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Cost Trends in Renewables Development

Presented by: **Mon-Fen Hong**
Senior Consultant

Presented to: **NECA Renewables Conference 2008**

March 5, 2008

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Renewable Energy Project Costs Are Up

“Toto, I've a feeling we're not in Kansas anymore.”

-Dorothy, Wizard of Oz

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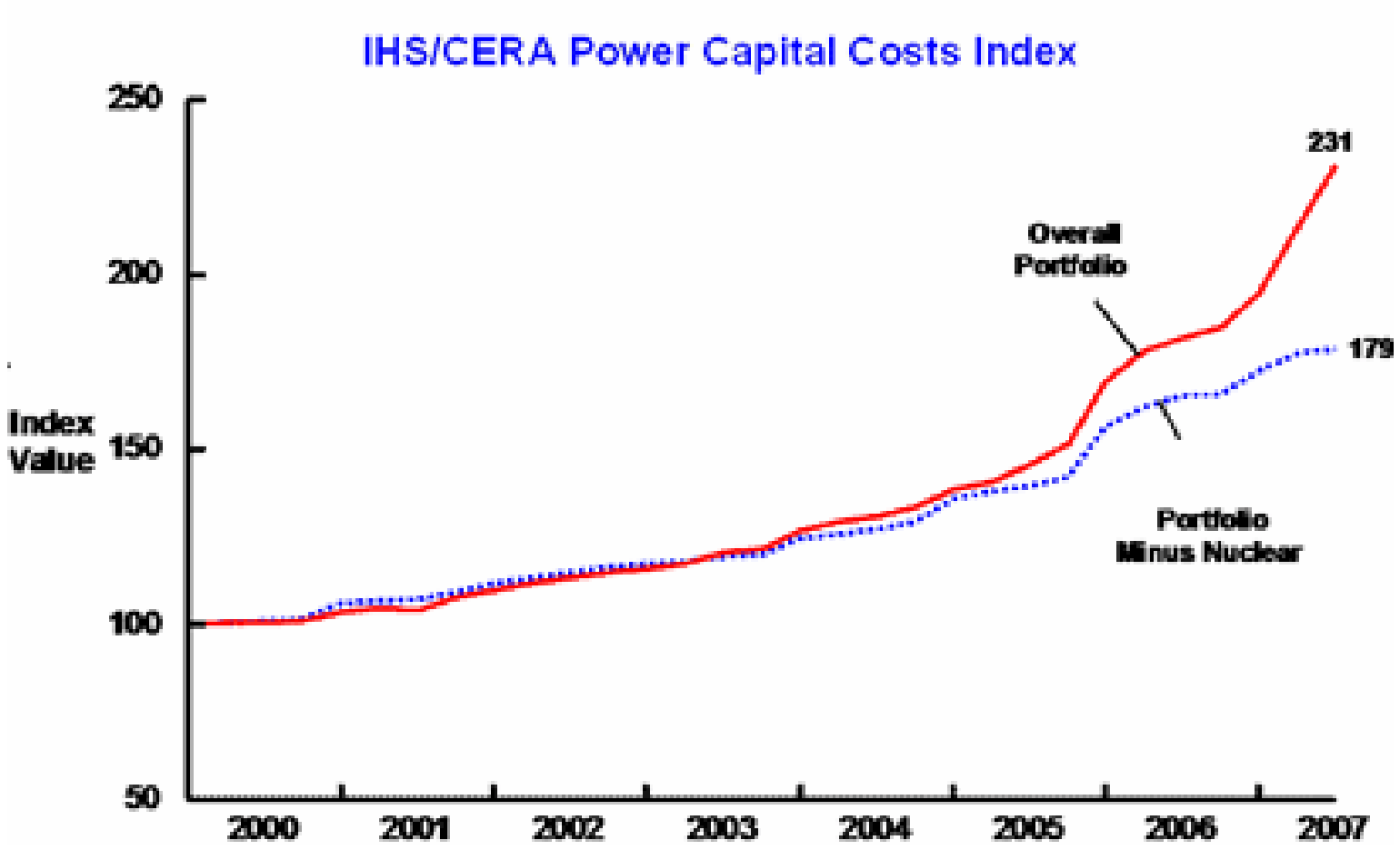
Power Capital Costs On The Rise



