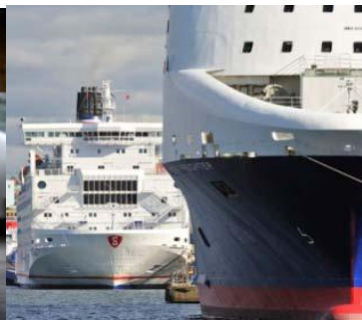
Malin Kotake and
Linus Karlsson

EPDs for the Botnia Line and future work with PCRs in the transport sector

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

EPD stakeholder conference
May 15, 2012



The task of the Swedish Transport Administration

Trafikverket:

- is responsible for the long-term planning of the transport system for road traffic, rail traffic, maritime shipping, and air traffic
- is responsible for construction, operation and maintenance of the state road network and national railway network

The road network 98,400 km of state roads
41,000 km of municipal streets and roads
76,100 km of private roads with state grants

The railway network
11,900 km of railway line
90% electrified

Outline of presentation
- Part 1 EPD: s for the Botnia Line

- A vision, a decision, a result
- Benefits and fields of application
- Methodology and mode of operation
- Conclusions and result
- International outlook
- Moving on….

Part 2 Future work with PCRs in the transport sector

The Vision

Information to passengers and transport buyers

BOTNIABANAN AB LKM9027I0001

Umeå Ö - Nyland 1 klass

Denna biljett berättigar till en tur- och returresa längs hela Botniabanan.

1 Vuxen

Umeå Ö - Nyland		Botniabanan			
Avgång	Ankomst	Tåg			
12.02	13.06	0001			
Nyland - Umeå Ö		**1 klass**			
Avgång	Ankomst	Tåg	Vagn	Plats	Salong
20.12	21.16	0002	01	01	Fönster

Giltig 2010 och 2011

00689107 Bet 6913. Uth 6913

CO_2-emissions

Transport:	0,8 kg
Infrastructure:	5,0 kg
Total:	5,8 kg

CO_2-fee **1,5 kr**

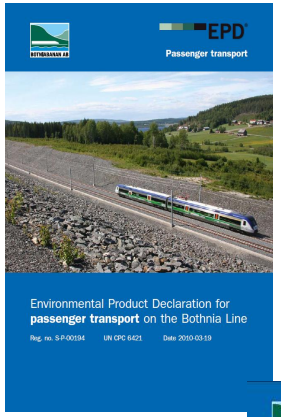
(based on 24 EUR/tCO2)

