Local Economic Impacts of Renewable Energy Component Manufacturing

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Understanding the labor market impacts of a transition to renewable energy sources, including how these impacts are distributed among historically disadvantaged populations, is crucial for stakeholders who may be guiding the location and type of renewable energy investments. State and federal policies have invested significant resources in expanding both renewable energy generation and domestic renewable energy component manufacturing. The literature to date has focused on the local economic impacts of renewable energy generation facilities (Gilbert et al, 2024, JAERE; Chan and Zhou 2023). In this paper, we explore the heterogeneous impacts of domestic manufacturing of renewable energy components.

We estimate the causal effect of wind component manufacturing activity on local household income. We further evaluate whether this component manufacturing effect differs in historically disadvantaged communities or among lower skilled workers. We combine panel data from a variety of sources to quantify these effects using several identification strategies, including an inverse-propensity-weighted shift-share instrumental variables framework.

At the county level, we collect data on the presence/absence and number of wind component manufacturing facilities per county from American Clean Power (ACP), an industry association. We combine this with a state-level panel of aggregate annual revenues at wind component manufacturing facilities gathered by IBISWorld, a private industry data aggregator. We combine this data with county-level data on household earnings from the American Community Survey. We further use the Biden Administration's designation of "disadvantaged communities" (DACs) under the Justice40 Initiative to code counties as either containing a DAC or not. We instrument for wind energy component manufacturing activity using a shift-share strategy that interacts national surges in domestic renewable component manufacturing with measures of county-level historical manufacturing activity and suitability for wind energy development.

From this county level analysis we find statistically and economically significant positive impacts of wind component manufacturing on local median household incomes. The size of these impacts are several times larger than the largest local earnings impacts of wind power generation facilities estimated in recent literature. We also find that the impacts are significantly smaller in counties containing disadvantaged communities, rural counties, and counties with facilities that manufacture specific component types. These heterogeneous impacts suggest that more granular analysis is required to understand how manufacturing affects households differently depending on their demographic characteristics.

To this end, we utilize geocoded, restricted-access data on the near universe of individual workers and establishments from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) database to conduct similar analysis at a granular level. We link data on renewable energy component manufacturing facilities from the Clean Economy Tracker and

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from ACP to internal Census establishment data on the number of workers employed and the amount of wages paid at these manufacturing establishments. For every worker in the LEHD database, we then compute the total employment and wages paid at all renewable energy component manufacturing establishments within 20, 40, 60, 80, and 100 miles of that worker's home in each year from 2015 to 2022. We use that information to estimate the impact of renewable energy component manufacturing employment and wages on general regional employment and wages at the individual worker level. We then differentiate these effects by the educational status of the impacted workers, and whether or not they live in a designated DAC. We identify these effects using a similar shift-share approach as described in the county-level estimates. Although these worker-level results are still underway, we expect them to be completed by April with ample time for the NBER Summer Institute.

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