Source: Cambridge Energy Research Associates <http://www.ihsindexes.com/>

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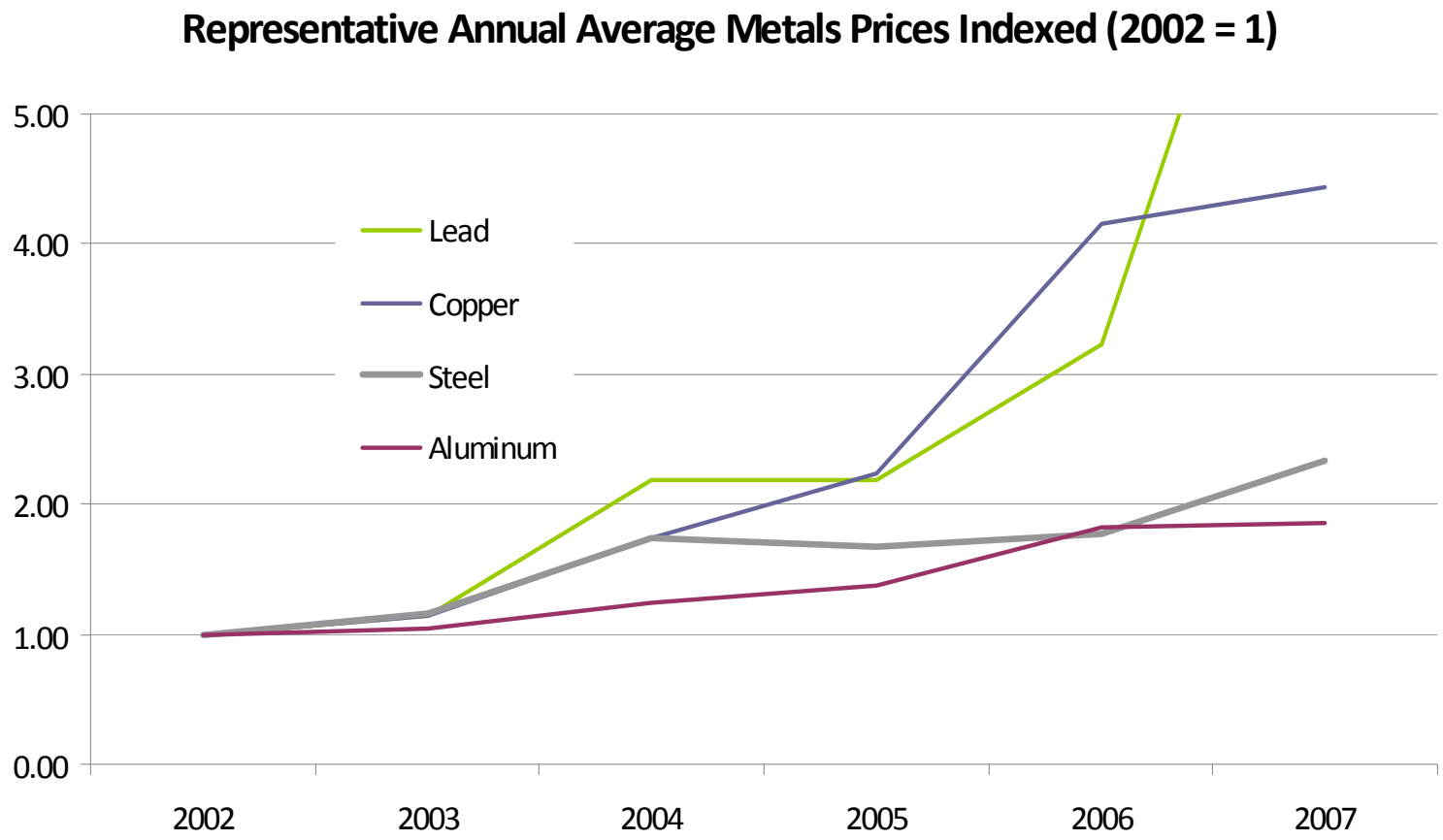
What Are the External Drivers of Rising Project Costs?

