THE HONG KONG INSTITUTION OF ENGINEERS
香港工程師學會

RENEWABLE ENERGY TRANSITION AND ROLE OF CARBON TRADING

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Latest Update

Global Energy Landscape Change

Significant changes due to climate change concerns, technological advancements, and policy interventions

01

Based on Renewable Capacity Statistics 2025 released by IRENA, 2024 saw a **massive increase** in renewable power capacity totaling 4,448 GW

02

Addition of 585 GW in 2024, accounted for 92.5% of global power additions,

03

Record rate of **annual growth at 15.1%**

04

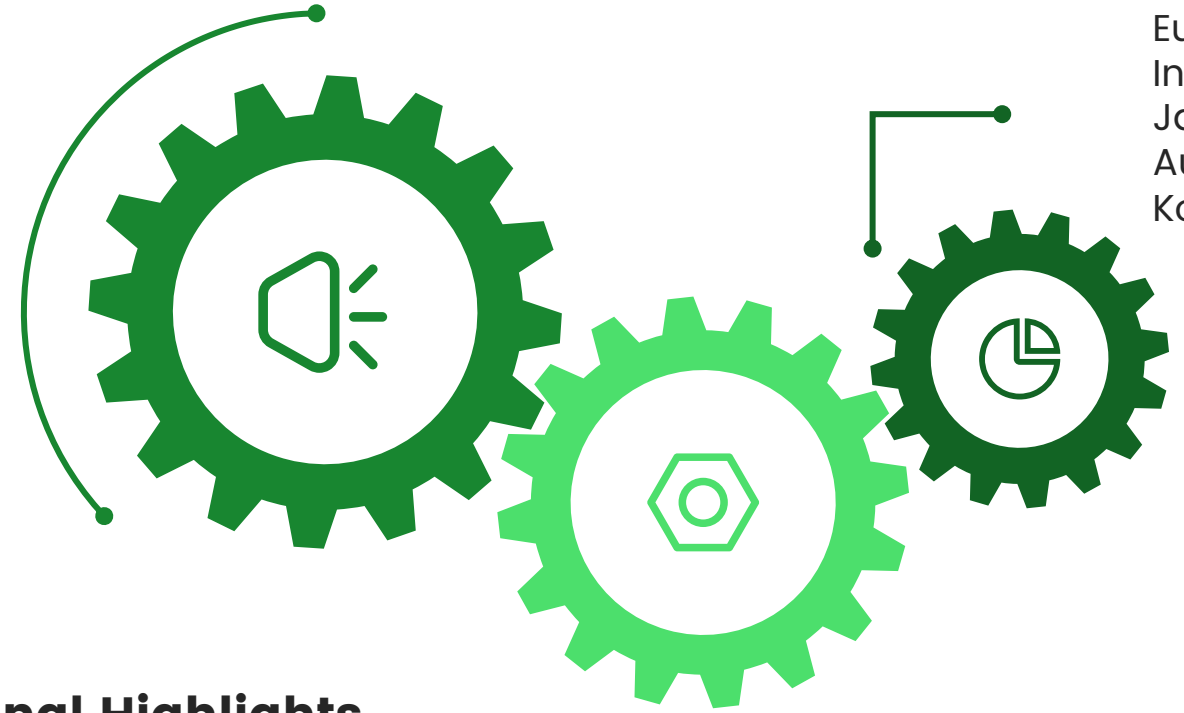
Solar Energy (2015–2024)

Installed Capacity (GW)

China 44- 890
US: 24 - 180
Europe: 100 - 340
India: 6 - 97
Japan: 34 - 92
Australia: 5 - 38
Korea: 3 - 27

Global Growth

Solar energy has experienced **exponential growth** driven by falling costs and government incentives.



Regional Highlights

China: World leader in solar capacity, surpassing 800 GW by 2024.
Europe: Significant expansion due to the EU Green Deal.
US: Growth driven by state- level incentives and federal tax credits.
India: Ambitious targets under the National Solar Mission.
Australia: High solar adoption, particularly residential rooftop systems.

Wind Energy (2015–2024)

01

Trends

Offshore wind has grown rapidly alongside onshore installations.

02

Regional Highlights

Europe: Pioneer in offshore wind, with major projects in the North Sea.

China: Largest wind energy producer globally.

US: Growth in Texas and Midwest regions; emerging offshore potential.

India & Australia: Focus on onshore wind due to geographic advantages.

