

Synergies between air pollution control and GHGs mitigation

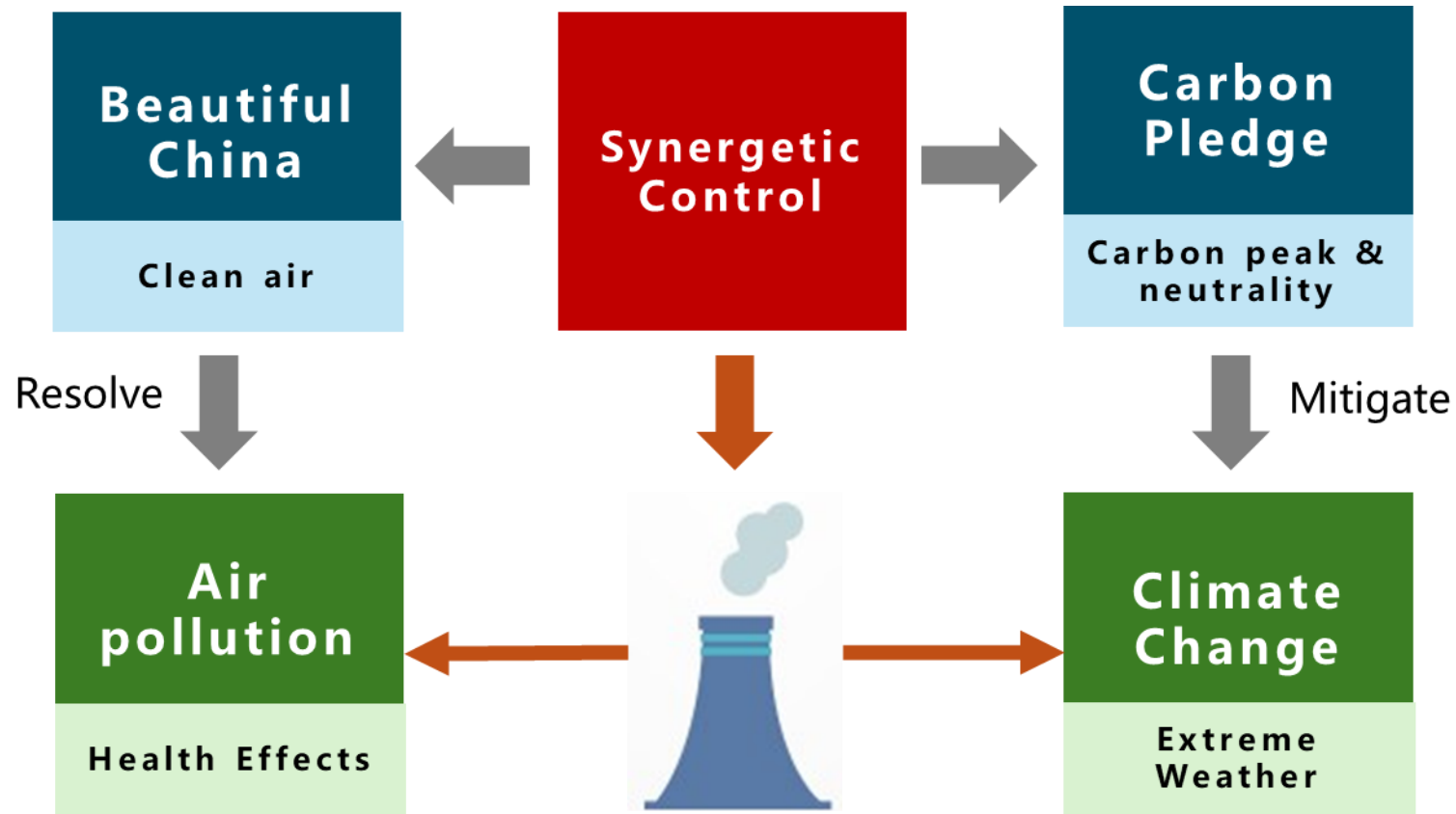
