

# Results from Element Matching

**Project name:** Bod nidarosdomen

**Construction site located at:** 63.4269, 10.3969

## Summary of results

Total score	Score without reuse	Savings	Substitutions
459.32 kg CO2 equivalents	2114.16 kg CO2 equivalents	78.27%	81.58%

The 'Greedy Algorithm Plural' algorithm yields the best results, substituting 31/38 demand elements (81.58%). Using 'GWP' as the optimization metric, a total score of 459.32 kg CO2 equivalents is achieved. For comparison, a score of 2114.16 kg CO2 equivalents would have been obtained by employing exclusively new materials. This results in a total saving of 78.27%. Note that impacts of transporting the materials to the construction site is not accounted for. Open the CSV file with the file path './Results/substitutions.csv' to examine the substitutions.

## Constants used in calculations

Constant	Value	Unit
Density timber	491.0	kg/m <sup>3</sup>
Density steel	7850	kg/m <sup>3</sup>
GWP new timber	28.9	kg CO2 equivalents
GWP reused timber	2.25	kg CO2 equivalents
GWP new steel	800.0	kg CO2 equivalents
GWP reused steel	4.0	kg CO2 equivalents

## Information about datasets

Elements	Filename	Number of elements
Reused	SUPPLY_DATAFRAME_SVERRE.xlsx	109
Demand	DEMAND_DATAFRAME_SVERRE.xlsx	38

## Performance of algorithms

Name	Total score	Substitutions	Time
Greedy Algorithm Plural	459.32 kg CO2 equivalents	81.58%	0.103s

The design tool is runned with 1 algorithms, namely: Greedy Algorithm Plural. The Greedy Algorithm Plural yields the lowest score, as shown in the table. The substitutions by this algorithm are completed in 0.103 seconds.