Klimatkalkyl
– a model for climate Impact calculations of transport infrastructure

TRAFIKVERKET

Cecilia Kjellander
Malin Kotake
2015-04-22

Trafikverket – the Swedish transport administration

Our tasks

- To be responsible for the long-term planning of the transport system for road, rail, shipping and aviation
- To be responsible for the construction, operation and maintenance of State owned roads and railways

Our Vision

Everybody arrives smoothly, the green and safe way.




TRAFIKVERKET

Scope of presentation

- The importance of assessing energy use and greenhouse gas emissions in the infrastructure planning, design and construction process
- Klimatkalkyl - a model for calculating energy use and CO_2-emissions of transport infrastructure in an efficient and consistent way
- Benefits from climate calculations in infrastructure projects

Aim – an energy-efficient transport system

Maintanence

Reinvestments/ waste management

Planning and design process

Minimizing energy use and climate impact in a life cycel perspective

Use/operation

Construction

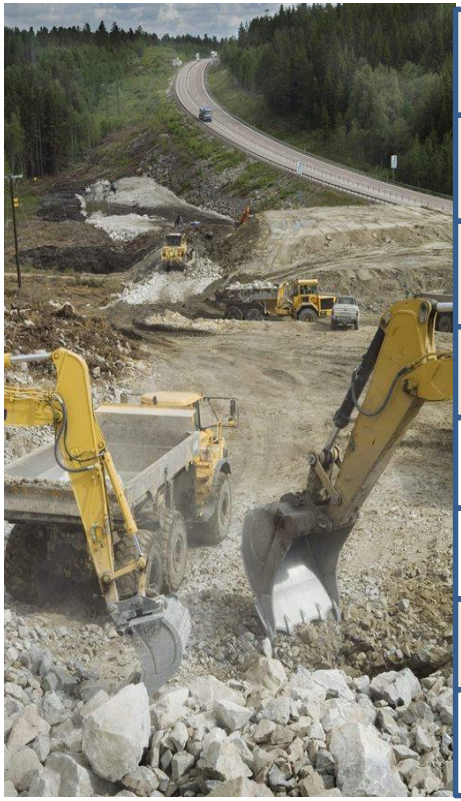
TRAFIKVERKET

Background and aim

- Enable calculations of CO_2 emissions and energy use in a consistent and efficient way
- Integrate climate impact in decition makning
- Reduce CO_2 emissions and energy use from transport infrastructure
- Follow up and report results of implemented measures

Can be used for individual investment projekts, for parts of investment projects or for a whole investment plan

Klimatkalkyl = Quantifying CO_2-emissions and energy use in a life cycle perspective



- Raw material extraction
- Processing
- Transport
- Construction
- Operation
- Maintenance
- Disposal of any residue

Resources

Emissions

- According to ISO 14041:2006
- For each activity quantifying in- and outflow

”Klimatkalkyl”, a model for transport infrastructure LCA with focus on energy use and CO_2-emissions

- Compare alternative routings in a project
- Identify hotspots – what contributes most to energy use and climate impact in a project
- Analyze how different measures affect energy use and climate impact – work with improvements
- Follow up climate and energy performance

