



Cost-effectiveness of Wind Energy

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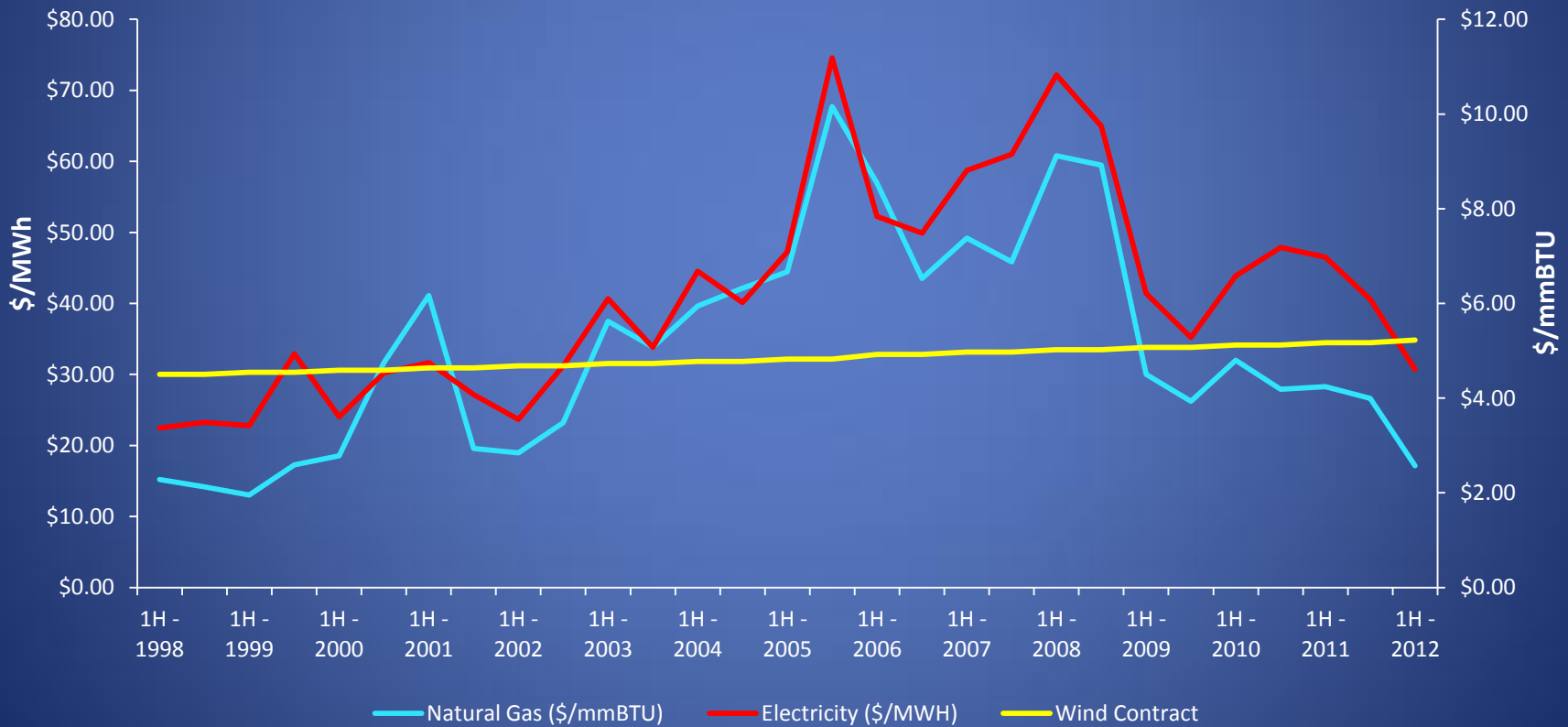
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Wind Energy Costs are Low and Stable



