International Energy Agency

国际能源署

An energy sector roadmap to carbon neutrality in China 中国能源体系碳中和路线图

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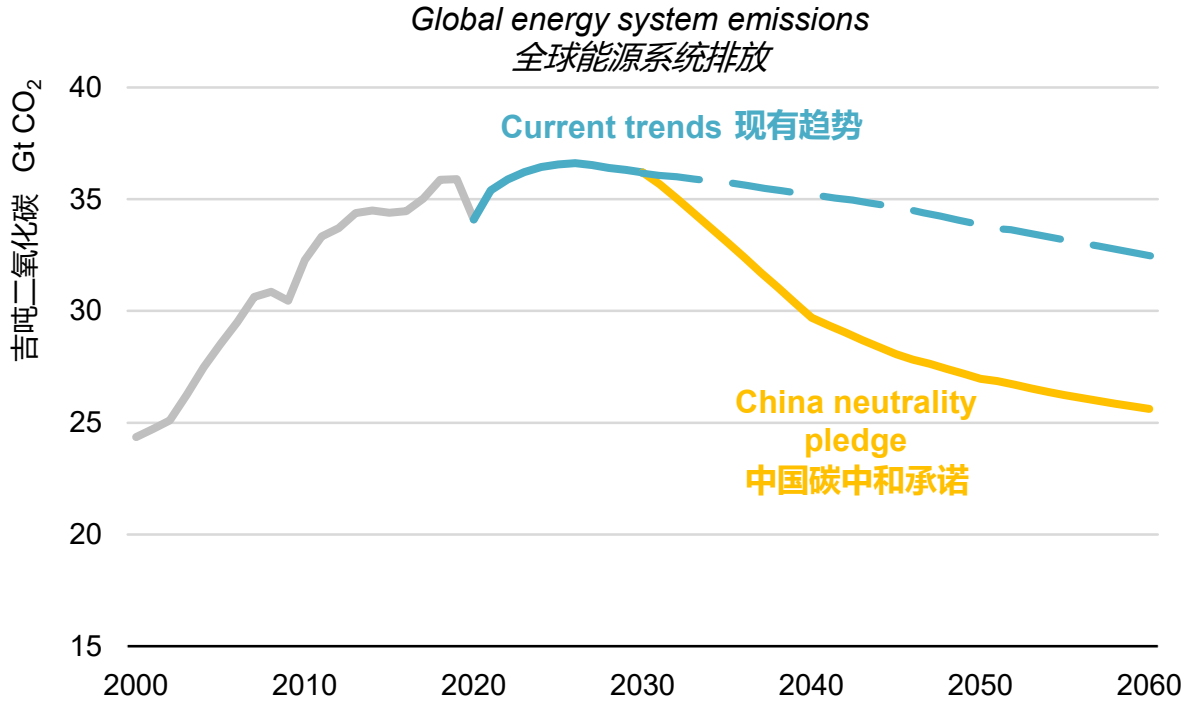
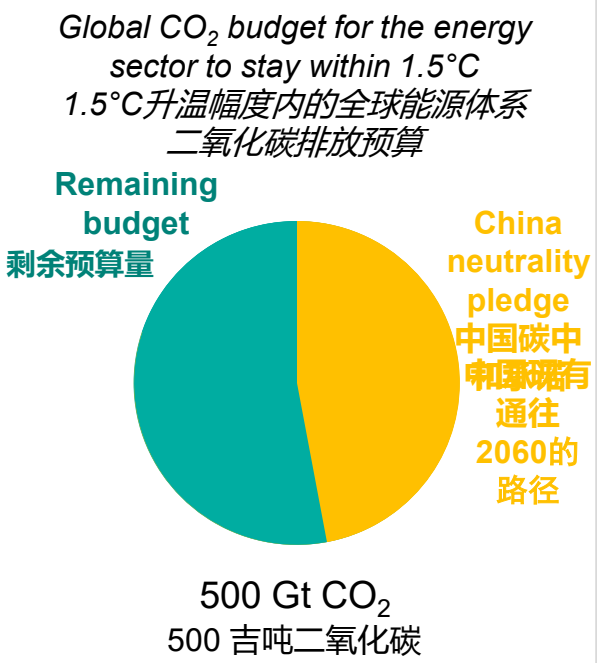
A world in motion, moved by China
在中国的推动下，一个变化中的世界

