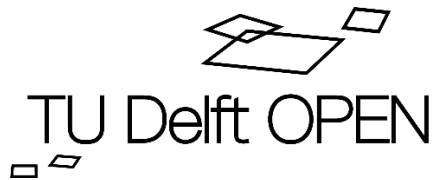


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Erratum to: Annual climate impact and primary
energy use of Swedish transport infrastructure
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Erratum

In the original version of this paper, some figures and units in Table 5 (in the main text) and Table A1, A2, A6, and A7 (in the Appendix) were found to be incorrect. The corrected tables are presented below. These changes only concern the presentation of data. They do not concern any of the calculations made; hence, they do not affect any of the results or conclusions in the paper.

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Table 5. Form and number of standard measures in new construction and the infrastructure stock, based on the data inventory in this paper. For more details, see Appendix.

Form of infrastructure	Annual new construction	Infrastructure stock
Road, state-owned (km)	270	98 500
Road, municipal (km)	110	42 000
Road, private (excluding forest roads) (km)	1 900	250 000
Road, forest roads (km)	1 700	210 000
Walking and cycling paths (km)	190	19 000
Road, bridges (m ²)	35 000	4 700 000
Road, tunnels (km)	1.8	49
Railway (track km)	98	15 000
Tramway (track km)	5.8	280
Metro (track km)	n/a	280
Rail, bridges (track km)	2.5	170
Rail, tunnels (track km)	8.5	280
Industrial tracks (track km)	n/a	15 000
Airports, surface area, paved (m ²)	15 000	40 000 000

Table A1. New construction of road infrastructure during 1 year (arithmetic mean over the period 2010–2015): resulting inventory of standard measures (plain roads, tunnels, bridges, traffic junctions, roundabouts, wildlife fence, noise protection, soil stabilisation, and deforestation). Length of plain roads do not include roads constructed in tunnels and on bridges, since the standard measures for tunnels and bridges in Klimatkalkyl 4.0 include also construction of the road.

Standard measure	Unit	Form of road infrastructure		
		State-owned	Municipal	Private
Motorway 4 lanes, 21.5 m wide	km	1		
Motorway 4 lanes, 18.5 m wide ¹	km	23		
2+2 road	km	6	0.4	
2+1 road, 14.0 m wide	km	8	0.3	
2+1 road, 12.5 m wide ¹	km	3		
2 lane road, 9 m wide ¹	km	8		
2 lane road, 8 m wide ¹	km	210	20	4
2 lane road, 6.5 m wide	km	3	80	20
1 lane road, 5 m wide	km	9	6	160
Gravel road	km		4	3 440
Walking and cycling path	km	190		
Widening of road, 1 m	km	3		
Widening of road, 2 m ¹	km	1		
Widening of road, 4 m ¹	km	5		
Widening of road, 5 m	km	3		
Widening of road, 6 m ¹	km	10		
Widening of road, 9 m ¹	km	2		
Widening of road, 10 m ¹	km	2		
Extra pavement	m ²	326 600		
Cable barrier	m	31 100		
Rock tunnel, 1 lane	m	490		
Rock tunnel, 2 lanes	m	490		
Rock tunnel, 3 lanes	m	300		
Rock tunnel, 4 lanes	m	70		
Concrete tunnel, 1 lane	m	270		
Concrete tunnel, 2 lanes	m	80		
Concrete tunnel, 3 lanes	m	80		
Concrete tunnel, 4 lanes	m	60		
Concrete beam bridge	m ²	990		
Short span concrete bridge	m ²	520		
Composite bridge	m ²	7 600		
Bridge, type not specified	m ²	25 400		
Bridge, for walking and cycling	m ²	130		
Bridge barrier	km	4		
Roundabout, normal	number	46		
Roundabout, small	number	0.8		
Junction, large	number	7		
Junction, medium	number	3		
Wildlife fence	km	80		
Noise protection	km	5		
Deforestation	m ³ sub	20 430		252 200
Soil stabilisation, LC columns ²	m	1 788 900	494 000	762 180

1. Material and energy use for construction of these standard measures was estimated by scaling material and energy use for construction of other standard measures.
2. It was assumed that soil stabilisation is required in all road construction projects. It was assumed that 10% of a project's surface area is stabilised with 5 metres of lime-cement (LC) columns per m² stabilised soil (Stripple, 2001).

Table A2. New construction of rail infrastructure during 1 year (arithmetic mean over the period 2010–2015): resulting inventory of standard measures (substructure, superstructure, electrification system, signalling system, telecommunication system, tunnels, bridges, station buildings, platforms, soil stabilisation, and deforestation).

