China’s Energy Supply Crunch
Can we avoid a painful transition in China – and beyond?

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The current power crunch
Power crunch: Strong power demand rebound, led by industries

China’s electric power demand continues to be dominated by industries, especially heavy industries.

![Power demand growth of typical upstream industrial sector](image1)

![China’s power demand by sector, 2019](image2)

Government proposes three measures, with the goal of securing energy supply in livelihoods sectors.

![The NDRC’s measures to secure energy supply in the 2021/22 winter season](image3)
Those measures are in fact very much in line with the 14th Five-Year Plan outline issued in 2020

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<th>Announced policy directions/targets for 14th FYP thus far</th>
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<td><strong>Peak carbon emissions before 2030 and carbon neutrality by 2060</strong></td>
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<td><strong>Secure energy supply</strong></td>
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<td>• Clean and efficient use of coal</td>
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<td>• Emphasize domestic oil and gas production and storage, and diversifying supply</td>
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<td><strong>Develop clean energy</strong></td>
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<td>• 20% non–fossil fuel in primary energy use</td>
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<td>• Construction of integrated clean energy base</td>
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<td>• Installed nuclear capacity to reach 70 GW</td>
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<td><strong>“Cap/ intensity dual control” in energy consumption and carbon emissions</strong></td>
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<td>• 13.5% reduction in energy intensity</td>
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<td>• 18% reduction in carbon emissions intensity</td>
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<td><strong>Market mechanism and cost reduction</strong></td>
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<tr>
<td>• Establishment of carbon trading market</td>
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<td>• Continued energy market reform</td>
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<td><strong>Strengthen pollution control</strong></td>
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<td>• Reduce heavily polluted days</td>
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<td>• Clean up highly polluted water bodies by 2025</td>
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Note: A heavily polluted day is when the Air Quality Index is above 200.
Source: IHS Markit

What does this mean for climate policies?
i.e., Will China be able to reach peak coal / peak CO₂ before 2030?
Peak coal demand ≠ Peak coal-fired power
Technically, coal demand can peak while coal-fired power continues to expand.

China’s coal consumption

Non-power coal demand peaked in 2015

Chinese coal consumption by sector, 2010 vs 2019

Centralized, utility-scale coal-fired power plants have significantly reduced their conventional pollutant emissions during a 2012-16 campaign

Air pollution emissions from the power sector dropped significantly during 2011–16

Centralized, utility-scale
How much more can coal-fired power expand in China without jeopardizing its climate goals?

IHS Markit’s China coal-fired power capacity outlook

- **2005–15**: Strong power demand growth
- **2016–20**: Smog control
- **2020–30**: Carbon emission peaking
- **2031–50**: Significant coal phaseout and retrofit

Gross additions and retirements (GW)

Installed capacity (GW)

Source: IHS Markit

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Having coal or gas plants doesn’t mean one has to run it frequently

- Reserve capacity needs to be above and beyond forecast peak to ensure supply reliability under unexpected circumstances:
  - Unscheduled outages
  - Extreme weather
- Guangdong had outages this May:
  - Demand upswing driven by economic recovery and unusually hot weather
  - Supply shortage from low hydro flow
  - Thermal units offline for scheduled maintenance in the spring
- Climate-related extreme weather will make reserve capacity even more important
- Storage technologies are critical

Historical peak load pattern for Guangdong (2019)

Source: IHS Markit, National Development and Reform Commission

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China stops building coal plants overseas

A long-term outcome of China’s “dual control” is the migration of industries
Where will industries go next?

Coal-fired power projects in South and Southeast Asia

Vietnam power capacity annual gross additions

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