

FULLY AUTOMATED ROAD FREIGHT -RTS, ENIRONMENTAL AND ECONOMIC BENEFIT

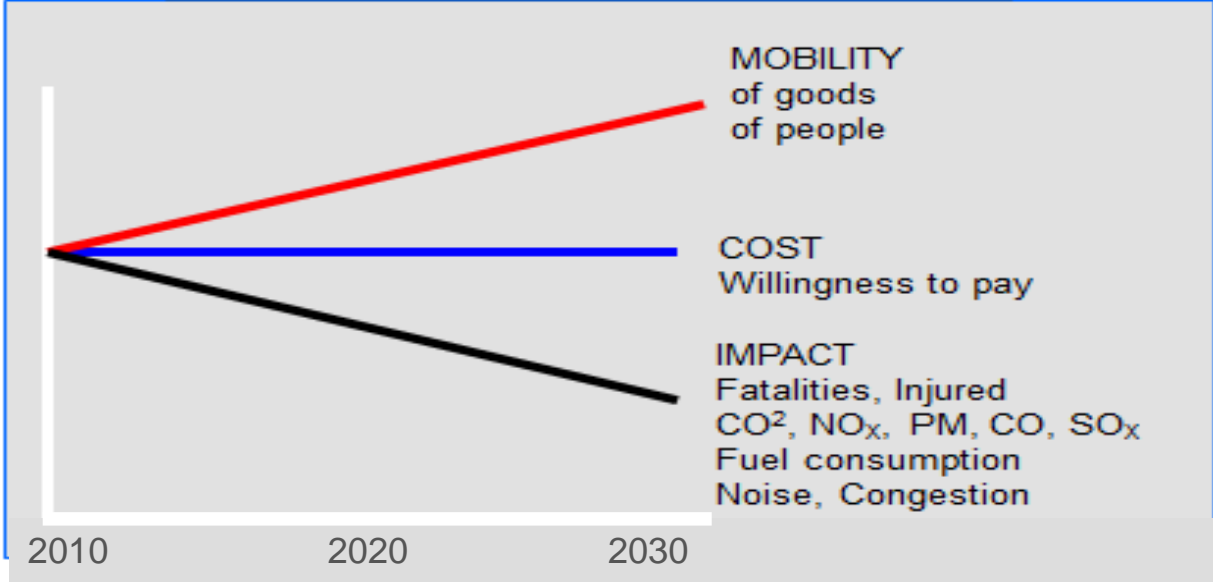
NORDISK TRAFIKSÄKERHETSFORUM, ÅLAND
14 SEPTEMBER 2018