1. Competing demand for raw materials driving commodity prices up



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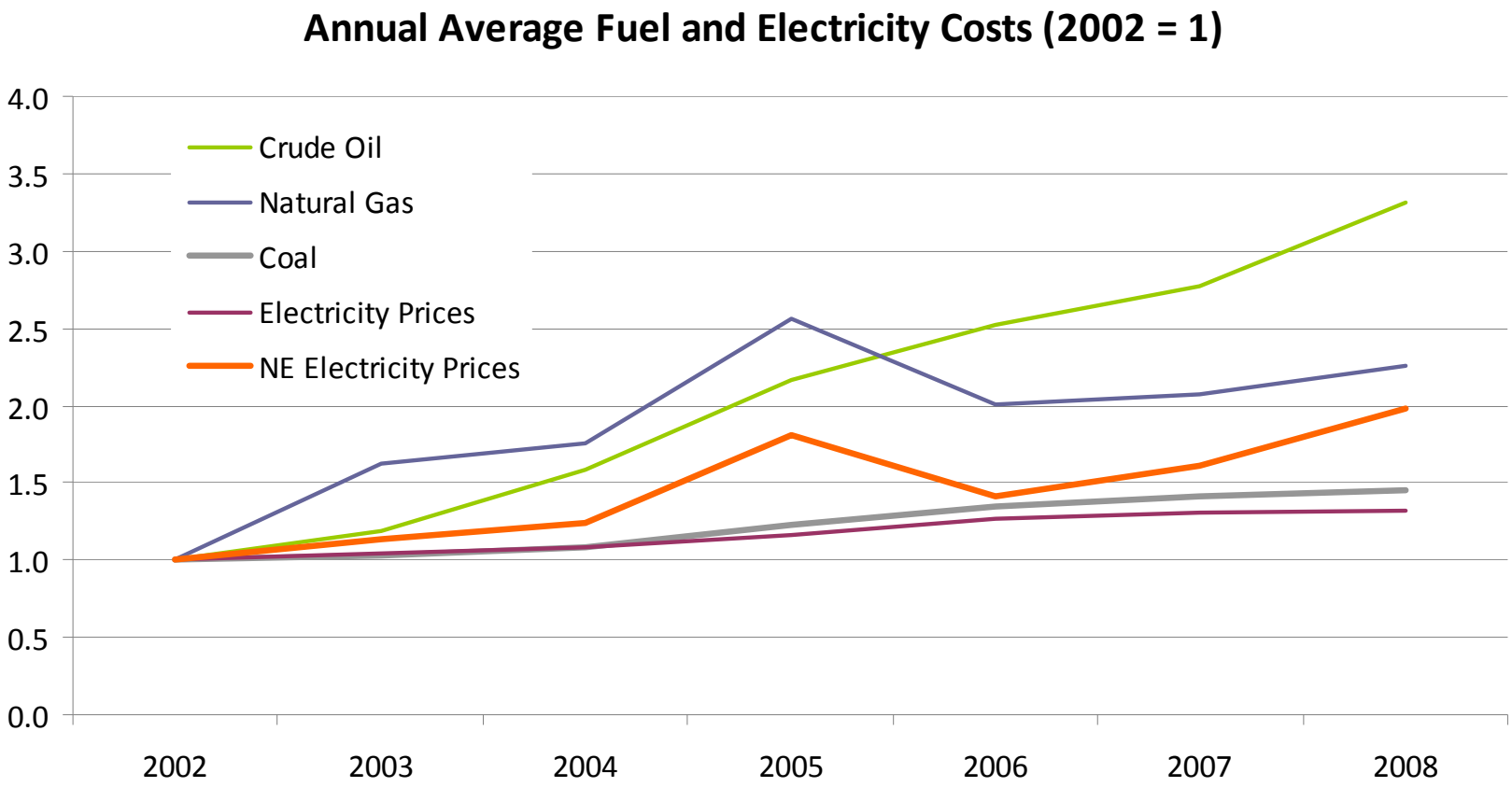
What Are the External Drivers of Rising Project Costs?

