



# Stranded Assets in the Chinese Coal-Fired Power Sector

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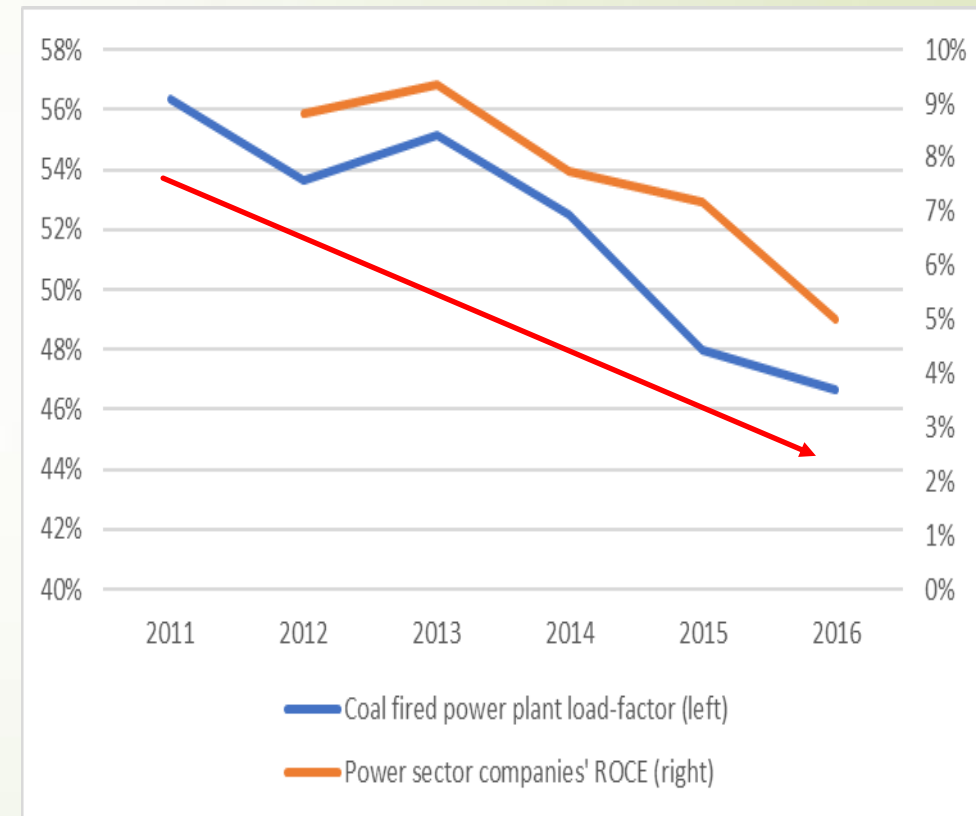
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# Pressure on the coal-fired power sector in China


- Recent investment boom, structural slowing demand growth, & hence overcapacity
- Carbon market & electricity market reform
- Continued rapid growth of RE to meet climate, energy & environment goals



