

Analysis of CO₂ mitigation policies in the Chinese cement industry

Yufei Wang, Samuel Höller*, Zhengping Hao

*Contact: samuel.hoeller@wupperinst.org; Wuppertal Institute for Climate, Environment and Energy

Period: China's 11th (2006-2010) and 12th Five-Year Plans (2011-2015)

Main objective:

Identify key policies and technologies in Chinese cement sector and assess their CO₂ reduction effects compared to 2005. They are:

- Closing outdated facilities
- Waste heat recovery
- Clinker substitution
- Other energy efficiency improvement

Main methodology:

Core equations:

$$\Delta\text{CO}_2 = \Delta(\text{Energy_Intensity}_{\text{coal}} \times \text{Emission_factor}_{\text{coal} \rightarrow \text{CO}_2})$$

$$\text{CO}_2\text{saved} = \Delta\text{CO}_2 \times \text{Output_Cement}$$

Where: the unit of ΔCO_2 is ton CO₂/ton cement, and the unit of CO₂saved is ton CO₂.

Main results:

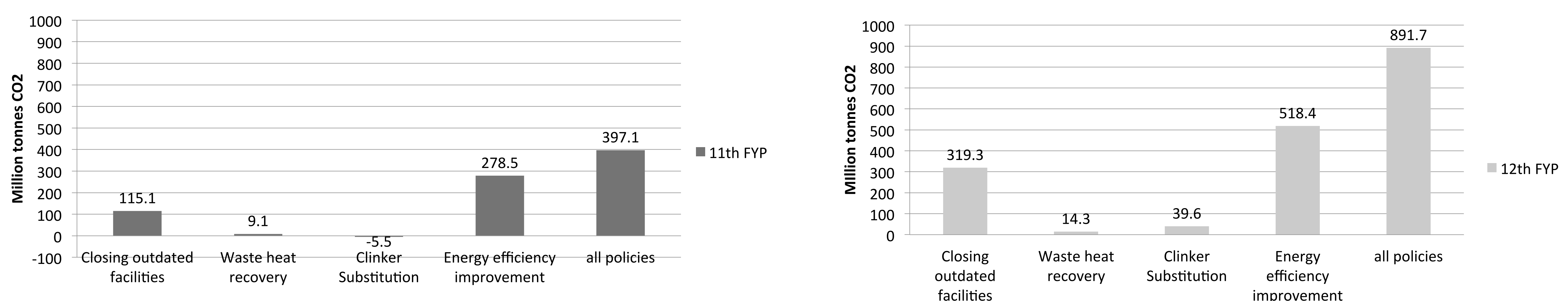


Figure 1. CO₂ saved by different mitigation policies in the 11th FYP and 12th FYP compared to 2005

- Energy efficiency improvement is the most effective mitigation measure
- Potential in 12th FYP period is even higher than during 11th FYP period