MÅRTEN JOHANSSON
CTO
SWEDISH ASSOCIATION OF ROAD TRANSPORT COMPANIES

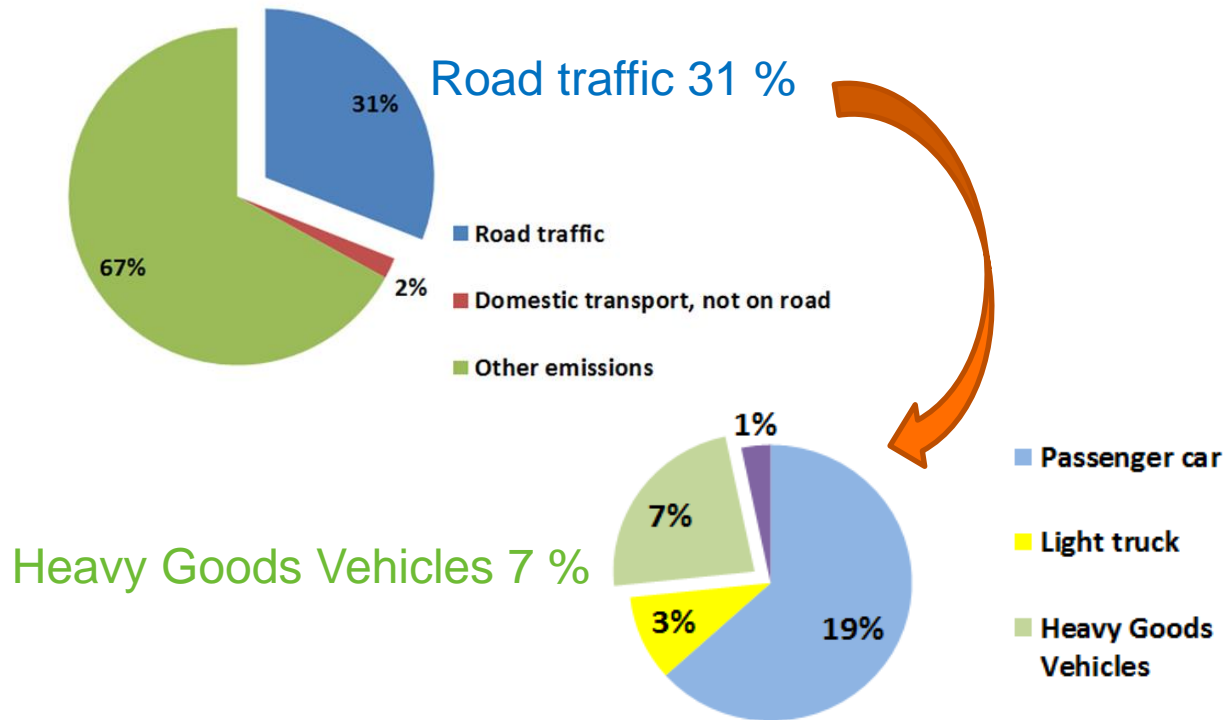




The Challenge



GHG EMISSIONS IN SWEDEN

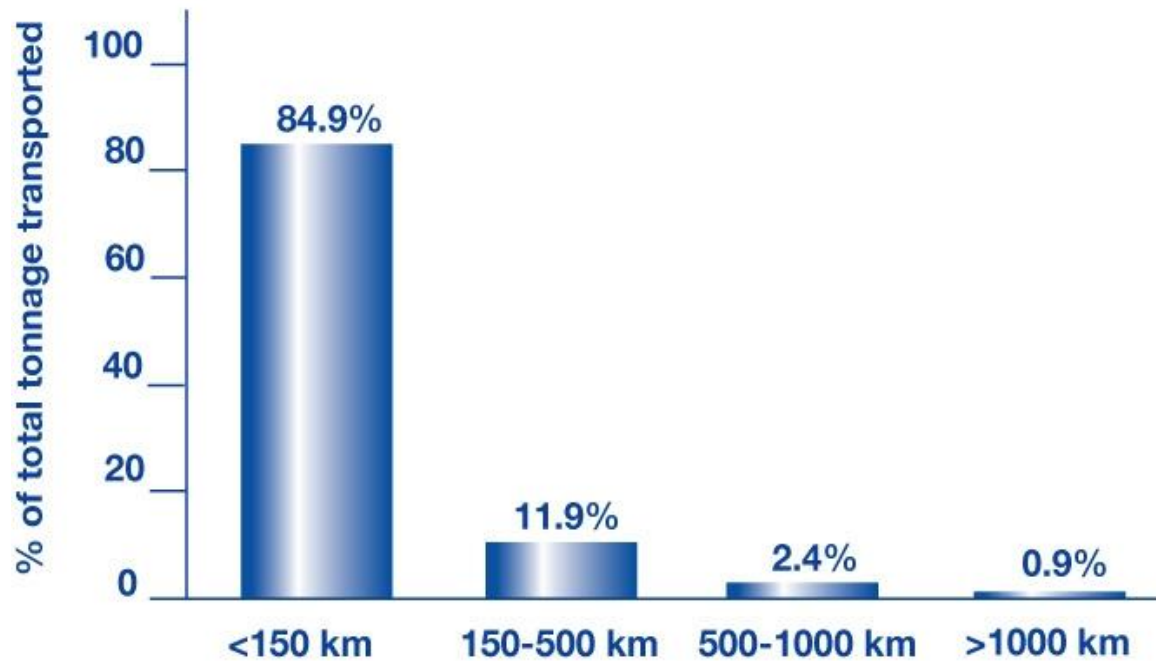


Source: KNEG





EUROPEAN ROAD TRANSPORT TONNAGE DISTANCES IN MODERN ECONOMIES

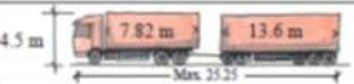
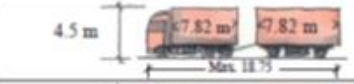
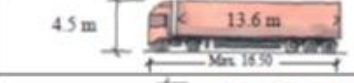
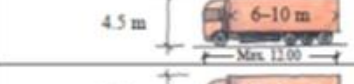







