The Economic Effects of Interregional Trading of Renewable Energy Certificates in the WECC

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Executive Summary

In the U.S., individual states enact Renewable Portfolio Standards (RPSs) for renewable electricity production with little coordination. A distinctive feature of RPS policies is their flexibility. Most implementations allow LSEs to meet their renewable targets through ownership of an equivalent number of Renewable Energy Credits (RECs), which are financial instruments that represent the environmental attributes of electricity generated using renewable energy technologies. The trading eligibility of the RECs from out-of-state LSEs varies from one state to another.

On one hand, virtually all states having RPS policies allow for unlimited use of out-of-state RECs provided that the underlying electricity is delivered into the state. These are called "bundled RECs" because they correspond to out-of-state RECs that require deliverability of the electricity into the state. However, only some states allow for "unbundled RECs"; that is, out-of-state RECs that do not require deliverability into the state. By allowing utilities to meet a fraction of the RPS goal with out-of-state unbundled RECs, states aim to further reduce the expense of meeting the RPS regulation. Unbundled RECs allow LSEs to take advantage of the most cost-efficient renewable resources available for deployment, independent of location.

Using a co-optimization (transmission and generation) planning model, we quantify the long run economic benefits of allowing flexibility in the trading of RECs among the U.S. states belonging to the Western Electricity Coordinating Council. We characterize flexibility in terms of the amount and geographic eligibility of out-of-state RECs that can be used to meet a state's RPS goal.

Although more trade would be expected to have economic benefits, neither the size of these benefits nor the effects of such trading on infrastructure investments, CO_2 emissions and energy prices have been previously quantified. We find that the gains from trade that result when all states allow their load-serving

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entities to meet 100% of the renewable targets using out-of-state unbundled RECs are approximately $4.3 billion per year, compared to the situation in which no out-of-state RECs are allowed. These cost savings correspond to a 13.4% reduction in annualized cost of generation operations and new investment in generation and transmission. Remarkably, 90% of these economic gains can be captured by increasing the allowed unbundled REC imports from 0% to just 25%, assuming that trade is restricted to either 1 west-wide zone, or 2 or 3 subregions of WECC. Increasing trading flexibility beyond 25% yields additional, but much more modest, cost reductions. This trend is mirrored in the distribution of investment among different renewable energy technologies, which tends to stabilize together with total system cost once the in-state constraint is expanded beyond 25%.

However, much fewer of these benefits from importing unbundled RECs are achieved if myopically tight restrictions are placed on the geographic regions from which imports can come, similar to restrictions some states now have in place. When the west is divided into four regions, and unbundled REC imports are restricted to within each region, about $0.7 billion are lost (when considering the case of 100% unbundled REC trading flexibility). This is because, under a 4-Region scenario, the state of California would not be able to import RECs generated using relatively inexpensive renewable resources located in states like Utah and New Mexico. Thus restrictions on overall REC imports as well as the sources of those imports are both important.

We also find that increasing unbundled REC trading flexibility does not necessarily result in either higher transmission investment costs or a substantial impact on CO_2 emissions. Finally, increasing REC trading flexibility decreases energy prices in some states and increases them elsewhere, while the WECC-wide average energy price decreases.