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Chinese Energy & Economic Challenges:
Is the World in Denial?*

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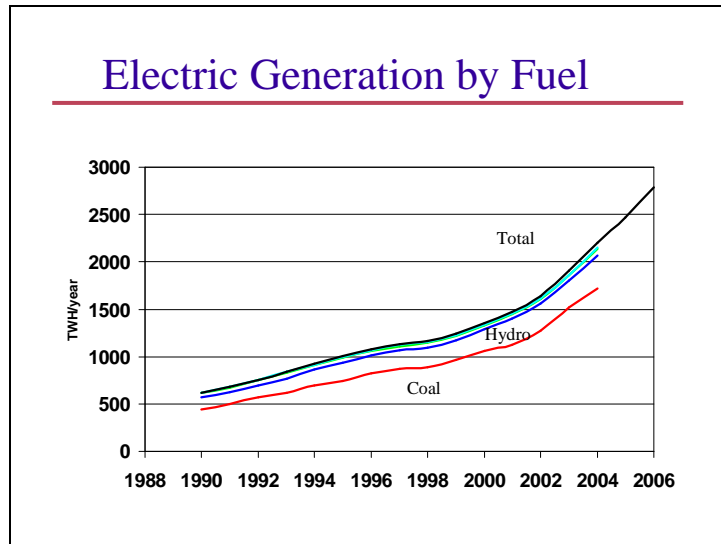
*Presenter's Note:

All opinions, analyses and statements are solely those of the authors
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Income Elasticities

Year	GDP Growth	Electric Growth	Annual Income Elasticity	
1988	11.3%	9.6%	.85	
1989	4.1%	7.3%	1.77	Low reported growth (3.7%)
1990	3.8%	6.2%	1.64	Low reported growth (3.7%)
1991	9.2%	9.1%	.99	
1992	14.2%	11.3%	.79	
1993	14.0%	11.1%	.79	
1994	13.1%	10.8%	.83	
1995	10.9%	8.6%	.79	
1996	10.0%	7.2%	.72	
1997	9.3%	5.0%	.54	
1998	7.8%	2.8%	.36	Question whether economy faltered
1999	7.6%	6.3%	.82	
2000	8.4%	9.4%	1.12	Start of New Story
2001	8.3%	8.6%	1.03	
2002	9.1%	11.5%	1.26	
2003	10.0%	16.3%	1.63	
2004	10.1%	15.3%	1.52	
2005	10.2%	12.2%	1.20	
2006	10.5%	14.4%	1.37	

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Thought Experiment: What If...

GDP growth averages 5.9%/yr from 2007-2025

Income elasticity drops to 1.1 from 2007 through 2025

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Then...

Big numbers by 2025:

	2006	2025	Multiplier
Generation (TWH)	2,825	9,445	x3.3
Capacity (GW)	622	1,899	x3.1

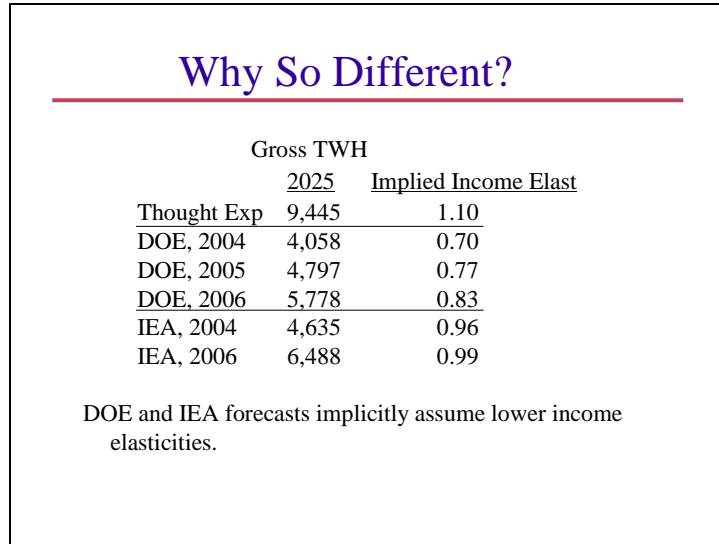
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Compare to DOE and IEA

