



# Hedging an Uncertain Future: Internal Carbon Prices in the U.S. Electric Power Sector

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**RESOURCES**  
FOR THE FUTURE

# Political vs. Investment Cycles

*“The cycle for electing (and ultimately, replacing) politicians in Washington is much shorter than the cycle for building and replacing generating assets”*

- *Standard & Poor Global Ratings, December 2016*

# What does a carbon price represent?

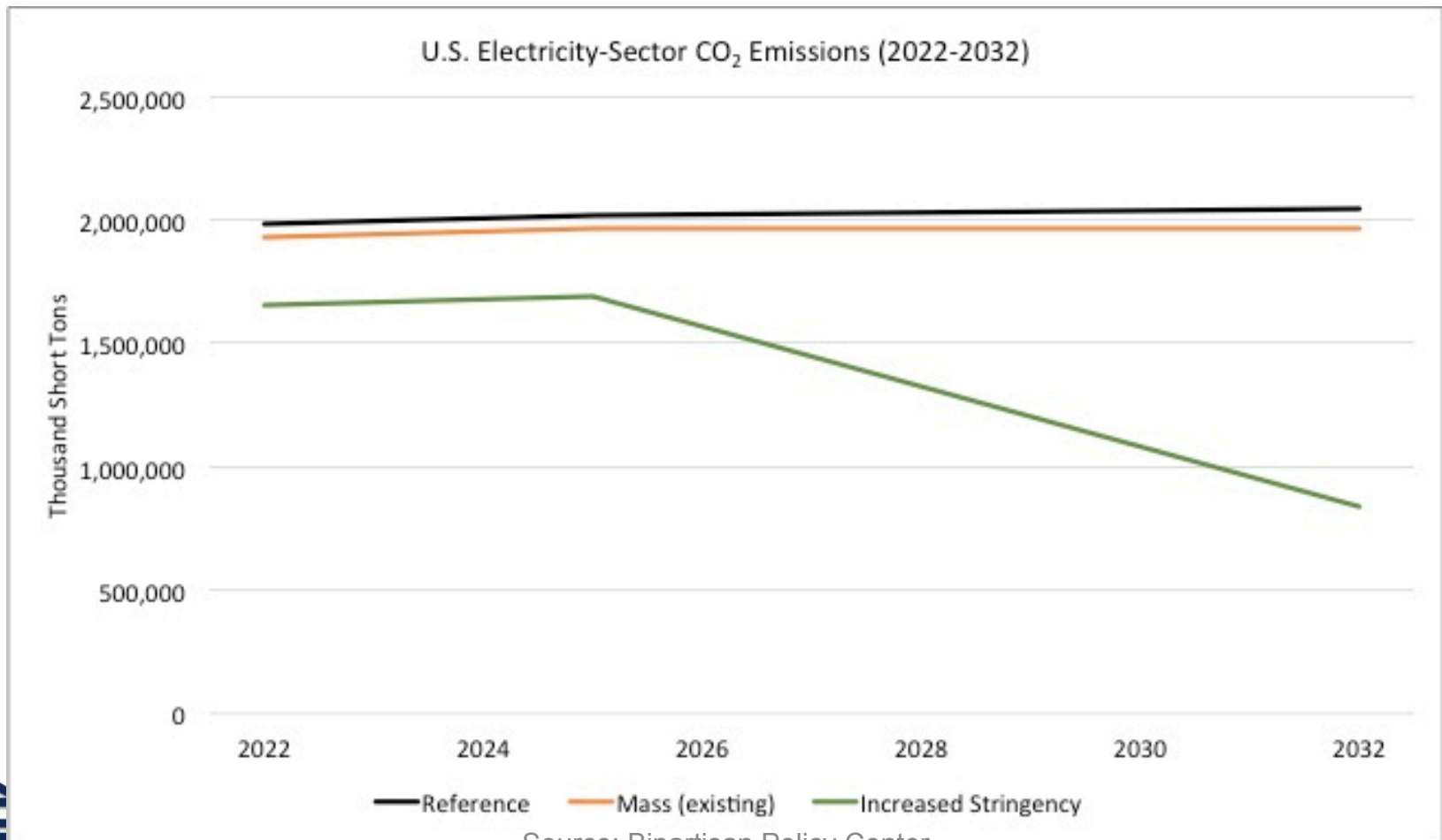
- Two approaches
  - Potential regulatory cost of carbon
    - Involves political, legal, economic evaluation
    - Depends on estimates of future market developments, economic growth, complementary policies
  - Social cost of carbon (SCC)
    - Estimates of future damages and benefits of avoiding these damages
    - The “right question” but requires complex assessment with numerous scientific and economic issues

# Benefits of Internal Carbon Pricing

- Anticipate future policies
- Manage regulatory risks, including stranded assets
- Prepare for new markets and services
- Respond to customer and investor interests

