

Abstract

**Regenerative braking saves 40 % of energy**

*Analyses of the energy consumption in the Copenhagen suburban line (S-bane) have showed that the regenerative braking saves 40 % of energy. With a total consumption of 120 GWh per year it means that DSB saves approximately 50 GWh per year.*

To find energy savings DSB has completed a comprehensive analysis of the energy flow and losses in the Copenhagen S-bane including train sets as well as infrastructure.

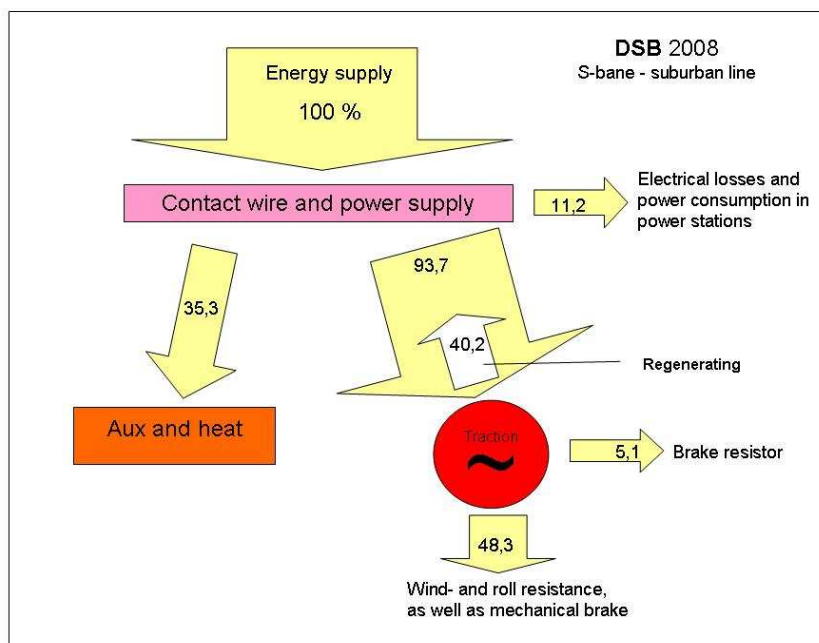
The work has resulted in a range of ideas for energy savings which has been analysed or are about to be. Some of the ideas will be implemented and other are not economical sustainable.

The analyses have been carried out in two phases:

The first phase included a "mini universe" consisting of a limited railway line with only two trains and test runs over two nights. The objective with this analysis was to get an understanding of the mutual impact between the two trains.

The second phase included the "global universe" consisting of the whole S-bane, all trains and the normal traffic in a full year (2008). The objective with this analysis was to get an understanding of the entire system energy flow.

Figure showing the total energy flow:



Facts about the Copenhagen suburban line (S-bane)

Nominal voltage	1650 volt DC
Km track	170 km double track
Number of substations	39
Number of train sets	135
Maximum speed	120 km/h