Source: Authors, based on data from Enerdata, GlobalData, & company reports



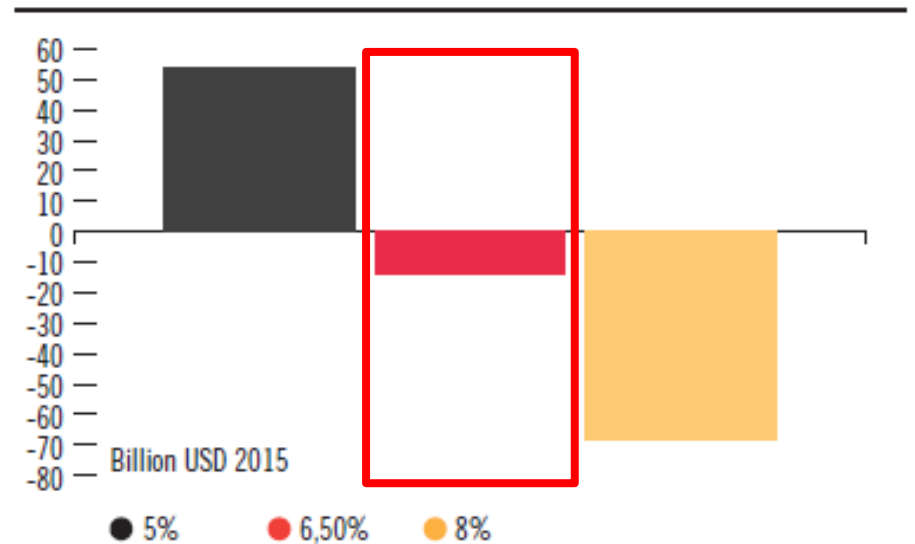
# Objectives and structure of the study

- ▶ Model the revenues & profitability of the entire coal-fired power sector in China since 2005.
  - ▶ The model was built on a plant-by-plant basis.
  - ▶ Three scenarios were modelled, out to 2050:
    - ▶ 2°C Scenario
    - ▶ Manged 2°C Scenario
    - ▶ NDC-Style Scenario
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# Key Finding # 1: The status quo for the sector is distinctly negative

- In the NDC style-scenario, persistent low load factors (45% by 2030), and carbon market & electricity market reforms put **significant pressure on coal-power profitability.**
- Using the study's central discount rate of 6.5%, the net present value of the **½ trillion USD** invested in coal power since 2005 is estimated at **negative 14.2 billion USD**

Figure 12. Net present value of coal-fired power fleet since 2005 at different discount rates, NDC-Style Scenario, billion USD<sub>2015</sub>

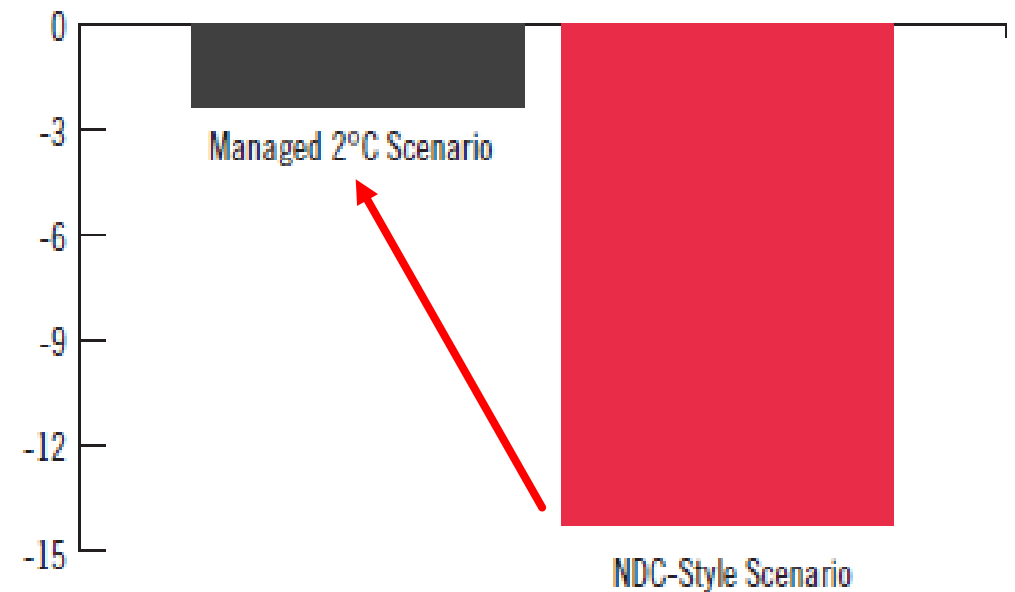


Source: authors' calculations

## Key Finding #2: A managed transition in line with 2°C would improve on the *status quo*

- In the Managed 2°C Scenario:
  - Moratorium on new coal
  - Retirement of old coal
  - New revenue sources for flexibility in a high RE system
- This scenario improves on the NDC-Style Scenario, raising the NPV of the coal fleet to **negative 2.3 billion USD**

**Figure E1.** Cumulative net present value of the coal fleet, 6.5% discount rate, Managed 2°C Scenario versus NDC-Style Scenario, in billion USD<sub>2015</sub>