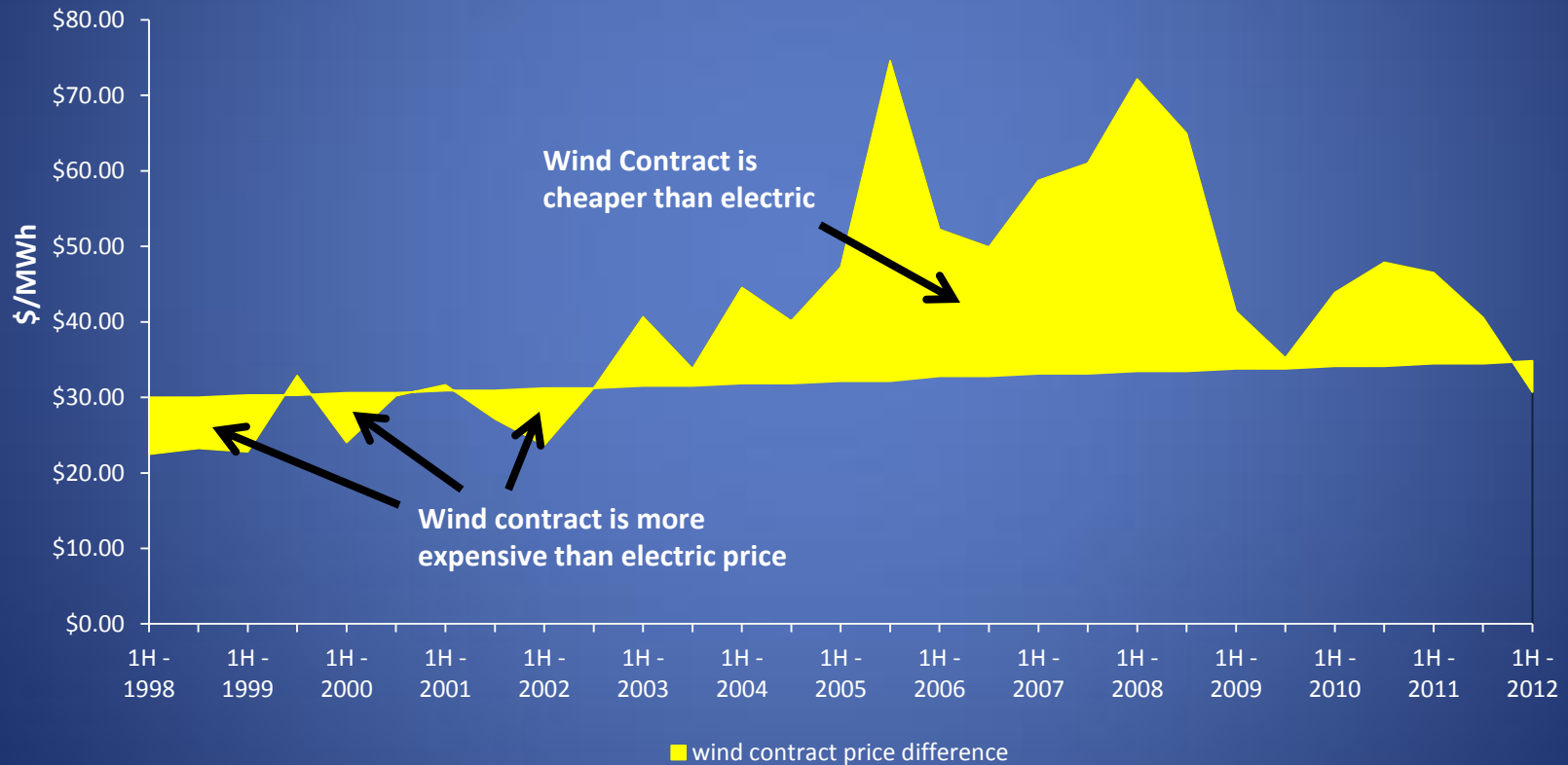
- Over the past decade, wind energy costs have been comparable with natural gas operating costs
- With no fuel cost, wind energy costs are stable over the life of the project
- Technology and Market Improvements have led to declining wind prices since 2008

Electricity, Natural Gas and Wind Prices 1998-2011



Difference Between Wind and Electric Prices

On a levelized basis, the wind contract is \$11.50/MWh less expensive



Recent Developments Impacting Wind Cost



- **Project Performance**

- Continued increases in hub heights and rotor swept area (in proportion to nameplate capacity), leading to improvements in capacity factors within individual wind resource classes, especially in lower-wind-speed sites

