FreightSimSilent Quick Reference Guide

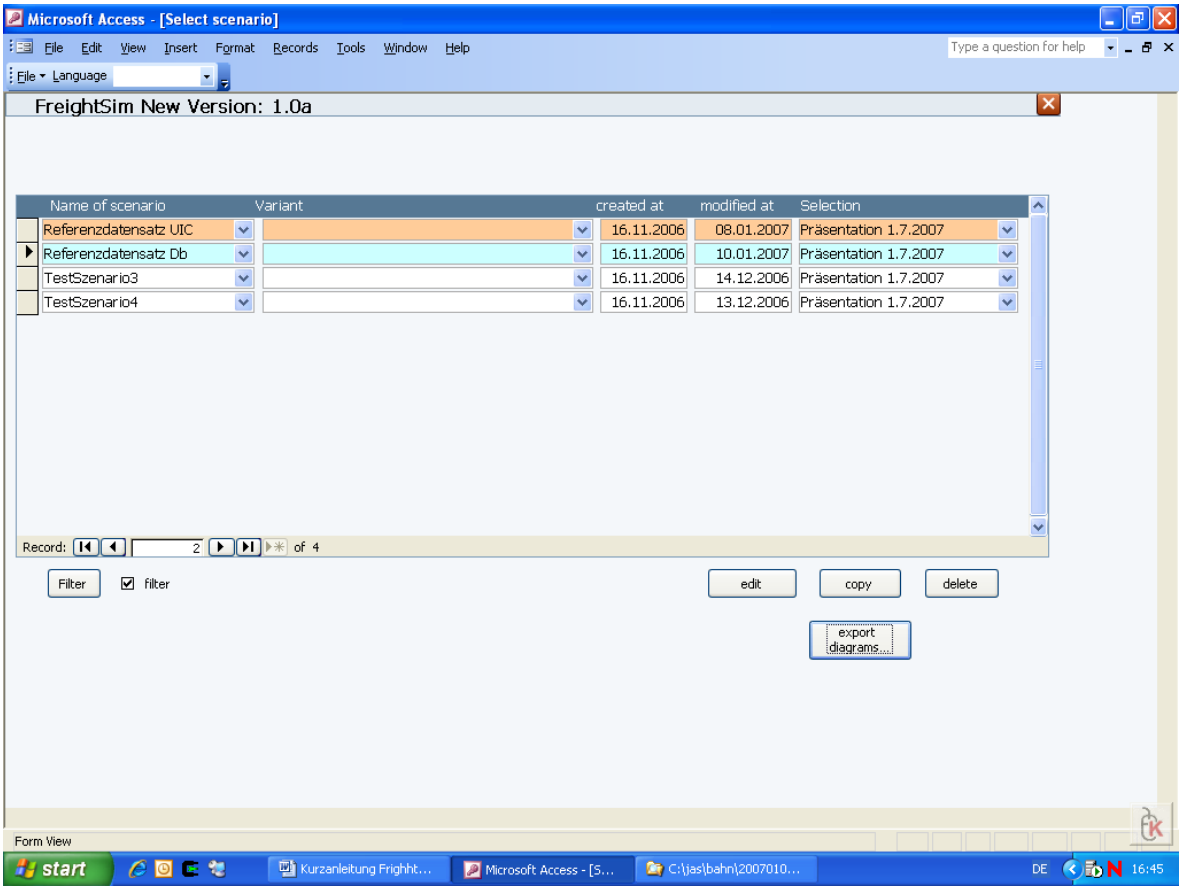
Introduction

The "FreightSimSilent" application was developed to cost-optimise the retrofitting of freight trains with low-noise composite brake blocks. It comprises an MS Access-based tool for managing the retrofitting scenarios and vehicle fleets and an MS Excel-based calculation module. In particular, the application allows users to calculate break-even points for the specific parameters (interest rate, retrofitting costs, etc...) of individual scenarios. This last feature uses MS Excel's Solver Add-in.[1] The MS Excel-based calculation module can also be used as a separate application. Scenarios can be archived by exporting them (including results) from MS Excel to the MS Access version of FreightSimNew.

FreightSimSilent is available in four languages: English, German, French and a user-definable language.

Scenario management

When the application is started, the *Select scenario* form is automatically opened:

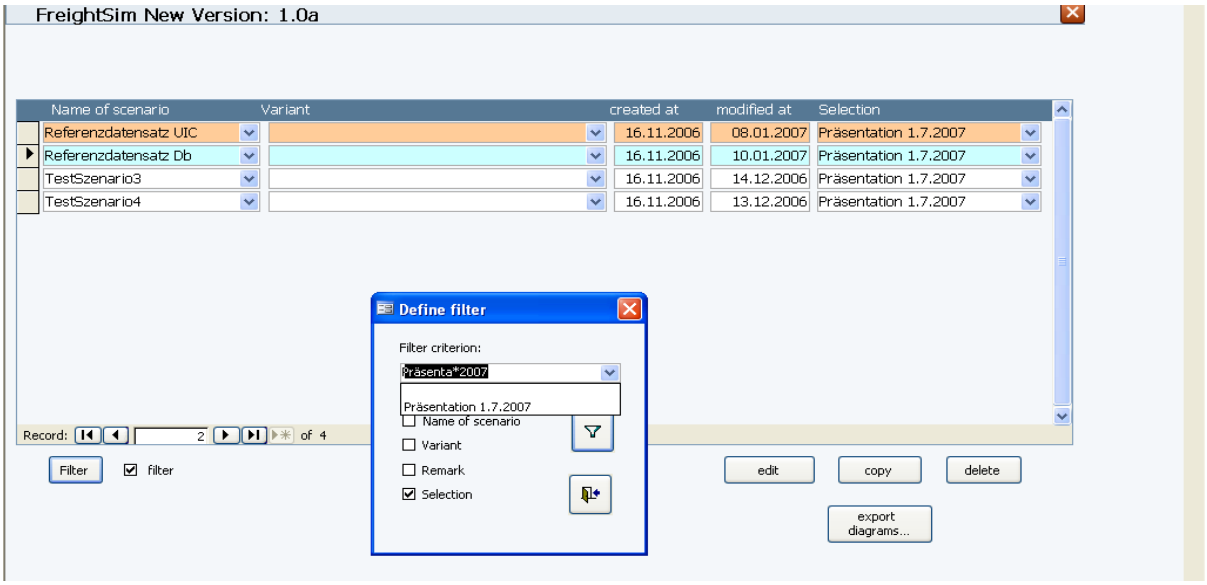


[1] A separate guide is available for embedding the Solver.

In this form, scenarios can be copied, deleted and selected for editing. New scenarios are created by copying existing scenarios.

An overview of the scenarios appears when the application is started; it can be opened at any time from anywhere within the application by pressing F10.