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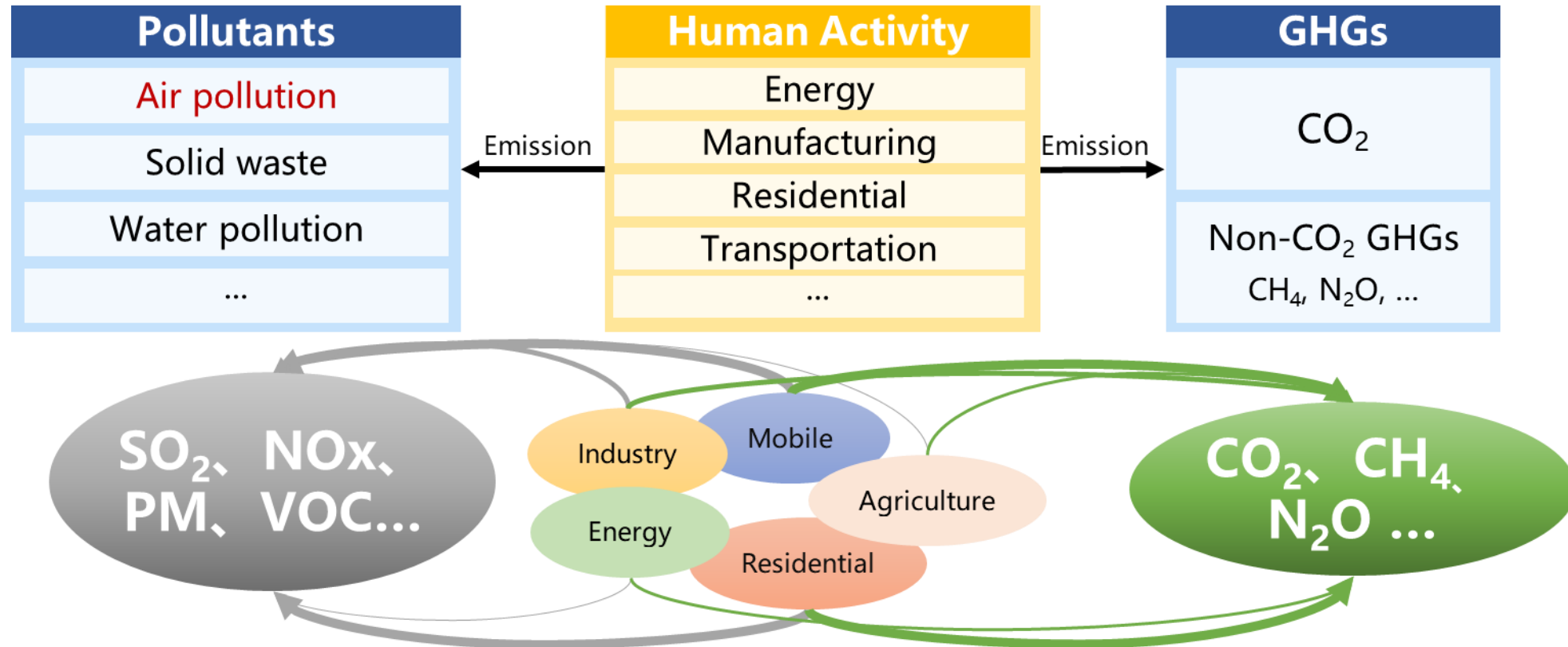


