**Trade-offs in Emissions Reductions with a CO₂ Policy**

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**Key Takeaways**

Restricting carbon pricing to only the electric sector may lead to “missed” decarbonization and electrification opportunities in other sectors of the economy. This analysis shows how:

- Electric sector-only policies neglect emissions reduction opportunities in non-electric sectors.
- Even without a carbon price, electrification plays a major role in reducing transportation emissions.
- Higher electricity costs from electric sector-only policies limit additional electrification and CO₂ reductions in non-electric sectors.

A variety of policies have been proposed and promulgated in the United States with the goal of reducing CO₂ emissions in the electric sector. However, there are additional economic opportunities for reductions of non-electric CO₂ emissions through electrification of energy end-use in the buildings, transportation, and industrial sectors. Policy design can play a major role in capturing all cost-effective opportunities to reduce CO₂ emissions. Using the U.S. Regional Economy, Greenhouse Gas, and Energy (US-REGEN) model, EPRI compared the impact of economy-wide versus electric sector only carbon policy to explore these trade-offs in sectoral coverage.

Carbon policy that targets only the electric sector may inadvertently discourage opportunities to decarbonize other sectors through electrification (Figure 1). Model results suggest that while a carbon price applied only to the electricity sector leads to significant CO₂ reductions in that sector, it may lead to increased emissions in the buildings, transportation, and industrial sectors.

For this analysis, EPRI modeled three scenarios using US-REGEN:

- A **Reference** scenario that includes no carbon policy beyond existing state RPS.
- A **CLC Policy** scenario where a $43/tCO₂ price is applied economy-wide beginning in 2021. This policy mimics the Climate Leadership Council (CLC) proposal (Baker-Schultz Plan).
- An **Electric Sector Only** scenario where the carbon price from the CLC Policy scenario is applied only to the electric sector.

In the Reference scenario, transportation electrification is economic even without a carbon price, leading to significant CO₂ emissions reductions, particularly from light-duty vehicles (see USNEA report). Emissions from the electric sector also decline despite the new charging load as a result of gradual replacement of coal with natural gas and renewables. Emissions decline slightly in the buildings sector.

**Figure 1.** Trends in CO₂ emissions for the electric and non-electric sectors across the three scenarios.
When the carbon price is applied only in the electric sector, the price of electricity is increased without a corresponding penalty on direct use of fossil fuels. This effect disincentivizes customers from adopting electric technologies in the end-use sectors. In the Electric Sector Only scenario, the economics of vehicle electrification worsen, and the more limited electrification in the industrial and buildings sector under an economy-wide policy disappears.

Key Insight: An economy-wide carbon price accelerates electrification in all end-use sectors relative to the reference case, while an electric sector only carbon price decelerates electrification and associated emissions reductions.

Contact Information
For more information, contact Geoff Blanford (gblanford@epri.com). Additional results are provided in EPRI Product #3002015050. USNEA report is available as EPRI Product #3002013582. Model documentation can be found at http://esca.epri.com.