Scenarios must be clearly identified using the fields *Name* and *Variant*.
The field *Selection* is most commonly used together with the filter function. Further information about this function can be found below.
The orange-coloured scenario is the fixed reference scenario and cannot be changed. The blue-coloured scenario is the user's default data set. This can only be changed after a warning message has been acknowledged.[2]

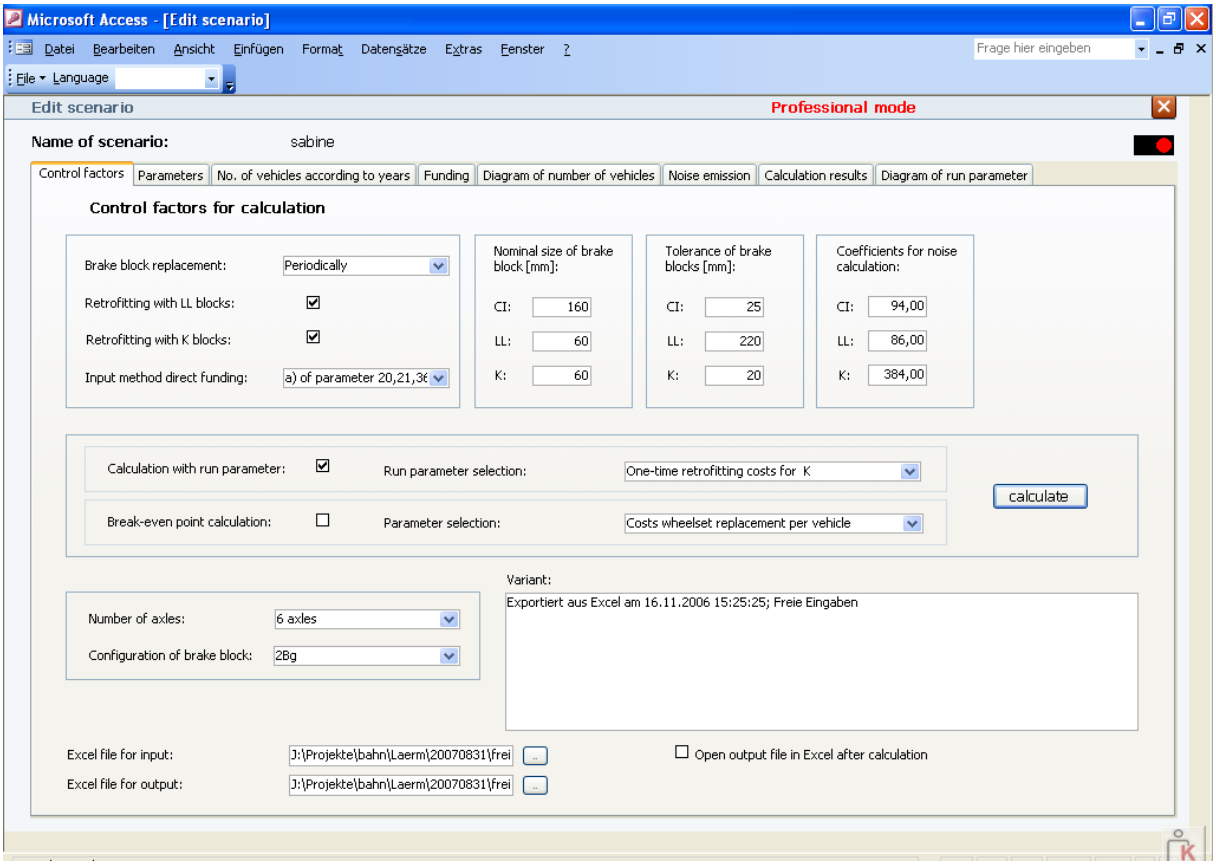


The *Filter* button can be used to define filters for the fields *Name*, *Variant*, *Remark* and *Selection*. In the *Filter criterion* field, the star wildcard character (*) can be used to stand for any number of characters.
The filter function is especially useful in connection with the *Diagram Export* function described below.

Editing / calculating scenarios

Scenarios can be opened by clicking on the *Edit* button.

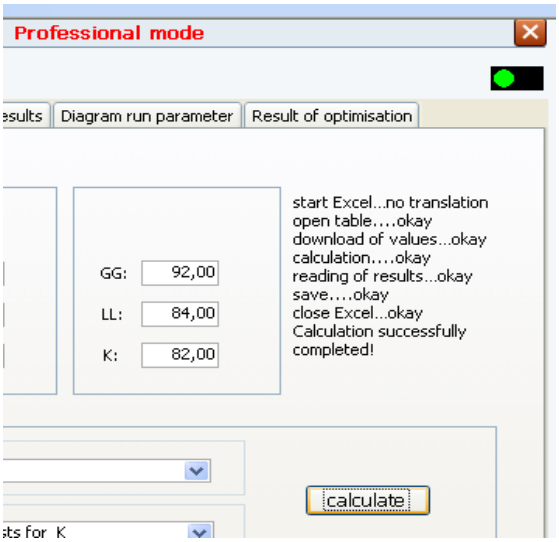
[2] Using a full version of MS Access, it is possible to change the reference data set by editing the table "tblSzenarien".



To provide a better overview of the information, the parameters and calculation results in the *Edit scenario* form above are displayed on multiple tabs.
The traffic light symbol in the upper right-hand corner is green if the input parameters have not changed since the last calculation.

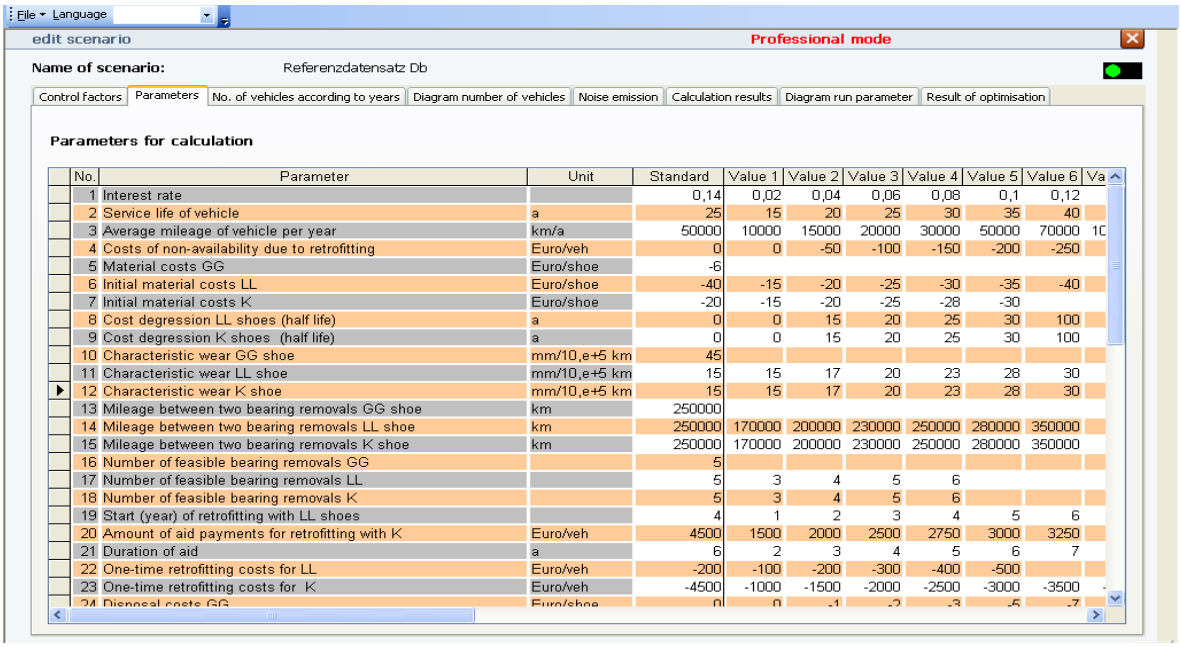
Control factors

Parameters for the type of calculation and for the vehicle fleet can be defined on the *Control factors* tab. In addition, you can select a run parameter and, in professional mode only, a parameter for which a break-even point should be calculated.
You can start the calculation by pressing the *Calculate* button. The status of the calculation is displayed in the upper right-hand section of the window (see picture below).