Standard measure	Unit	Form of rail infrastructure		
		State-owned railways	Non-state-owned railways	Tramways
Substructure, single-track ¹	km	70		0.4
Substructure, double-track ¹	km	4	2	2
Superstructure, single-track	km	80	0.01	0.4
Superstructure, double-track	km	7	2	3
Electrification system, single-track ²	km	110	0.01	0.4
Electrification system, double-track ²	km	10	2	3
Signalling system, single-track ²	km	110	0.01	0.4
Signalling system, double-track ²	km	10	2	3
Telecommunications system, single-track ²	km	110	0.01	0.4
Telecommunications system, double-track ²	km	10	2	3
Rock tunnel, single-track	km	6		
Rock tunnel, double-track	km	0.8		0.1
Concrete tunnel, single-track	km			
Concrete tunnel, double-track	km			0.2
Service tunnel	km	3		
Concrete beam bridge, single-track	km	1		
Concrete beam bridge, double-track	km			0.06
Short span concrete bridge, single-track	km	0.3		
Short span concrete bridge, double-track	km		0.1	
Composite bridge, single-track	km	0.6	0.01	
Composite bridge, double-track	km	0.1		
Station building, above ground	m ²	1 090		
Station building, under ground	number	0.3		
Platform ³	m ²	13 980		
Soil stabilisation, LC columns ⁴	m	102 410	2 970	5 450
Soil stabilisation, concrete piles ⁴	m	39 570	2 050	2 100
Deforestation	m ³ solid under bark	19 370	640	

1. The substructure is shorter than the superstructure since the standard measures for tunnels and bridges in Klimatkalkyl 4.0 includes the substructure in the tunnel and on the bridge.
2. The length of electrification, signalling, and telecommunication systems were assumed to be the length of the rail superstructure (unless stated otherwise in the project descriptions).
3. For projects that included platform construction at a station, it was assumed that the platform area constructed was equal to the platform area on that station in 2016 based on data received from the STA.
4. It was assumed that soil stabilisation is required in all rail construction projects. It was assumed that the project requires 1 320 metres of LC columns and 510 metres of concrete piles per kilometre (Stripple and Uppenberg, 2010).

Table A6. Reinvestment of road infrastructure: the road infrastructure stock divided into standard measures representative of the standard measures in Klimatkalkyl 4.0. The length of plain roads was assumed to include also roads in roundabouts and junctions. The surface area of bridges was assumed to include also bridges in junctions. Stone and wood bridges, vault bridges, and soil composite bridges (representing 10% of the bridge area on the state-owned road network and most bridges on the private road network) were not included.

Standard measure	Unit	Form of road infrastructure		
		State-owned	Municipal	Private
2+2 road	km	160	170	9
2+1 road	km	1 170	140	7
2 lane road, 8 m wide	km	20 600	8 780	630
2 lane road, 6.5 m wide	km	46 100	29 140	2 610
1 lane road	km	11 980	2 340	20 460
Gravel road	km	18 470	1 790	437 910
Walking and cycling path	km	2 430	15 430	860
Rock tunnel, 1 driving lane	km	6		
Rock tunnel, 2 driving lanes	km	20		
Rock tunnel, 3 driving lanes	km	8		
Rock tunnel, 4 driving lanes	km	9		
Concrete tunnel, 1 driving lane	km	1		
Concrete tunnel, 2 driving lanes	km	3		
Concrete tunnel, 3 driving lanes	km	1		
Concrete tunnel, 4 driving lanes	km	1		
Concrete beam bridge	m ²	1 748 370		
Short span concrete bridge	m ²	1 668 790		
Composite bridge	m ²	1 248 720		

Table A7. Reinvestment of rail infrastructure: the rail infrastructure stock divided into standard measures representing the standard measures in Klimatkalkyl 4.0.

Standard measure	Unit	Form of rail infrastructure				
		State- owned	Other	Tramway	Metro	Industrial tracks
Substructure ¹	track km	13 800	1 280	275	160	14 550
Superstructure ²	track km	14 130	1 310	280	280	14 550
Electrification system ³	track km	11 970	160	280	280	7 280
Signalling system ³	track km	11 970	160	280	280	7 280
Telecommunications system ³	track km	11 970	160	280	280	7 280
Rock tunnel	track km	130	10	4	100	
Concrete tunnel	track km	30	3		10	
Concrete beam bridge	track km	120	1			
Composite bridge	track km	30	10			
Bridge, not specified ⁴	track km			1	10	
Station building, above ground ⁵	m ²	176 780				
Station building, underground, rock and soil	number				40	
Platform	m ²	792 690				

1. The substructure does not include the substructure in tunnels and on bridges, since the standard measures for bridges and tunnels in Klimatkalkyl 4.0 include substructure
2. Excluding non-trafficked tracks
3. Only included for electrified tracks
4. This standard measure, an average of the bridge standard measures in Klimatkalkyl 4.0, was used when information on bridge type was not available.
5. Includes also space used for commerce, offices, storage rooms, restaurants, etc.