Pollution-carbon co-control provides new perspective



Coordinated efforts to **reduce pollution and carbon emissions** will serve as the **steering wheel** leading the green transition of China's economy

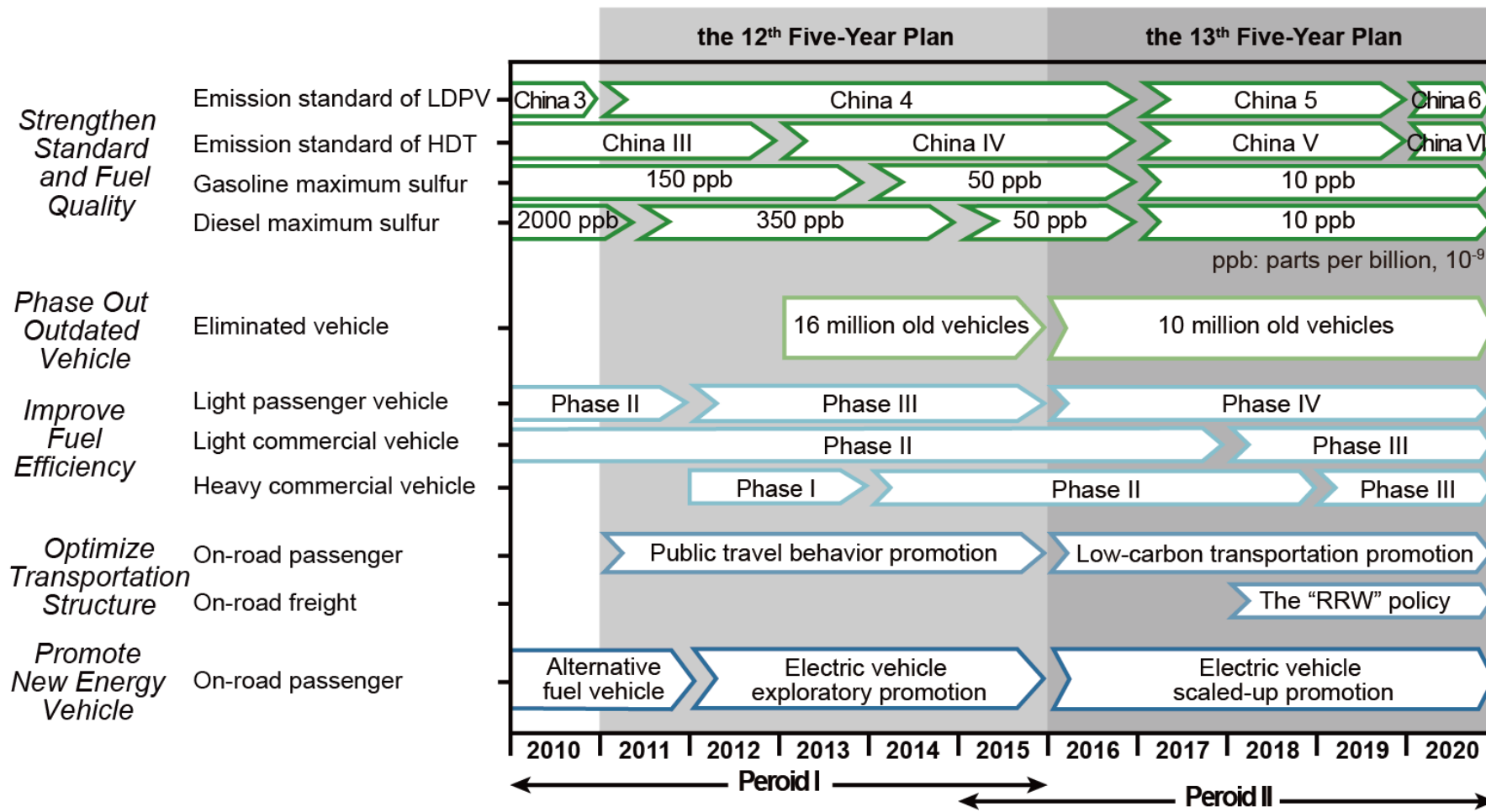
Air pollution and CO₂ share same roots



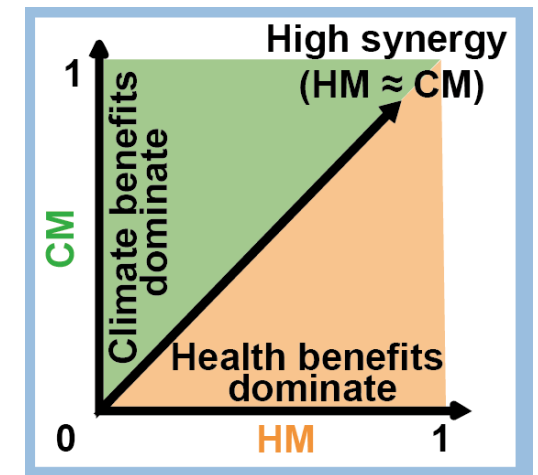
□ In China, **nearly all** SO₂ and NO_x emissions, **~50%** of VOCs and **~85%** of primary PM_{2.5} (excl. fugitive dust) emissions, share same sources with CO₂ emissions.