Professional mode
esults
Diagram run parameter
Result of optimisation
GG:
92,00
LL:
84,00
K:
82,00
start Excel...no translation
open table....okay
download of values...okay
calculation....okay
reading of results...okay
save....okay
close Excel...okay
Calculation successfully
completed!
calculate
sts for K

Parameters

A total of 37 technical and financial parameters can be defined for the scenario on the *Parameters* tab.

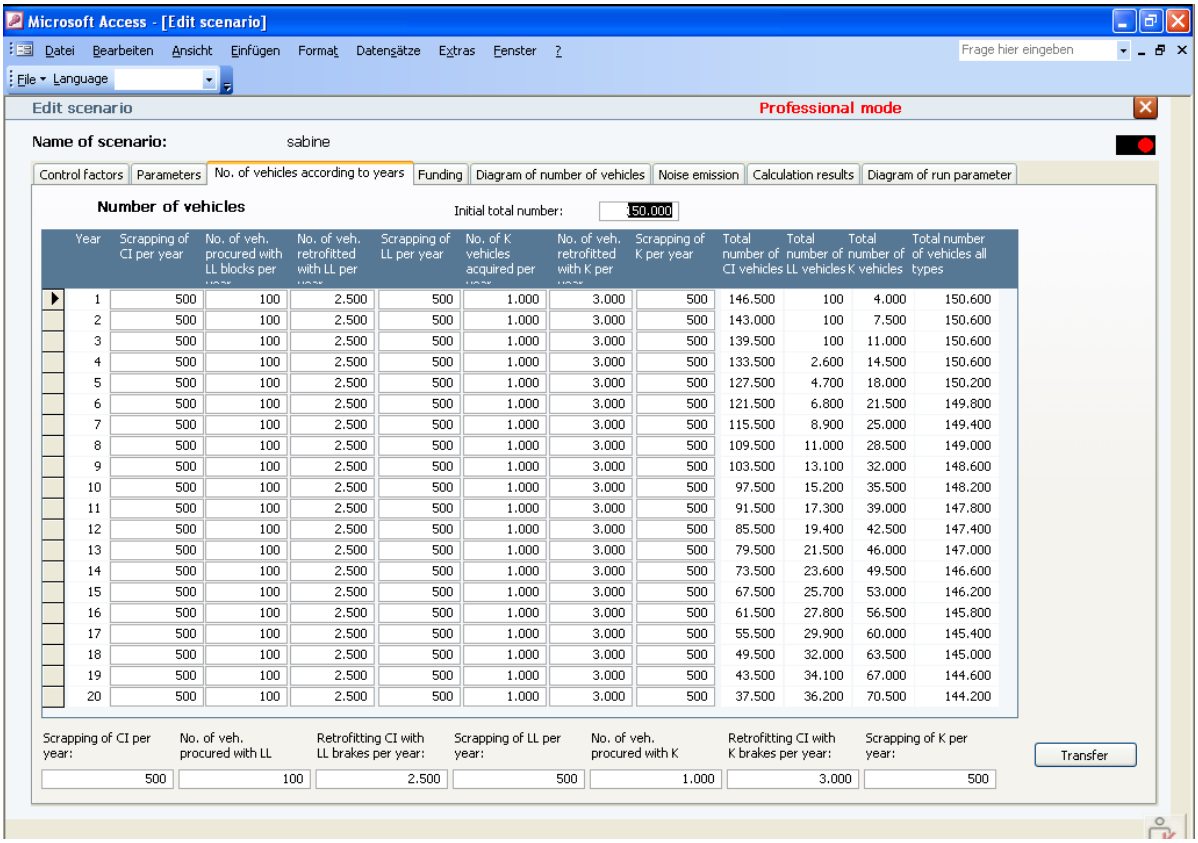


No.	Parameter	Unit	Standard	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6
1	Interest rate		0,14	0,02	0,04	0,06	0,08	0,1	0,12
2	Service life of vehicle	a	25	15	20	25	30	35	40
3	Average mileage of vehicle per year	km/a	50000	10000	15000	20000	30000	50000	70000
4	Costs of non-availability due to retrofitting	Euro/veh	0	0	-50	-100	-150	-200	-250
5	Material costs GG	Euro/shoe	-6						
6	Initial material costs LL	Euro/shoe	-40	-15	-20	-25	-30	-35	-40
7	Initial material costs K	Euro/shoe	-20	-15	-20	-25	-28	-30	
8	Cost degression LL shoes (half life)	a	0	0	15	20	25	30	100
9	Cost degression K shoes (half life)	a	0	0	15	20	25	30	100
10	Characteristic wear GG shoe	mm/10,e+5 km	45						
11	Characteristic wear LL shoe	mm/10,e+5 km	15	15	17	20	23	28	30
12	Characteristic wear K shoe	mm/10,e+5 km	15	15	17	20	23	28	30
13	Mileage between two bearing removals GG shoe	km	250000						
14	Mileage between two bearing removals LL shoe	km	250000	170000	200000	230000	250000	280000	350000
15	Mileage between two bearing removals K shoe	km	250000	170000	200000	230000	250000	280000	350000
16	Number of feasible bearing removals GG		5						
17	Number of feasible bearing removals LL		5	3	4	5	6		
18	Number of feasible bearing removals K		5	3	4	5	6		
19	Start (year) of retrofitting with LL shoes		4	1	2	3	4	5	6
20	Amount of aid payments for retrofitting with K	Euro/veh	4500	1500	2000	2500	2750	3000	3250
21	Duration of aid	a	6	2	3	4	5	6	7
22	One-time retrofitting costs for LL	Euro/veh	-200	-100	-200	-300	-400	-500	
23	One-time retrofitting costs for K	Euro/veh	-4500	-1000	-1500	-2000	-2500	-3000	-3500
24	Disposal costs GG	Euro/shoe	0	0	-1	-2	-3	-5	-7

The calculation is performed using values from the *Standard* column. If a parameter is defined as a run parameter on the first tab (*Control factors*), the calculation is performed using all values in the columns *Value 1* to *Value 9*. For all other parameters, data from the *Standard* column is used.

No. of vehicles according to year

The vehicle fleet can be specified on the *No. of vehicles according to year* tab.



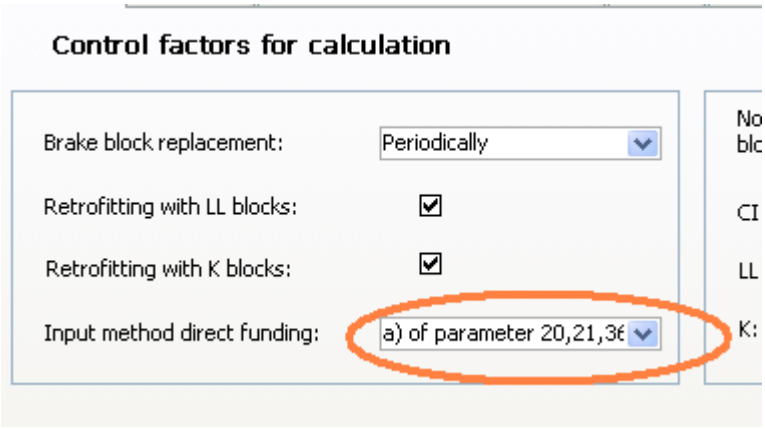
The number of scrapped CI / LL / K vehicles, the number of new LL / K vehicles and the number of CI vehicles retrofitted with K / LL brake blocks can be entered for every year. The total number of vehicles for every year is calculated as the values are entered.
By clicking the *Transfer* button, the rows can be filled with equal values for every year.

