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ELECTRICITY SUBSIDIES IN LOW COST JURISDICTIONS: THE CASE OF BRITISH COLUMBIA (CANADA)

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Overview

Many US states and Canadian provinces have access to low cost electricity and decide to set the regulated residential price according to average cost principles, often below the market price. For instance, in 2004, 25 American states had an average residential electricity price below the US residential average price, while restructuring of their electricity market was either "not active" or "delayed" (EIA, 2003). The average retail electricity price in these 25 states was US$ 0.0743 per kWh, well below the national residential average of US$ 0.0885 (EIA, 2005a:44, and EIA, 2005b). Residential electricity consumers in these low cost regulated markets benefit from an indirect subsidy, equivalent to the opportunity cost of not selling at the market price (either in a neighboring jurisdiction or locally). The objective of this paper in twofold: (1) to estimate the size of this subsidy in one specific jurisdiction adopting such a policy (British Columbia, Canada); and (2) to estimate how different household income groups benefit from this subsidy.

Low residential electricity prices are often justified on social and political grounds (to protect low-income households and to please voters). But if a disproportionate share of the electricity is sold to higher-income households, this latter group may be the main beneficiary of an energy subsidy, hardly justified from an economic or equity point-of-view. In such a case, the social justification of low electricity prices may prove to be misguided, and maintaining low prices may even become a political problem, because it would primarily benefit high-income households.

By studying these two unintended consequence of an average-cost pricing policy below market price, a clearer picture of the real cost of this economic policy emerges. The many jurisdictions in North America in such a situation may realize the economic and social costs of this policy. Furthermore, environmental consequences such a low price policy induce, by requiring higher production and capacity levels than justified from an economic perspective, may provide more arguments to end these subsidies.

Methods

The first question of this paper, the estimation of the total electricity subsidy, is investigated through an analysis of what constitutes a subsidy (WTO, 1994; EIA, 2000; UNEP, 2002). Following the reviewed definitions, an empirical analysis of the size of the subsidy in British Columbia is performed under different scenarios, using different reference market prices and market parameters.

The second question, the evaluation of the distribution of the subsidy across household income groups, is investigated empirically through the analysis of two distinct data sources: household electricity consumption from the regulated electricity company (BC Hydro) and household income from the 2001 Canadian Census (from Statistics Canada). The analysis is done at the "dissemination area" level (geographical units of about 400-700 persons), the lowest possible unit of analysis at which the data can be found and matched. British Columbia has 7,463 such units. The study of household electricity consumption by income is usually done through consumer expenditure surveys. See for instance EIA (2001) or, for a multi-country

comparison of electricity consumption distributions, Jacobsona, Milmana and Kammen (2005). These consumer expenditure surveys use samples of consumers, whereas the whole population is used in this approach. For confidentiality reasons, households are however "averaged" by dissemination areas, which is a limitation. But as far as households sharing a similar income level live in similar locations, which is a well-documented pattern, this limitation remains secondary (see Massey and Fisher, 2003, and Myles, Picot and Pyper, 2000, for more on the clustered geographic distribution of income in an American and a Canadian context).

Results

Based on a pilot analysis of the data, preliminary results show that BC Hydro and its shareholder, the government of British Columbia, forwent approximately US$450 millions in profits in 2004, over the sale of 15 TWh to residential consumers at an average cost price, rather than at a market price. This corresponds to an indirect subsidy of US$314 for each of the 1,462,079 residential customers in 2004.

However, not all customers used the same amount of electricity. By analyzing consumption by household income groups, it is found that the subsidy varies from US$211.68 for low-income households to US$387.10, for high-income households. See the table below for more results.

	Household Income Groups				
	Less than $10,000	$10,000 to $29,999	$30,000 to $49,999	More than $50,000	All customers
Consumption per Household (kWh)	7,213	8,928	10,600	13,191	10,701
Subsidy per household	$211.68	$262.00	$311.06	$387.10	$314.03

Conclusions

Increasing economic efficiency calls for pricing reforms in the many jurisdictions across North America that sell low cost electricity to their residential consumers according to average cost principles. Bringing the price closer to a market price would end an era of indirect subsidies favoring primarily higher income groups. Equity and accessibility for low-income households can be maintained through other mechanisms, such as direct transfer payments. The resulting price increase will also lead to lower electricity production and capacity requirements (not directly assessed in this preliminary work), which can only be beneficial from an environmental point of view.

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