Risk Analysis Methods for Small Hydro Power Plants in Creating Insurance Policy

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Abstract: Small Hydro Power Plants provide more diversity in terms of financing projects, location selection, ownership, its applications as well as insurance methods, comparing to the Conventional Hydro Power Plants. Electricity produced by small hydro power plants could be used to improve energy efficiency of different production facilities, domestic and public lighting and other applications. However, those energy objects are exposed to the variety of risks that should be taken into consideration in different ph ases of objects' construction, operation and maintenance. Understanding of those risks is crucial for undertaking of different techno-economic analysis, as well as establishing of the insurance policy for those power plants. The approaches used to create insurance policy for Small Hydro Power Plants in certain countries depend of the technology applied and development level of the country and will be provided in this paper.

Keywords: Small Hydro Power Plants, Energy Efficiency, Insurance Policy.

1. Introduction

Hydropower is one of the oldest energy sources and therefore has been exploited for centuries. The interest for Small Hydro Power (SHP) Plants was changing since the time of the first usage of hydropower turbine for electricity generation in 1880's. The basic turbine technology was developed by the end of the 19th century, when SHP was intensively used. The next period stimulated usage of larger units therefore SHP Plants were not a trend. However, the oil crisis and circumstances that increased concerns for both environmental protection and energy supply security led to the increased interest for SHP Plants, especially at the beginning of 21st century. The development of automation and remote control, as well as standardization of the equipment also contributed to the increased interest in SHP Plants [1].

There is no international consensus on the definition of SHP Plants. Criteria for this definition are various, starting from the most common criteria - installed capacity. Outside of Europe, in Canada SHP refer to upper limit capacities of between 20 and 25 MW, in United States upper limit is 30 MW. However, in Europe a value of up to 10 MW total capacities is becoming generally accepted. This limit is accepted by Portugal, Spain, Ireland, Greece and Belgium, together with European Small Hydropower Association –ESHA. The limit is fixed at 3 MW in Italy, 1.5 MW in Sweden, 20 MW in UK and 12 MW in France [2]. Sometimes, categorization of SHP plants is associated with the catchments area of the river (for SPH catchments area should be less then 200 km2, according to some sources) [1]. SHP Plants could be stand-alone systems in isolated areas, but could also be connected to a grid.

A well designed SHP Plant should fit within its surroundings, having minimal negative environmental impacts. The advantages of SHP Plants are numerous, since they can represent renewable, decentralized and low-cost form of energy. However, SHP Plant can be shared with other types of water uses, being a by-product of some other activity (e.g. irrigation systems, water supply systems, flood protection structures or discharge regulation structures), and generating energy whenever excess discharge exists. Those SHP Plants are classified as supplemental hydropower systems.