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CO₂ Price Forecast

Planning for Future Environmental Regulations

This article explores the paths that the electricity sector has taken to appropriately account for the price of carbon dioxide (CO₂) in resource planning.



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U.S. electric utilities and other entities are increasingly incorporating CO₂ price projections into long-term electricity sector planning and investment decisions. Because power plants and other electric sector assets have long lifetimes—often 50 years or longer—prudent, long-term resource planning requires reasonable projections of future prices, both for fuel and for anticipated environmental policies and regulations. Incorporating a price for CO₂ in resource or investment planning benefits project developers, investors, customers, and society as a whole by promoting more economically robust and environmentally friendly power generation portfolios.

Mechanisms for Setting a CO₂ Price

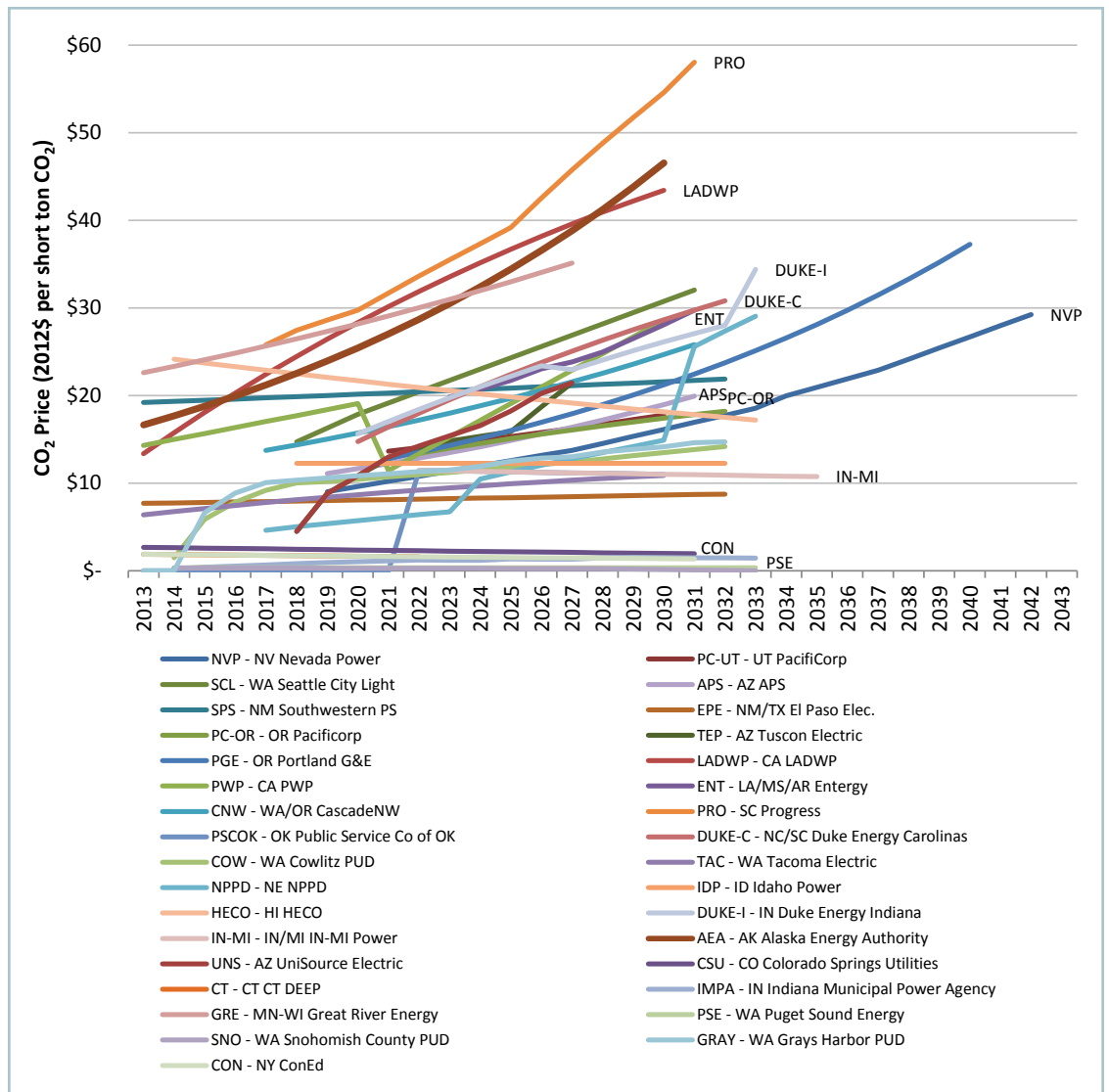
A CO₂ price places a monetary value on the externalities associated with generation from fossil

fuel combustion. Mechanisms include direct CO₂ taxes, the trading and sale of CO₂ allowances, a “social cost of carbon” used in federal rulemakings, and marginal CO₂ abatement cost curves used to estimate cost effectiveness of many CO₂ mitigation strategies. Some of these mechanisms, such as a carbon tax or allowance, internalize the external costs of climate change by making polluters pay; other CO₂ price-setting approaches inform regulatory standards in which non-market policies (e.g., unit-specific emissions limits or mandates for improved technology) may be represented by an “effective” price that—if instituted as an allowance or tax—would result in the identical emission reduction as the non-market policy.¹ Utilities can and do internalize an effective CO₂ price in resource planning processes as a way of including the potential costs of future regulations.

by **Patrick Luckow, Joseph Daniel, Spencer Fields, Elizabeth A. Stanton, and Bruce Biewald**

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Figure 1. The wide range of CO₂ prices used by utilities in recent IRPs.