Funding and track access charges

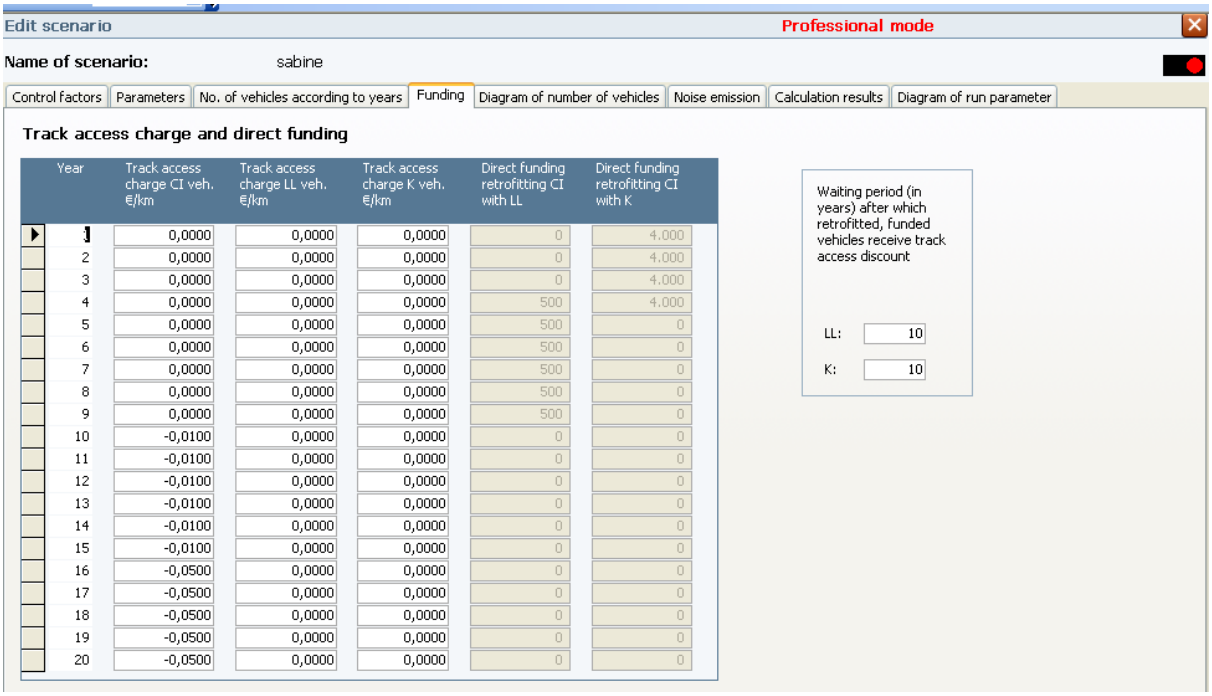
It is expected that each CI vehicle retrofitted with LL / K brake blocks will receive direct funding. The amount of funding can be entered in one of three ways:

a) By using parameters 20, 21, 36 and 37 on the “Parameters” tab
b) By entering it in the table on the “Funding” tab
c) As the sum total of a) and b)

The input method can be selected on the “Control factors” tab:



For every year, a track-access surcharge or discount for CI, LL or K vehicles can the entered on the tab “Funding”.

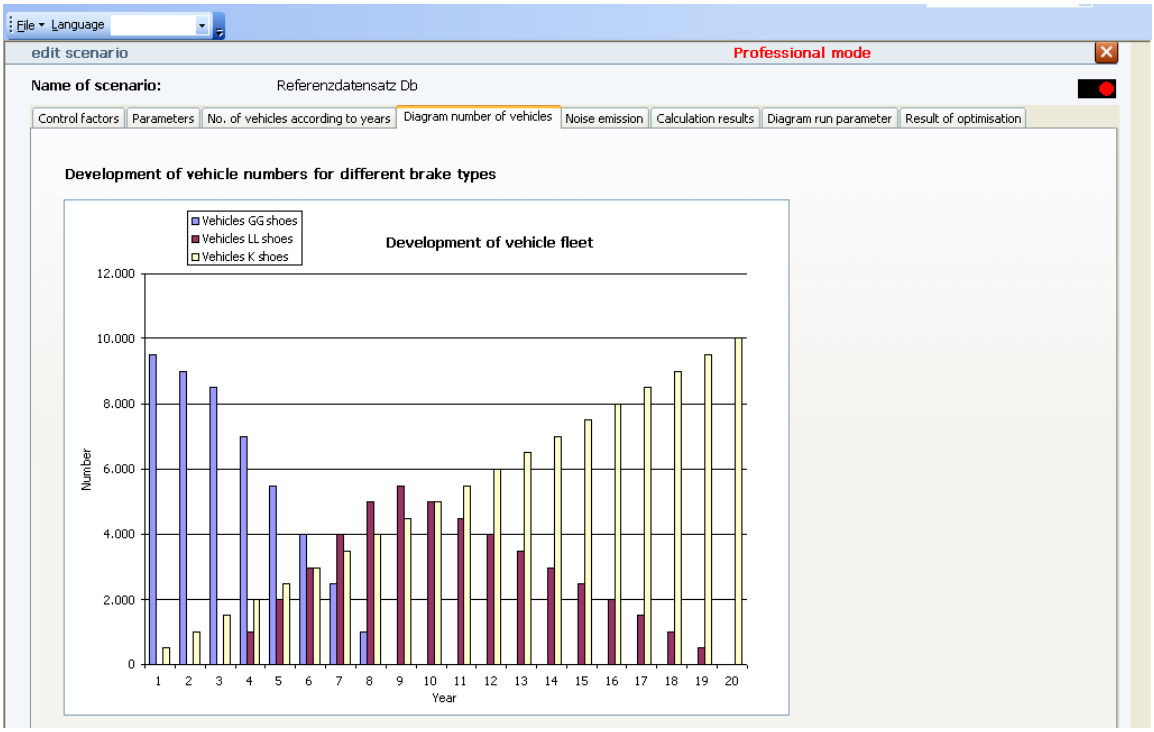


A waiting period can be specified after which the retrofitted, funded vehicles can receive noise-related track-access discounts.

The following pages only contain valid data once the calculation has been performed (by pressing *Calculate* on the first page).