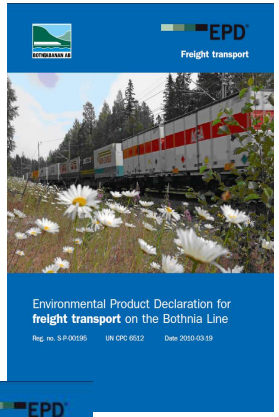
Comparison– car

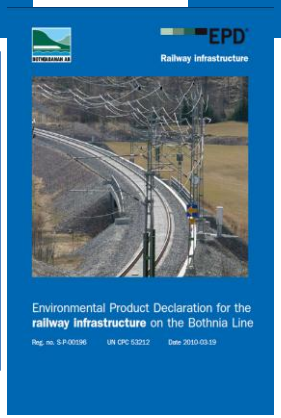
CO_2-emissions:	36 kg
CO_2-fee	8 kr

Total price: 170 kr

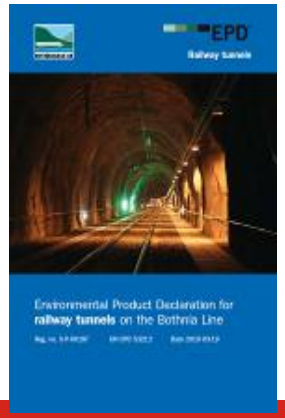
The result

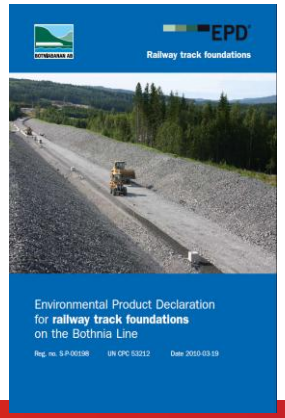


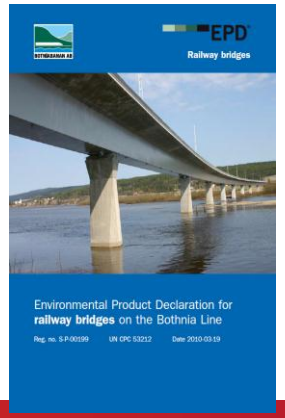


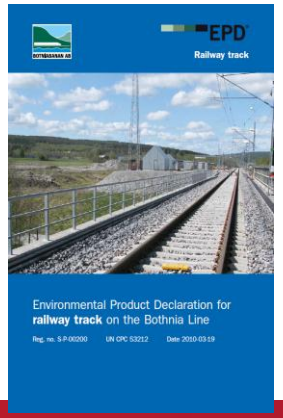


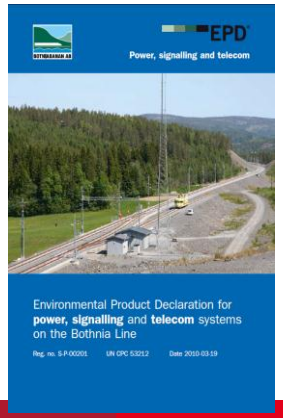
EPD:s for the Botnia Line











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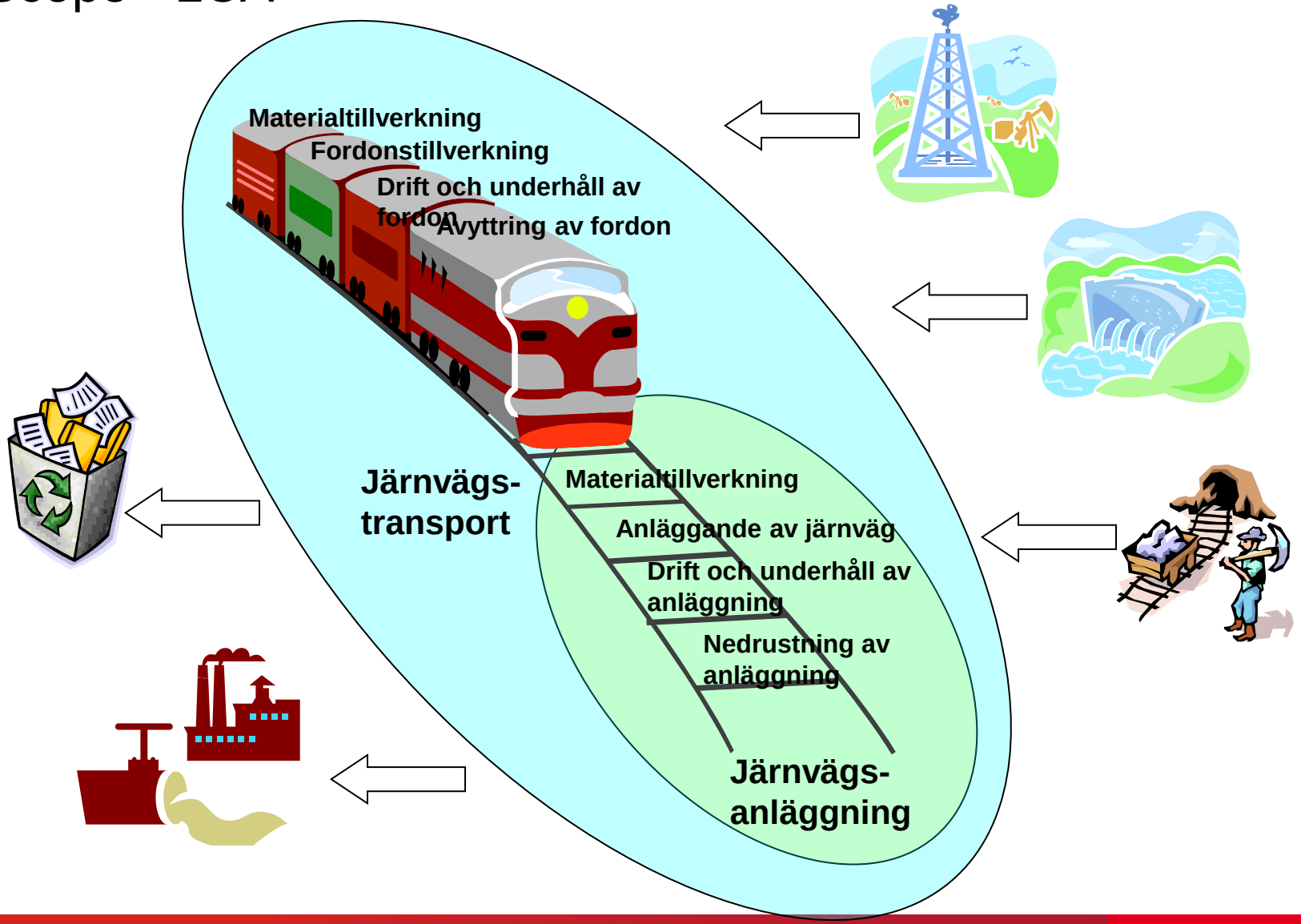
The Botnia Line – A part of the expanding European railway network

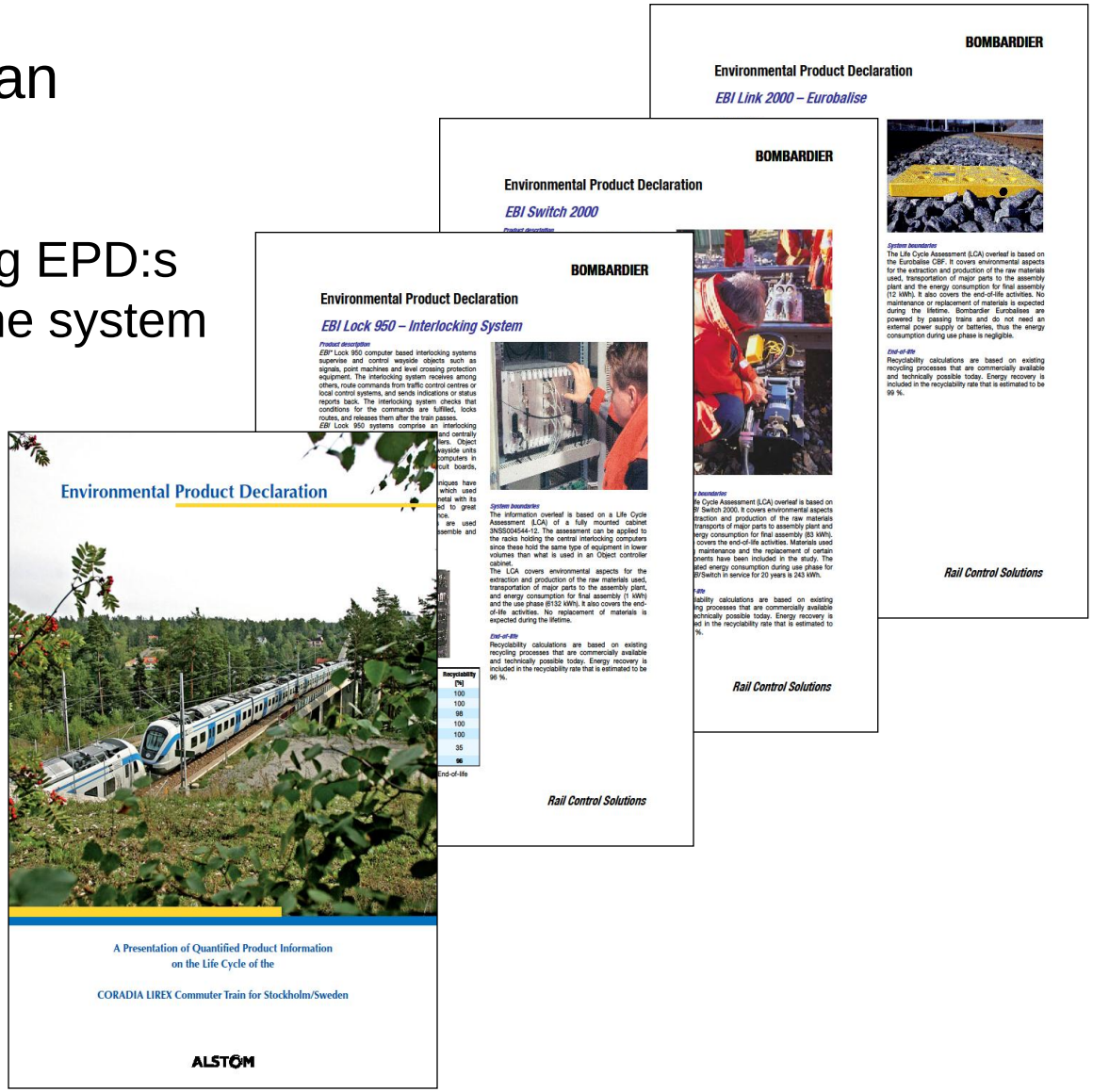
- 190 km new railway
- Single track with 20 meeting stations
- Heavy freight trains
- Fast passenger trains (250 km/h)
- ERTMS signalling system
- Building period 1999 – 2010
- 1,4 billion EUR

