

## Factors Determining the Effectiveness of Wave Energy Plant (*WEP*)

In order to optimize the *WEP*, feasibility studies have to be carried out – to choose a construction site, to calculate the wave energy potential, to choose the type and capacity of the technology, the connection scheme for the electricity grid, to assess the necessary capital expenditures, the amount of energy produced, the revenue from its sale and production costs. *WEP* planning is done in the context of profit maximization. Several economic criteria are used to do this, such as net present value (*NPV*), internal rate of return (*IRR*), payback time, average cost of energy in *LCOE* [1, 2]. With multiple or many variables, the number of variants can be very large, making it more difficult to choose the right solution. In practice, the impact factors of the project are complemented, at least, by a diagram of energy directions, the results of negotiations with investors, equipment suppliers and builders. Some of the parameters not initially covered become known and there is a need to review the feasibility study.

In this chapter, only *NPV* and *LCOE* are used, with the algorithms described in the work.

Optimization tasks are stochastic:

$E (NPV (T_{work.})) D_{max}$ ,

$E (LCOE (T_{work.})) D_{min}$ .

The essence of stochastic tasks is complex because it requires the use of statistical data on input processes (including, but not limited to correlations). Let us note that long-term forecasts need to be created, which cause difficulties. They (long-term forecasts) must be made / compiled according to appropriate planning or proper evaluation of any project.

When evaluating the economic efficiency of a power plant, a scenario approach is used and random variables with average times are used [2]. There is a known method for assessing the effectiveness of *WEP*, based on the annual breakdown of seasons (winter, spring, autumn and summer) and the selection of typical days (work or holiday) for each season. In this case, the daily averages are used and the revenue is calculated for each season based on the number of days. Another method is based on the annual breakdown by month and the corresponding average value [1, 2] for calculating cash flow. The disadvantage of these methodologies is that it is impossible to consider the actual production of *WEP* electricity and the real price changes in market conditions that occur every hour.

## USED INFORMATION SOURCES

[1] US catching up with Europe – Forbes October 3, 2012

[2] Reedsport project delayed due to early onset of winter weather – Oregon Live Oct 2012