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RESEARCH ADDENDUM

Consumer Electricity Price Impacts of the 45V Hydrogen Production Tax Credit

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This supplementary analysis is based on results from "Minimizing emissions from grid-based hydrogen production in the United States," published in *Environmental Research Letters* (https://doi.org/10.1088/1748-9326/acacb5), and has not itself been subject to formal peer review. See the full paper for further context.

Context and Results

In "Minimizing emissions from grid-based hydrogen production in the United States," we analysed the emissions and hydrogen production cost impacts of potential implementations of the Section 45V clean hydrogen production tax credit. However, it is also possible that by changing how hydrogen producers consume and procure power within regional electricity markets, the rules governing 45V could indirectly affect the prices paid by other electricity consumers in these markets. In this brief research addendum, we reanalyze electricity system modeling results from our paper to assess these consumer price impacts.

Figure 1 shows the impacts of potential 45V implementations on the average hourly wholesale electricity price – the price paid for generation by load-serving entities and passed on to consumers in their electricity bills – in two regions of the Western US in scenarios where 5 GW of local hydrogen electrolysis capacity is deployed. In "Strict Rules" cases, hydrogen producers must procure physically-deliverable, hourly-matched clean electricity from newly-built generators, while in "Lax Rules" cases they may procure clean electricity without any restrictions on timing, location, or vintage. We find that average wholesale electricity prices are **8% higher** in the southern California region when lax rules are put in place, and **10% higher** in Wyoming & Colorado. This result implies that when subsidized hydrogen producers are not required to directly procure the new, time-matched, deliverable clean power necessary to meet their electricity demand, **the costs of meeting this additional demand are socialized among all electricity consumers in the form of higher prices**. In these cases, the total additional costs shifted to other electricity consumers by hydrogen producers operating under lax rules are **$392 million per year** in the Southern California region, and **$158 million per year** in the Wyoming & Colorado region.

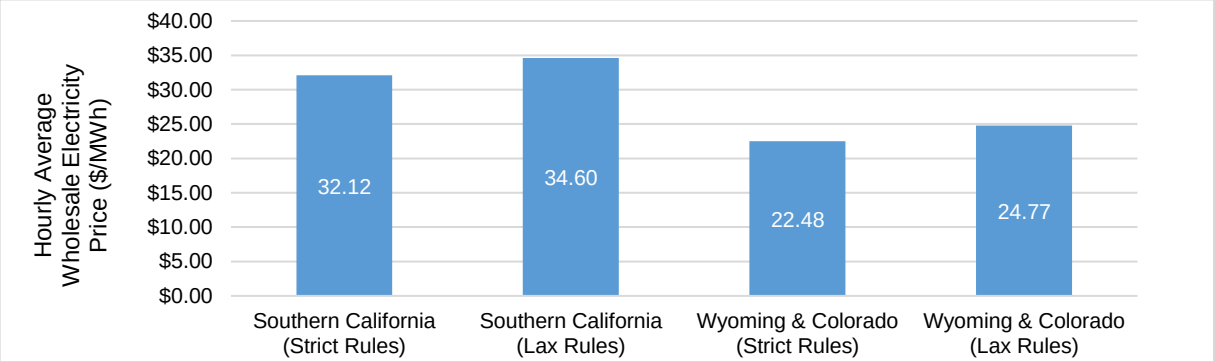

Figure 1: Long-run impact of 45V PTC rules on average hourly wholesale electricity prices in Southern California (left) and Wyoming & Colorado (right) in scenarios where 5 GW of hydrogen electrolysis capacity is deployed in each region, circa 2030.