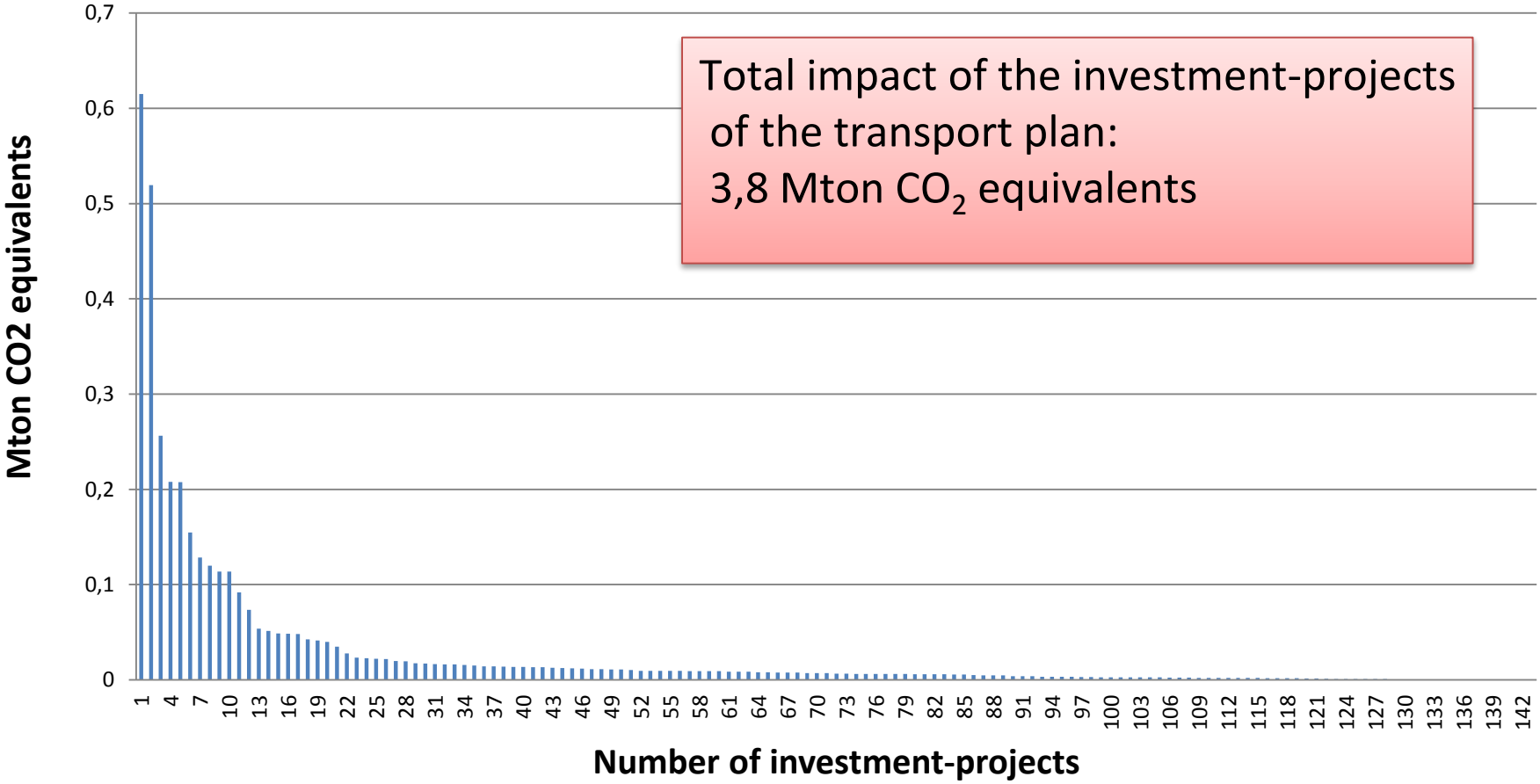
CO_2-emissions = Emission factors X

Resource templates for standard measures

Project specific data for material and energy resources

Climate assessment of the National transportplan 2014-2025

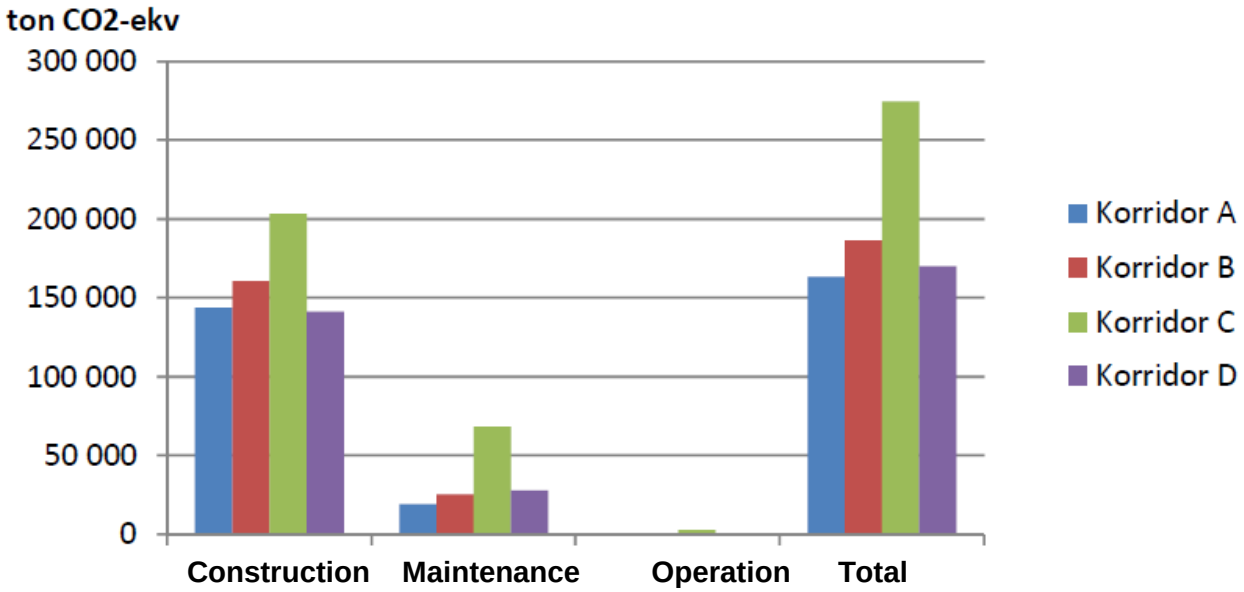
- CO_2 emissions from investment-projects



