

Introducing electricity load level detail into a CGE model

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Extended Abstract

The last years have seen a huge effort in improving the representation of the energy sector in computable general equilibrium (CGE) models widely used in E3 assessments. The major motivation for this effort lies in the limitations of CGE when dealing with energy and environmental policies, in which the energy sector may play a relevant role: these policies may change the way technologies or fuels are used, and these changes may have broader economic consequences which need to be accounted for. Therefore, if we want to accurately represent the impact of energy or environmental policies on electricity prices, and of these prices in the rest of the economy, we need to consider an additional level of detail: time period detail, or, in power systems jargon, load level detail.

This paper presents the first attempt to our knowledge at building temporal disaggregation into a CGE model, while keeping technological detail. This contribution is coupled with some methodological improvements over existing technology-rich CGE models.

The results of the case study clearly show the enhanced capability of this model for assessing complex policies with load shifting, demand profile changes and technology substitution. The model is able to account for the indirect effects characteristic of CGE models while also mimicking the detailed behavior of the electricity operation and investment present before only in bottom-up detailed models. Moreover, and unlike previous exercises, we show that the approach is feasible even for country-level systems, such as the Spanish one.

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