Growth of key indicators, 1980 to 2020
1980年至2020年关键指标的增长情况

China's rapid economic development lifted hundreds of millions of people out of poverty. Today, China is the largest source of fossil fuel use & CO_2, but also the world's centre for the manufacturing & deployment of clean energy.
中国经济的快速发展使数以亿计的人摆脱了贫困。如今，中国是化石燃料使用和二氧化碳排放的最大来源，但也是世界清洁能源的制造和部署中心。

China's carbon neutrality pledge is significant for the world
中国的碳中和承诺对世界意义重大



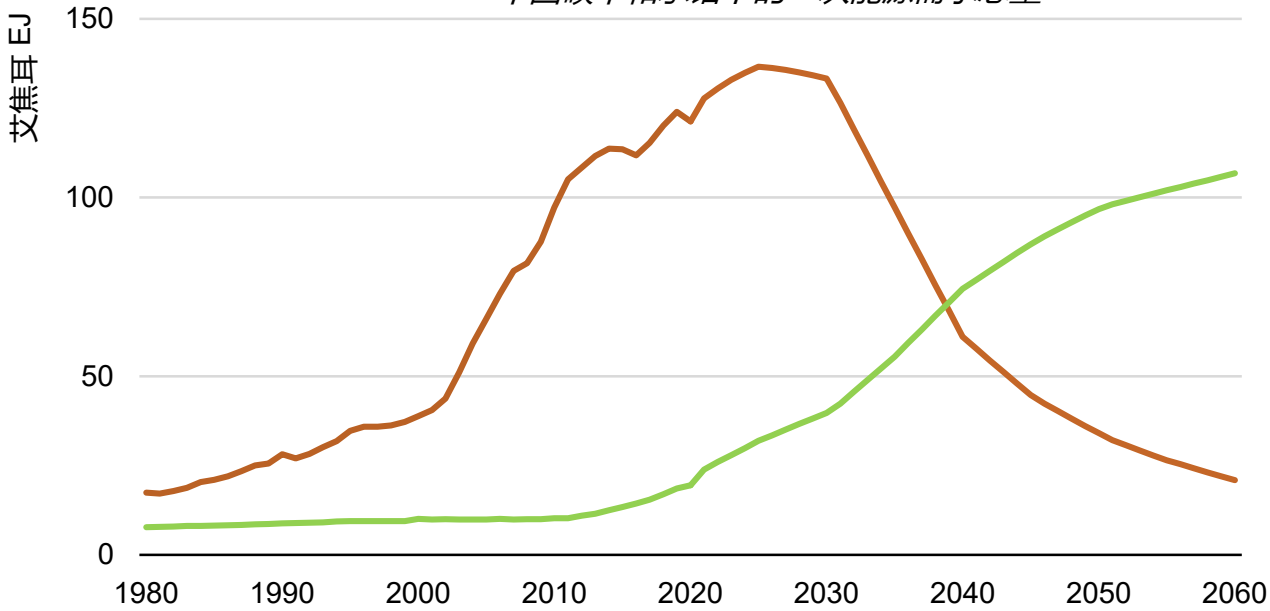


China's carbon neutrality pledge is an important contribution to the fight against climate change; but the global emissions budget for limiting the global temperature rise to 1.5 °C is very tight.
中国的碳中和承诺将对应对气候变化做出重要贡献；但将升温幅度控制在1. 5℃内的全球排放预算仍非常紧张。

