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SUMMARY FOR DECISIONMAKERS

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Should Chile use renewables, fossil fuel or hydropower for future electricity supply? Evidence from a contingent valuation study

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The rapid increase in energy demand in Chile has become a crucial issue for the Chilean government. Energy demand has increased by 6% over the last decade and it is expected to continue increasing in the coming years due to population growth and development of economic activities, especially the industrial and mining sectors. The Chilean National Energy Committee has estimated that on average the increase in demand by the major electrical system of the country (the Central Interconnected System —CIS) will rise by approximately 7% in coming years. Currently, 58% of the Chile's energy is generated using thermoelectric sources (fossil fuels), specifically oil, coal, and gas. Energy generation from fossil fuels is one of the main sources of greenhouse gas emissions contributing to global warming. They also imply a high dependence on energy imports, particularly natural gas from Argentina. The remaining 42% of Chilean energy is generated by hydropower, including small and large dams. There have been a number of serious conflicts over the construction of large dams in environmentally and culturally sensitive areas, resulting in both an increase in construction costs as well as long delays. At the moment almost no energy is being generated in Central Chile by nonconventional renewable energy sources (RES). At the national level this generation is 0.07% of the total energy supply, consisting of wind power. Concerns over environmental goals and future energy security have boosted the Chilean government's interests in looking at the potential for alternative energy sources to meet the rising energy demand. Different alternatives are currently available to Chile: 1) increase the energy generation based on fossil fuels, 2) develop large scale hydroelectric dams in Chilean Patagonia 3) introduce and develop nonconventional renewable energy sources (wind, solar, biomass and geothermal power). However, all these different sources entail costs and benefits that should be considered and contrasted if socially optimal investments are to be made (Bergmann et al., 2006).

This article studies the debate on the future energy supply in Chile. Using the Contingent Valuation Method, this study investigates the public's preferences, attitudes and willingness to pay (WTP) premiums for the introduction and development of renewable energy sources instead of using fossil fuels or building large dams in Chilean Patagonia. This information will help bring environmental pricing and consideration of externalities related to energy generation into future policies.

Although RES are generally more expensive than traditional sources, they are recognized for entailing lower environmental and social impacts. In general, cost-benefit analysis of energy projects currently does not consider the value of the externalities associated with the energy generation. RES may become a competitive alternative if the government accounts for this issue.

Results show that the introduction and development of renewable energy sources are supported by Chilean households. They present a significant and positive willingness to pay premiums for the development of these kinds of sources. In aggregated terms, this premium would be enough to cover the extra investment cost needed to develop RES projects based on wind, solar and biomass but not those that would include geothermal power, in comparison with the conventional sources. Therefore, authorities should consider the diversification of the energy mix. They may consider the implementation of systems of "premiums for green electricity" as established in some European countries, where households pay a green tariff for RES. The collected funds could be allocated to support the development of RES in terms of subsidies or incentives to its implementation. This study shows the maximum amount of money households in Chile would contribute monthly to this objective, which is between US$7 and $8.5 per month or an extra 16% to their current electricity bill. This amount is realistic if we compare it with other countries that currently apply tariffs for green energy developments.

The premiums that Chilean households are willing to pay increase with higher levels of education, knowledge about the current energy sources and income. Only in cases when the hydropower projects are baseline does age has a significant effect, indicating that younger people are willing to pay more than older people for preserving the Chilean Patagonia in its pristine state. Households that plan to visit the Aysen region are also willing to pay a higher premium than those who do not. Finally, it is possible to keep the Chilean Patagonia natural environment and also reduce the construction of thermoelectric plants if alternatives such as the RES are considered in Chile.

Photos: José Aravena, www.ecosistemas.cl and www.wikipedia.com

References

Bergmann, A; Hanley, N; Wright, R. 2006. "Valuing the attributes of renewable energy investments." Energy Policy, 34 (9): 1004–1014

Claudia Aravena is a Venezuelan/Chilean economist. Her research is part of her Ph.D. thesis at Queens University Belfast under supervision of Prof. George Hutchinson and Dr. Alberto Longo. As a LACEEP grantholder, her research was supervised by Prof. Fredrik Carlsson from University of Gothenburg.

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