Scope - LCA


Materialtillverkning
Fordonstillverkning
Drift och underhåll av fordon
Avyttring av fordon
Järnvägs-transport
Materialtillverkning
Anläggande av järnväg
Drift och underhåll av anläggning
Nedrustning av anläggning
Järnvägs-anläggning

LCA for Botniabanan

We have used existing EPD:s for different parts of the system



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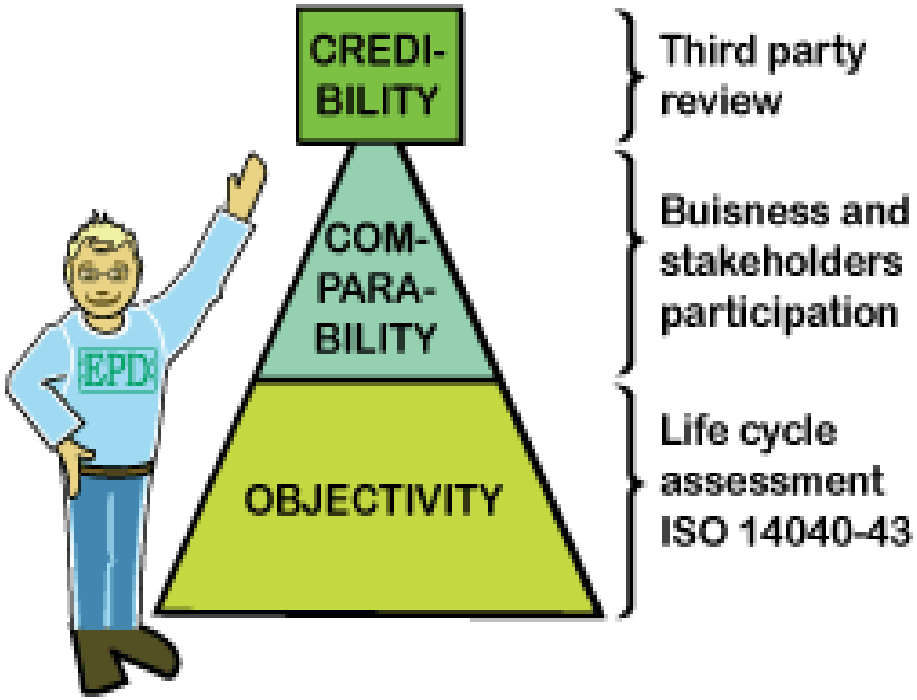
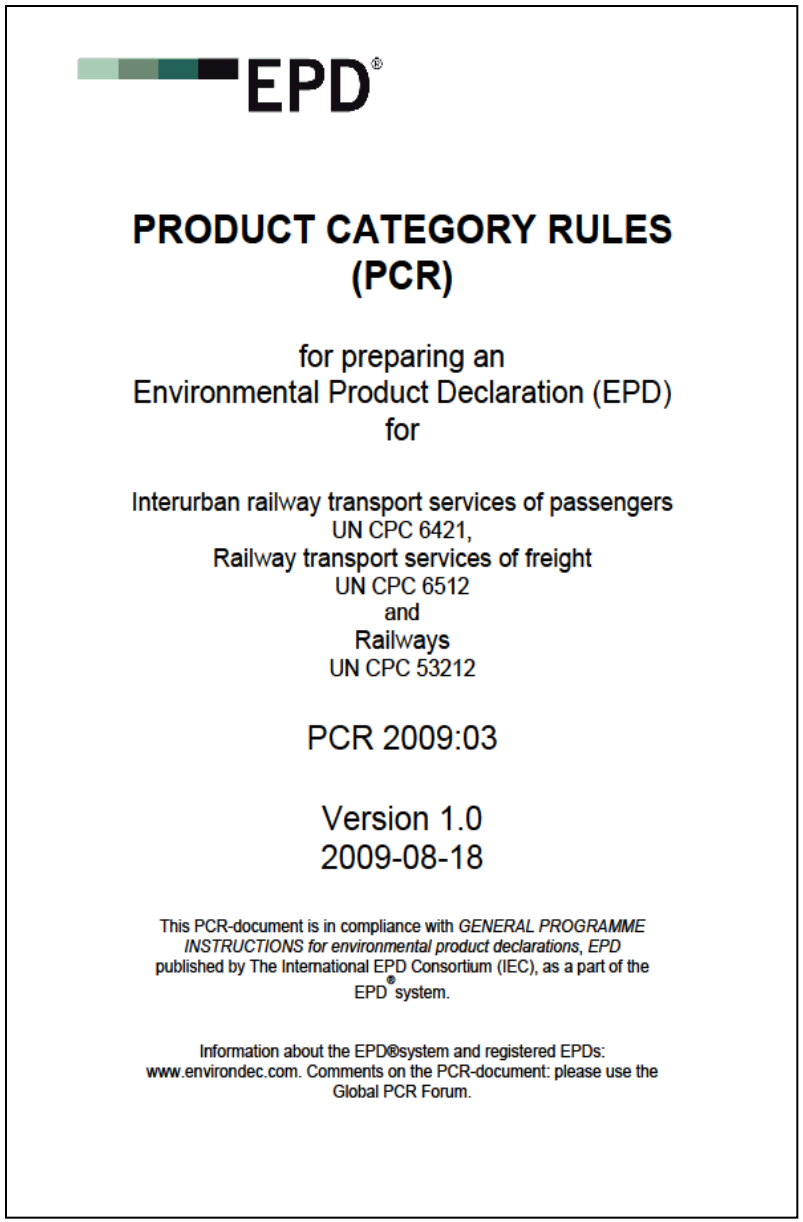
International EPD®-system