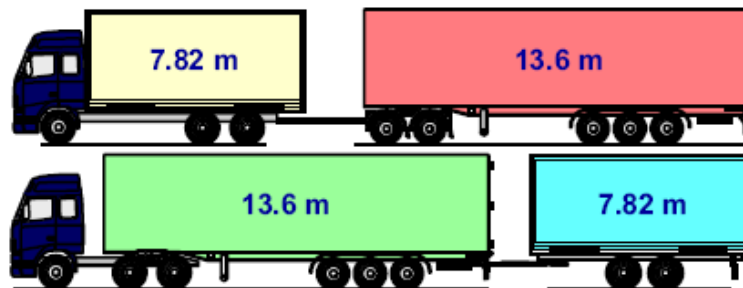
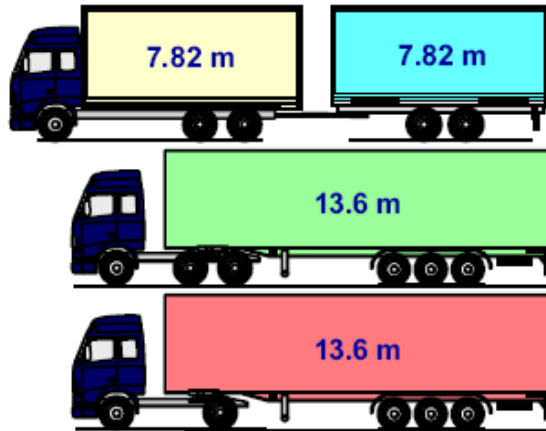
(c) International Road Transport Union (IRU) 2011



How to choose the best goods reception arrangement



Illustration of vehicle	Vehicle type, designation ¹⁾ Gross weight in tonnes ²⁾	Vehicle length	Vehicle width ³⁾	Vehicle height ⁴⁾	Trailer platform height ⁵⁾	Goods reception type	Vertical clearance ⁶⁾	Loading dock height ⁷⁾
	Road train approx. 60 tonnes	24.00–25.25	2.60	4.00–4.50	1.00–1.35	Bigger goods reception with hydraulic dock leveller	Vehicle's total height + 0.60 m ⁸⁾	1.00–1.35
	Road train ≤ 40 tonnes	18.75	2.60	4.00–4.50	1.00–1.35	-	-	1.00–1.35
	Articulated vehicle ≤ 40 tonnes	16.50	2.60	4.00–4.50	1.00–1.35	-	-	1.00–1.35
	Motor vehicle ≤ 32 tonnes	8.00–12.00	2.60	3.60–4.50	1.00–1.35	-	-	1.00–1.35
	Motor vehicle ≤ 26 tonnes	8.00–12.00	2.60	3.60–4.50	1.00–1.35	-	-	1.00–1.35
	Motor vehicle ≤ 18 tonnes	8.00–12.00	2.60	3.60–4.50	1.00–1.35	-	-	1.00–1.35
	Motor vehicle (small truck)	6.00–8.00	2.20–2.60	3.10–3.50	approx. 0.70–	Smaller goods reception with hydraulic dock leveller/manual dock leveller	-	0.70–0.80
	Light motor vehicle (delivery van) ≤ 3.5 tonnes	approx. 5.00 m	approx. 1.95 m	approx. 2.50 m	approx. 0.40–0.60 m	Smaller goods reception with manual dock leveller	-	0.40–0.60
	Car, delivery van	approx. 5.00 m	approx. 1.60 m	approx. 1.80 m	approx. 0.40 m	Weather-tight loading and unloading station	2.50	0