# Key Finding #3: The banking sector can handle the disruption of 2°C

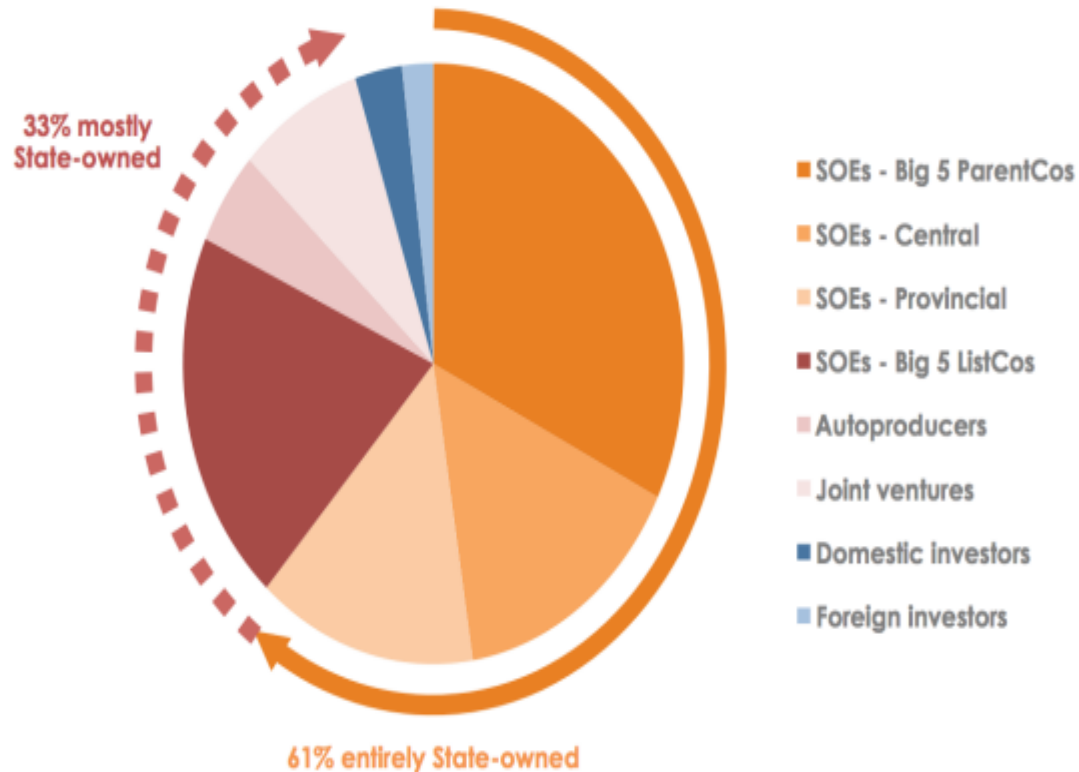
Table E1. Numerical results of the scenario analysis, in billion USD<sub>2015</sub>

	Discount Rate								
	5%			6.5%			8%		
	NPV	Stranded asset value	Banking sector exposure	NPV	Stranded asset value	Banking sector exposure	NPV	Stranded asset value	Banking sector exposure
2°C	11.7	-155.6	-65.4	-46.2	-122.5	-51.4	-92.7	-98.0	-41.2
Managed 2°C	69.5	-97.8	-41.1	-2.3	-78.6	-33.0	-58.9	-64.2	-27.0
NDC-Style	54.3	-113.0	-47.5	-14.2	-90.4	-38.0	-68.3	-73.6	-30.9

- ▶ Banking sector exposure to coal sector stranded assets is estimated at **negative 33.0 billion** USD in the Managed 2° Scenario at 6.5% discount rate
- ▶ Prudential loan-loss provisions of the Chinese banking sector are estimated at **ca. 370 billion USD**