A history repeated… but low-carbon
历史重演，但往低碳方向发展

Total primary energy demand under China neutrality pledge

中国碳中和承诺下的一次能源需求总量



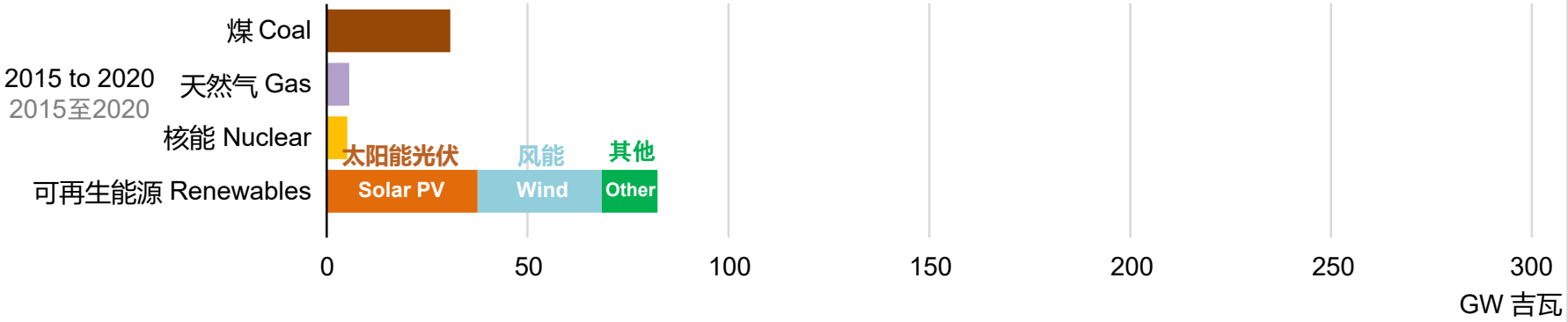
*Low-carbon includes fossil fuels with CCUS
“低碳”包括应用CCUS技术后的化石燃料

China’s carbon neutrality pledge means solar becomes the largest primary energy source by around 2045. Demand for coal drops by more than 80% by 2060, oil by around 60% and natural gas by more than 40%.

中国的碳中和承诺意味着到2045年左右太阳能将成为最主要的一次能源。到2060年，对煤炭的需求将下降80%以上，石油需求下降约60%，天然气需求下降40%以上。

A power mix dominated by renewables
以可再生能源为主的发电来源组合

Average annual power capacity additions in China, historic and under China neutrality pledge
中国历史上和中国碳中和承诺下的年均新增发电装机容量



Renewables-based generation, mainly wind and solar PV, increases seven-fold between 2020 and 2060. There is no coal-fired power generation without carbon capture as of 2050.

基于可再生能源的发电量，主要是风电与太阳能光伏，在2020年和2060年之间增加了7倍。到了2050年，不再有未应用碳捕获装置的燃煤发电。

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GW 吉瓦

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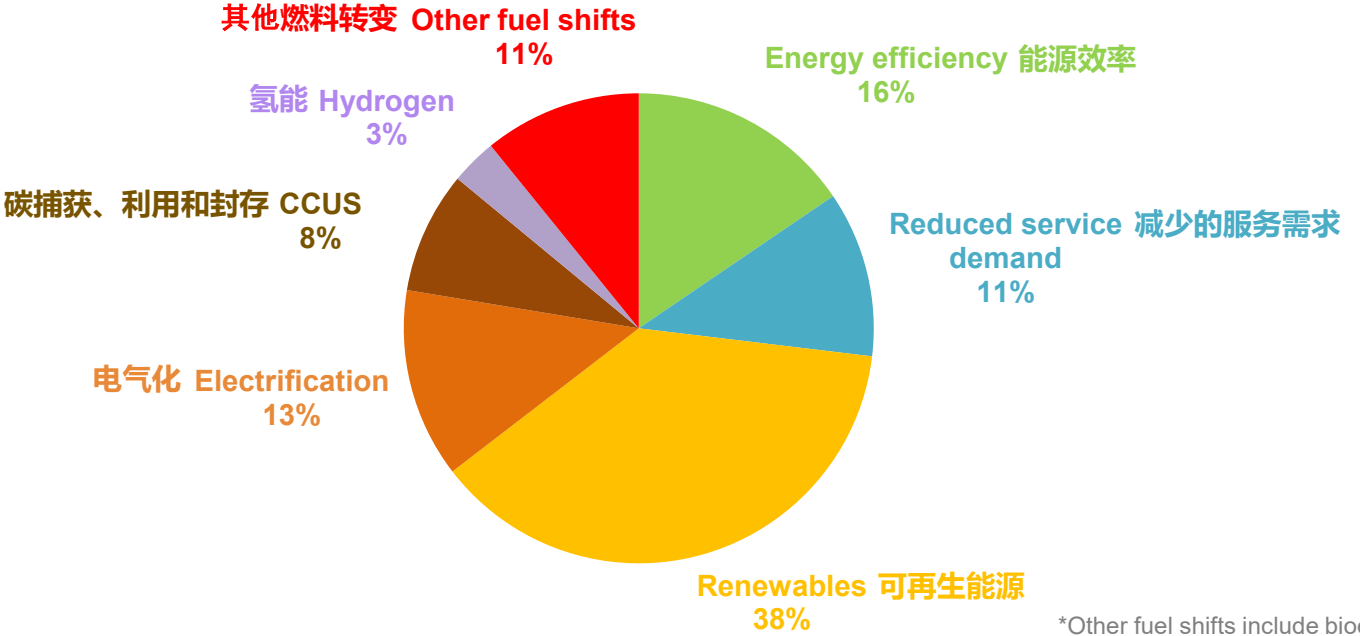
Reaching carbon neutrality relies on many technologies
实现碳中和有赖于众多技术