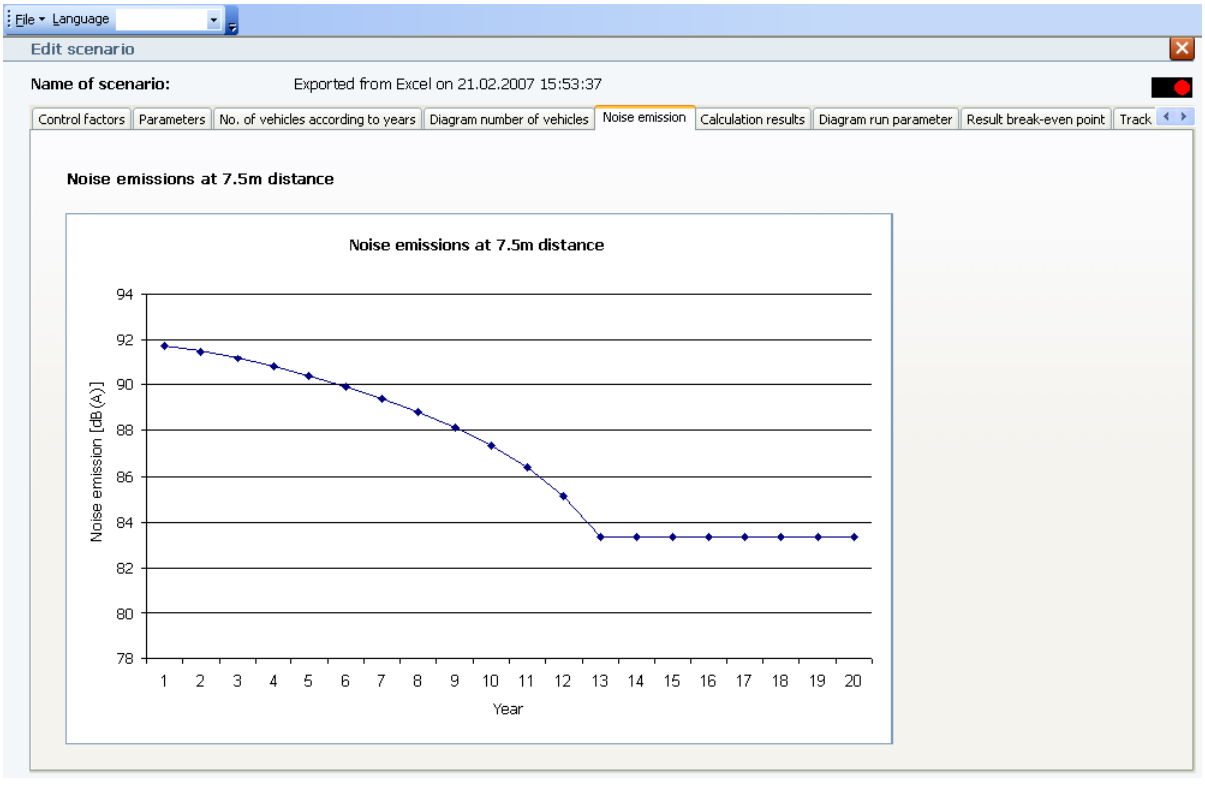
Diagram number of vehicles

The *Diagram number of vehicles* tab contains a bar chart that graphs the distribution of the vehicle fleet in terms of brake block type for every year.



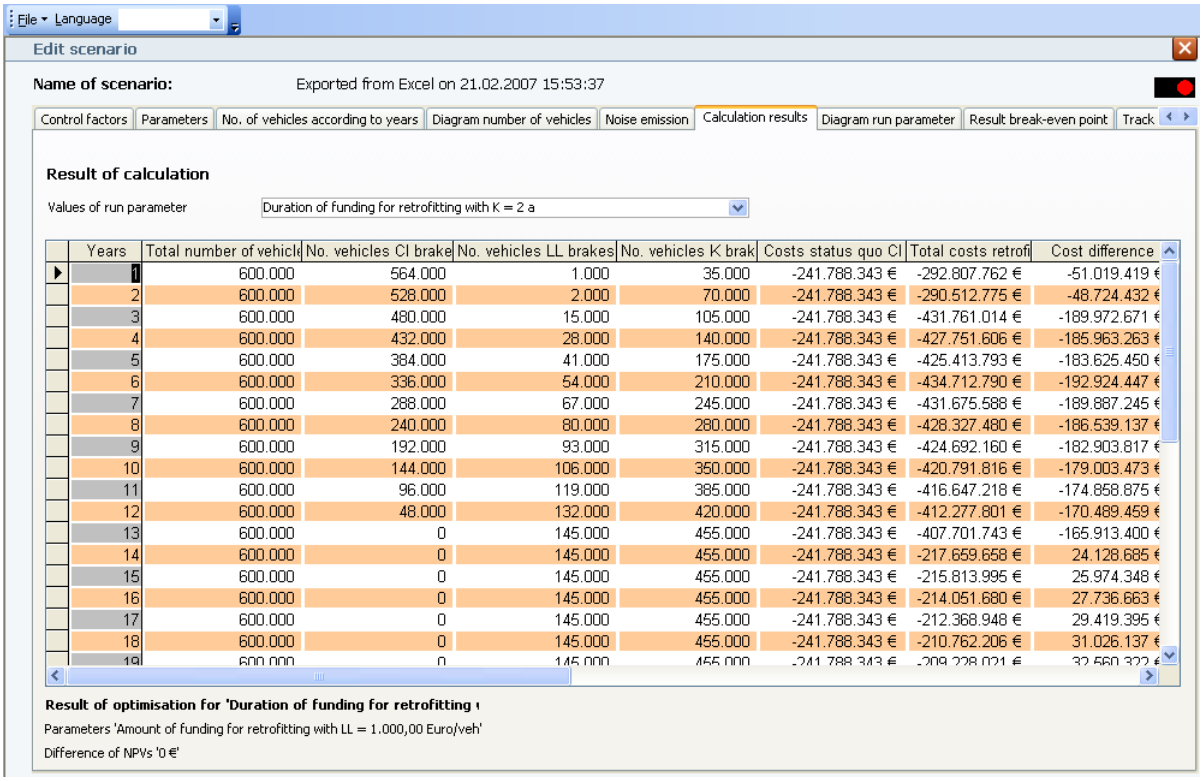
Noise emission

The *Noise emission* tab shows average noise emissions, measured at a distance of 7.5 meters.