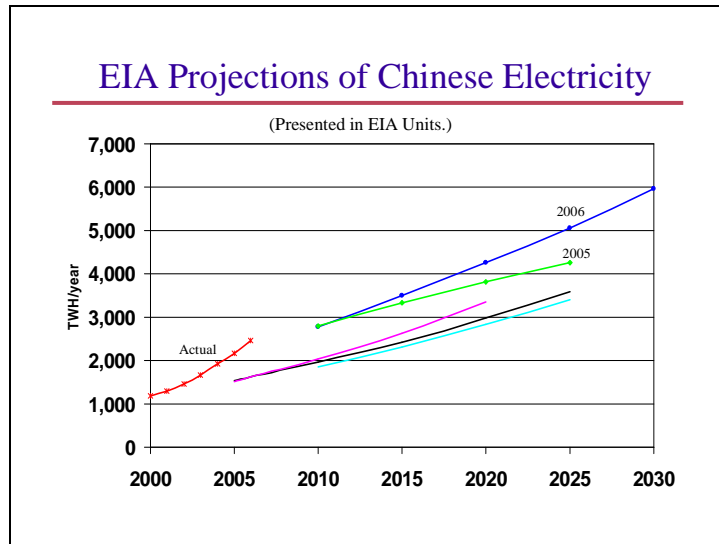
Electric Generation, TWH:

	2006	2025	Multiplier
Thought Experiment	2,825	9,445	x3.3
DOE Forecast, 2006		5,778	x2.0
IEA Forecast, 2006		6,488	x2.3

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Perspective

Are such large increases reasonable?

Put into perspective by comparing to:

Kwh/capita for other countries

Income elasticity for other countries

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Perspective: kwh/capita

China	year:	2006	2025	19 years
	kwh/cap:	2,157	6,521	
US		1948	1967	19 years
		2,176	6,467	
Japan		1966	1989	23 years (recession)
		2,153	6,447	
Taiwan		1978	1996	18 years
		2,095	6,619	
South Korea		1989	2002	13 years
		2,207	6,887	

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Perspective: Income Elasticity

Income Elasticity of Electric Demand

	<u>Long Run</u>	<u>Period</u>
China	1.10	2007-2025
US	1.91	1948-1967
Japan	1.07	1966-1989
Taiwan	1.00	1978-1996
South Korea	1.68	1989-2002

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Implications for Coal

million tons/year

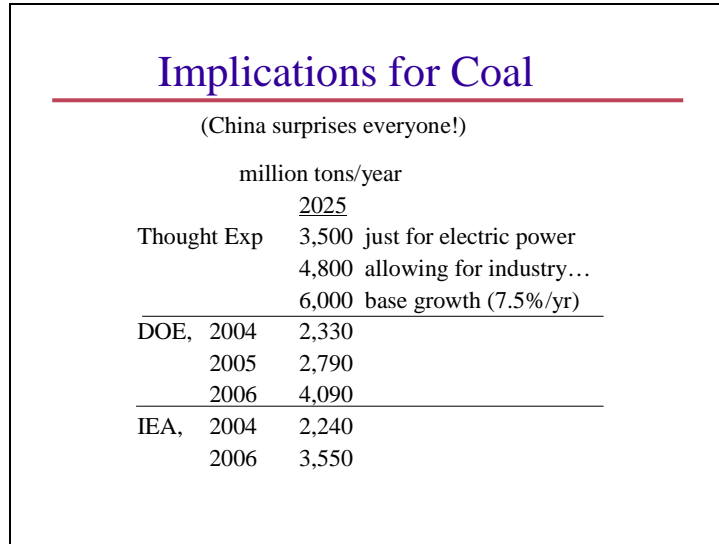
2025

3,500 just for electric power

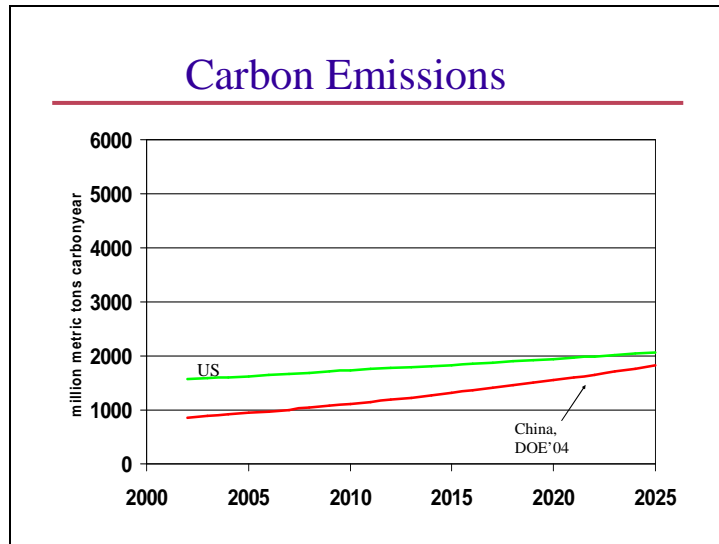
4,800 allowing for industry...