EU

40/44 tonnes
18,75 metres

EMS - European Modular System

25,25 metres

Sweden 1997

Finland

Nederlands

Norway 1 June 2008

Denmark 1 Nov 2008



Intermodal transports

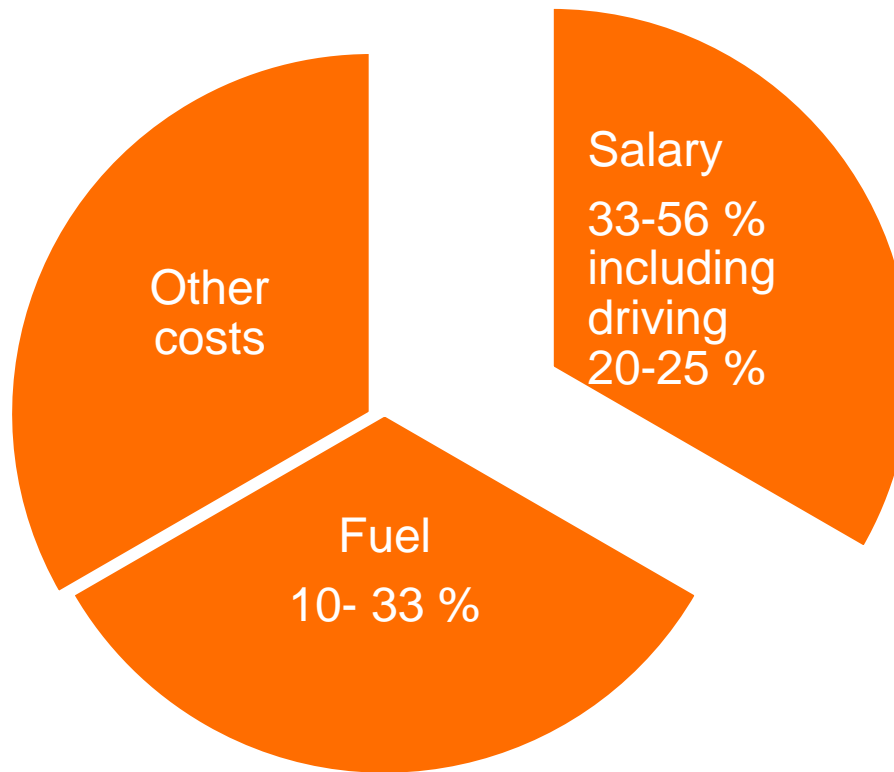
- Load carriers used in intermodal transports:
 - Trailer
 - Swap-body
 - ISO Containers







TRANSPORT COSTS FOR ROAD FREIGHT



- ?
CTU
container
swapbody
semitrailer
vehicle combination
cargo
loading
cargo securing
unloading
documents
communication
customer service



CLIMAT SMART TRANSPORT

GVW tonnes	Vehicle or combination	Payload kg	Fuel litres/10 km	Index energy per tonneskm
74	Truck + trailer	53 000	5,3	100
64	Truck + trailer	45 000	4,5	100
40	Tractor + semitrailer	27 000	3,3	122
28	3-axle truck	19 000	2,8	147
18	2-axle truck	10 000	2,5	250
<3,5	Small truck	1 000	1,5	1.500
1,5	Car	(förare) 75	0,75	10.000
0,05	Autonomous small vehicle	10	0,1	10.000