Calculation results

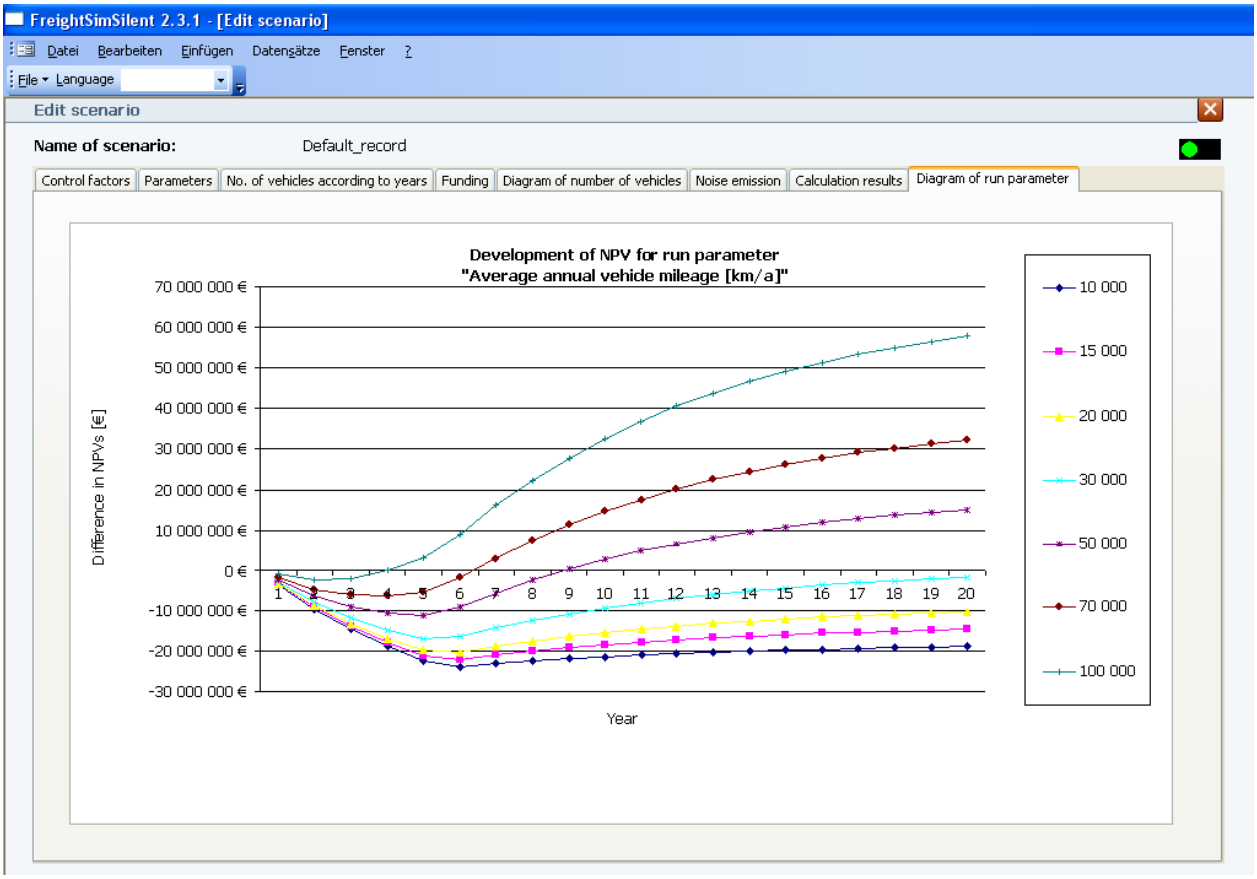
The *Calculation results* tab shows the development of the total *cost for the status quo* (continued use of CI brake blocks), *the total cost for the given retrofitting scenario*, the *cost difference* and finally the *net present value* of the cost difference.
If a run parameter is defined, the calculation is performed for every value of the run parameter.



Years	Total number of vehicle	No. vehicles CI brake	No. vehicles LL brakes	No. vehicles K brak	Costs status quo CI	Total costs retrofi	Cost difference
1	600.000	564.000	1.000	35.000	-241.788.343 €	-292.807.762 €	-51.019.419 €
2	600.000	528.000	2.000	70.000	-241.788.343 €	-290.512.775 €	-48.724.432 €
3	600.000	480.000	15.000	105.000	-241.788.343 €	-431.761.014 €	-189.972.671 €
4	600.000	432.000	28.000	140.000	-241.788.343 €	-427.751.606 €	-185.963.263 €
5	600.000	384.000	41.000	175.000	-241.788.343 €	-425.413.793 €	-183.625.450 €
6	600.000	336.000	54.000	210.000	-241.788.343 €	-434.712.790 €	-192.924.447 €
7	600.000	288.000	67.000	245.000	-241.788.343 €	-431.675.588 €	-189.887.245 €
8	600.000	240.000	80.000	280.000	-241.788.343 €	-428.327.480 €	-186.539.137 €
9	600.000	192.000	93.000	315.000	-241.788.343 €	-424.692.160 €	-182.903.817 €
10	600.000	144.000	106.000	350.000	-241.788.343 €	-420.791.816 €	-179.003.473 €
11	600.000	96.000	119.000	385.000	-241.788.343 €	-416.647.218 €	-174.858.875 €
12	600.000	48.000	132.000	420.000	-241.788.343 €	-412.277.801 €	-170.489.459 €
13	600.000	0	145.000	455.000	-241.788.343 €	-407.701.743 €	-165.913.400 €
14	600.000	0	145.000	455.000	-241.788.343 €	-217.659.658 €	24.128.685 €
15	600.000	0	145.000	455.000	-241.788.343 €	-215.813.995 €	25.974.348 €
16	600.000	0	145.000	455.000	-241.788.343 €	-214.051.680 €	27.736.663 €
17	600.000	0	145.000	455.000	-241.788.343 €	-212.368.948 €	29.419.395 €
18	600.000	0	145.000	455.000	-241.788.343 €	-210.762.206 €	31.026.137 €
19	600.000	0	145.000	455.000	-241.788.343 €	-209.228.021 €	32.560.322 €

Diagram run parameter

The development of the net present value (NPV) of the cost difference is displayed graphically on the following *Diagram run parameter* tab. If a run parameter is used, the development of the NPV is plotted for each value of the run paramter.



Professional mode

You can switch to professional mode by selecting *Professional mode* from the *File* menu and then entering a password[3].

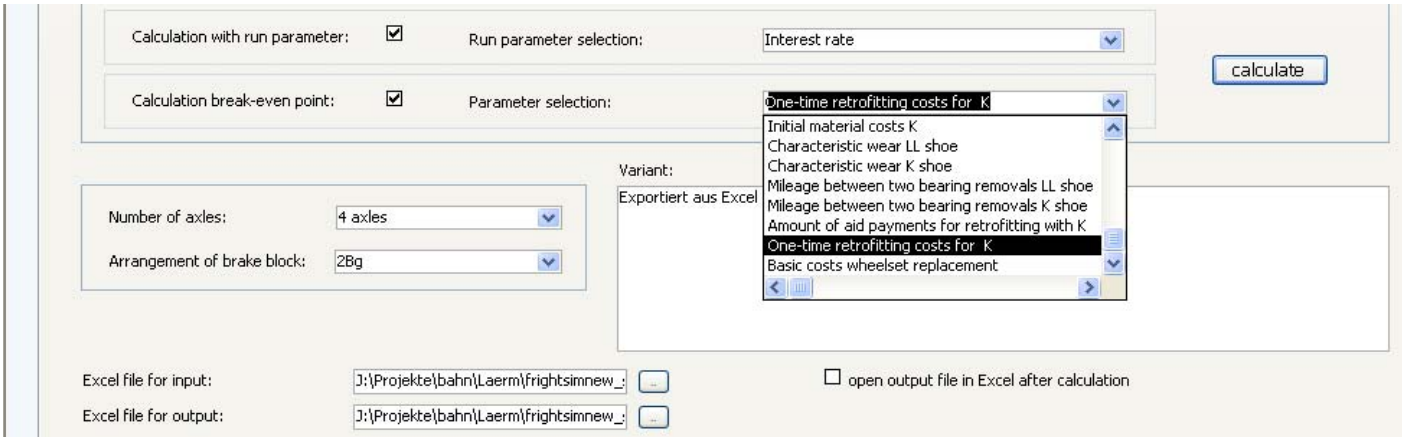
In professional mode additional control elements are activated on the *Control factors* tab. They enable:

- the calculation of break-even points.
- the use of multiple versions of the calculation module.
- Excel to be opened automatically with the current data after the calculation has been performed, e.g. to examine intermediate results.