□ **Same emission sources serve as the scientific basis for synergetic control.**

Quantifying synergetic level of measures is important

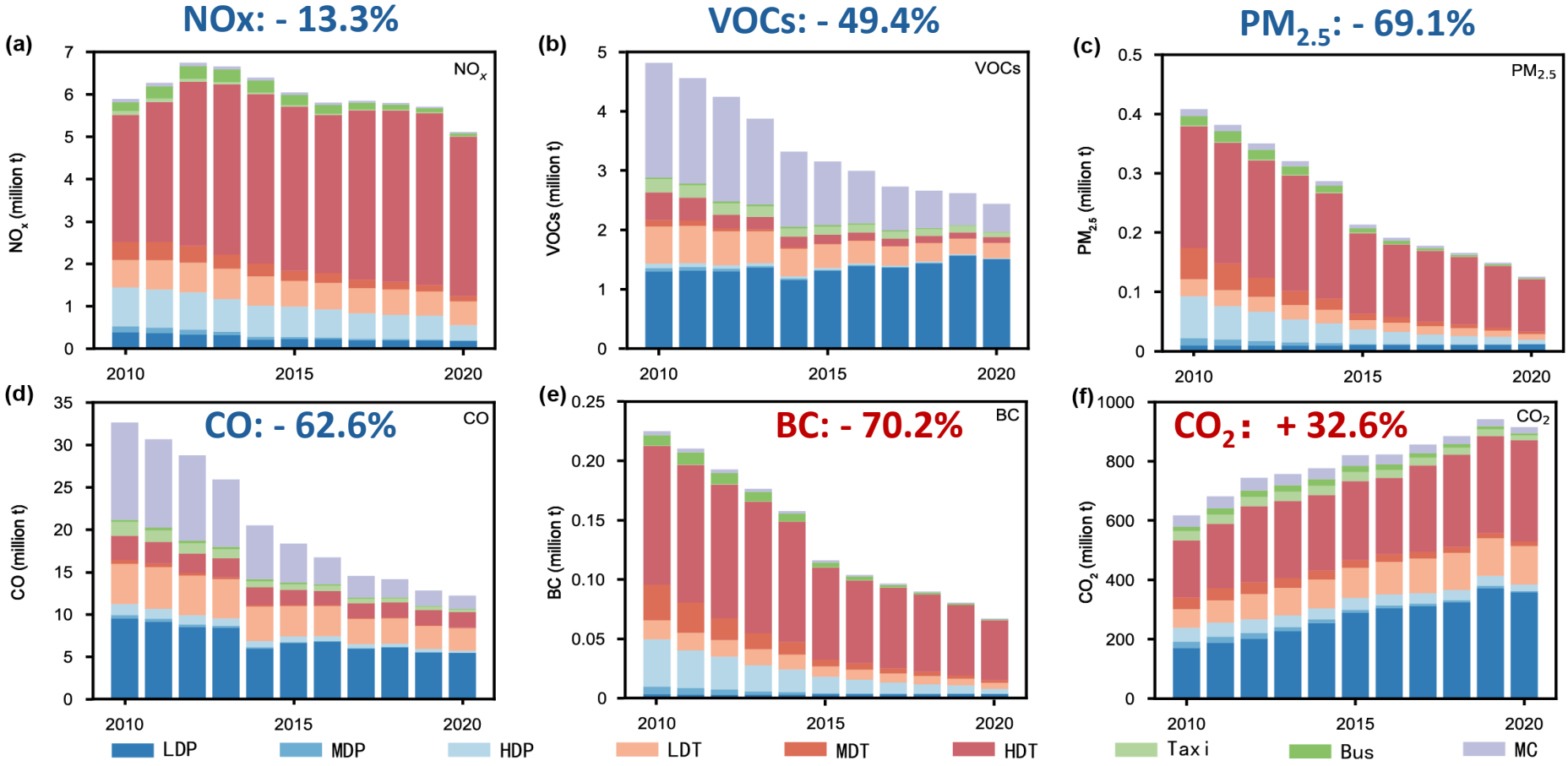