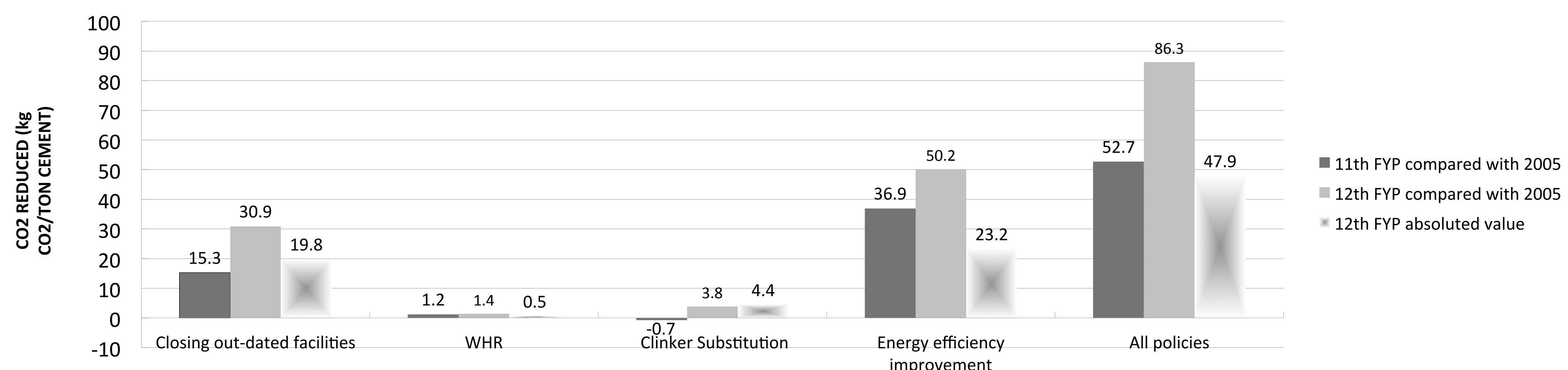


Figure 2. CO₂ reduced per ton cement of each measure in the 11th FYP and 12th FYP

- CO₂ reduction/t cement is slightly lower in 12th FYP period than during 11th FYP period

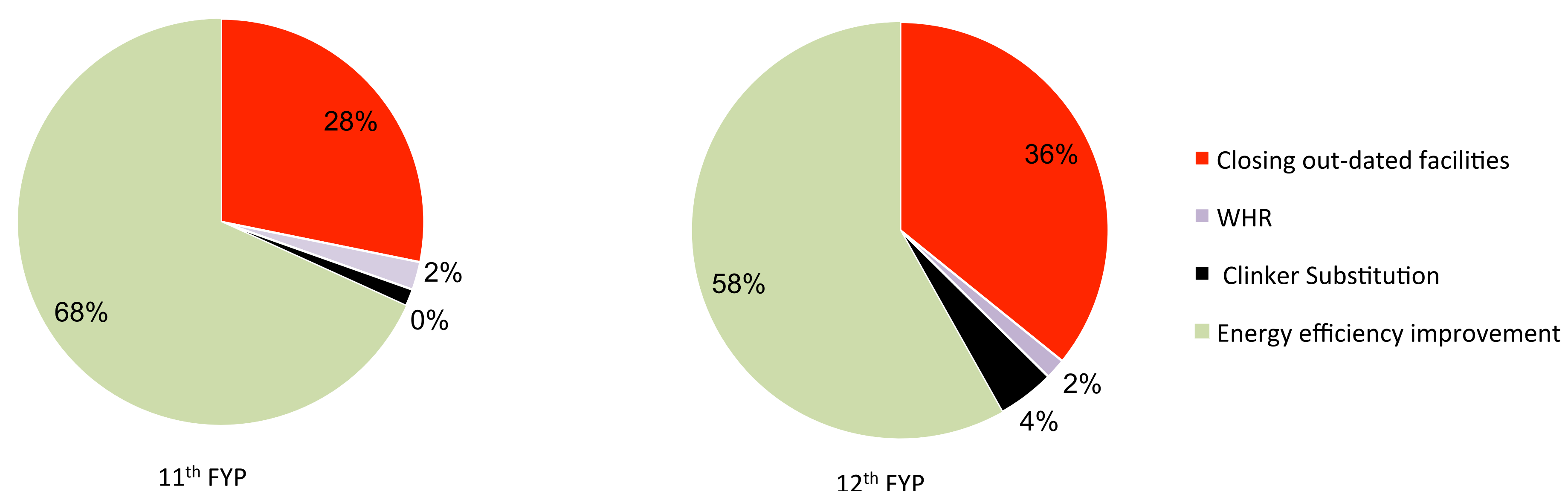


Figure 3. Share of the contribution to CO₂ reduction of each measure in the 11th FYP and 12th FYP

- energy efficiency improvement and closing of outdated facilities are main mitigation techniques in China

Conclusion: Main policies to reduce CO₂ emissions in the period of the 11th and 12th FYP in the Chinese cement sector have been reviewed and assessed. Energy efficiency improvement and closing of outdated facilities contributed the most to CO₂ reduction. In the current 12th five year plan period, these policies will impact CO₂ reduction considerably. In addition, it is necessary to research and develop advanced technologies, such as alternative fuels use and carbon dioxide capture and storage (CCS). More positive policies are required to be developed and implemented at sector level.