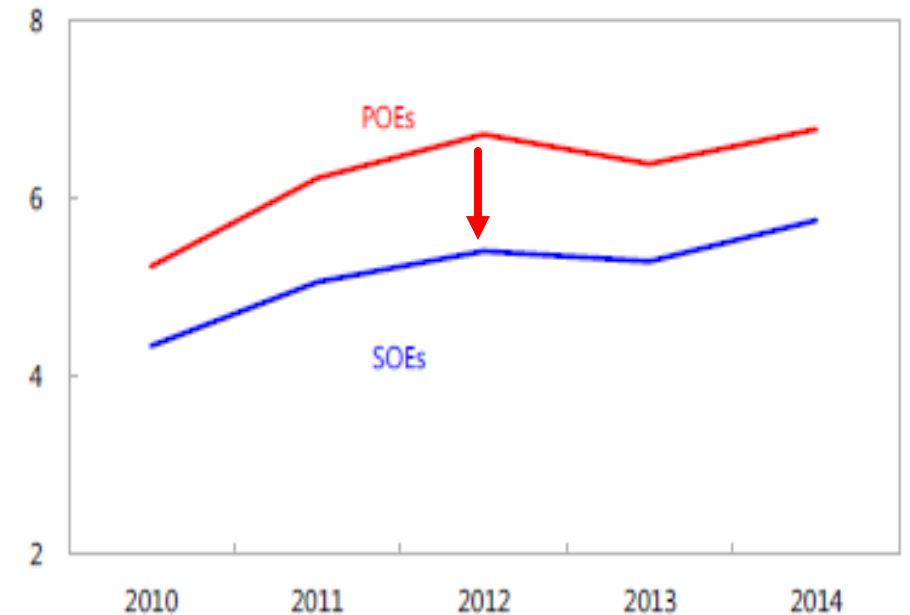
# Digression #1: the importance of the ownership structure of the fleet

Figure ES-1. Chinese installed coal power capacity ownership breakdown



## Implied Interest Rate<sup>1/</sup> is Lower for SOEs

(In percent)

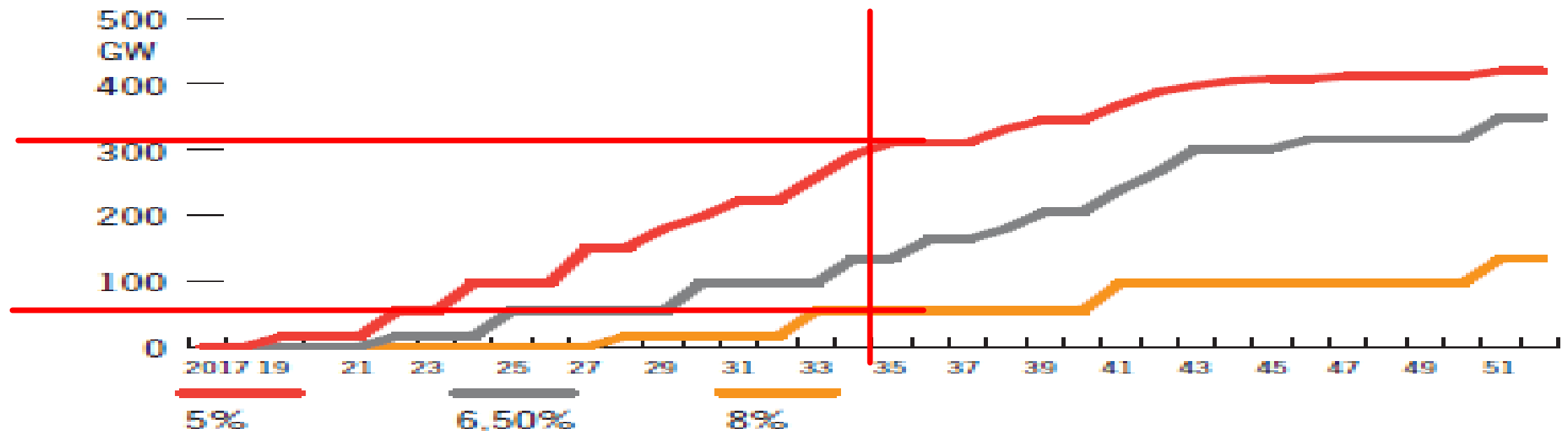


Sources: WIND database; and IMF staff estimates.

<sup>1/</sup>Derived as interest payment/total debt.