Based on ISO 14025




EPD®

PRODUCT CATEGORY RULES (PCR)

for preparing an
Environmental Product Declaration (EPD)
for

Interurban railway transport services of passengers
UN CPC 6421,
Railway transport services of freight
UN CPC 6512
and
Railways
UN CPC 53212

PCR 2009:03

Version 1.0
2009-08-18

This PCR-document is in compliance with *GENERAL PROGRAMME INSTRUCTIONS for environmental product declarations, EPD* published by The International EPD Consortium (IEC), as a part of the EPD® system.

Information about the EPD®system and registered EPDs: www.environdec.com. Comments on the PCR-document: please use the Global PCR Forum.

PCR developed by:
Botnia Line AB
Trafikverket
Linköping University
Stakeholders

Scope of PCR:
Includes all direct and indirect environmental load from rail transport services

Possible to develop EPDs for:
- Transport service
- Infrastructure systems
- Parts of infrastructure

Benefits of EPD:s for infrastructure and transport services

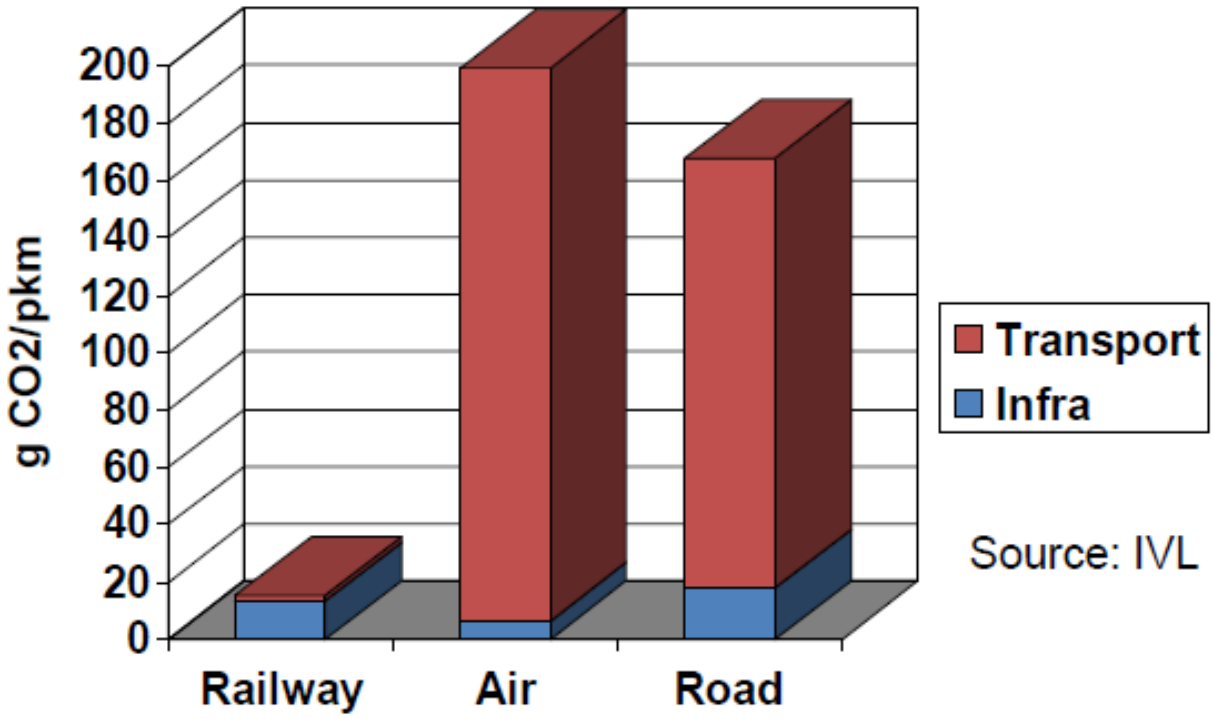
- Overall picture – what is significante and what is not
- Focusing measures where most effective

