

Life Cycle Cost Calculation Tool for Moving Block Railway Operation

Abstract

In the fixed block operation—ETCS Level 1 and 2—the tracks are divided into block sections in which only one train is allowed to move in a block section at the time. In contrast, in moving block operation—ETCS Level 3—the trains can travel at an absolute distance because the next danger point location is well known. Thus, an increase in capacity is expected for moving block operations, but its potential benefits could be exceeded by the higher costs of introducing this technology.

The aim of this study is to identify which are the factors that play a role in the Life-Cycle Costs (LCC) estimation for the implementation of moving block operation in a new and in an existing railway system. Using the life-cycle costing methodology and considering from the planning to the disposal phase, a parameterized cost calculation tool was developed as part of the study. Different scenarios from ETCS Level 1 to Level 3 were analysed from the cost perspective.

The results showed that ETCS Level 3 has a higher share of the costs in the planning phase, but a significantly lower share during the operation phase. Consequently, it is a very competitive alternative that has similar LCC as ETCS Level 1, for both new and existing railway lines. Moreover, an overlay configuration of ETCS Level 1 and Level 3 appears to be more cost-effective than an ETCS Level 2 with improved block sections. Finally, it was found that the line length has a considerable influence on moving block scenarios' competitiveness, while the longer the line, the more attractive becomes a moving block implementation in cost terms.



