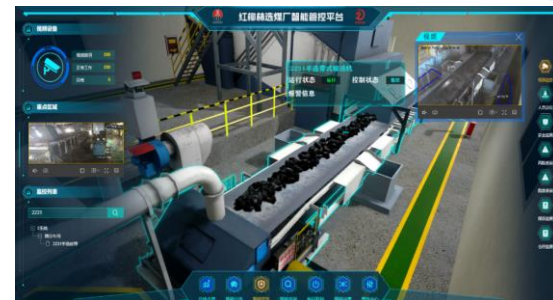
~*Smart energy production*: to accelerate the digitalization and intellectualization of the coal mines, oil and gas field, power plant, etc

~*Smart energy integration*: to conduct fossil and non-fossil energy integration, the supply-demand side integration (simultaneous two-way response)

### ➤ *Green fossil energy industry*:

~*Environmental protection*: to stick on the stringent environmental protection standard on the fossil energy industry

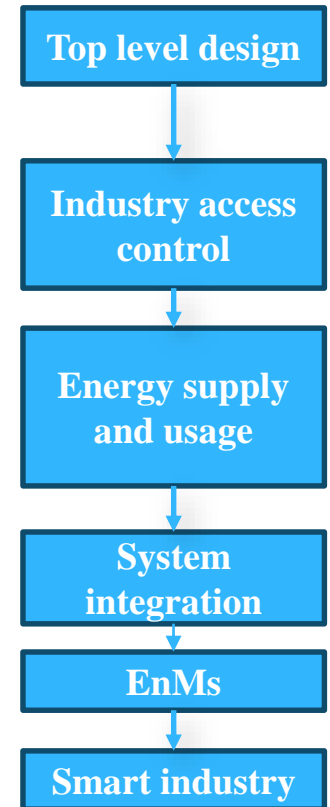
~*Carbon reduction*: to deploy CCUS to the fossil energy industry



# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

## ◆ *Industry restructure:*

- Make plans for carbon neutrality in key industrial sectors.
- Impose stringent control (energy intensity standards) on the redundant expansion of industrial sectors accounts for high energy consumption and emissions.
- Improve low carbon and green energy supply and industrial electrification.
- Deploy more high-efficient energy-using equipment.
- System integration and optimization
- Expand engagement in energy management activities.
- Upgrade the industry by integrating with the emerging tech such as IoT, AI, 5G communication



# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

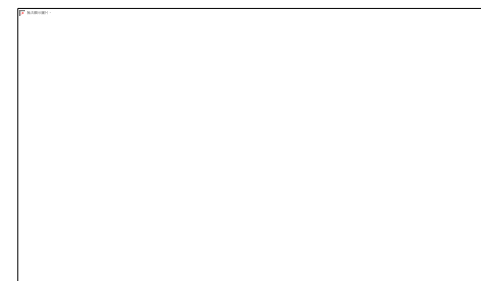
## ◆ *Green transportation :*

- Widely deployment of green transportation vehicles, new energy driven vehicles, hydrogen refilling stations. Accelerate the development of electric railways, charging and swap battery networks.

- During 2016-2022, the new energy automobile inventory increased from 1 million to 13 million, the market share increased from 0.6% to 4.1%.

- By 2023, the high speed railway network milage is 45000 km and expected to grow up to 70000 km by 2035.

- Improve the energy efficiency standards of fuel vehicles



# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

## ◆ *Green buildings:*

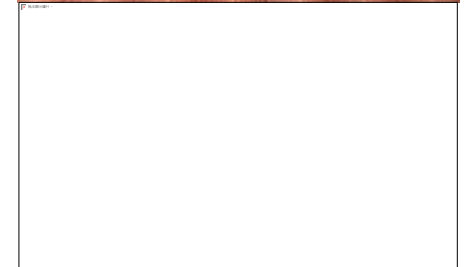
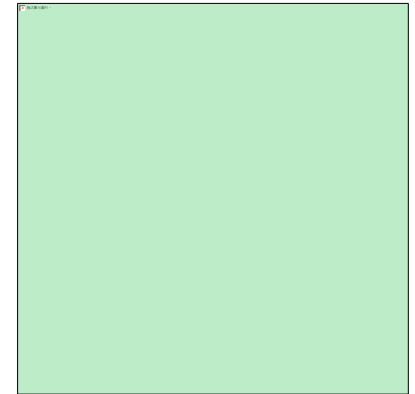
- Improve the green building standards
  - ✓ By 2025, new buildings must follow green building codes
- Promote energy-saving retrofitting for the existing buildings.
  - ✓ By 2030, the energy efficiency of retrofitted existing building at the city level expected to increase by 20%
- Optimize the energy supply to building
  - ✓ Heat loss of the district heat supply network expects to decrease by 5% by 2030 compared to 2020.
- Improve building electrification.
  - ✓ By 2030, the electricity expects to account for 65% of the energy consumption of building sector.



# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

## ➤ *Regulations and standards:*

- Laws and regulations.
  - Revisions to the *Energy Conservation Law, Electric Power Law, Law on the Coal Industry, Renewable Energy Law, Circular Economy Law, etc.*
- Standards.
  - Improve the energy intensity standards for industrial process and,
  - energy efficiency standard for end-use equipment, and the supporting standards
- Statistics and monitoring capacity.
  - Improve the energy consumption monitoring and metrology system in the major industrial sectors and,
  - energy consumption online monitoring system for the key energy consumers in the industrial sectors.



# Main Measures for Clean Energy Utilization and Energy Conservation in the 3060 Context

## ◇ *Supporting policies:*

### ➤ Finance and tax policies

- Implement tax refund for purchasing energy efficient products, green vehicles.
- Improve the policies for ladder type electricity price, peak-valley electricity price, pricing mechanism for renewable energy based electricity, punitive electricity price.

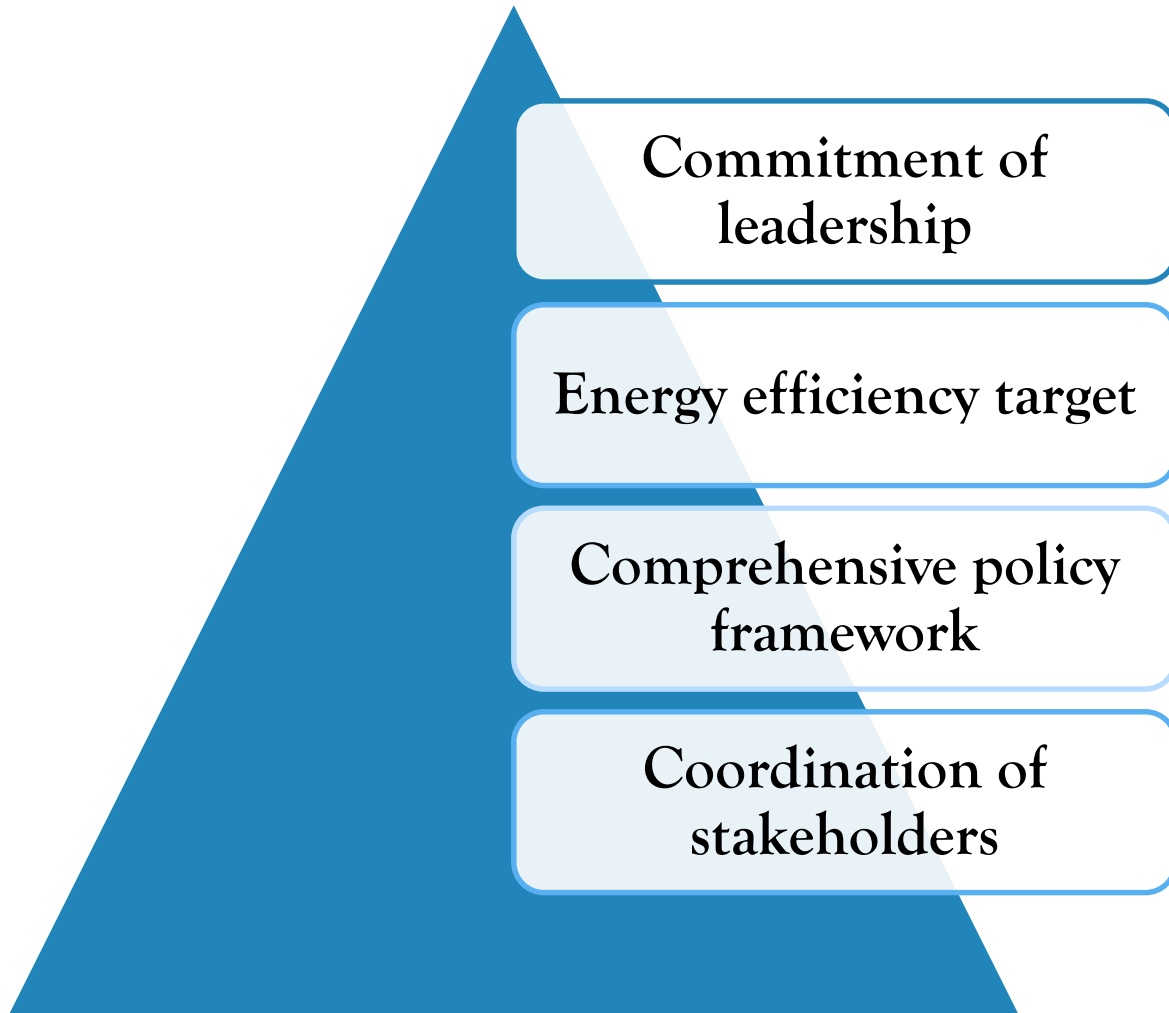
### ➤ Market mechanism.

- Improve the energy consumption allowance trading mechanism.
- Promote EMC and the energy saving services.





# Key to success



# Suggestions



- Policy
  - Cost-effective evaluation of policies
  - Continuous improvement of the policy portfolio (regulations and standards)
- Capacity building
  - Basic data and database
  - International collaboration
- Emerging energy-using areas
  - Data centers etc.



**Thank you for your attention!**

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