TRAFIKVERKET

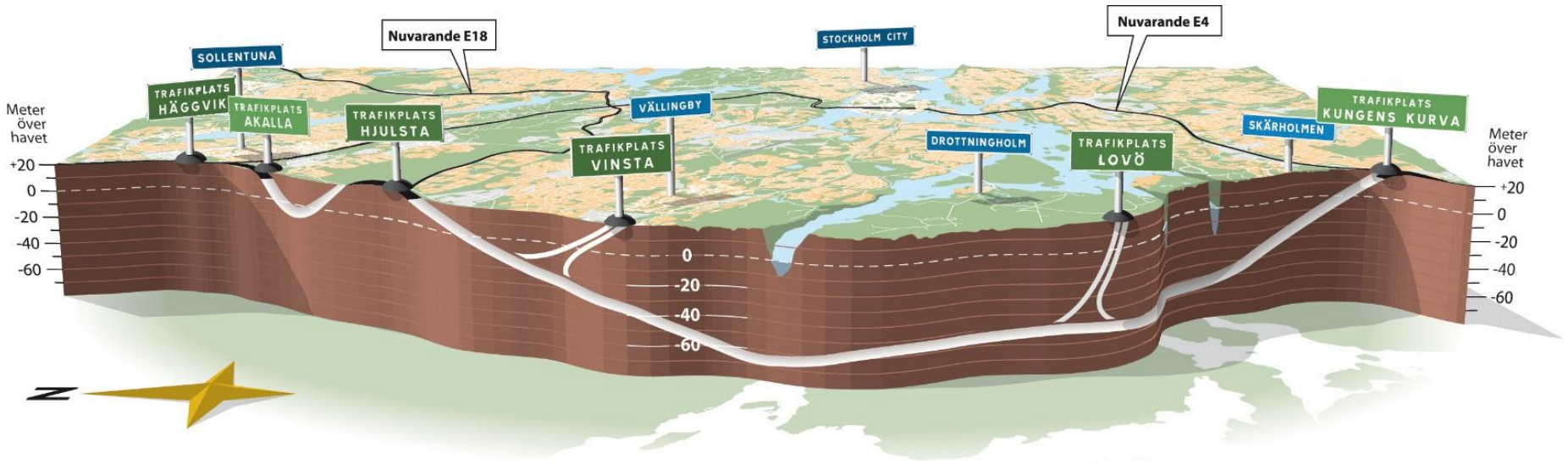
East Link Project

- Sweden's first high-speed railway for trains running at up to 320 kilometres per hour.
- Total emission: 615 000 tonnes CO_2 eqv.
- Supplementary investigation on alternative routes through Linköping



E4 The Stockholm bypass

- A new route for the European highway (E4) past the Swedish capital.
- 18 km out of 21 km of the link are in tunnels.
- Requirement on action plan from the Government.