- Tool for planning
- Followup/Accounting/Reporting
- Communication

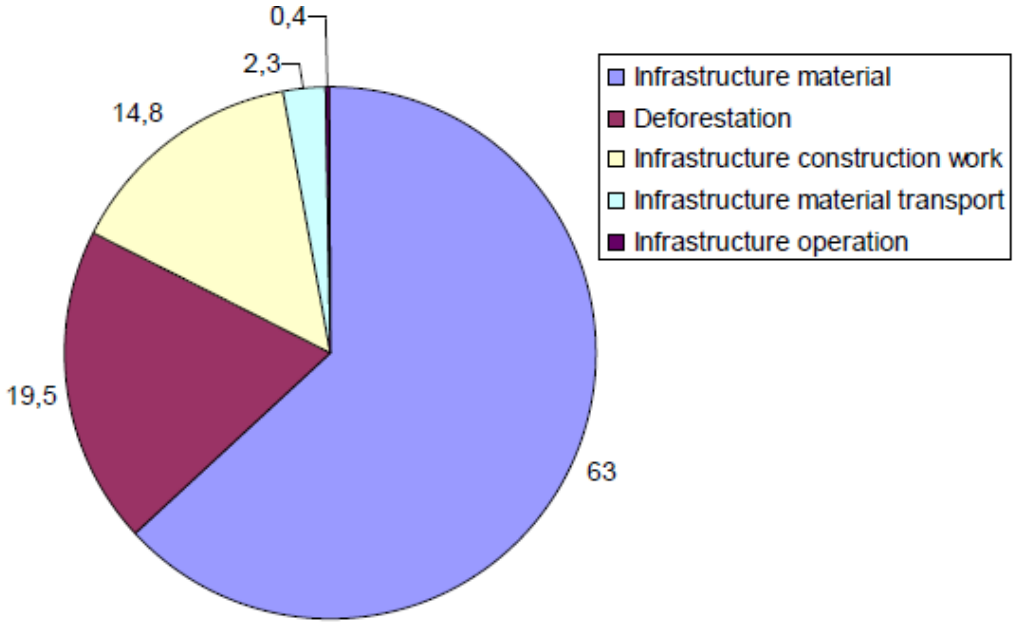
- Fields of application EIA, Carbon footprint, Environmental management, CEEQUAL etc.

Reduce environmental impact – Improve environmental performance

Comparing transport modes Källa: IVL



Dominating processes for railway infrastructure



Percentages of total greenhouse gas emissions for 1 km Bothnia Line over 60 years
Total: 3 870 ton CO2-equivalents

Contribution to GWP from infrastructurematerial:

Material	Track	Tunnel	Bridge	Stations	Terrass	EST	Totalt
Stål	29%	4%	5%		3%	3%	**43%**
Cement	6%	10%	11%		5%	0%	**32%**
Byggnader				11%			**11%**
Aluminium						4%	**4%**
Spräng-medel	0%	2%			1%		**3%**
Plast	0%	1%			1%	1%	**2%**
Koppar						1%	**1%**
Totalt	**35%**	**16%**	**16%**	**11%**	**10%**	**9%**	**97%**

- **Rail 26 %**
- **Cement for bridges and tunnels 21%**

What effects can choice of steel supplier give?

Bothnia Line: 85 800 ton rail steel during 60 years (including reinvestments)

Rail supplier 1: 2,83 kg CO2/kg steel (generic database data)
Rail supplier 2: 1,92 kg CO2/kg steel (32 % less) (specific data)

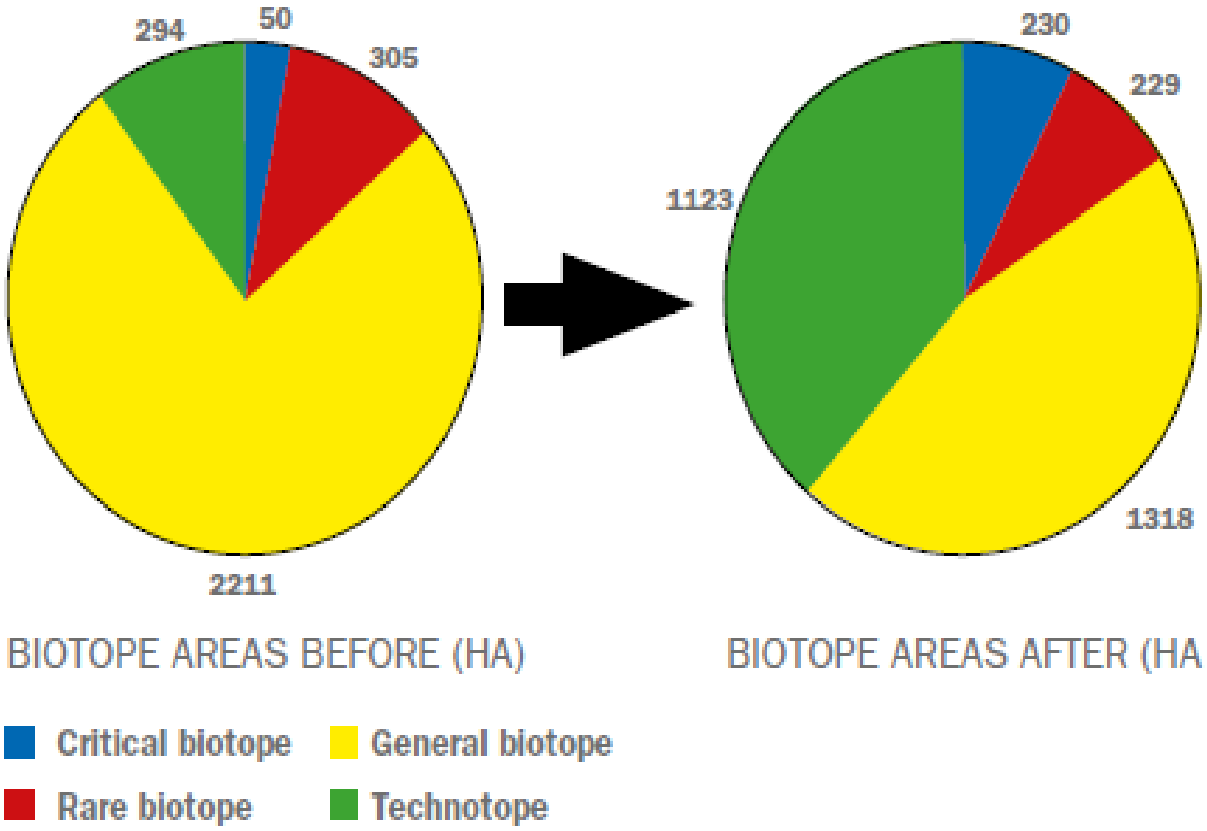
Emissions supplier 1: 242 814 ton CO2
Emissions supplier 2: 164 736 ton CO2

Difference: 78 078 ton CO2 !!