Foto: Katherine Morales Vigoya

Figure 1: LCC Results for New Lines Test Project

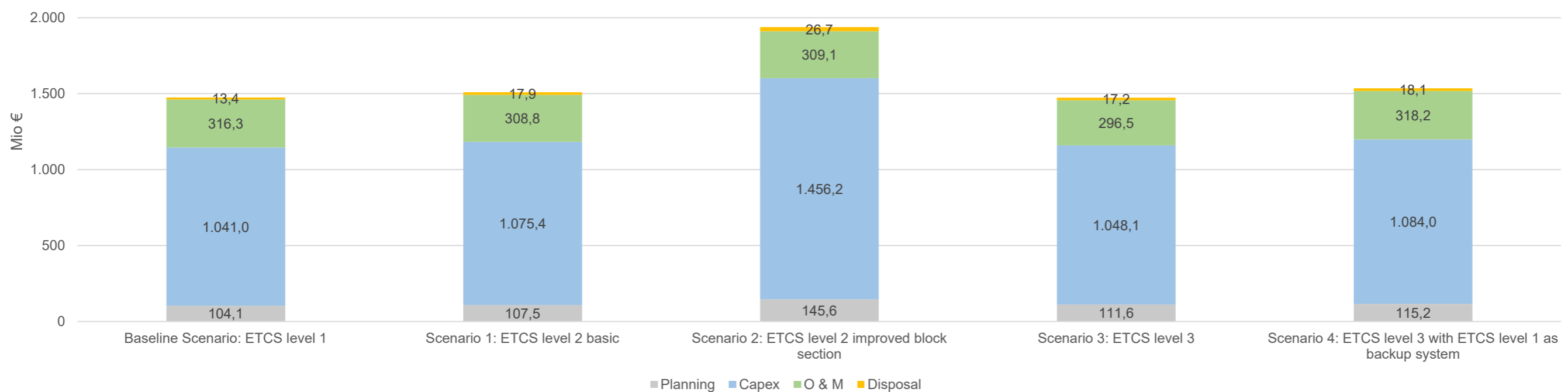


Figure 2: Conceptual Model of the Calculation Tool

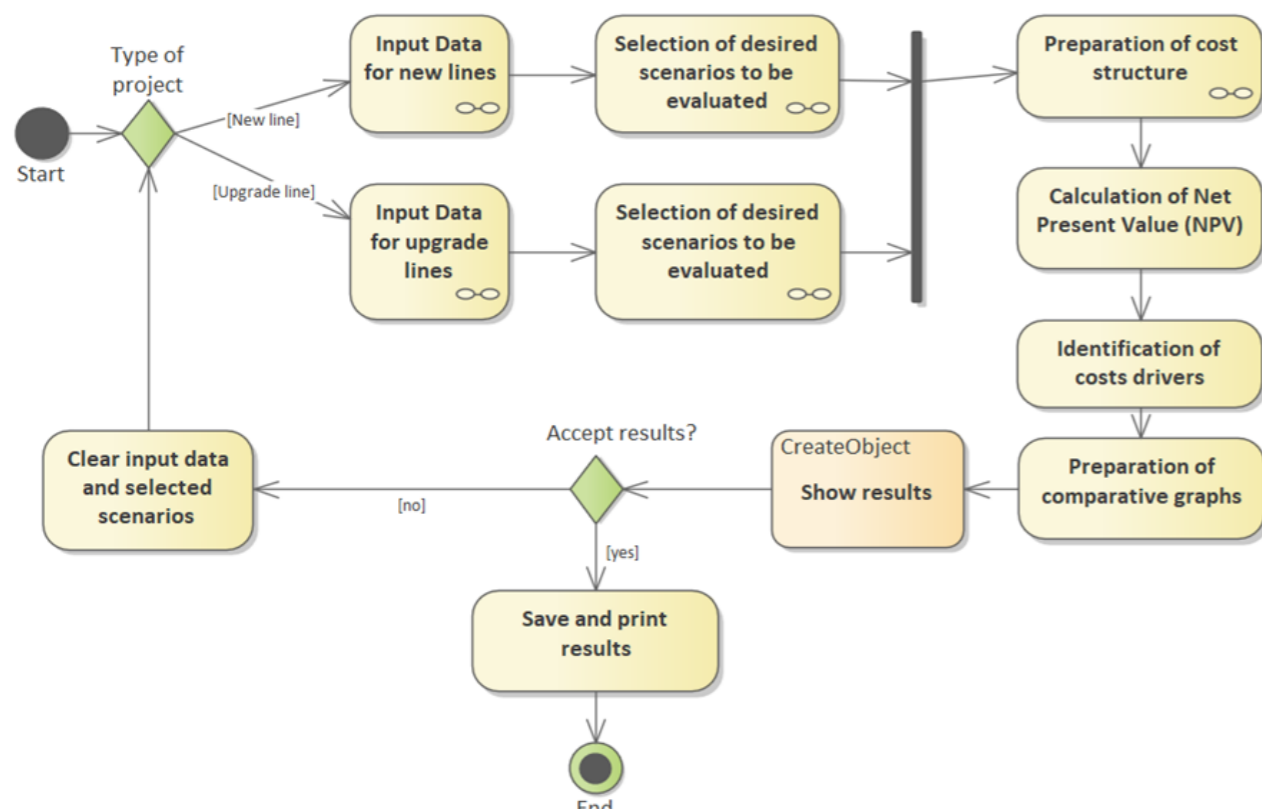
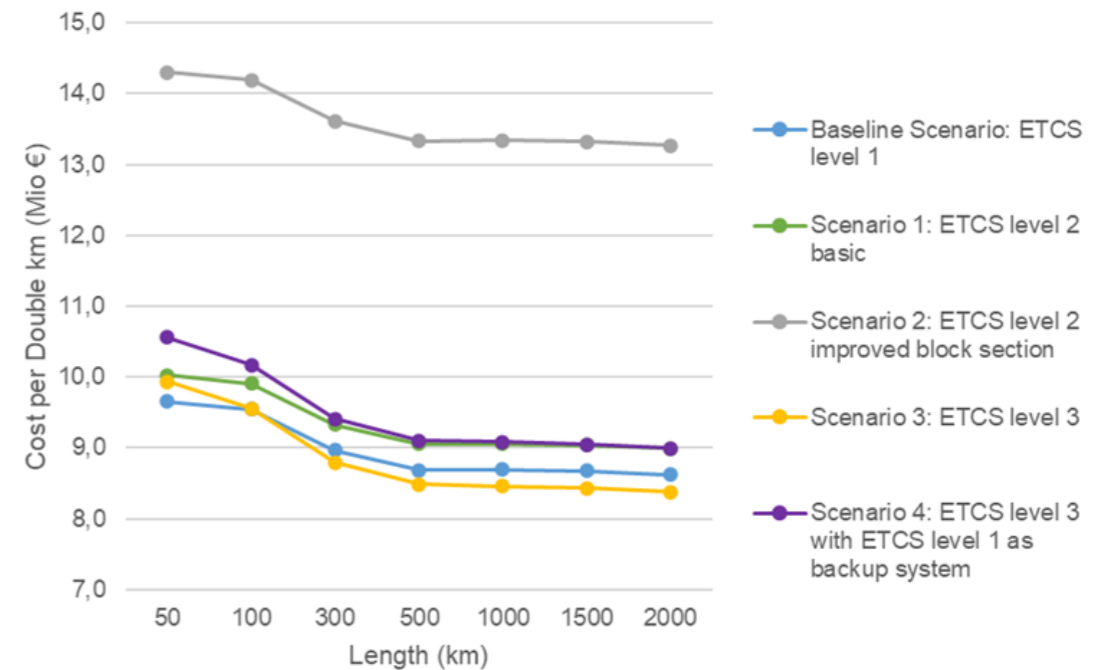


Figure 3: Length Line Influence in New Lines LCC



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