2. Increased fuel/energy costs



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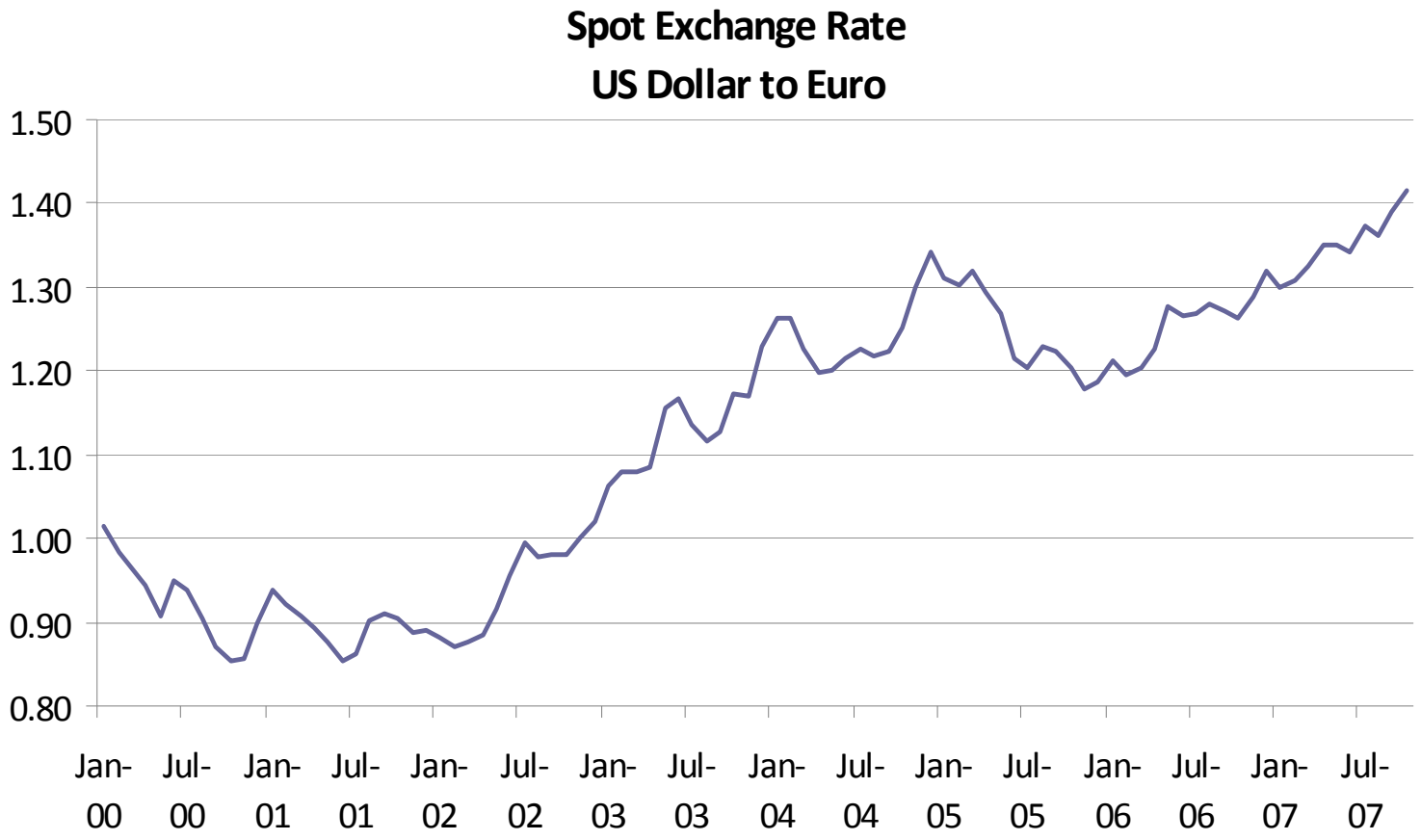
What Are the External Drivers of Rising Project Costs?

