Cooking with solid biomass fuels, such as wood and charcoal, is linked to a range of negative social, economic and environmental impacts. Despite efforts to encourage a transition to cleaner burning fuels and devices, over three billion people continue to rely on solid fuels for cooking in the Global South (1). This number has remained fairly static over the last couple of decades despite a decline in the proportion of population dependent on solid fuels because population growth has outpaced the rate of transition away from these fuels. Future scenarios exploring cooking energy transitions suggest that in the absence of new policies, business as usual projections of socio-economic growth will be insufficient to make clean cooking services affordable to all by 2030 (2). In addition, stringent climate policy, if not mediated by measures to safeguard the poor, can result in significant price rises (3). This would make achieving universal access by 2030, a target under SDG7, more untenable. However, these studies all assume a single baseline of socio-economic growth and fail to account for the full range of price effects on fuel choices and demands for alternative cooking fuels. In this work we explore the transition away from solid biomass cooking using a full representation of key Shared Socioeconomic Pathway (SSP) narratives (4) for major regions of the Global South, and compare this to the transition under climate mitigation policy scenarios under a middle of the road SSP2 future. We employ the latest version of the MESSAGE-Access model (5). This improves on the previous methodology by developing a structural model of fuel choice and demand that requires making no a priori assumptions about preferences between fuels, and accounts for the full range of price and income responses so as to better capture substitution effects between clean and non-clean fuel options.

Our preliminary findings suggest that the rapid urbanization and poverty reduction under SSP1 enables a more rapid transition to cleaner cooking making more efficient and less polluting fuels affordable to many by 2030. Under an SSP2 or SSP3 future a large proportion of the population will remain dependent on solid biomass fuels for cooking. Stringent climate policy consistent with the goal of holding warming well below 2 degrees C by the end of the century, can significantly jeopardize this transition even further, if additional policies to address affordability of the poor are not introduced. Continued dependence on solid biomass for cooking results in significant household and outdoor air pollution and associated health and climate impacts that make achieving several of the SDGs more challenging.

References