Emission reductions by measure for China's carbon neutrality pledge, cumulative to 2060
累计至2060年中国碳中和承诺中各措施的减排量

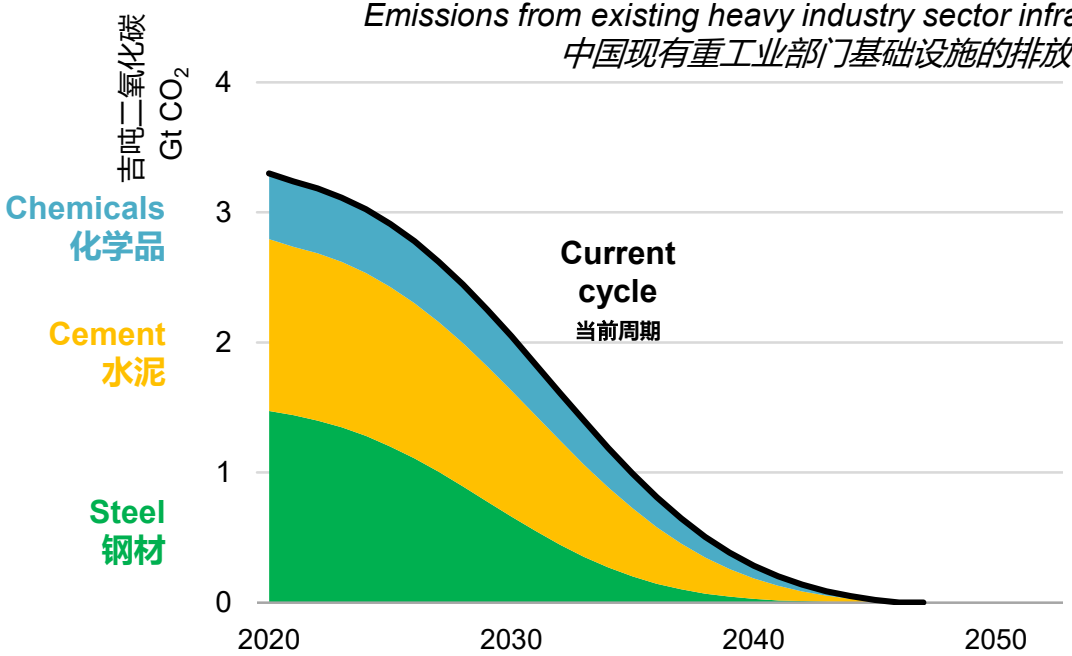


*Other fuel shifts include bioenergy
其他燃料转变包括生物能

Renewables and energy efficiency are the foundation of China's energy system transformation. Innovative technologies - like hydrogen and CCUS - are critical for heavy industry and long-distance transport.
可再生能源和能源效率是中国能源系统转型的基础。 创新技术——如氢能和CCUS——对重工业和长途运输至关重要。

An orderly transition requires early signals
有序的转型需要早期信号

Emissions from existing heavy industry sector infrastructure in China
中国现有重工业部门基础设施的排放情况



China's cement and steel sector emissions alone are more than the total CO_2 emissions of the European Union.
中国仅钢铁和水泥行业的二氧化碳排放量就高于欧盟的二氧化碳总排放量。

