Capacity expansion in International Electricity Market Module (IEMM)

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International Energy Outlook (IEO)

- International Energy Outlook (IEO) presents an assessment of long-term world energy markets, through 2050 in the most recent IEO2021.

- Projections are provided for 16 world regions, divided according to Organization for Economic Cooperation and Development (OECD) members and nonmembers (non-OECD).
World Energy Projection System (WEPS)

• WEPS is an integrated model that aims to capture various interactions of economic changes and energy supply, demand, and prices across regional markets.

• Core set of WEPS modules

**Demand Modules**
- Residential
- Commercial
- Industrial
- Transportation

**Transformation Modules**
- Electricity
- District heating

**Supply Modules**
- Coal
- Oil and natural gas

**Global Activity Module**
- Greenhouse Gas Module
- Convergence Module
International Electricity Market Module (IEMM)

• For each of the 16 WEPS regions, IEMM projects:
  – Electricity generating capacity additions and retirements
  – Electricity generation
  – Electricity added to and removed from storage
  – Electricity sold and purchased
  – Electricity delivered to consumers
  – Fuel consumed in electricity generation
  – Carbon dioxide emissions
  – Electricity prices

• Least-cost optimization, subject to constraints (emission caps, “renewable portfolio standards”)

• Limited in resolution in terms of other market details aside from weighted average cost of capital (WACC)
Economic growth is anticipated to be highest in non-OECD regions

Average annual percentage change in GDP for OECD regions, 2020–50

- Australia and New Zealand
- Mexico and Other Americas
- United States
- Canada
- OECD Europe
- South Korea
- Japan

Total OECD

Average annual percentage change in GDP for non-OECD regions, 2020–50

- India
- Other Asia
- Africa
- China
- Other Europe and Eurasia
- Other Americas
- Middle East
- Russia
- Brazil

Total non-OECD

Strong growth in energy demand is expected in non-OECD countries, but it implies unprecedented investment for some regions.

Total generating capacity for OECD and non-OECD regions by technology, 1990, 2020, and 2050.

Net generating capacity additions between 1990–2020 and 2020–2050 for selected regions.

Q: “What factors influence investment decisions in the electric power sector around the world, as it transitions to a low-carbon future?”
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U.S. Energy Information Administration | https://www.eia.gov/
International Energy Outlook | https://www.eia.gov/outlooks/ieo/
Annual Energy Outlook | https://www.eia.gov/outlooks/ieo/
Short-Term Energy Outlook | https://www.eia.gov/outlooks/steo/

Levelized Cost and Levelized Avoided Costs of New Generation Resources in the Annual Energy Outlook 2022 |
https://www.eia.gov/outlooks/aeo/electricity_generation.php