

## **An input-output analysis of energy and GHG emissions indicators of gasoline and diesel oil in Brazil**

Topic: CGE and econometric input-output modeling IV

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The goal of this study is to evaluate energy and GHG emissions indicators for gasoline and diesel oil in Brazil; the methodology chosen was the Input-Output (IO) Analysis. For this purpose, an economic IO model and a hybrid IO model were made to provide a comparison between them. The analysis considers 2009 as base year, because this is the most recent year which is possible to estimate the Brazilian input-output matrix from official data when the project started. Both models (economic and hybrid) have 25 sectors and 114 commodities; the approach allows all direct and indirect effects through production chain to be estimated. Into the whole Brazilian economy, energy sources and GHG emissions are accounted in terms of domestic and imported origin, as well as renewable and non-renewable. The main data collected and used to build the models were the use and make matrices (provided by The Brazilian Institute of Geography and Statistics – IBGE) and the consolidated matrix with energy flows for primary and secondary energy sources (provided by The Brazilian Energy Research Company – EPE). The results obtained with both models are very similar, considering gasoline as well as diesel oil; in general, the indirect effects captured by the hybrid model are a little bit higher due to the stronger linkage among the energy sectors when the transactions through these activities are accounted in physic (energy) units. From hybrid model, the main results are 1.201 toe and 1.202 toe embodied energy for 1 toe of gasoline and diesel oil, respectively; with respect to GHG emissions, the indicators are 75.32 gCO<sub>2</sub>eq/MJ to gasoline and 86.91 gCO<sub>2</sub>eq/MJ to diesel oil.