3. Depreciation of U.S. currency



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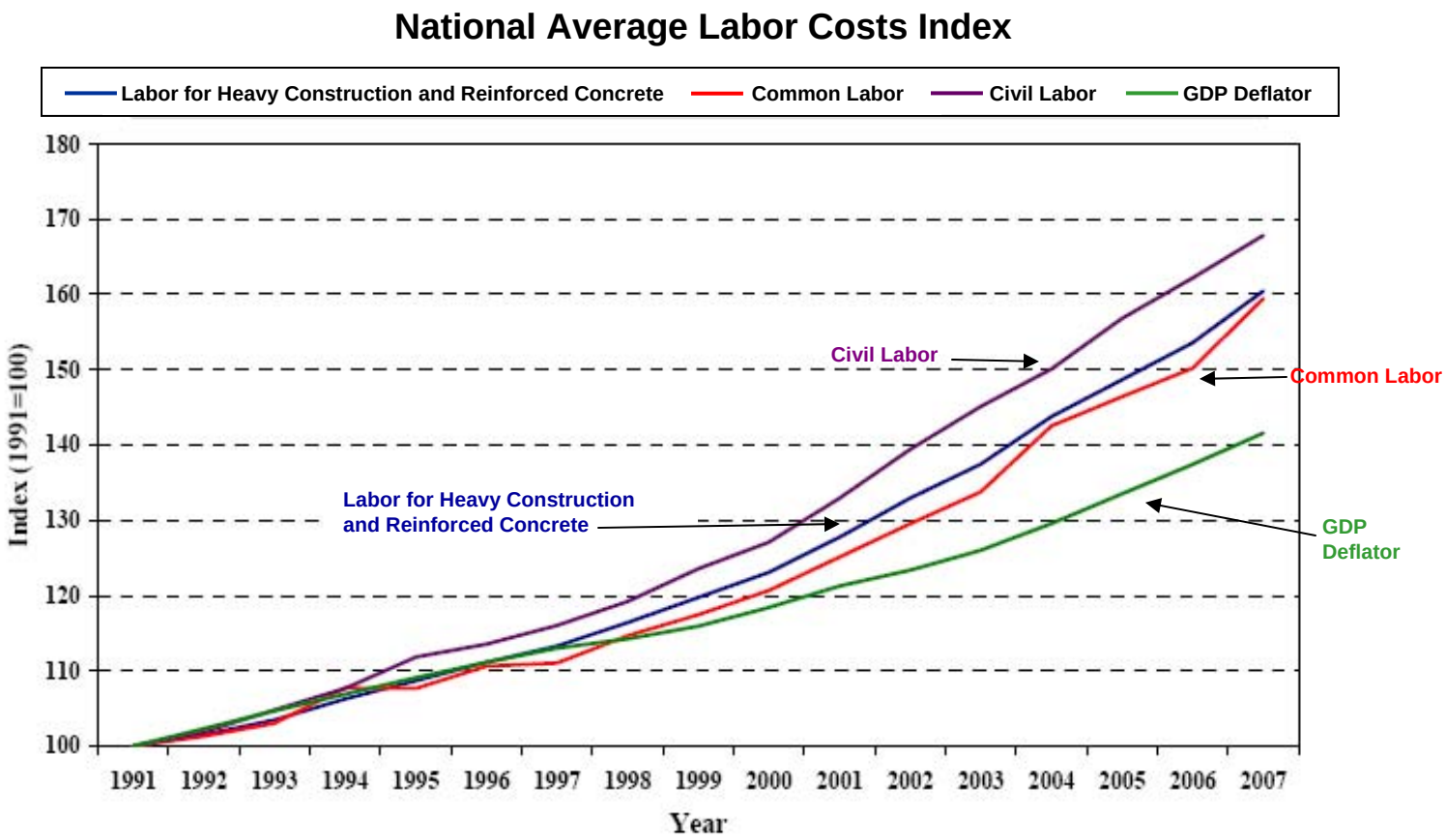
What Are the External Drivers of Rising Project Costs?