TRAFIKVERKET

Work procedure in Stockholm bypass

Climate calculation

Workshops

Action Plan

- Measure 1 – xx kg CO_2
- Measure 2 – xx kg CO_2
- ---
- ----

Climate calculation

Results klimatkalkyl Stockholm bypass

Construction:

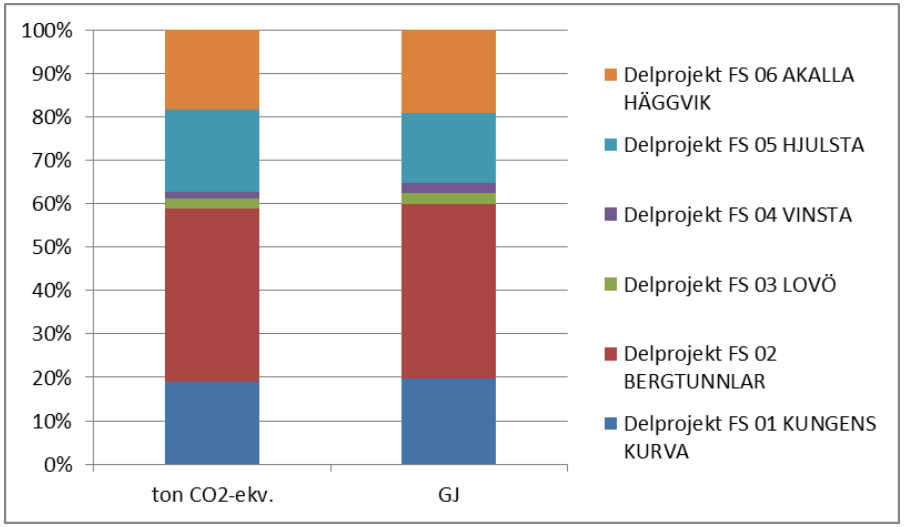
570 000 tonnes CO2-eqv.

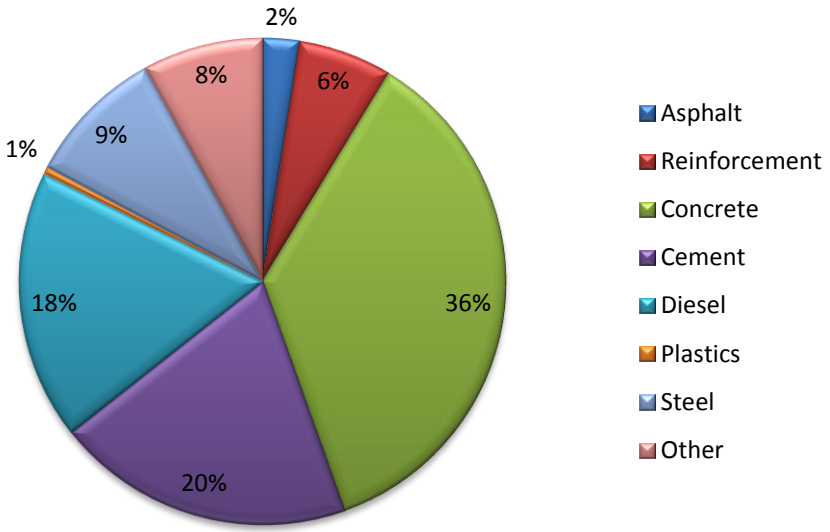
7 000 000 GJ

Operation:

1 000 – 90 000 tonnes CO2-eqv/year

200 000 GJ/year





TRAFIKVERKET

Efficiency potential during construction

10 % reduction of greenhoouse gas emission gives -57 000 tonnes CO_2-eqv

HOW?