6,000 base growth (7.5%/yr)

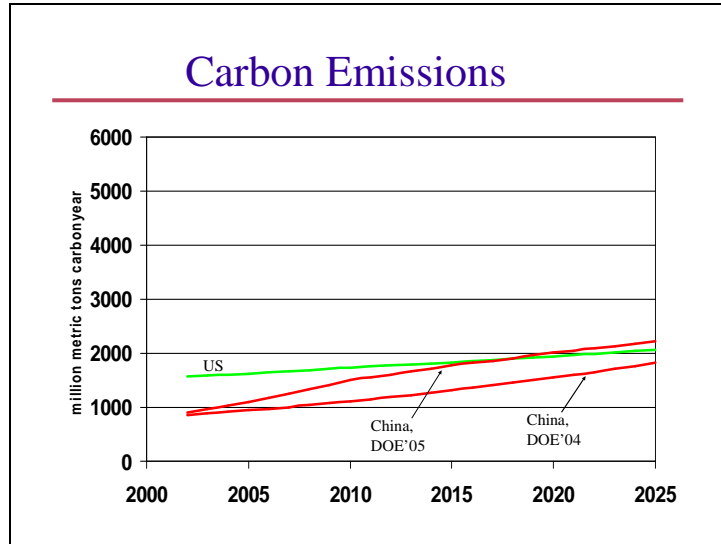
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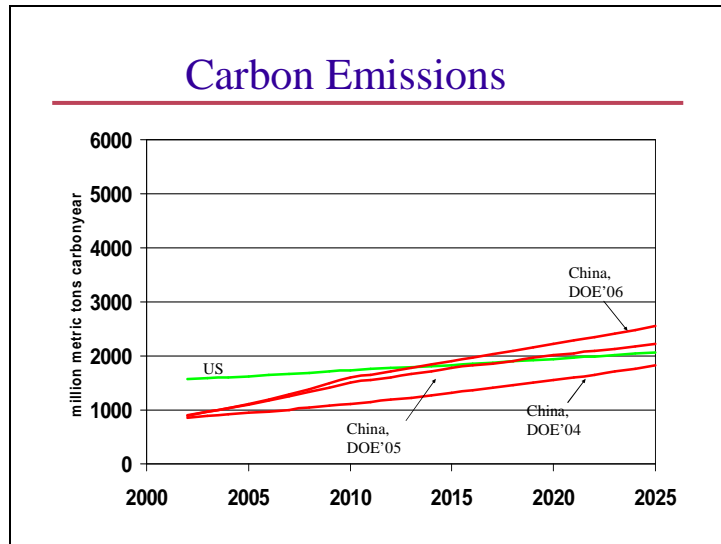
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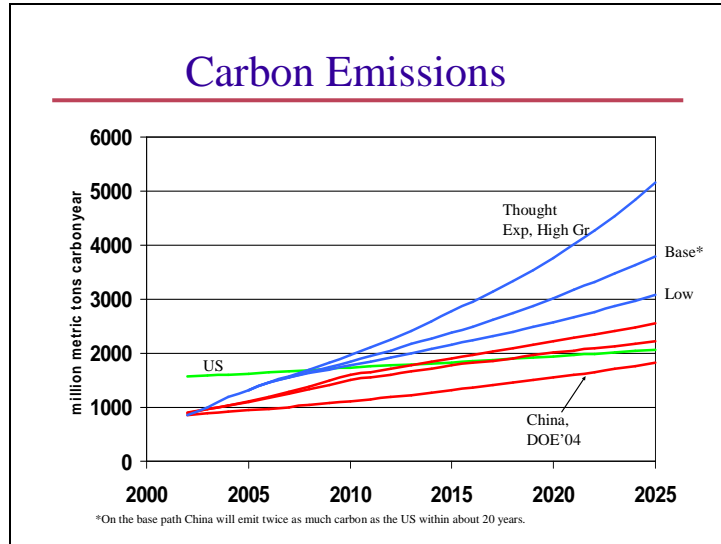
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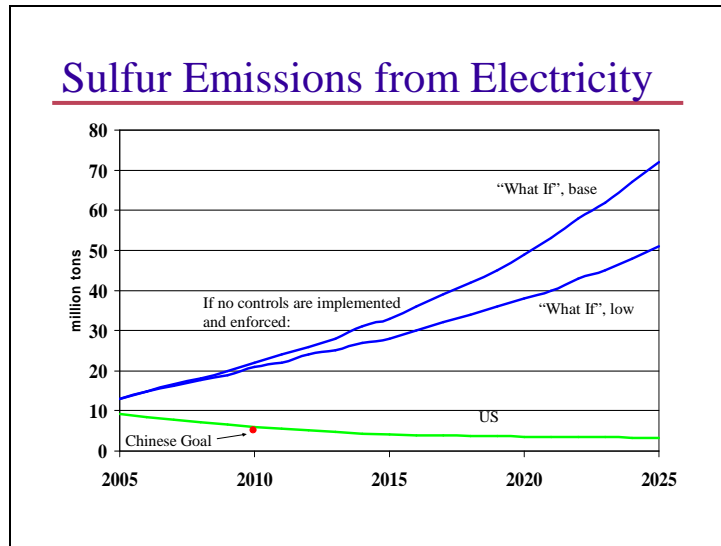
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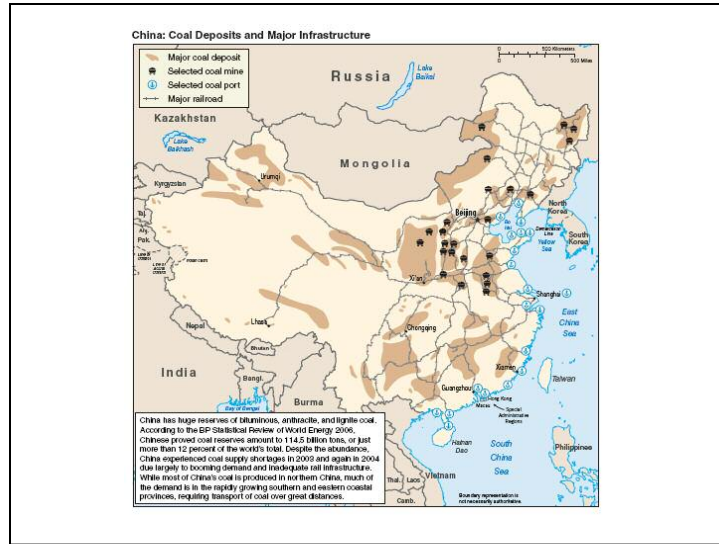