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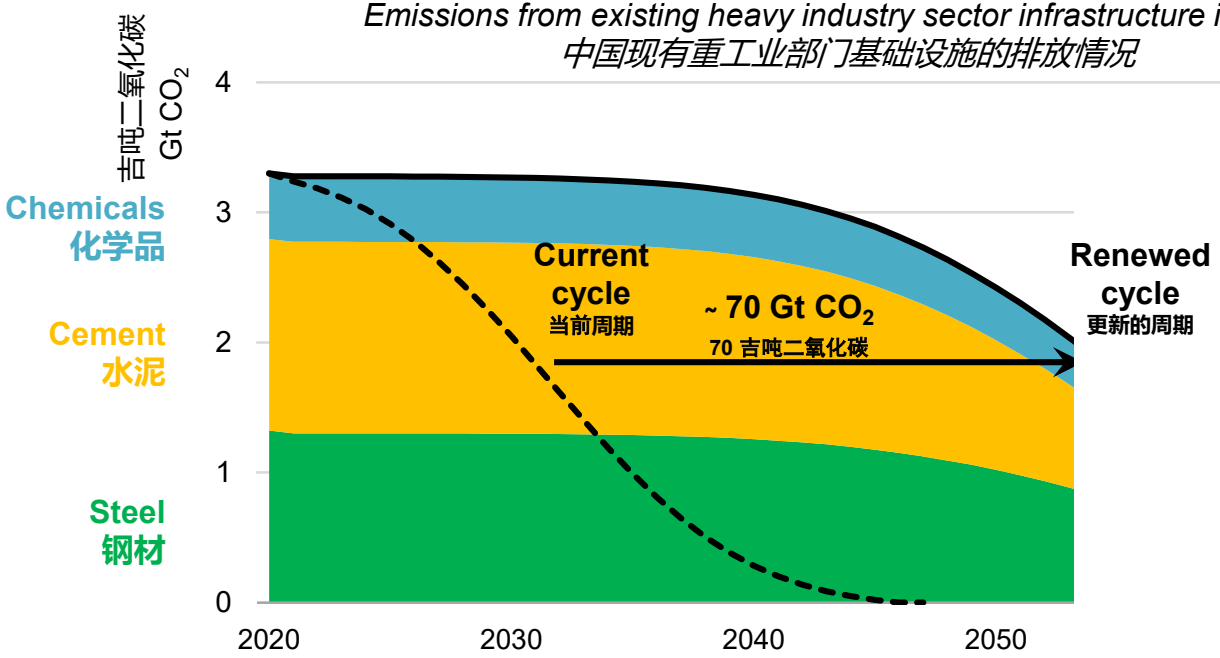
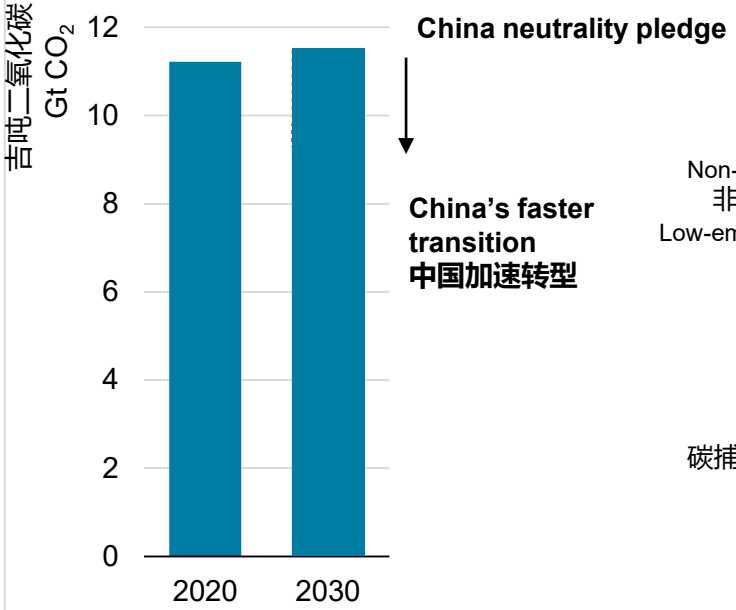


China's cement and steel sector emissions alone are more than the total CO_2 emissions of the European Union. A renewed investment cycle of heavy industry infrastructure could lead to around 70 Gt of CO_2 emissions.