CO₂ Prices in Long-Term Utility Planning

The utility Integrated Resource Plans (IRPs) required by many states make it necessary to project future prices for fuel and electricity. The substantial uncertainties in these price forecasts are understood, and are accepted as part of the process of making the best possible predictions given current information. Forecasting a CO₂ price is a similar exercise. Given the current regulatory environment, many utilities have come to recognize that making the assumption that there will be no CO₂ price is unrealistic and may lead to significant unexpected future costs.

An ongoing review by Synapse of IRPs released by U.S. utilities in 2012 or later found that at least 44 IRPs from 39 utilities incorporated CO₂ prices in modeling used to aid in decision-making regarding generation and transmission investments.²

(Note: These utilities operate in 42 states and represent a substantial fraction of total U.S. generation. States not included do not necessarily neglect CO₂ pricing. Such states may have utilities that do not make IRPs public, do not conduct integrated resource planning, have not produced a new IRP in the 2012–2013 window, or have simply not yet made it into our database.)

Many of these utilities use or incorporate the Synapse CO₂ forecast into their resource planning.¹ The Synapse CO₂ forecast, along with others, is developed through analysis and consideration of the latest information on federal and state policy-making and the cost of pollution abatement. (Note: Other forecasters of CO₂ prices include ICF International, Wood Mackenzie, and Energy Ventures Analysis; however, since the Synapse forecast is the only one that is made public, it is not possible to

show comparisons between forecasts here.) Figure 1 presents the range of non-zero CO₂ price forecasts employed by utilities in the reference case (or “business as usual” case) of their 2012 and 2013 IRP planning processes. This figure demonstrates the wide range of CO₂ prices being used by utilities in recent IRPs.

The Writing on the Wall

Federal action is not the only route available to implement carbon prices in the United States. Historically, several states and regions have led the nation on climate and other environmental initiatives, and several states already have a mechanism in place to regulate CO₂ emissions. For example, Minnesota and Washington set baseline CO₂ price forecasts that utilities operating within the state must use in their planning;^{3,4} Vermont requires an effective CO₂ price of \$80 per ton for utility resource planning;⁵ electricity generators in the Northeast states participating in the Regional Greenhouse Gas Initiative purchase allowances for each ton of CO₂ emitted; and California’s statewide carbon cap-and-trade program, implemented under AB 32, represents the world’s second-largest CO₂ market.

Given the broad scientific consensus on the need to reduce greenhouse gas emissions, it is likely that federal regulatory measures together with state and regional policies will lead to the existence of a cost associated with CO₂ in the near-term. Currently, there is a significant push for CO₂ regulation through Section 111(d) of the U.S. Clean Air Act, which would set caps on carbon emissions, inducing an effective price of carbon. Previous attempts by the U.S. Congress to pass climate legislation either (1) set a carbon price through a cap-and-trade system or carbon tax, or (2) encouraged low-carbon resources through portfolio standards

mandating a set fraction of clean energy. These attempts, to date, have been unsuccessful.

Despite these challenges, it is clear that the U.S. federal government is already considering the cost of carbon. Since 2010 the federal government has included a carbon cost (the “social cost of carbon”) in regulatory rulemakings to account for the climate damages resulting from each additional ton of greenhouse gas emissions, a value that was recently updated in 2013 to a central value of US\$42/tCO₂.⁶ While the adequacy of the chosen value is still being debated,⁷ the federal government is already using this non-zero price in a range of rulemakings, including fuel economy standards, lighting efficiency standards, and air quality rules.

Prudent Planning Is Key

Including a CO₂ price is important in planning for uncertainty in environmental regulations—irrespective of when or how federal and state climate policies are adopted. State and regional policies, together with federal regulatory measures, place economic pressure on CO₂ emitting resources in the next several years, such that it is relatively more expensive to operate a high-carbon-emitting power plant. Delaying action to reduce CO₂ emissions makes emissions mitigation more costly.⁸ If no action is taken today—but in 10 or 20 years a decision is made to act abruptly—changes which could have happened gradually over time will have to happen very quickly, and are likely to result in increased costs to utilities and their customers. Both effective CO₂ prices in investment planning and market CO₂ prices in the form of cap-and-trade policies are prudent planning actions that reduce emissions, assist in global efforts to avoid climate damages, and protect public interests. **em**

Utilities can and do internalize an effective CO₂ price in resource planning processes as a way of including the potential costs of future regulations.

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