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**MECHANISMS TO PROMOTE ENERGY EFFICIENCY: REFRIGERATOR
REPLACEMENT IN BRAZIL**

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Overview

Although in the last 20 years considerable progress in refrigerator efficiencies was made, inefficient and obsolete refrigerators are operation in Brazil consuming up to five times more electricity when compared to efficient models available in the Brazilian market. This paper estimate the energy saving potential and assess the replacement options considering the cost of the electricity saved. We simulate policy instruments to reduce cost benefit ratios through incentives mechanisms such as subsidy on capital costs and energy tax as to accelerate the replacement of old refrigerators with new ones.

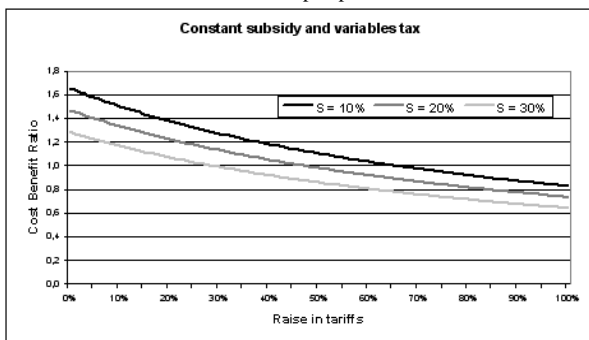
Methods

Considering a base case refrigerator stock by models and age we built a model to estimate the potential for energy conservation by Brazilian region through replacement inefficient and outdated refrigerators by efficient with label A (PROCEL labeling scheme). We evaluate the cost of saved electricity under the consumer perspective in relation the replacement options (inefficient and efficient refrigerators) and analyzed the sensibility of useful mechanisms for decrease cost-benefit ratio for efficient refrigerators: subsidy on investments and energy tax.

Results

The replacement of obsolete refrigerators would allow savings of about 264kWh/year/unit on average. This would represent 3,7 TWh in 2006. The annual discount rate adopted in Brazilian commerce is at least of 60% and this does not favour the consumer decision towards replacement by efficient model. In case of replacement by efficient equipments with discount rate of 60% the necessary subsidy for approach the cost benefit ratio to 1 is around 87% of capital costs while to discount rate of 12% this value is around 44%. In the case of replacement by new inefficient refrigerators exists in market with cost 20% lower and consumption 30% superior the necessary discount for the cost benefit to approach to 1 is 85% and 6% for discount rate of 60 and 12% in that order.

Fig. 1: Cost benefit ratio under consumer perspective: annual discount rate of 12%.



In other hand the tax on electricity tariffs showed less efficient in to reduction of cost benefit ratio. Only with 80% price increase the cost benefit ratio approach of 1 to discount rate of 12%. The figure 1 shows results to combination of mechanism.

Conclusions

We investigate the implications of changes in discount rates, tariffs, rebates offered to consumers as ways to promote the replacement of existing refrigerators by new efficient equipments. We too compare the results with the costs of producing from the societal perspective.

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