Available online at www.sciencedirect.com
ScienceDirect
Journal of Policy Modeling xxx (2016) xxx–xxx
Journal of Policy Modeling
www.elsevier.com/locate/jpm

Paying for green energy: The case of the Chilean Patagonia☆

Juan-Pedro Garces-Voisenat [a,*], Zinnia Mukherjee [b]

[a] Department of Economics, Siena College, USA
[b] Department of Economics, Simmons College, USA

Received 2 February 2016; received in revised form 22 February 2016; accepted 10 March 2016

Abstract

We survey and assess the willingness to pay (WTP) for environmentally-friendly sources of energy, in the context of the proposed construction of five hydroelectric dams in the Chilean Patagonia. We then compare the estimated WTP to the real costs of generating electricity with different currently available technologies for renewable sources of energy. Overall, we find that the WTP of Chilean citizens would be more than enough to pay for greener sources of energy. We also find that the WTP is affected by age and gender of the respondents, but surprisingly not by income.

JEL classification: O1; Q2; Q4

Keywords: Green economy; Sustainable development; Energy; Environment; Chilean Patagonia

1. Introduction

Many emerging economies that are at a crossroads of their development processes face the critical question of choosing the energy sources needed to promote economic growth. Traditional sources based on fossil fuels have been proved to be damaging to the local and global

☆ A previous version of this paper has been deposited as a working paper in the Munich Personal RePEc Archive (MPRA), under the name 'Estimating the willingness to pay for environmental resources in the Chilean Patagonia' (MPRA paper 39320, http://mpra.ub.uni-muenchen.de/39320/). MPRA acts only as a repository, and has no copyright over the paper.

* Corresponding author at: 515 Loudon Road, Loudonville, NY 12211, USA. Tel.: +1 518 783 2908.
E-mail address: jp.garcesvoisenat@gmail.com (J.-P. Garces-Voisenat).

http://dx.doi.org/10.1016/j.jpolmod.2016.03.012

environment. The more environmentally-friendly sources, such as solar, wind, geothermal and mini-hydro generating plants, tend to have higher operational costs, which poses a challenge to poorer economies.

An emerging economy that faces this critical choice is Chile. The country has been increasingly using coal- and natural-gas-powered plants to produce energy, along with declining hydroelectric generation. Traditionally, the country has exploited its hydroelectric potential by building big hydroelectric dams in several rivers of its central regions. Unfortunately, the rainfall is quite irregular in the central zone of Chile, which causes frequent disruptions in the supply of electricity. This has prompted a trend toward the construction of thermal fossil fuel plants. However, the unreliable supply of natural gas from Argentina and the declining Chilean coal production, coupled with the increased environmental awareness of the population, are threatening the viability of this new mix.

In recent years, the construction of five big hydro-electric dams was proposed on the rivers Baker and Pascua, two pristine rivers in the Patagonia region of Chile. Never before had this region been used for such purposes, and in fact its whole extent of some 150 thousand km^2 of rainforest, glaciers and snow-capped mountains remains basically in its primitive state, with sparse settlements of aboriginal people and early settlers. There are a few scattered towns which live off the agricultural and fisheries activities. But the area is mostly known for its rugged nature, its scenic beauty and the abundant reserves of water it contains.

This project (HidroAysén) would have required flooding 29 km^2 of natural reserve lands and also building power lines and 70-meter-high towers along a stretch of about 1000 km in the Chilean Patagonia, which in turn would have entailed clearing a considerable amount of rainforest. The benefits promised by the private consortium in charge of the construction were 2750 MW of new installed capacity for the Chilean energy grid, which represents 20% of its current installed capacity.

The threats to the environment posed by large-scale hydroelectric generation are not circumscribed to the displacement of local populations, the destruction of native forests and ecosystems and some esthetic considerations. It has also been found that the operation of large dams in the generation of electricity can produce considerable amounts of greenhouse gases (Fearnside, 2004), on occasions as much as fossil-fuel generating processes.

Before the project was recently rejected on environmental grounds by the government of Chile (June 2014) after seven years of negotiations, some studies and surveys were carried out to measure the degree of support for the project from the local population and the population of Chile at large. Most of them showed reticence to accept alterations to the natural environment of Patagonia and a relatively widespread support for the introduction of green tariffs in the production and distribution of electricity. Ponce, Vásquez, Stehr, Debels, and Orihuela (2011), using the contingent valuation method (CVM), showed that urban dwellers of four major cities in Chile had a willingness to pay (WTP) per year equivalent to 28% of the cost of the project for one of the five dams.

In this paper, we also use CVM to estimate WTP, with a nationwide sample of respondents and referring to the whole project (five dams). The study was concluded in March 2013, just a year before the project was canceled. In spite of the project having been recently discarded, we think this exercise has enormous value for the design of energy generation policies – and particularly the consideration of *green* policies – in developing countries.

We expect this paper to offer a fresh look at a problem that is currently affecting many developing countries in their quest for growth. In the South American context, this concern is shared by countries like Ecuador, Peru and Brazil, which face increasing threats over their Amazonian

Please cite this article in press as: Garces-Voisenat, J. -P., & Mukherjee, Z. Paying for green energy: The case of the Chilean Patagonia. *Journal of Policy Modeling* (2016), http://dx.doi.org/10.1016/j.jpolmod.2016.03.012