4. Increased labor/management costs grew faster than GDP



Sources: The Handy-Whitman© Bulletin, No. 165, and the U.S. Bureau of Economic Analysis.
Simple average of all regional labor cost indices for the specified types of labor.

Excerpt from: ""Rising Utility Construction Cost." Brattle Group. September 2007.

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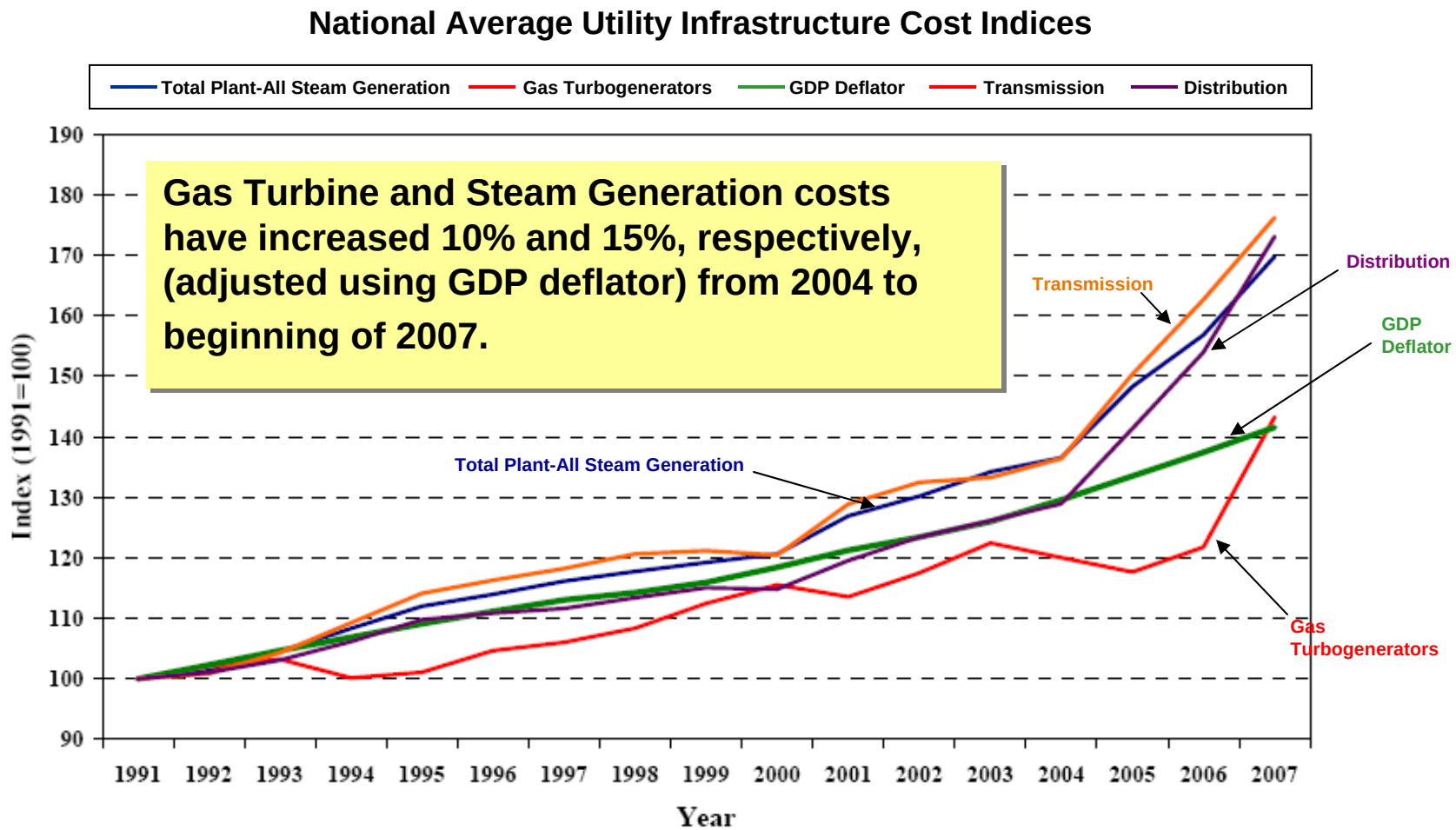
All Generator Costs Are On The Rise