Climat smart



Not climat smart



CLIMAT SMART ROAD FREIGHT

>fossil free fuel

**GHG
reduction**

30 %

20 %

10 %

Electric road

>HCT

Best solution

Fully automated
vehicle

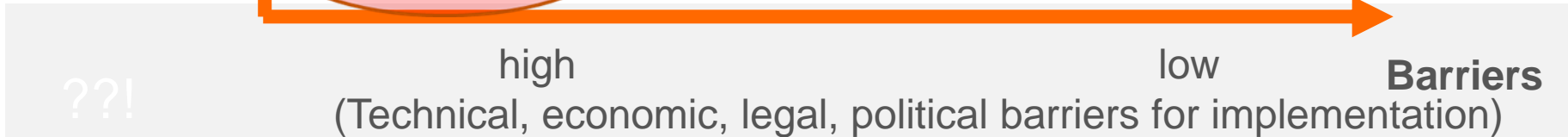
high

low

Barriers

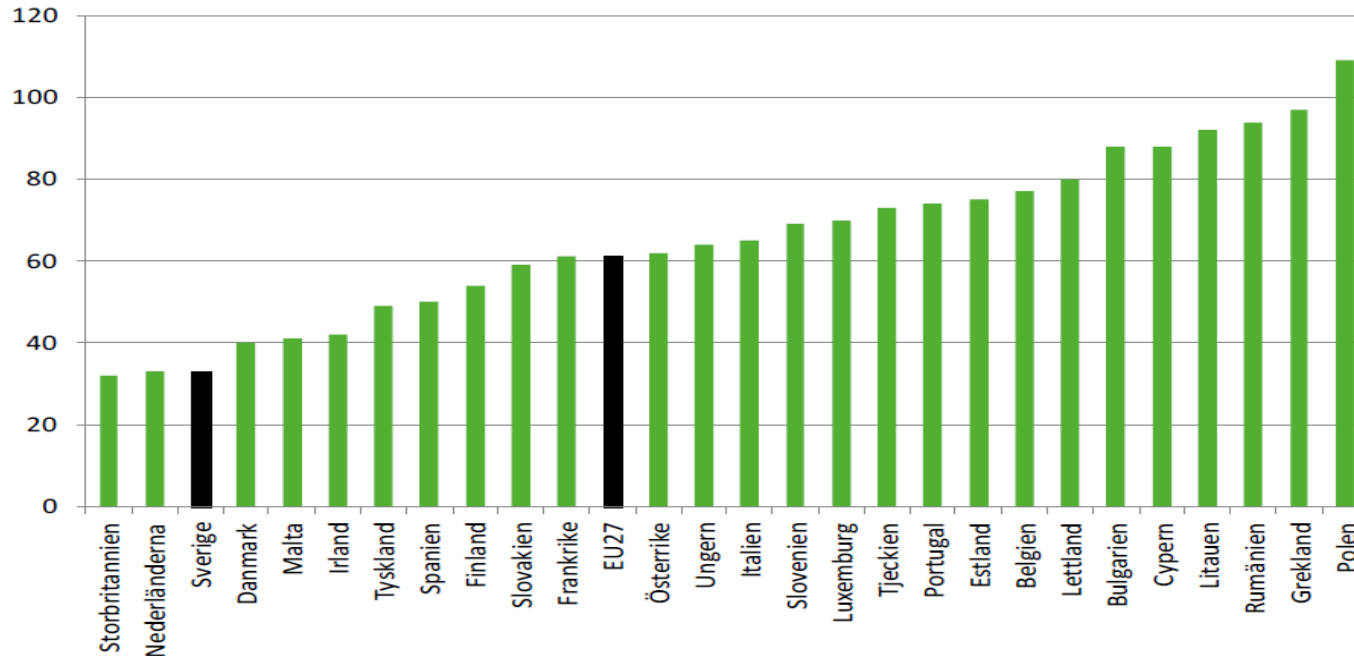
(Technical, economic, legal, political barriers for implementation)

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FATALITIES IN ROAD TRAFFIC 2012 IN EU 27 PER 1.000.000 POPULATION



Figur 1.5: Antal dödade i vägtrafikolyckor per miljon invånare i EU 27. År 2012.

Källa: CARE (EU road accidents database) or national publications. European Commission / Directorate General Mobility and Transport (se föreliggande rapporter Bilaga 2, Tabell 7.2).



