

MODEL AND ITS APPLICATIONS OF EFFECTS OF HYDROPOWER PROJECT CONSTRUCTION ON ECOLOGICAL ENVIRONMENT BASED ON ECOLOGICAL FOOTPRINT

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It is the hydropower projects that play an important part in the national economy and the society development, in the people life by flood control, generating electricity, water supply, ship and tour, and so on. However, many issues, such as effects of hydropower project on ecological environment, compositive estimation of ecological environment as well as technology and economy, approach of improving ecological environment by hydropower project, establishment of eco-water resources, and the like, have been paid good attention to (Wang, 2003) from project research to project practice and have greater advances so that the functions of hydropower projects have greatly changed.

It is in the feasibility periods, reports/tables of environment effects must be conducted in order to estimate effects of hydropower projects on environment. However, the present estimating approaches have still some shortcomings and some key problems, how to estimate the effects on ecological environment, how to increase obverse effects and decrease side ones, and how to establish models and systems of quantitative estimations, all matter.

Where constructions of hydropower project was concerned, in this paper ecological footprint theory (Wackernagel et al, 2004; Erb, K.-H., 2004; Haberl et al, 2004; Rees, 2000) was firstly introduced in hydropower project areas, the ecological footprint concept and model of hydropower project construction (EFHPC) were developed and applied in the dam construction for the Xixiyuan Project (Bicknell, 1998; Simpson, 2000). Some conclusions may be drawn as followings:

EFHPC is a effective approach to estimate effects of hydropower project construction on ecological environment and to compare various plans, and the ecological footprints were very different for various dam types and various constructing plans.

Where dam construction for the Xixiyuan Project was concerned, indirect land occupations were much larger than direct ones, and then constructing plans were very important to decrease constructing ecological footprints.

To use less constructing materials of high energy density was a effective measure to decrease ecological footprints of hydropower construction, for example, concrete was much larger than earth and rock. The ecological footprints produced by electric-driving mechanisms were less then ones by diesel oil-driving mechanisms and larger power

facilities brought about lesser ecological footprints than smaller ones.

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