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**INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE  
MULTISERVIZI S.P.A.**

**Abstract:**

"Innovation to reach excellence, to reduce environmental impact, to optimize costs and improve efficiency". Innovation has always had an important role for Marche Multiservizi S.p.A., the multi service provider of the province of Pesaro and Urbino. Our Company has always invested in research and technology to develop the services it manages within its territory. Its activities contribute to the growth of the territory it manages. The study developed by the Engineering and Construction Department of Marche Multiservizi, fits into this context, with the mission of improving the cost-benefit analysis that compares the traditional pipe laying techniques with trenchless technologies, with a focus on Horizontal Directional Drilling technology (HDD).

The research concerned three fundamental variables to choose the best method to lay high-density polyethylene water pipes (HDPE) with an external diameter of 110mm, the cost of the intervention, the duration of construction and CO2 emissions. With regards to the first two variables, the results show that it is advantageous to adopt HDD technology for interventions of 100 m or more, as opposed to traditional open-dig excavation techniques. Using trenchless technology, the costs are similar, but the execution times are considerably lower.

The most interesting result was obtained in the analytical quantification of CO2 emissions determined for the two different laying techniques (HDD vs open dig) applicable for the construction of a 1,000 m aqueduct in HDPE – with an external diameter of 110mm. It was found that the Horizontal Directional Drilling technology involved a considerable reduction in CO2 emissions equal to 68 tons of CO2, considering Equivalent Tons of Petroleum (TEP) and Embodied Carbon (Kg CO2e/Kg) for each type of material and the various machines used in each construction process.

The result corresponds to the emissions produced by the annual electricity needs of about 71 families, an environmentally favorable result.