Calculating break-even points

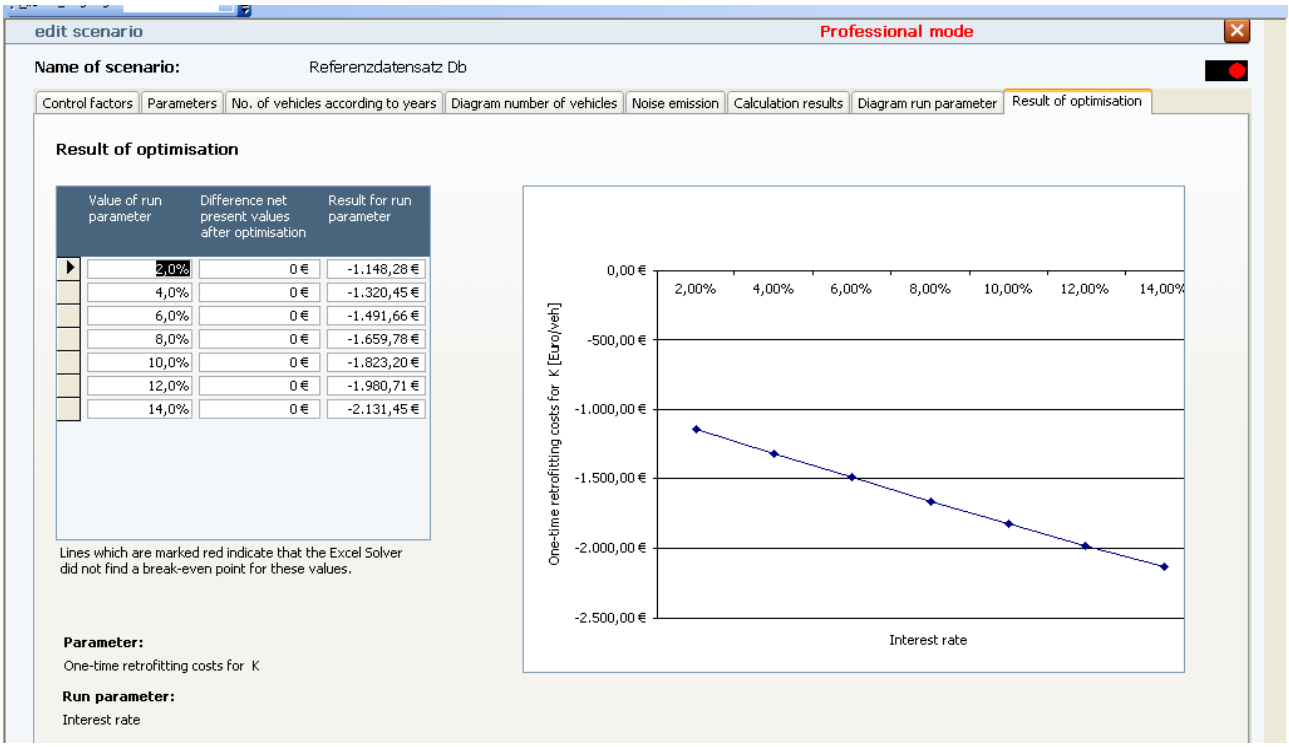
You can select the variable parameter for the break-even point calculation on the *Control factors* tab. The break-even point is so that the cost of the retrofitting scenario is identical with the cost of equipping the vehicles with CI brake blocks (difference in net present value = 0).
Note: The calculation of break-even points is not implemented for all parameters. Not all combinations of values lead to useful results.

[3] The password is not for data protection purposes. All data is readable in full versions of Access. It is only intended to prevent the application's advanced functions from being used without "sufficient expertise". The initial password is "Lokomotive".



If a run parameter is defined, the break-even point is calculated for all values of the run parameter.

After the calculation has been performed, the break-even point (relative to the run parameter) is displayed on the *Result break-even point* tab in tabular and graphic form.



If the Solver cannot produce a valid result, the corresponding row in the *Result break-even point* table is highlighted in red.

If *Amount of payment K* or *Amount of payment LL* is selected as a variable parameter, an additional tab titled *Track access charge* will appear. Here the track access discounts and surcharges are calculated relative to the brake blocks used.

The calculation is based on the percentage of direct funding entered on the *Control parameters* tab.
If *Amount of payment K* or *Amount of payment LL* is selected as a variable, the *Result break-even point* tab does not display a useful result. Instead the values in the column *Remaining funding needs per K/LL vehicle* on the *Track access charge* tab are calculated.

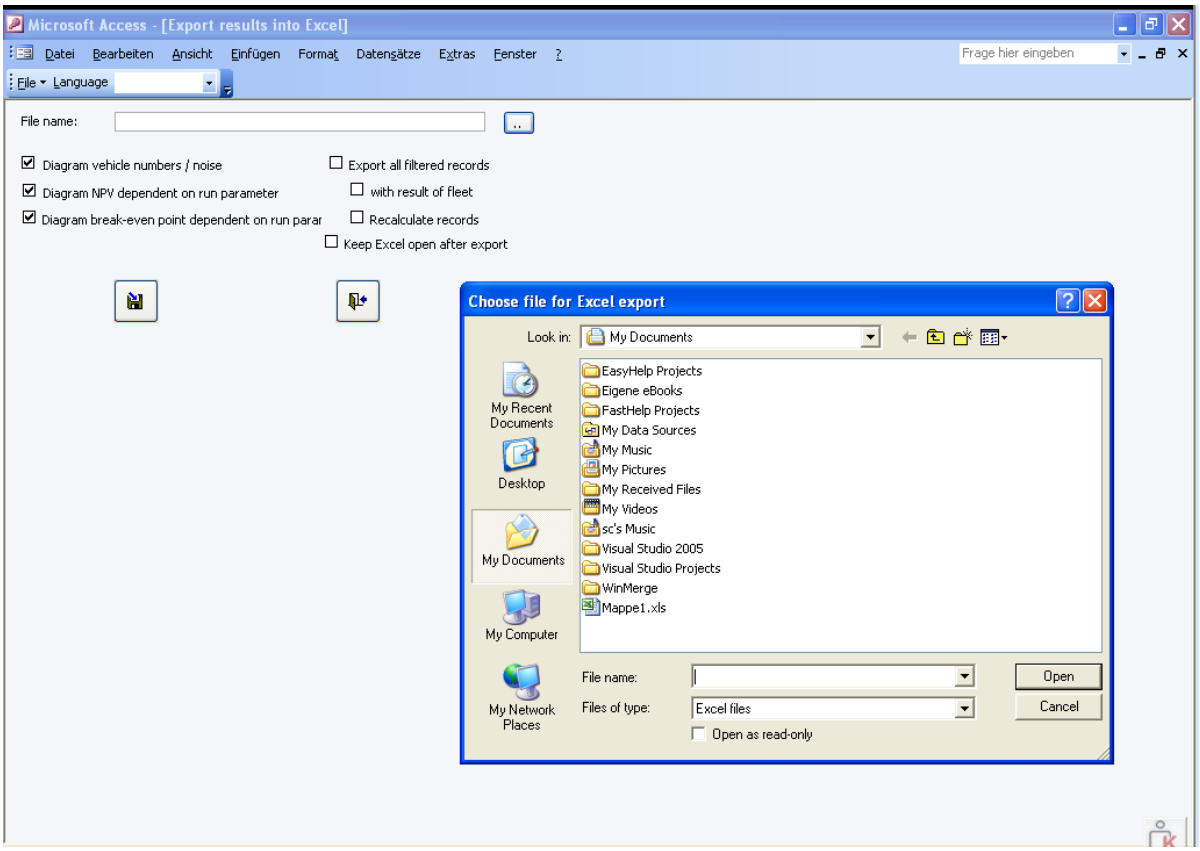
Please note: If after calculating the break-even point, the VBA Editor in MS Excel displays a compilation error, the Solver is probably not correctly embedded in Excel.