Sources: The Handy-Whitman© Bulletin, No. 165 and the U.S. Bureau of Economic Analysis.
Simple average of all regional construction and equipment cost indexes for the specified components.

Excerpt from: ""Rising Utility Construction Cost." Brattle Group. September 2007.

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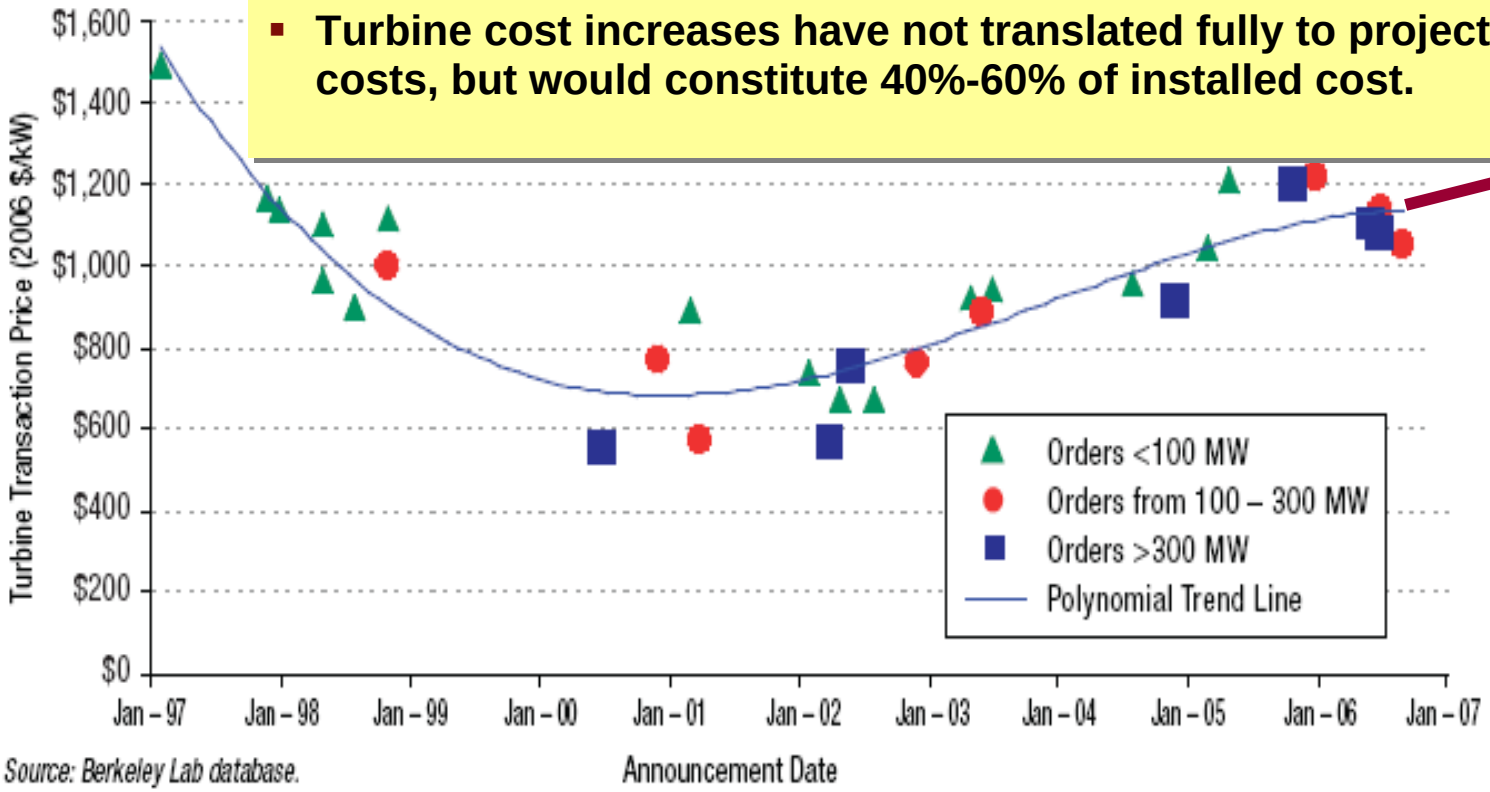
Wind Turbine Costs Also On The Rise

