



Achieving CO₂ Emission Reductions in APEC

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1. APEC's Progress Toward its Renewable Energy Goal

2. The Challenges of CO₂ Emission Reductions

3. Key Takeaways



APEC's Progress Toward its Renewable Energy Goal



RE share of energy consumption is ahead of schedule



From 2010 to 2022, APEC increased modern renewable energy's share in **final energy consumption** by 75.6%, from **6.02%** to **10.57%**, leaving only a **1.47** percentage point increase over the remaining eight years to reach the APEC's renewable energy doubling goal



RE in the power sector is also ahead of schedule

30%



Between 2010 and 2022 APEC has increased the share of modern RE in power generation by 63.4%, from 15.58% to 25.46%



The Challenges of CO₂ Emission Reductions



Emissions Remain On An Upward Trend



- Generation from carbon emitting sources, and therefore carbon emissions, continue to grow at a steady pace.
- Generation from carbon-emitting sources is growing at a slower rate than carbon-free generation, but since it starts from a much larger base, carbon emitting sources still produced almost twice as much electricity in 2022 compared to carbon-free sources.



Electricity Demand Growth & Carbon-Free Generation



- Although renewable energy has been accelerating, other carbon free generation has not.
- Total APEC electricity demand is increasing more rapidly than carbon free generation.

Note: Modern renewables is a subset of carbon free generation. Carbon-free also includes nuclear, biomass, biofuels, low-carbon hydrogen, and fossil-fired generation with CCS.



Typical Capacity Factors



- Variable renewable energy sources typically have lower capacity factors than dispatchable electricity generators.
- The lower capacity factors must be considered as an economy determines the optimal mix of dispatchable and non-dispatchable generators in its electricity supply.



Grid reliability requires "dispatchable" generation



- Electrical grid reliability will become an increasingly important issue as the share of non-dispatchable energy increases.
- Non-dispatchable energy sources cannot be relied to meet peak load under all conditions.
- Carbon-free generation includes both dispatchable and nondispatchable energy sources.



Key Takeaways



Key Takeaways

- APEC adopted a renewable energy doubling goal in 2014 and is **well ahead of schedule in meeting that goal.**
- Nevertheless, APEC CO2 emissions from power generation are still rising at a steady rate.
- The reasons for this surprising result are **complex and vary by economy**, but include:
 - **Electricity demand is increasing** in most APEC economies.
 - Wind turbines and solar panels generally have **lower capacity factors** than thermal plants.
 - Wind and solar generation is **not dispatchable**.
- To maintain grid reliability, power systems must have **dispatchable energy sources that exceed peak demand.**
- Including dispatchable, zero and low-carbon electricity generation technologies in a power system can enhance reliability while also reducing CO2 emissions.







Thank you

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