# Key Finding #4: SOEs are both a risk and an opportunity for coal transition

**Figure 8. Cumulative amortized capacity under different discount rates, Managed 2°C Scenario**

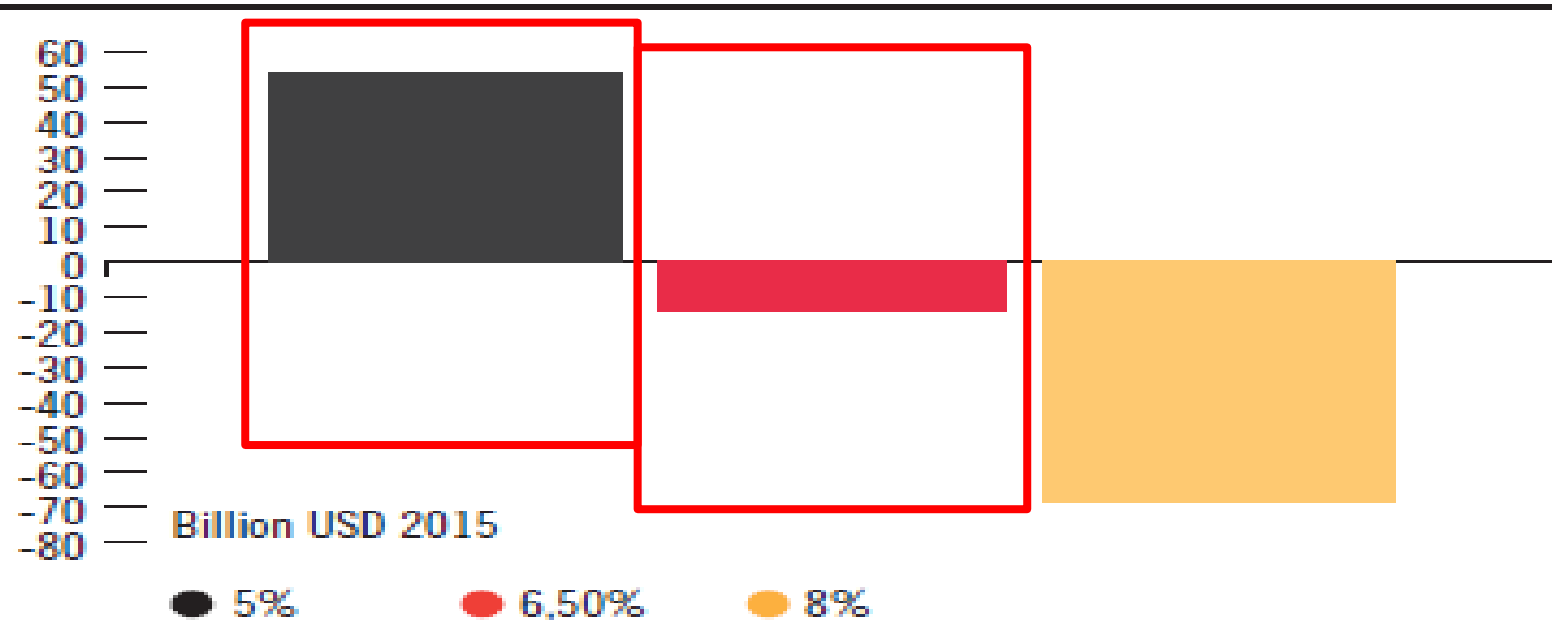


Source: authors' calculations. N.B. sample size is 421 GW



# Key Finding #4 (II): SOEs are both a risk and an opportunity for coal transition

**Figure 12. Net present value of coal-fired power fleet since 2005 at different discount rates, NDC-Style Scenario, billion USD<sub>2015</sub>**



Source: authors' calculations



# Conclusions



- ▶ There are already significant stranded assets in the coal fired power sector, particularly when compared to market costs of capital
- ▶ A well-designed acceleration of power sector transition can improve on the situation & would not lead to financial disruption
- ▶ SOE reform is crucial to transition:
  - ▶ Old coal assets should be put in a coal sector 'bad bank' & amortized & retired as fast as possible