- **Wind Turbine costs (adj. for inflation) up about 25%-30% (from 2004 to 2006).**
- **Turbine contracts going forward are even higher ($1300/kW-$1500/kW), depending on size of contract.**
- **Turbine cost increases have not translated fully to project costs, but would constitute 40%-60% of installed cost.**



Source: Berkeley Lab database.

Figure 21. Reported U.S. Wind-Turbine Transaction Prices over Time

Excerpt from: "Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2006." U.S. DOE Report. May 2007

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What Else is Driving Rising Wind Project Costs?

External to Industry

1. Global demand for raw materials driving commodity prices up
2. Increased fuel/energy costs
3. Depreciation of U.S. currency
4. Increased labor/ management costs for large engineering projects in general

Internal to Industry

- Massive increase in demand worldwide (US and Asia)
- Supply chain bottlenecks (component fabrication, manufacturing, assembly, transportation, skilled labor)
- Transmission/interconnection
- Permitting/Siting increasing development cycle
- Manufacturers improving profitability
- Improved technology and performance
- PTC uncertainty

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Looking Forward for Wind

External to Industry

1. Global demand for raw materials driving commodity prices up
2. Increased fuel/energy costs
3. Depreciation of U.S. currency
4. Increased labor/ management costs for large engineering projects in general

UNCHANGED or RISING

Internal to Industry

- Massive increase in demand worldwide (US and Asia)
- Supply chain bottlenecks (component fabrication, manufacturing, assembly, transportation, skilled labor)
- Transmission/interconnection
- Permitting/Siting increasing development cycle
- Manufacturers improving profitability
- Improved technology and performance
- PTC uncertainty

COMPETING DRIVERS

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What Else is Driving Rising Biomass Project Costs?

External to Industry

1. Global demand for raw materials driving commodity prices up
2. Increased fuel/energy costs
3. Depreciation of U.S. currency
4. Increased labor/ management costs for large engineering projects in general
5. Conventional generator costs rising in general

Internal to Industry

- Competition for biomass fuel by generators, heating demand, and biofuels facilities
- Value of biomass and LFG increase as substitutes for fossil fuels
- Increased environmental requirements such as emissions controls and water management
- Extended permitting/siting cycle for greenfield projects
- PTC uncertainty

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Looking Forward for Biomass

External to Industry

1. Global demand for raw materials driving commodity prices up
2. Increased fuel/energy costs
3. Depreciation of U.S. currency
4. Increased labor/ management costs for large engineering projects in general
5. Conventional generator costs rising in general

UNCHANGED or RISING

Internal to Industry

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- PTC uncertainty

UNCHANGED or RISING

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In Short… *There Is No Going Back*

- **Not many drivers that point to declining costs in the near-term**
- **At best, costs are held steady in real-terms**

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End of Presentation

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Thanks!

Contact Information: **Mon-Fen Hong**

La Capra Associates

Twenty Winthrop Square
Boston, MA 02110
617-933-0652

mhong@lacapra.com