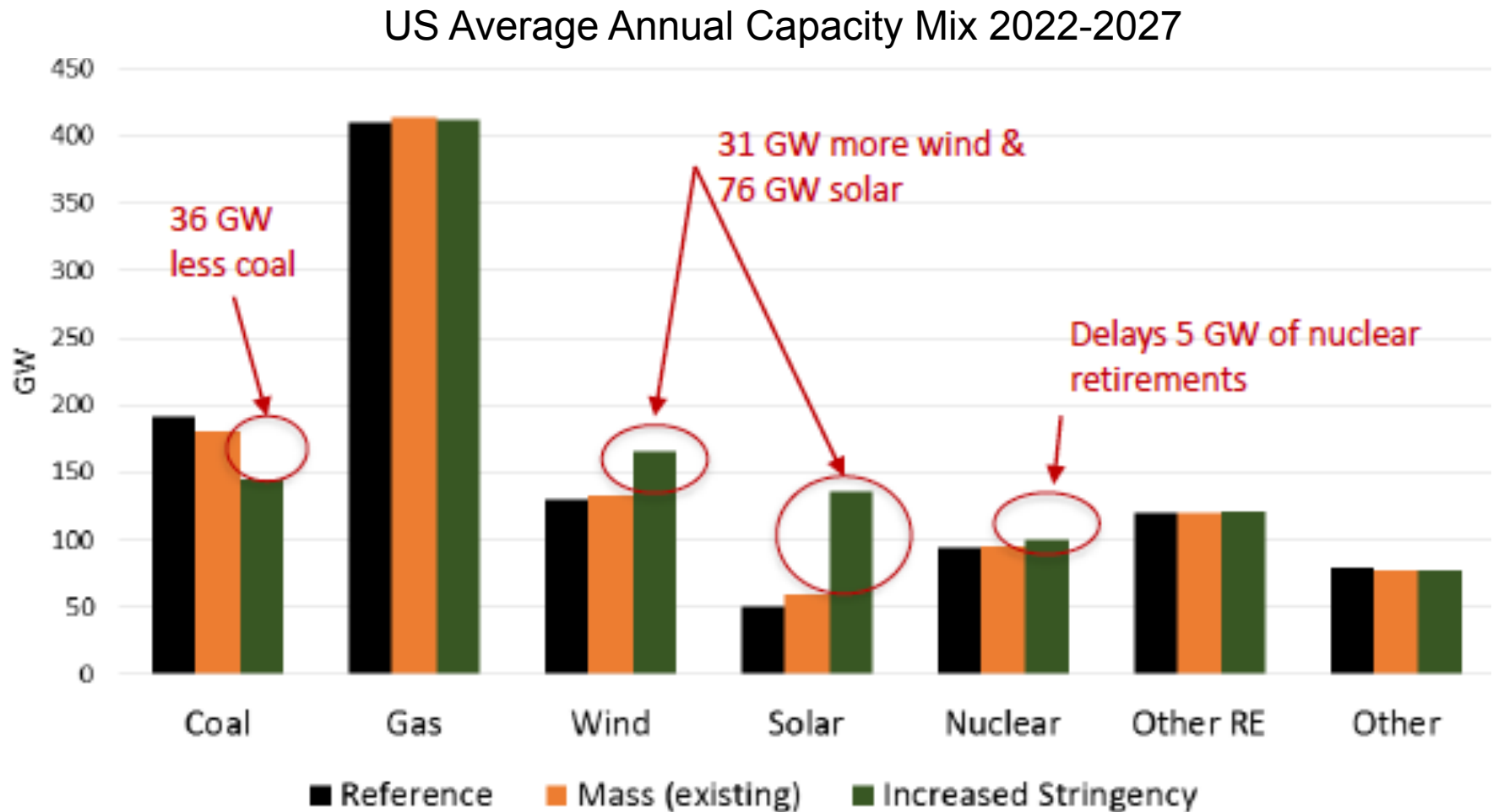
# Impacts of Perfect Foresight on Pricing

What if electricity companies knew now that in 2030, new standards would require a 65% reduction from 2005 levels by 2040?



Source: Bipartisan Policy Center  
June 2016

# Impacts of Perfect Foresight on Pricing



# Policy drivers for internal carbon pricing

- Integrated Resource Plans (IRPs)
- Valuing distributed energy resources (DERs)
  - New market and regulatory structures require better ways to value the benefits of DERs
  - A few states have used the SCC
- Carbon disclosure and pricing
  - Stronger SEC guidance in limbo
  - Voluntary efforts, including CDP & Task Force on Climate Related Financial Disclosures

# Integrated Resource Plans

- Used by state-regulated vertically integrated companies to plan for energy and peak demand (not merchant companies in wholesale power market regions)
- IRPs forecast scenarios and portfolios of supply- and demand-side resources
- IRP requirements set by states and vary based on frequency, planning horizon, treatment of environmental costs, and many other factors