Equals:

- 9 % of total CO2-emissions from railway infrastructure over 60 years
- 9 700 rounds around the earth with car
- Total emissions from railway traffic in Sweden per year

Additional aspects - Biotopemethod



The result of Trafikverkets first EPD

Projekt	**CF** (g CO_2/pkm)	**Biotope** (cm^2 CB/pkm)	**Noise** (cm^2 disturbed birdbiotope /pkm)	**Socio-economic benefit**	**CF/SE**
Botniabanan	13	+0,2	6,1	1,3	10
Citybanan					
Citytunneln					
Götalands-banan					
Hallandsås					
Oslo - Ski					
Förbifart Stockholm					

International outlook – a selection

- Environmental budget for Follobanan in Norway
- Carbon footprint of High speed railway infrastructure – UIC project
- Network rail – Carbon Assessment of existing railway network
- Carbon footprint of existing rail- and road network in Finland

Conclusions

- Lifecycle perspective is essential in the planning- and buildingprocess of infrastructure
- EPD – gives knowledge and an overall picture
- Enables informed and aware choices in the longterm perspective
- Reduces both environmental impact and costs
- Source for communication of environmental performance
- Patience and endurance
- Circles on the water…. – lots going on in other countries

Ambitions and challenges 2012 and forward

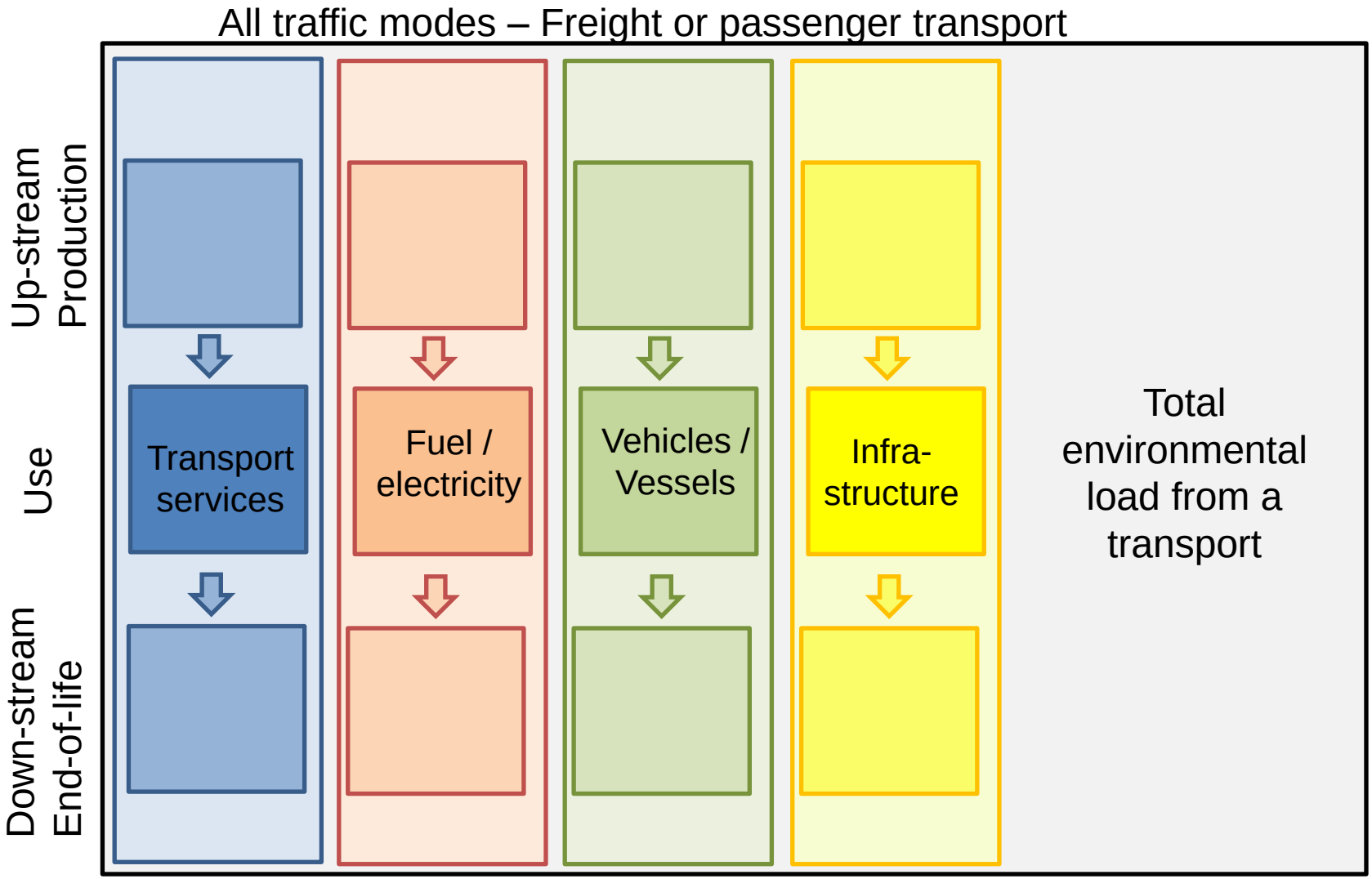
- Implement LCA/EPD-method in other projects
- Improve LCA-models and develop tools
- Input to CEEQUAL - sustainability and assessment awards in the construction sector
- Integrate knowledge from LCA in LCC
- Include environmental demands in procurement
- Implement reward systems to stimulate the market
- Syncronise road/railway – PCR infrastructure and PCR road

Future work with PCRs in the transport sector
- Development of PCRs for Transport infrastructure





”Map” of Transport System



Existing PCR:s/EPD:s in the transport sector

	Infrastructure	Transport service	Vehicles & Vessels
Railway	Yes (Botnia Line)	Yes (Botnia Line) Under development	Existing in some extent
Road	No	Under development	No
Shipping	No	Under development	No
Air	No	Under development	No

Why EPDs on transport infrastructure?