Additional professional mode functions

When in professional mode, it is possible to temporarily select a different Excel calculation module on the *Control parameters* page. To do this, enter the file name (including the path to the corresponding Excel workbook) in *Excel file for input*. In *Excel file for output*, enter the file in which you want the Excel workbook to be saved after the calculation. The *Excel file for input* should not be the same as the *Excel file for output*.
If *Open output file in Excel after calculation* is selected, the output file is opened in Excel after every calculation.

Exporting diagrams / vehicle fleets

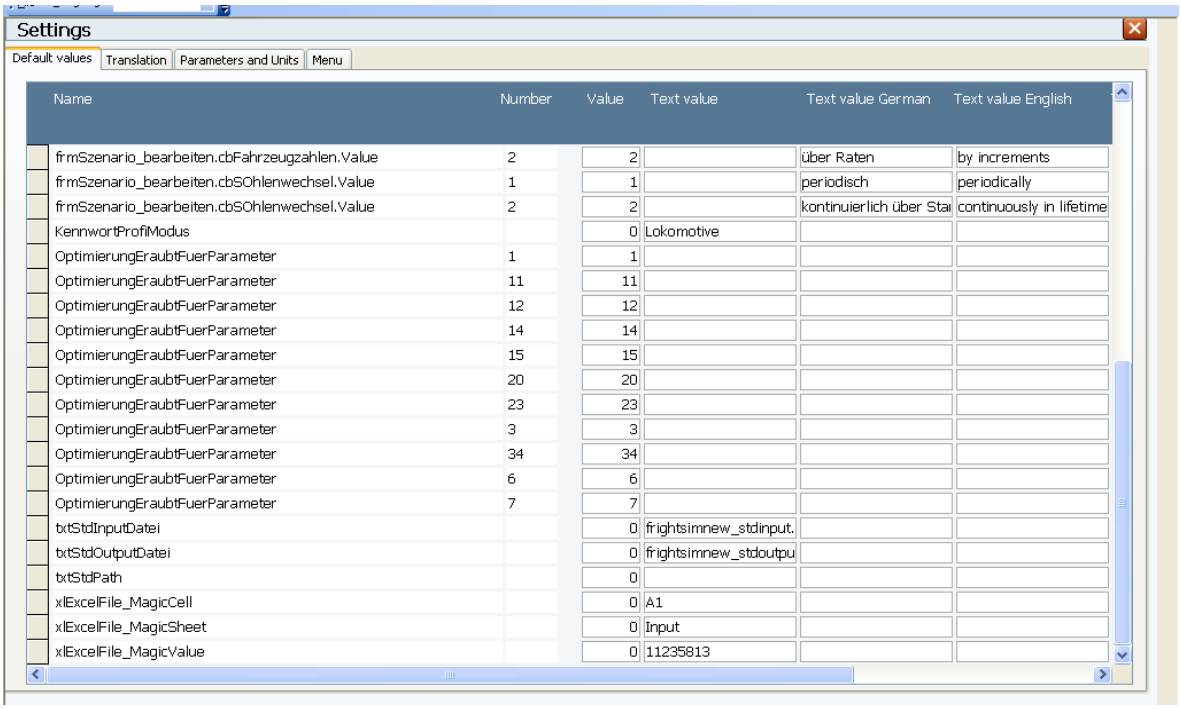
Using the *Export diagrams* button in the start window, you can export diagrams belonging to one or more scenarios to an Excel workbook.
If *Export all filtered records* is selected, the diagrams of all the scenarios visible in the start window are exported to Excel. If not, only the currently selected scenario is exported. A worksheet is created in the workbook for every scenario.
Using the filter option, in particular in connection with the *Selection* field, you can easily export compilations of scenarios.



If you select “Export all filtered records”, you can specify that all selected scenarios should recalculated. This may take a long time. Detailed status information is displayed while the calculation is being performed.
If you select “with result of fleet”, the program generates a worksheet with a summary for all scenarios. This feature can be used to analyse the whole fleet by treating each vehicle in the fleet as a separate scenario. This worksheet includes average noise emission values and the sum total of the cost-differences shown on the “Calculation” tab under “Edit Scenario”.
Before exporting, a check of the parameters is performed. If there are differences in parameter values between the scenarios, a list of warnings and notices is shown before the calculation is started. If there are differences in run parameter values between the scenarios, export is cancelled.

Settings

By clicking on the menu item *Settings* and entering a password to switch to professional mode, you can define settings for the application.



Name	Number	Value	Text value	Text value German	Text value English
frmSzenario_bearbeiten.cbFahrzeugzahlen.Value	2	2		über Raten	by increments
frmSzenario_bearbeiten.cbSOhlenwechsel.Value	1	1		periodisch	periodically
frmSzenario_bearbeiten.cbSOhlenwechsel.Value	2	2		kontinuierlich über Stai	continuously in lifetime
KennwortProfilModus		0	Lokomotive		
OptimierungEraubtFuerParameter	1	1			
OptimierungEraubtFuerParameter	11	11			
OptimierungEraubtFuerParameter	12	12			
OptimierungEraubtFuerParameter	14	14			
OptimierungEraubtFuerParameter	15	15			
OptimierungEraubtFuerParameter	20	20			
OptimierungEraubtFuerParameter	23	23			
OptimierungEraubtFuerParameter	3	3			
OptimierungEraubtFuerParameter	34	34			
OptimierungEraubtFuerParameter	6	6			
OptimierungEraubtFuerParameter	7	7			
txtStdInputDatei		0	frightsimnew_stdinput.		
txtStdOutputDatei		0	frightsimnew_stdoutpu		
txtStdPath		0			
xlExcelFile_MagicCell		0	A1		
xlExcelFile_MagicSheet		0	Input		
xlExcelFile_MagicValue		0	11235813		

You can edit four different tables:

Under *Default values*, the following elements can be changed:

- the values that are displayed in the combo boxes on the first tab of the *Edit scenario* dialog
- the parameters for which break-even point calculations are permitted
- the password for professional mode
- file name and path of the default Excel calculation module
- position and content of the magic cell used by the program to recognise Excel workbooks as valid calculation modules

Translation contains the text for all the control elements and messages. In the *Other* column, you can add a fourth language to the *German*, *English*, and *French* languages already available.

Under *Parameters and units*, you can define the names and units of all 37 parameters for all four possible languages.

Under *Menu*, the menu items are defined for all four languages.

Do you have any questions regarding the application?

Email us or pick up the phone and give us a call:

General questions (related to the contents):

UIC, 16 rue Jean Rey, 75015 Paris, France

Schwarz@uic.asso.fr

Telephone: +33.1.44492085

Technical questions (related to the software):

join and share GmbH, Oranienstr. 6, 10997 Berlin, Germany

info@join-and-share.de

Telephone: +49.30.61072280