Policy-specific Synergy Index



- 2 dimensions:**
- AP-related health benefits
 - GHG abatement

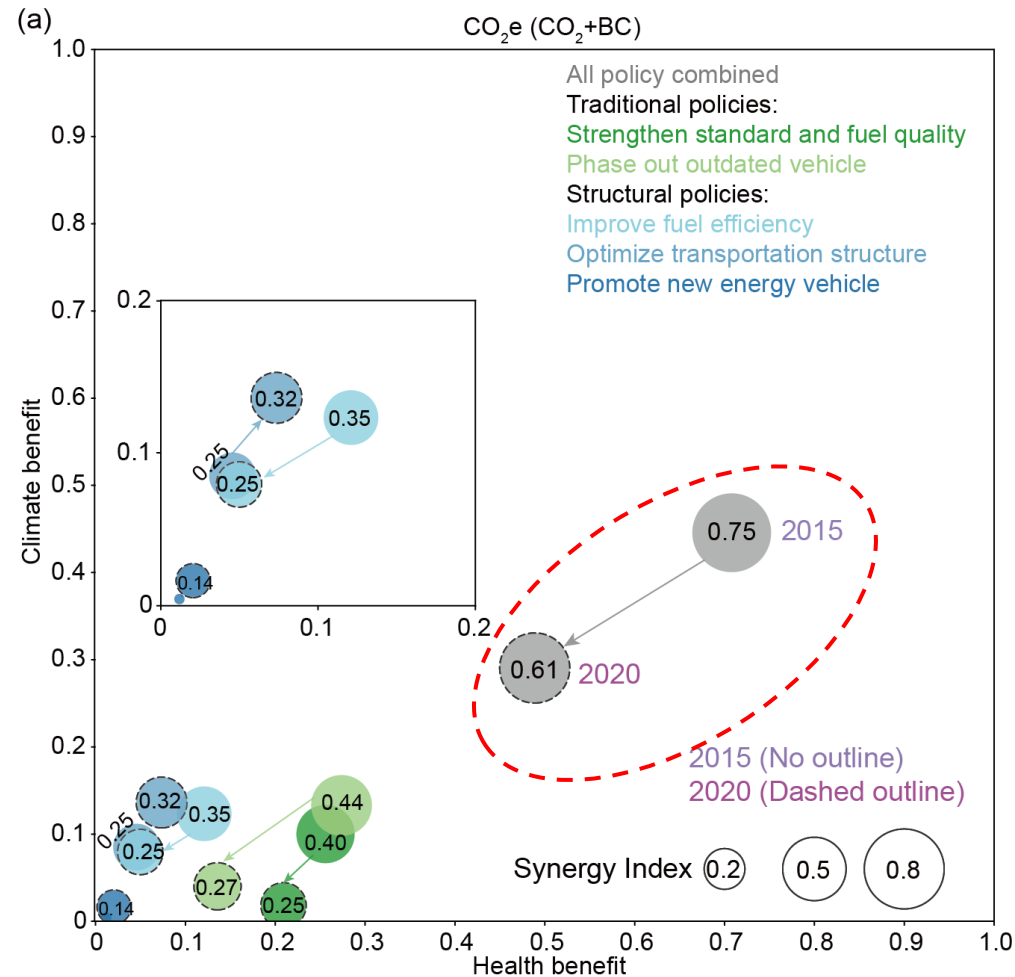
Trends in China's on-road air pollutant and CO₂ Emissions