- Infrastructure can be a ”module” in a EPD for a Transport
- Declare environmental impact of infrastructure

Project participants and time plan

Moderator

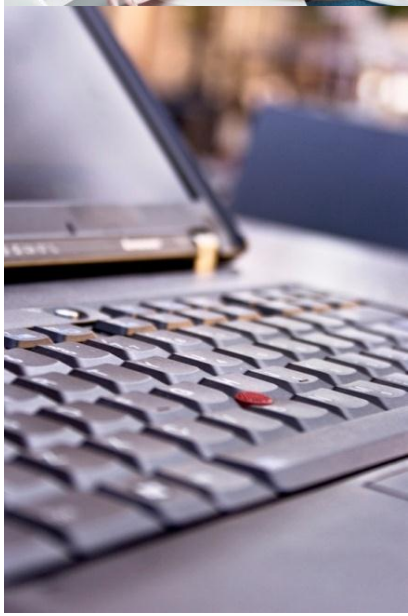
- Swedish Transport Administration

Product Category Stakeholder Consultation Group

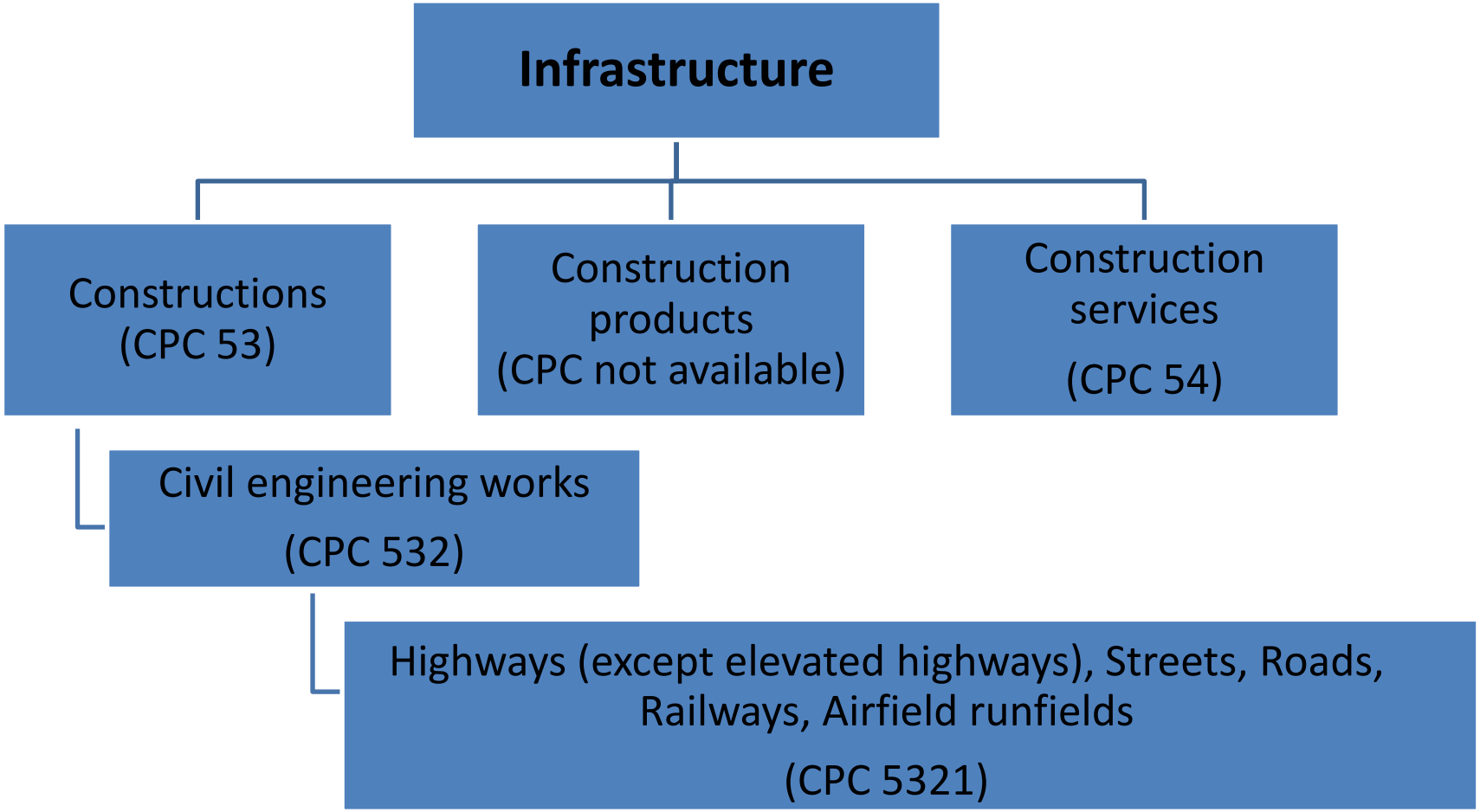
- Norwegian Road Administration
- Norwegian Railway Administration
- WSP
- MiSA
- Tyréns
- Asplan VIAK
- VTI