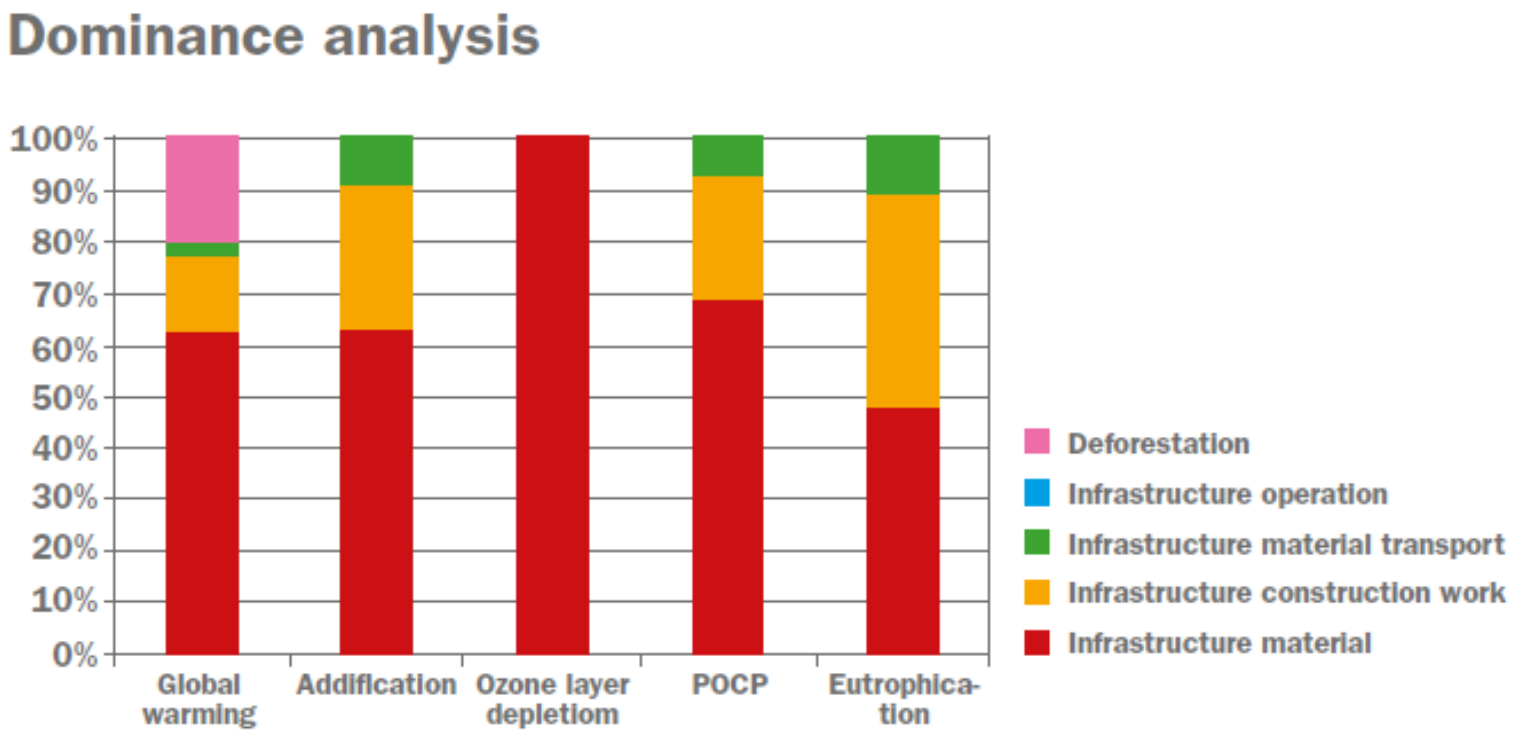
- Concrete with 7 % less ”Carbon Footprint”: -14 000 tonnes CO_2, about 2,5 %
- 10 % less concrete and reinforcing bars: -17 000 tonnes CO_2, about 3 %
- Reinforcing bars with about half carbon footprint : -18 000 tonnes CO_2, about 3 %
- Construction steel with 30 % less carbon footprint: -11 000 tonnes CO_2, about 2 %
- 20 % less diesel: -20 000 tonnes CO_2, about 3,5 %

Procurement requirements

- Requirements for the implementation of the contract.
- The contractor shall make climate calculations for its proposed solution, as a baseline for the follow-up of the efficiency improvements.
- Requirement of 10% reduction of climate gas emissions compared to the baseline
- Continuous follow-up of the efficiency improvements
- Climate calculations should be performed based on Trafikverkets model for climate calculation.
- Efficiency improvements through choice of materials should be substantiated with an Environmental Product Declaration (EPD), or equivalent
- The contractor shall present the final climate and energy performance of the contract through compilation of a climate declaration.

The Bothnia Line - EPDs for railway transports

Eight EPDs covering railway infrastructure and railway transports
http://www.environdec.com/en/Articles/EPD/EPDs-for-railway-transports/



Thank you for your attention!

More information on website: www.trafikverket.se/klimatkalkyl

Including report in english:

Klimatkalkyl version 3.0 – model for calculating energy use and greenhouse gas emissions of transport infrastructure from a life cycle perspective,

Contact:

malin.kotake@trafikverket.se

cecilia.kjellander@trafikverket.se