- **Installed Capital Costs**

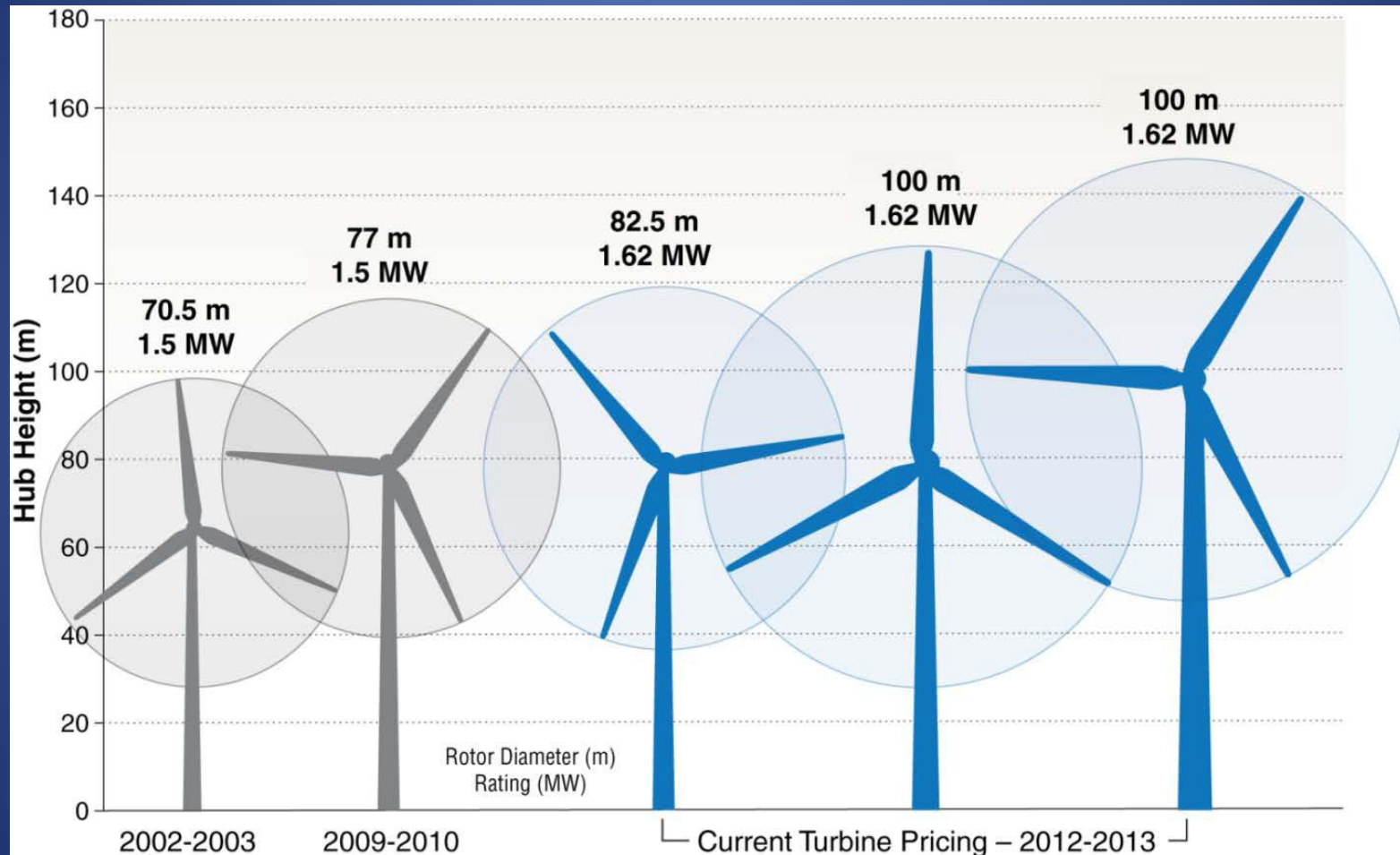
- Steep reductions in wind turbine prices negotiated over the last 2 years, with some evidence of a simultaneous reduction in balance of plant costs, which are expected to lead to sizable near-term capital cost reductions

- **Other Advancements**

- Operation and maintenance: Reduction in the cost of O&M for newer wind power projects
- Financing: Notwithstanding the impact of the financial crisis, generally improved financing terms over the *longer-term* as the sector and technology have matured
- Availability: Reduction in losses due to improved turbine/project availability

Typical GE Turbine Offerings Over Time

(does not include 2.5 MW turbine platform)

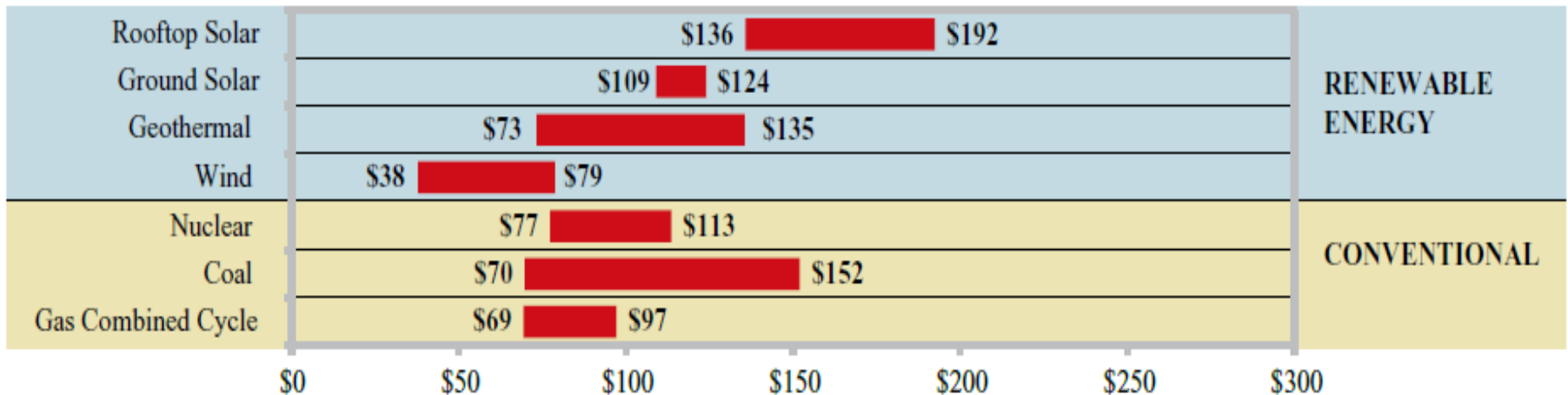


Source: Wisner, Bolinger, Lantz, Hand, NREL/LBL Feb 2012

Comparing the Cost of Energy

This comparative look at the costs of conventional and renewable energy per megawatt hour includes financing, operating and fuel costs. The range of prices for individual fuel sources reflects the varying costs of siting, permitting, land and construction costs.

The cost of renewable energy includes federal incentives.



Source: Lazard Inc., 2011