

# Market Power and Renewables: The Effects of Ownership Transfers

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Over the past few years, electricity markets around the world have seen important changes in their energy portfolios as new sources have been introduced (e.g. wind and solar) and others have been retired or penalized through taxes (e.g. non-refurbished nuclear plants and coal plants). These changes continue nowadays as a number of incentives to curb the greenhouse gas emissions associated with the production of electricity have either been put in place (e.g. production subsidies such as feed-in-tariffs (FiT) and mandates such as renewable portfolio standards (RPS)) or in other cases been dismantled.

We quantify the net result on wholesale electricity prices of two opposite effects: market power and the merit order effect. The latter occurs when there is an expansion of the amount of renewable energy sources (RES): in that case, the system's supply curve shifts to the right and its intersection with the demand curve occurs at a lower price than before the expansion. However, partial ownership of RES from firms with market power may counteract that effect. In fact, as we show theoretically, the best response for firms with market power is to reduce production from conventional sources, which has a positive effect on market prices. First, we quantify this market power effect on its own by measuring the effect on market prices when holding the system's capacity constant and changing the ownership structure. Second, we compare this effect to the merit order effect by expanding net capacity and allowing different firms to hold the additional capacity.

We estimate a detailed model of the Ontario electricity market to run simulations that consist of finding the new hourly equilibrium prices under different allocations of RES among market participants using the reaction functions estimated from the data. Our results show that, by keeping the total amount of RES constant in the system, transfers of that capacity from the fringe into the strategic firms give place to positive increases in prices of up to 24% relative to average prices and they increase with the amount of RES capacity transferred. These effects are net of the merit order effect because there are no additions to the system's RES capacity. As the strategic firms' portfolios include higher shares of RES, equilibrium prices increase by greater amounts. In other words, the expansion of the strategic firms' portfolios from adding RES capacity yields to more expensive electricity, contrary to the effects from a simple merit order effect. Finally, when we add RES capacity to the entire system following current policy guidelines in Canada, the merit order effect and market power combined yield lower prices relative to the equilibrium outcome with no added RES. We show that there can be a decrease of up to 30% under perfect competition but only around 7% when the largest firm is the owner of the new capacity.

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