Time plan

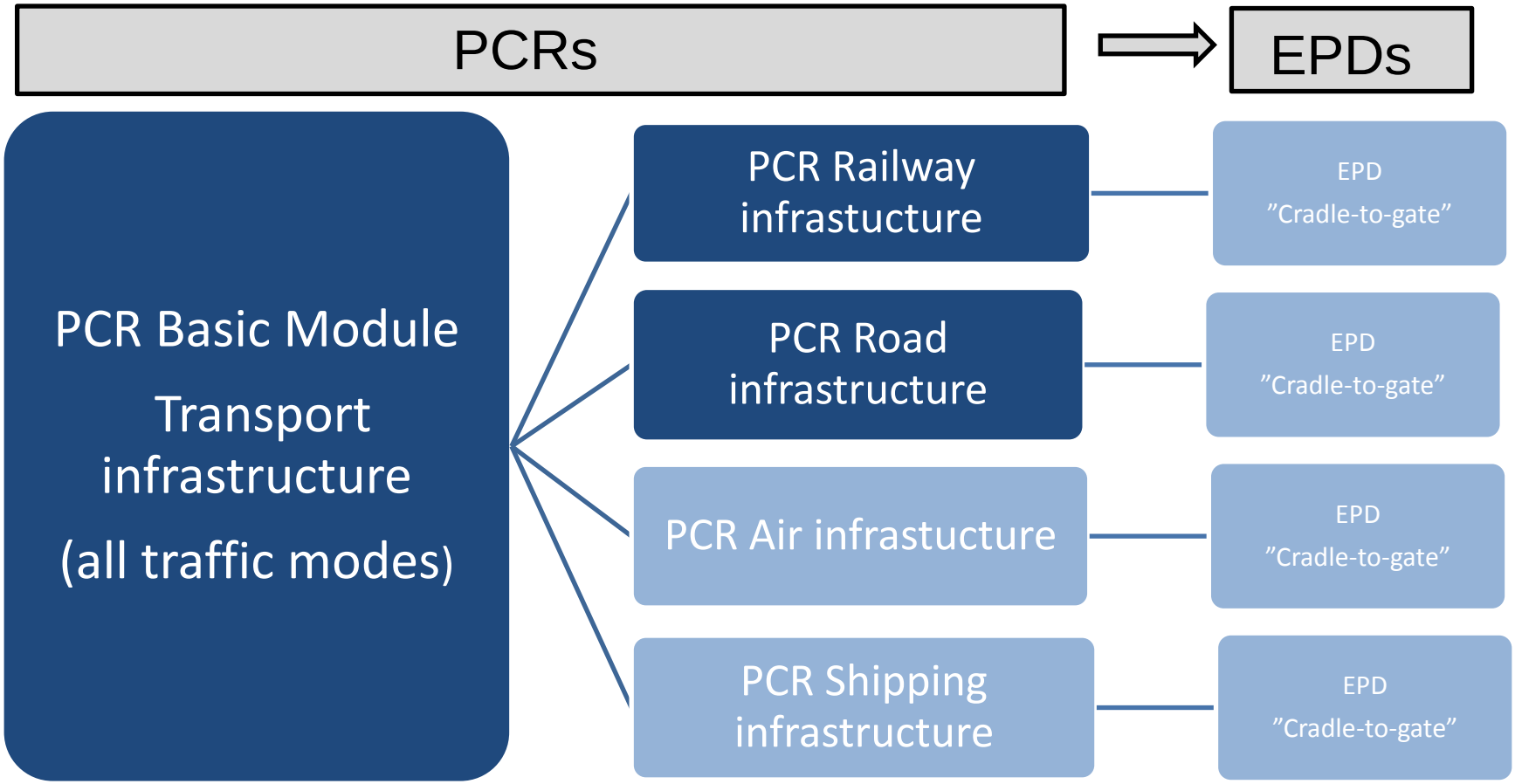
Open consultation	September / October 2012
PCRs approved and published	December 2012



CPC codes and existing PCRs



Aim: Create 3 PCRs



Crucial problems and challenges

- Life time

Construction + Maintenance + Operation

= Total environmental load for infrastructure per km infrastructure and year

Crucial problems and challenges

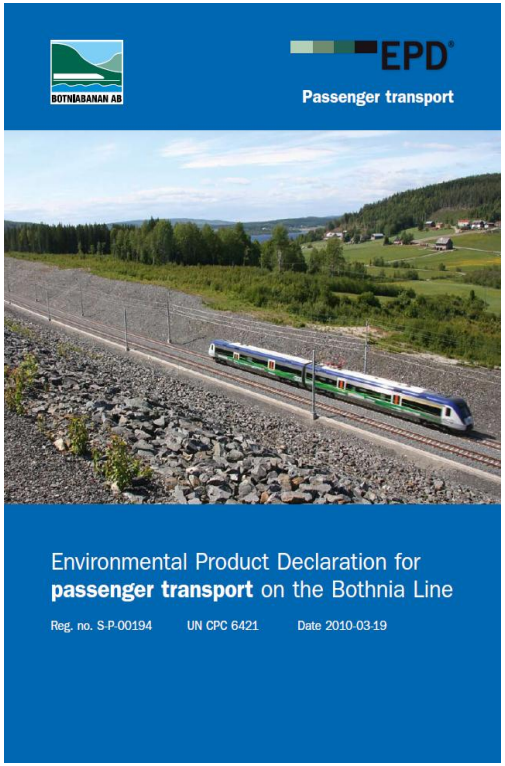
- Cut of rules
  10 % instead of 1 %

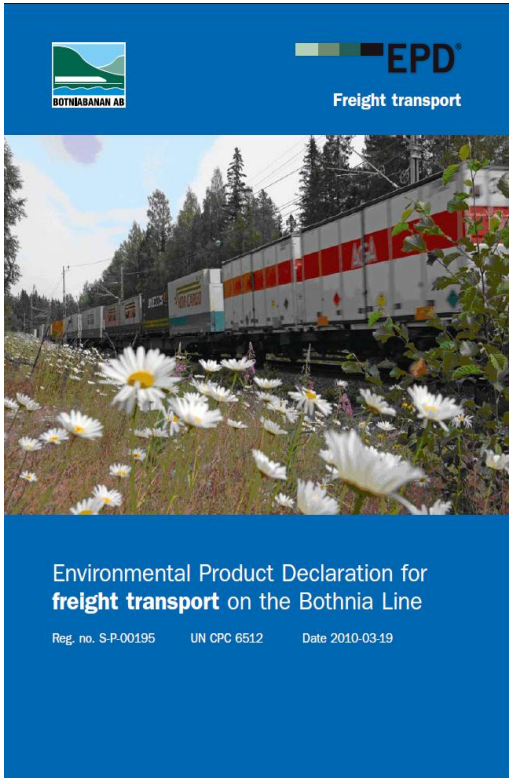
- Additional environmental information
  Not part of the LCA but important environmental information shall be declared. E.g.:
  - Impact on biodiversity
  - Land use
  - Management of materials and substances
  - Noise

Expectations of the International EPD system

- Support
- Function as a platform
- Aim for compliance with other existing systems and standards

Thanks for your attention!





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