Issue in Focus from IEO2020: Impacts of Changes in Natural Gas Prices and Renewable Capital Costs on the Asian Electric Sector

for
Center for Strategic and International Studies
October 14, 2020 | Washington, DC

by
Michelle Bowman, Lead Operations Research Analyst
U.S. Energy Information Administration
Non-OECD electricity generation grows fastest in Asia

Source: Energy Information Administration, International Energy Outlook 2019

Michelle Bowman, CSIS
IEO2020 Issue in Focus: Asia
October 14, 2020
Reference case projections result from specific natural gas price and renewable energy capital cost assumptions

Electricity generation by fuel, China
Comparative Reference case
billion kilowatthours

Electricity generation by fuel, Other Non-OECD Asia
Comparative Reference case
billion kilowatthours

Note: Other fuels representing a small percentage of generation are not shown
Source: Energy Information Administration, International Energy Outlook 2020 Comparative Reference case

Michelle Bowman, CSIS
IEO2020 Issue in Focus: Asia
October 14, 2020
Changes in natural gas prices and renewable energy capital costs could shift the electricity sector fuel mix in Asia

<table>
<thead>
<tr>
<th>Delivered natural gas price</th>
<th>Renewables capital cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Nominal</td>
<td>Comparative Reference case</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

High Nominal Low

High High

Comparative Reference case

Low Low
In China, economics of competing technologies and emissions policies drive decreases in coal generation

**Electricity generation by fuel, China**
Comparative Reference case
billion kilowatthours

- Coal
- Solar
- Wind
- Hydro
- Natural gas
- Nuclear

**Electricity generation by select fuels, China**
billion kilowatthours

<table>
<thead>
<tr>
<th>Renewables capital cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

- Wind
- Natural gas
- Solar
- Nuclear

Note: Other fuels representing a small percentage of generation are not shown
Source: Energy Information Administration, International Energy Outlook 2020

Michelle Bowman, CSIS
IEO2020 Issue in Focus: Asia
October 14, 2020
In Other Non-OECD Asia, competition exists between coal, natural gas, and renewable technologies.

Electricity generation by fuel, Other Non-OECD Asia
Comparative Reference case
billion kilowatthours

Electricity generation by select fuels, Other Non-OECD Asia
billion kilowatthours

Renewables capital cost

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>coal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>natural gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hydro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>solar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wind</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Other fuels representing a small percentage of generation are not shown.
Source: Energy Information Administration, International Energy Outlook 2020

Michelle Bowman, CSIS
IEO2020 Issue in Focus: Asia
October 14, 2020
Polices, markets, and resources determine the impact of natural gas prices and renewable capital costs on Asia’s generation mix

- **China**: Emission policies favor growth away from coal-fired generation
  - Low natural gas prices significantly shift the generation mix to predominantly natural gas
  - High natural gas prices with low renewable costs could lead to solar becoming the predominant source of electricity generation by 2050

- **Other Non-OECD Asia**: Without a unified emissions policy, coal, natural gas, and renewables compete, but fossil fuels remain the dominant source of generation in all cases
  - Low natural gas prices could make natural gas the primary fuel for electricity generation
  - High natural gas prices coupled with low renewable capital costs could double solar, wind, and hydropower generation over Comparative Reference case levels