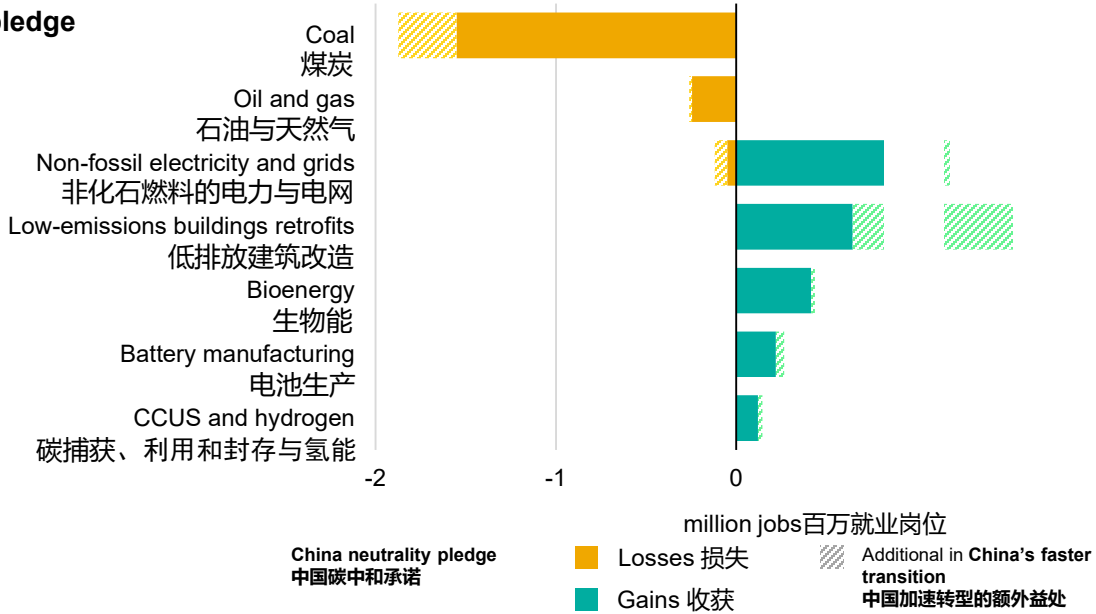
中国仅钢铁和水泥行业的二氧化碳排放量就高于欧盟的二氧化碳总排放量。
重工业基础设施的更新投资周期可能会导致大约70吉吨的二氧化碳排放。

Accelerating China's transition would yield additional benefits
中国在承诺目标基础上加速转型将带来额外的益处

Energy and process-related CO_2 emissions, China
中国与能源与加工过程相关的二氧化碳排放



Change in employment in China, 2019-2030
2019-2030年中国的就业岗位数量变化



A CO_2 emissions peak by the mid-2020s and 20% reduction by 2030 could make the transition more orderly and result in almost 1 million net additional jobs by 2030, increasing the chances of reaching net-zero emissions earlier.

使二氧化碳排放在2020年代中期达到峰值，并在2030年之前减少20%，可以使转型更加有序，并在2030年之前带来近100万个净增加的就业岗位，增加提前达到净零排放的概率。

Conclusions
结论

- China's impressive economic growth story has lifted hundreds of millions of people out of energy poverty. China today is the world's largest producer and consumer of energy, as well as its largest emitter of CO_2.
  中国显著的经济增长成就使数以亿计的人摆脱了能源贫困。如今，中国已是世界上最大的能源生产国和消费国，也是最大的二氧化碳排放国。

- China's clean energy efforts brought down costs of solar PV & batteries globally and changed the way the world thinks about low-carbon technologies. China is now a clean energy powerhouse.
  中国在清洁能源方面做出的努力在全球范围内降低了太阳能光伏和电池的成本，并改变了世界对低碳技术的思考方式。中国现在已经是一个清洁能源强国。

- China's carbon neutrality pledge demands an energy system transformation that results in growth for clean energy in the coming decades similar to what fossil fuels experienced over the past two decades.
  中国的碳中和承诺要求能源系统转型，这将使清洁能源在未来几十年的增长与化石燃料在过去二十年的增长情况相似。

- An accelerated transition can lead to a CO_2 emissions peak by the mid-2020s and a 20% reduction by 2030; it would make the transition more orderly and result in almost 1 million net additional jobs by 2030.
  在承诺目标基础上加速转型可以使二氧化碳排放在2020年代中期达到峰值，并在2030年之前减少20%；它将使转型更加有序，并在2030年之前带来近100万个净增加的就业机会。

- China's many strengths make it well placed for a successful transition to carbon neutrality, demonstrating leadership in technology and energy policy; international collaboration with China is essential.
  中国的许多优势使其有能力成功过渡到碳中和，且在技术和能源政策方面展现领导力；与中国的国际合作是必不可少的。

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