Road traffic fatalities in Sweden

	2007	2010	2013	2014	2015	2016	2017
Fatalities	471	266	260	270	259	270	254
By HGV	92	46	31	49	39	40	31
In HGV	6	4	4	5	5	5	3
Fatalities with HGV	98	50	35	54	44	45	34
% HGV involved	21 %	19 %	13%	20%	17%	17%	13%
In on coming traffic	52	22	14	26	21	12	19
% fatalities in on coming traffic	53 %	44 %	40%	48%	48%	27%	56%
Fatalities per 100.000 population	4,8	2,7	2,7	2,8	2,7	2,8	2,7
Suicides		7	9	13	11	16	15

Road Traffic Safety – A global issue

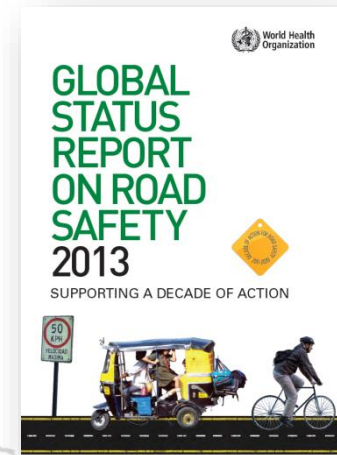


1.24 million road traffic deaths every year.

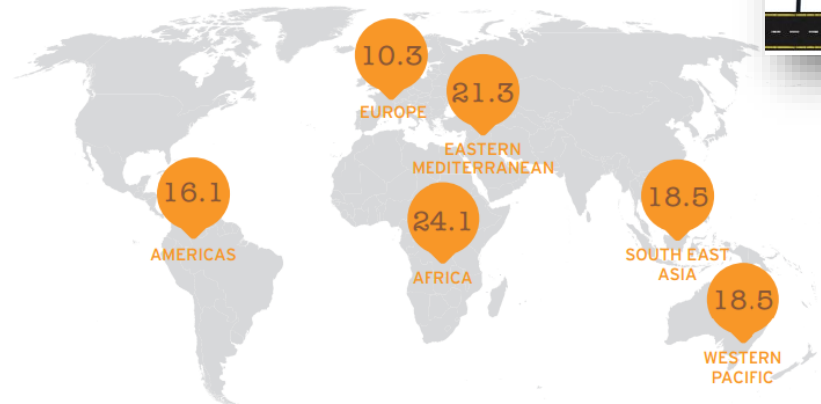
As many as **50 million** are injured each year.



8th leading cause of death globally



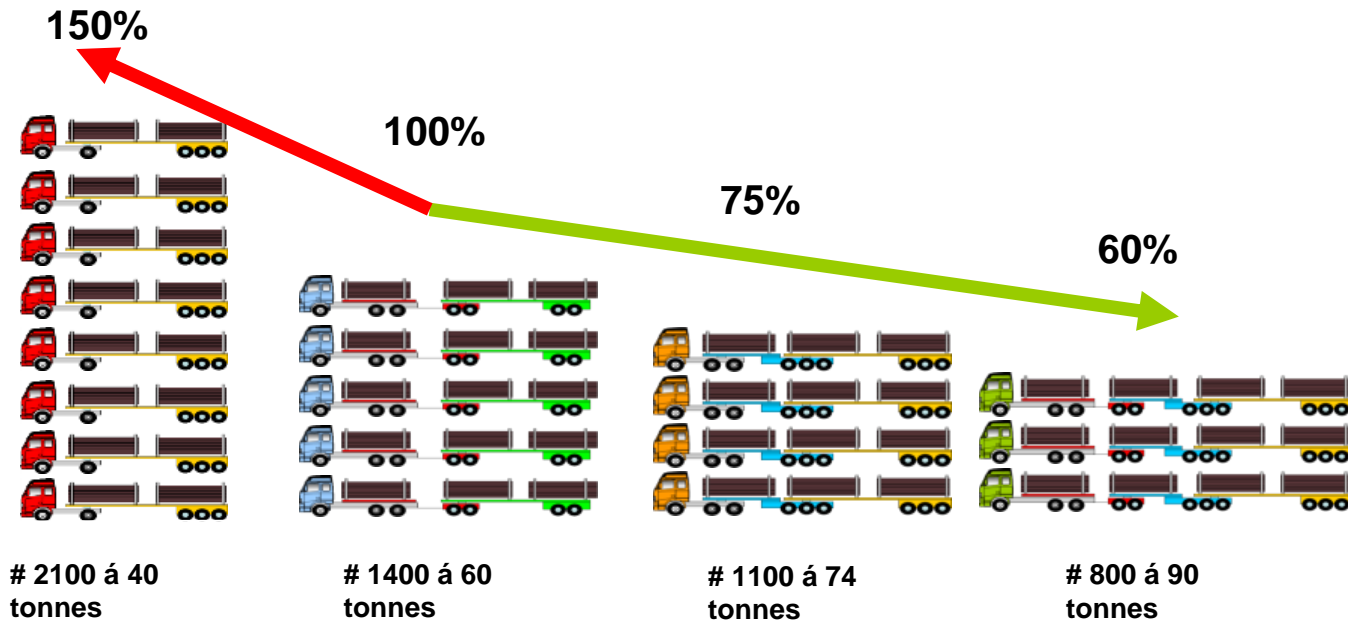
HOW SAFE YOU ARE DEPENDS ON WHERE YOU ARE:
ROAD FATALITIES PER 100,000 POPULATION



