

# Resource Rent Taxation – A New Perspective for the (Swiss) Hydropower Sector

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## Abstract

The electricity generation in Switzerland is mostly based on hydropower accounting for 58 percent of the total production. The exploitation of water in the hydropower sector can generate significant economic rents. These rents are given by the surplus return above the value of capital, labor, materials and other factors of production employed to exploit water resources. The states and regulators have different methods to capture these rents (see, e.g., Watkins (2001)), for instance through a fixed water fees system or a resource rent tax system. The latter is usually employed in the oil extraction industry.

For many decades the Swiss producers of hydropower pay to the owners – the cantons – a fee per kW gross capacity which is fixed by the federal law at a maximum of about US\$ 60. With the fixation of the fee on a kW basis, the substantial differences in cost and revenue structures of the hydropower plants are not directly taken into account.

Switzerland is planning to liberalize its electricity market. In this new situation to ensure the competitiveness of the Swiss hydropower sector a new flexible system such as a resource rent tax system, is needed (for a previous competitiveness analysis see Banfi et al., 2002).

Thus, the goal of this paper is to propose a new scheme for the (Swiss) hydropower fees, based on the economic concept of the so-called resource rent. Basically, we want to propose a resource rent tax (RRT) system which was first developed by Garnaut and Clunies Ross (1975). To improve the effectiveness of this system we propose to integrate certain elements of the yardstick competition approach in the implementation of a resource rent tax the RRT system. For the calculation of the resource rent we need to have information on

production costs and on total revenues (for a previous estimation of the total resource rent in the Swiss hydropower sector see Banfi et al. (2003)). One possibility is to take this information directly from the yearly report published by the plants. The other possibility would be, at least for the production costs, to estimate this value using the result of the econometric estimation of a frontier cost function (as was applied for the Swiss electricity distribution firms by Filippini and Wild (2001)). With this latter approach we would introduce the results of a benchmarking analysis, and therefore, some elements of the yardstick competition, in the implementation of an RRT system, which is in fact the main novelty of this paper.

The structure of the paper is as follows: First, we will give an overview on the Swiss hydropower sector and illustrate the problems arising with the current (fixed) water fee system. Second, we will discuss the concept of natural resource rent and its different extraction schemes (royalty, fixed fee, resource rent tax, ...). Next, we will propose an empirical analysis on the economic effects of the implementation of an RRT system in combination with a benchmarking analysis. For the empirical analysis, which implies the econometric estimation of a cost function for the hydroplants, we will use a data set on 60 companies. Finally, we will finish the paper with some conclusions and policy implications.

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