03

Key Metric: Installed Capacity (GW)

China: 130- 520
US: 70- 150
Europe: 140- 270
India: 25- 48
Japan: 3- 6
Australia: 4- 15
Korea: 1- 2

Hydropower (2015–2024)

Stability

Hydropower remains a cornerstone of renewable energy but faces challenges like environmental concerns.

Regional Highlights

China: Dominates global hydropower, with projects like Three Gorges Dam.

Europe & US: Limited new capacity; focus on modernization of existing plants.

India: Potential untapped in Himalayan rivers.

Key Metric: Installed Capacity (GW)

China: 320- 440

US: 102- 103

Europe: 214- 225

India: 47- 52

Japan: 50- 50

Australia: 8.2- 9.6

Korea: 6.5- 6.5

Overall Transition

The past decade has seen **remarkable progress** in renewable energy

Challenges remain in achieving a sustainable and equitable energy transition

Collaborative international efforts are essential to meet global climate goals

The total renewable energy generated in 2024 **remains insufficient** to meet global energy demands

Carbon Neutrality

Achieving carbon neutrality and supporting the United Nations Sustainable Development Goals (UNSDG) will require additional efforts, particularly through:

- **Financial Value**: Incentivizing investment in renewable energy projects
- **Environmental Value**: Reducing greenhouse gas emissions through renewable solutions
- **Social Value**: Promoting equity and sustainable livelihoods for communities worldwide

According to the 2023 "State and Trends of Carbon Pricing" report by the World Bank, the value of carbon pricing instruments surpassed $900 billion in 2022, driven by a surge in carbon prices and expanded market coverage

Carbon trading plays a **critical role** in bridging the gap by assigning market-based value to carbon reduction efforts

Carbon Trading

According to the World Bank's State and Trends of Carbon Pricing 2023 report, carbon pricing instruments currently cover about 23% of global greenhouse gas (GHG) emissions

The EU Emissions Trading System (EU ETS), China's national carbon market, and other regional systems (e.g., Korea, California, and Canada) account for the bulk of this coverage

Carbon prices are expected to increase globally to meet 1.5°C climate targets

Challenges

The High-Level Commission on Carbon Pricing recommends carbon prices of $50–$100/ton by 2030 to be effective for meeting the 2°C target, with higher prices likely required for the 1.5°C target.

The pace of carbon price increases will depend on:

- Political will and public acceptance.
- Economic impacts on industries and households.
- The expansion of global carbon pricing instruments

Opportunities

Belt & Road Initiative

- Partnership for common prosperity
- Foster technology transfer, investment and growth

International Collaboration

- Harmonisation of global/regional/national standards
- Joint effort to accelerate development and integration

Multi-Discipline Teamwork

- Interdependence of humanity and nature ecosystems
- Synergies between stakeholders and professions

HKIE's Sustainability Drive

Capacity Building

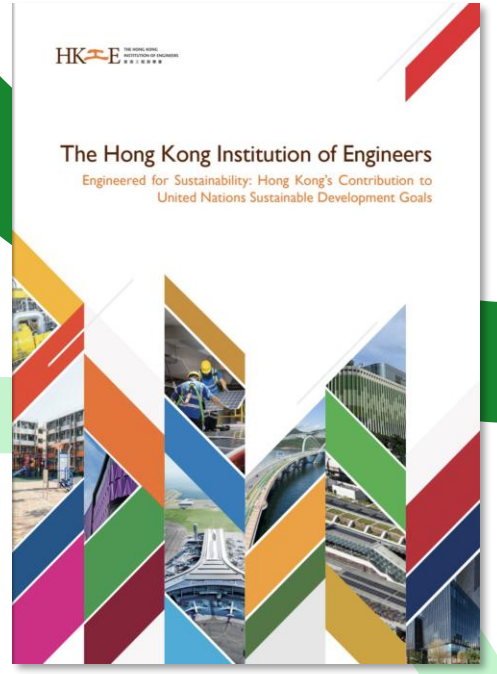
- Graduate Attributes and Professional Competence Standards with UNSDGs
- GBA Carbon Trader Certification
- Training on new energy and hydrogen economy

Public Education

- UNSDGs eBook on HK engineering contributions
- Vdeo campaign showcasing sustainability focuses of all our engineering disciplines

Policy Engagement

- Advice and suggestion for policy formulation
- Global dialogues and conferences



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