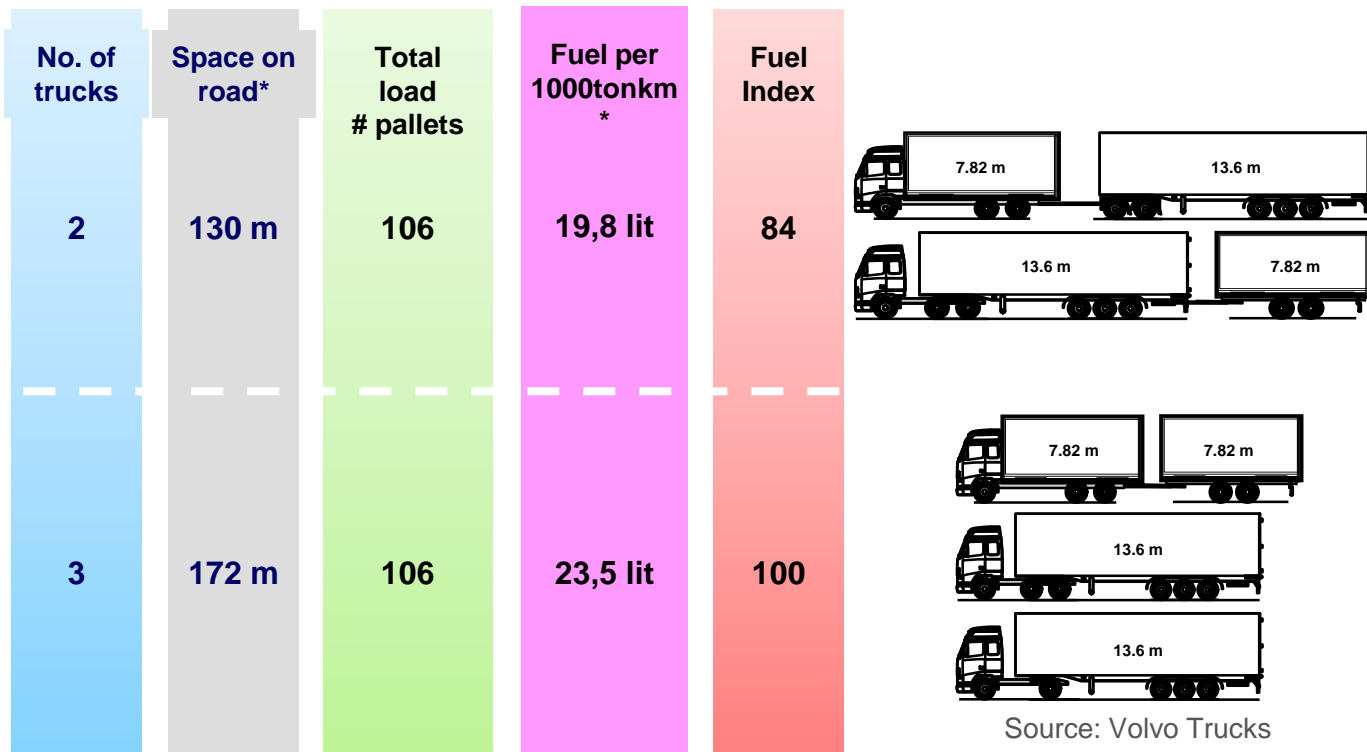
Global Road Safety Partnership Annual Report 2013

