

# Electrification and Socio-Economic Empowerment of Women in India

EPRG Working Paper 2012

Cambridge Working Paper in Economics 2045

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This study examines the effect of quality of electrification on empowerment of women in terms of economic autonomy, agency, mobility, decision-making abilities, and time allocation in fuel collection in India. It moves beyond the consensus of counting electrified households as a measure of progress in gender parity and analyzes how the quality of electrification affects women's intra-household bargaining power, labor supply decision and fuel collection time. In order to analyse the impact of reliable electricity on women's empowerment, we develop five empowerment indices using principal component analysis from a large cross-section of gender-disaggregated survey in India.

We use two stage least squares instrumental variables regression to investigate the causal link between access and quality of electricity and women's empowerment using the most recently available large gender-disaggregated survey from the India Human Development Survey, 2012. We use principal component analysis to combine 19 variables that elicit information on women's economic freedom, intra-household decision-making and resource allocation into five indices of empowerment: economic freedom, economic decision-making ability, agency, mobility, and household decision making ability.

The study finds that an additional hour of power outage and the quintiles of outages reduce women's empowerment and bargaining power, but the effect is not homogeneous across all women population. An hour of electricity is more beneficial for women in the second quintile of electricity deficiency where household on average has no electricity between 5-14 hours a day. There is not much difference in

the effect of electrification for those who are in the second and third quintiles of outage, where on average the household does not have electricity for 15-24 hours a day.

The results also show that a number of factors, in conjunction with electricity deficiency, affect women's empowerment in India. Educated women tend to lose the most from outages in rural and urban areas confirming the loss of labor supply by educated women with energy deficiency. Household income shows to have a strong impact on women's empowerment associated with electricity deficiency. The analysis shows that having access to electricity is not sufficient to empower women and the quality of electricity affects women's position on all five dimensions of empowerment and is key in closing the gap of gender differences by empowering women in the socio-economic realm.

Women's labor force participation, education, health, and exposure to electronic media are key intermediary factors through which electrification enhances women's empowerment. We find that the quality of electricity is associated with positive improvements in all five enabling indices. We then investigate how the intermediate factor of electricity deficiency may affect women's empowerment depending on education and household characteristics such as income and location. We find suggestive evidence that women's labor force participation and education are the most important determinants of their intra-household bargaining power and is critical to intra-household resource allocations.

Our results suggest that counting the electrified households is not sufficient, and quality of electricity is an important policy lever for empowering women. Access to electricity alone is unlikely to ensure significant progress in important dimensions of women's empowerment, in particular for decision-making ability and economic freedom. The study recommends revisiting the paradigm of access to electrification and women empowerment by focusing on the quality, of not only extensive but also intensive electrification to enhance life and economic opportunities for women and their households.

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May 2020