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Consequences of the implementation of the EU directives on environmental protection for spatial planning : [abstract]

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CAPITAL EXPENSES AND OPERATING COSTS OF SEWAGE DISPOSAL AND TREATMENT SYSTEMS

Summary

The selection of sewage disposal and treatment systems, as well as final reach of central and local systems continue to be relevant, very important and controversial issues, often discussed in many cities. This concerns, in particular, newly developed areas of highly urbanizing city edges, as well as suburban communes and rural areas. In order to facilitate the selection of proper solutions at the spatial planning stage, the authors of the paper presented data from the Polish and foreign literature, as well as results and calculations derived from own questionnaire surveys concerning estimated capital expenses and operating costs of sewage treatment plants. Those data were presented in relation to various size facilities in the function of average-day sewage volumes. It should be stressed that it is not possible to determine universal costs of construction and operation of sewage disposal and treatment systems, since they highly vary, depending on many factors (environmental, urbanistic and infrastructural conditions). It is obvious that capital expenses depend, first of all, on the plant size (determined in terms of its capacity and equivalent population number), quality of incoming sewage, efficiency of the plant, treatment method and technology, know-how solutions, methods of disposal and neutralisation of sewage sludge, modernity of projects, availability of land and costs of land acquisition, costs of utilities to be connected, access roads, etc.

Costs of construction of small sewage treatment plants may differ considerably, depending on, among other things, the treatment method and solutions to be adopted, and also on the location (plants inside buildings or only partly enclosed facilities), as well as methods of operation (whether they work in an automatic mode, with computer visualisation, with an additional chemical precipitation of sludge, dewatering in the bag filter, etc.).

When estimating capital expenses, especially useful are index costs related to the construction of those plants. They include, first of all, unit costs in the function of average daily sewage quantity (in PLN/m^3*day) and per one equivalent resident (in PLN/ER). Fig. 2 presents unit costs of sewage plant construction in the function of average daily sewage quantity, together with tendency lines. Fig. 3 shows comparison between unit construction costs, also in the function of average daily sewage quantity.

A very distinct decrease in unit costs of construction and operation as the plant capacity increases is a confirmation of the general principle of higher economic effectiveness of large projects as compared to small ones. This applies to all kinds of treatment plants, both the mechanical and biological ones, and the mechanical and biological and chemical