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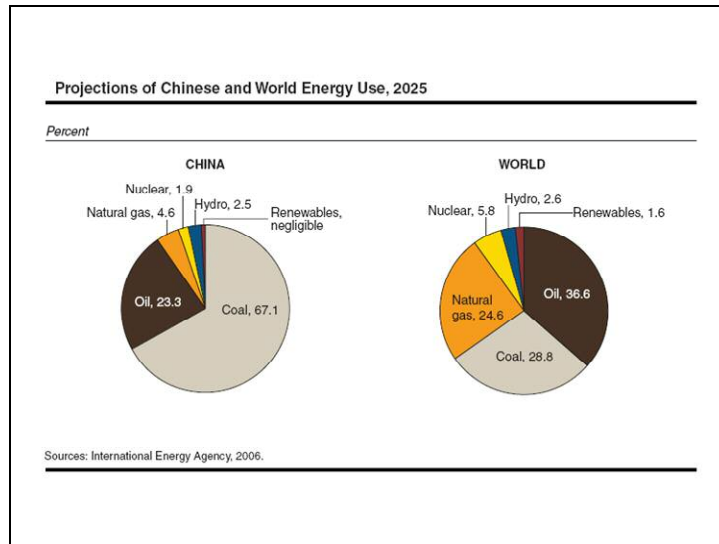
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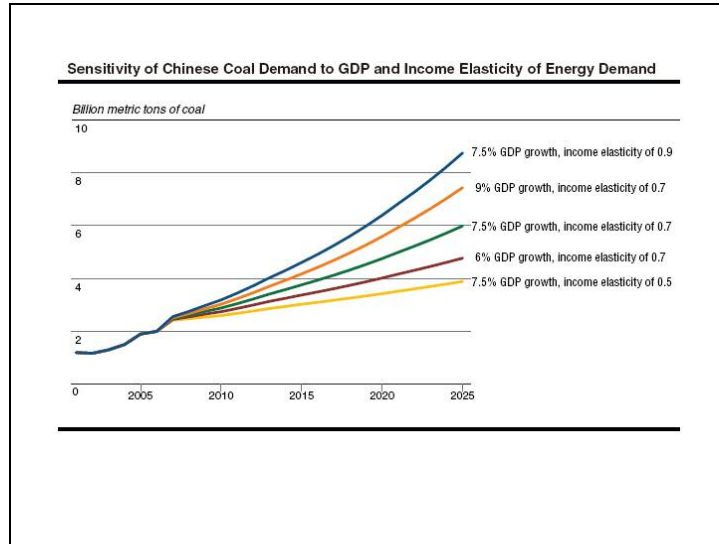
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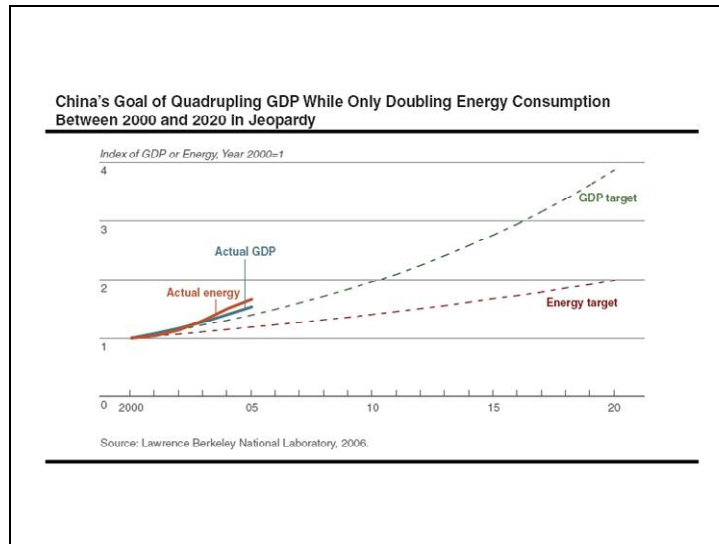
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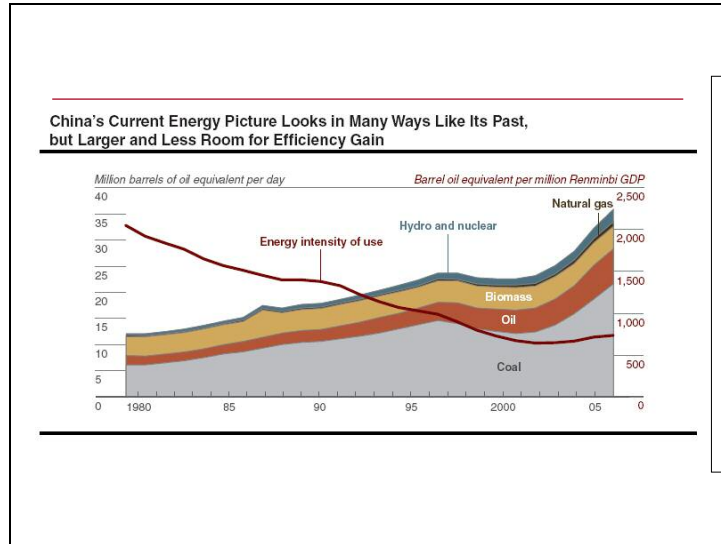
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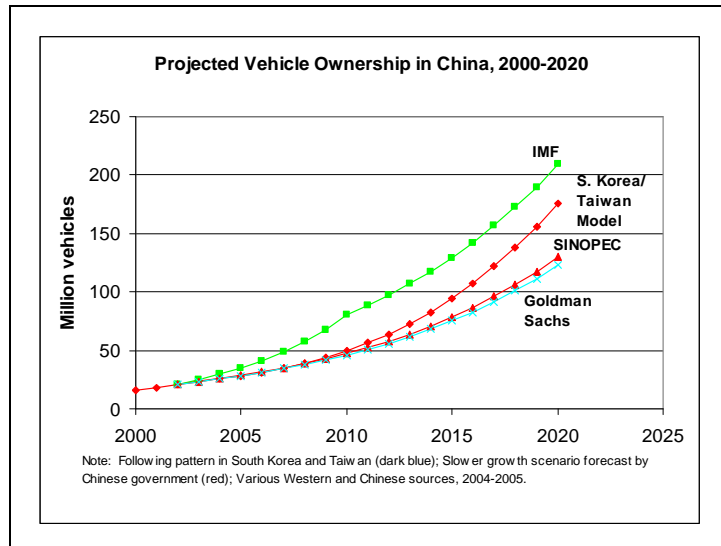
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Concluding Remarks

- ◆ China may have the **greatest impact** on world energy over the next two decades and beyond.
- ◆ Increased attention needed on **coal, improved efficiencies, and vehicle use.**
- ◆ Potential energy bottlenecks could **constrain future economic growth** affecting both China and rest of world.
- ◆ **Is China's current energy and economic path sustainable?** If not, how will the Chinese government respond to the problems?