# State IRP requirements for carbon pricing

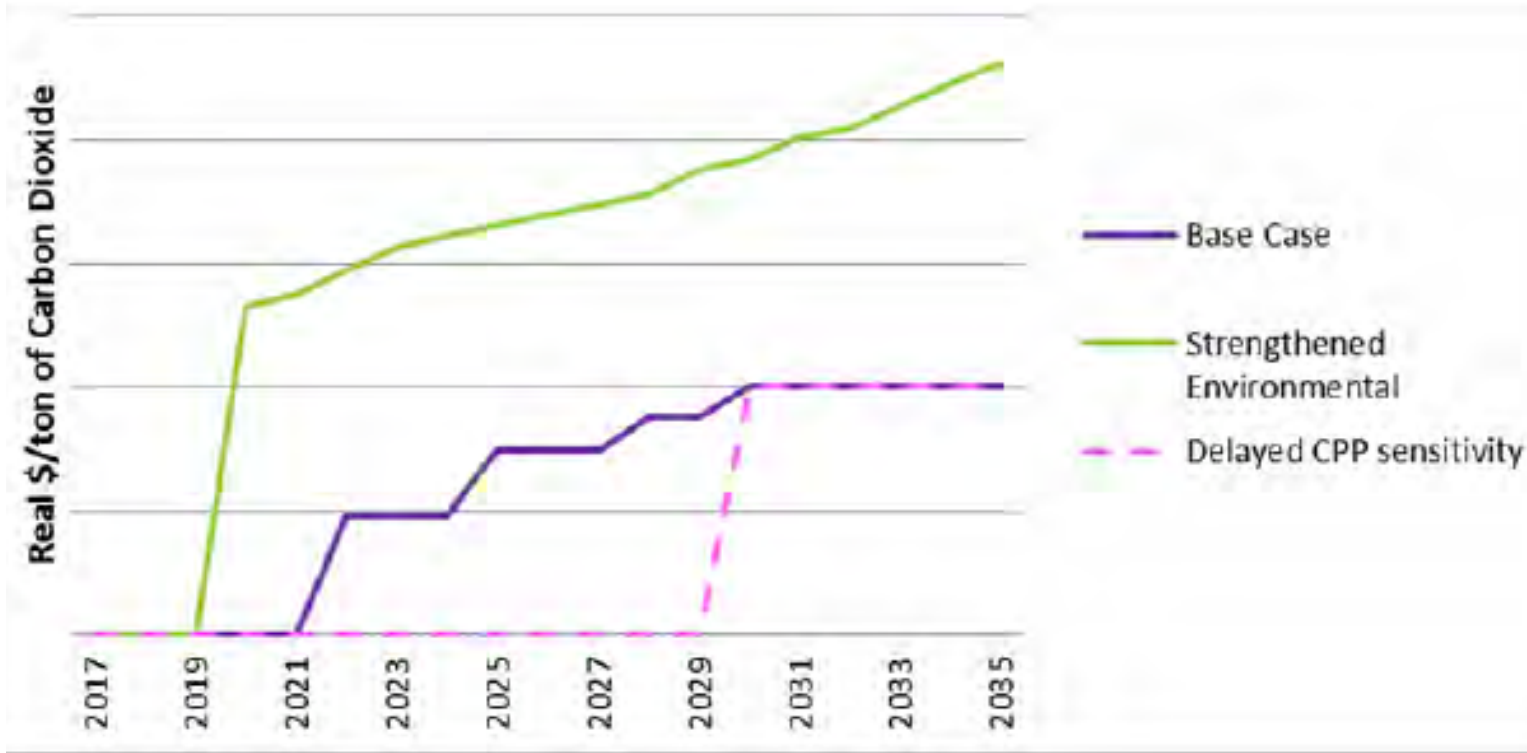
- Some require general consideration of environmental compliance costs
- Several require assessment or discussion of externalities/damages of emissions
- Some require specific ranges of prices or guidelines, for example
  - Oregon has requirements for pricing scenarios, including at least one that triggers a portfolio of resources “substantially different than the preferred portfolio.”

# Variation in carbon pricing

- Carbon pricing in 15 company IRPs from August 2015–November 2016 (after final CPP)
  - Base- or Mid- Case prices range from
    - 2022-2025: \$6-\$39 (2016\$)
    - 2032-2035: \$16-\$49 (2016\$)
  - Sensitivities as high as \$60 in 2025; \$90 in 2034
  - Most prices based on Clean Power Plan or California cap and trade, but some include potential future policies that are more stringent
  - Some scenarios include additional assumptions about lower carbon resources or market changes

# Carbon price transparency in IRPs

- Some companies provide multiple scenarios with estimated carbon prices for key years
- Others describe pricing scenarios, but don't reveal \$/ton
- Others keep details confidential (e.g., expected rate of price escalation.)
- Some IRPs don't discuss carbon prices at all



# Recommendations

- State policy makers should require transparent assumptions about carbon pricing in IRPs
- With stronger mandatory guidelines less likely, companies should consider adopting voluntary guidelines
- Continue developing projections for regulatory costs methodologies for the SCC

# Recommendations (continued)

- Continued modeling and analysis of potential future constraints by states and/or others
  - What carbon prices should be used for the most cost-effective trajectory to meet prospective emissions targets?
  - How will changes in electricity technologies, fuel prices (particularly natural gas), and market structures affect the level of carbon pricing necessary to meet emissions targets?
  - How will other types of policies, including renewable energy mandates and energy efficiency standards, affect internal carbon pricing?