Air pollutants +
CO₂ emissions -

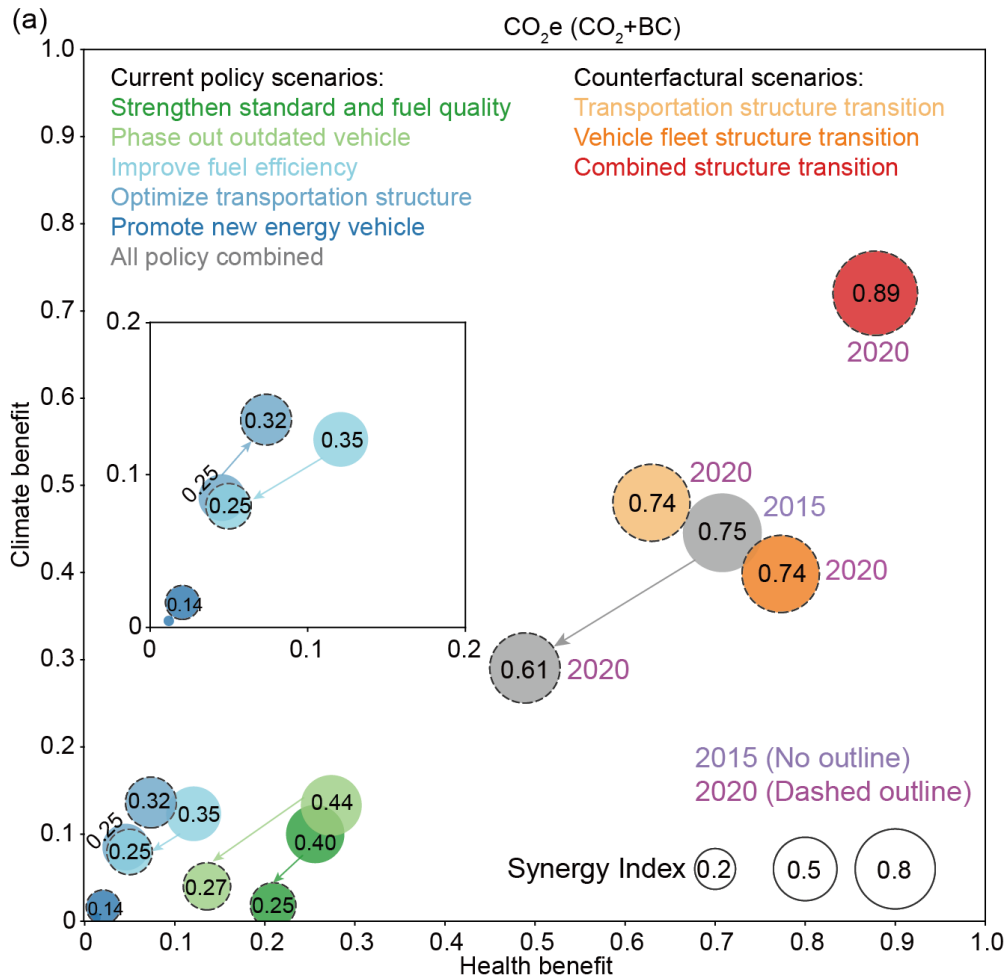
China's have effectively offset the air pollutant emissions from on-road transportation, challenges persist in curbing CO₂ emissions.

Decreasing trends in estimated Synergy Index



- The overall Synergy Index **declined by ~20%** from 2010-2015 to 2015-2020
- **Traditional policies** drove early synergies but declined over time
- **Structural policies** enhanced synergies but insufficient to offset the declining efficacy of traditional policies

Emerging role of structural transition



- **Strengthening transportation and vehicle fleet structure** in 2020 will substantially enhance overall synergies.
- Optimizing either the **vehicle fleet structure** or the **transportation structure** would both increase the overall Synergy Index approaching the Period I level.
- ***Combined Structure Transition*** achieves a Synergy Index of **0.89**—surpassing even the Period I level—with the highest climate metric and health metric

Implications

- Co-control of air pollution and GHGs could serve as a **fundamental approach for global environmental governance**
- **Same emission sources** are the scientific basis for pollution-carbon synergetic control
- China' s on-road transportation emission control policies achieved lower GHG emissions, cleaner air, and substantial public health benefits during 2010-2020, but **their synergies have been weakening**
- **Deep structural transitions** are urgently needed to sustain effective carbon and air-pollution co-control.
- **Scientific tools** for evaluating synergetic levels and optimizing co-control pathways are essential for future policymaking

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Thank you for listening!

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