Number of vehicles needed

60 Mtonnes cargo 92 km

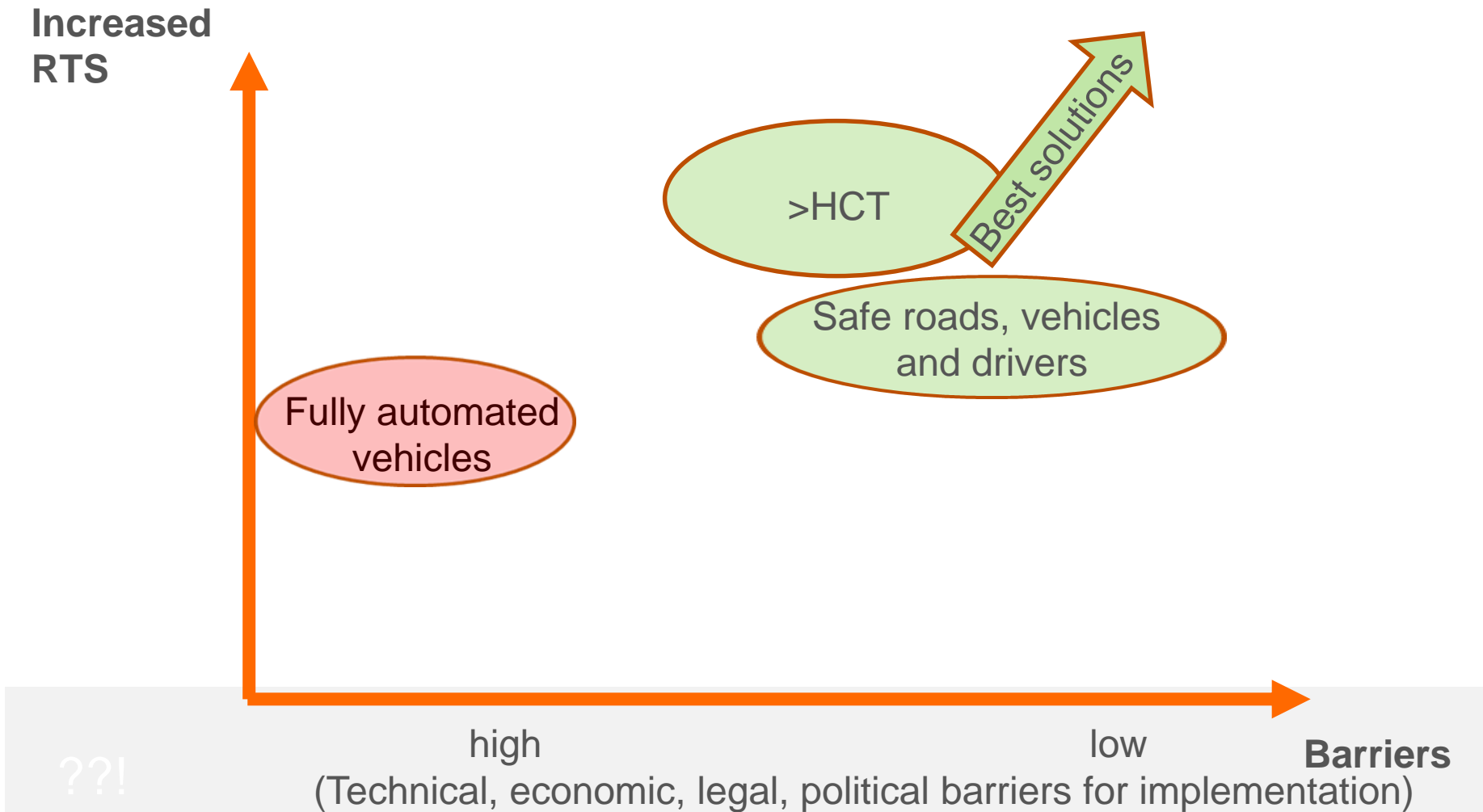


Comparison 25.25 m vehicles to 18.75 / 16.5 m



* Note: Calculated for load = 400 kg per pallet
Safety distance 40 m per truck

RTS- ROAD TRAFFIC SAFETY



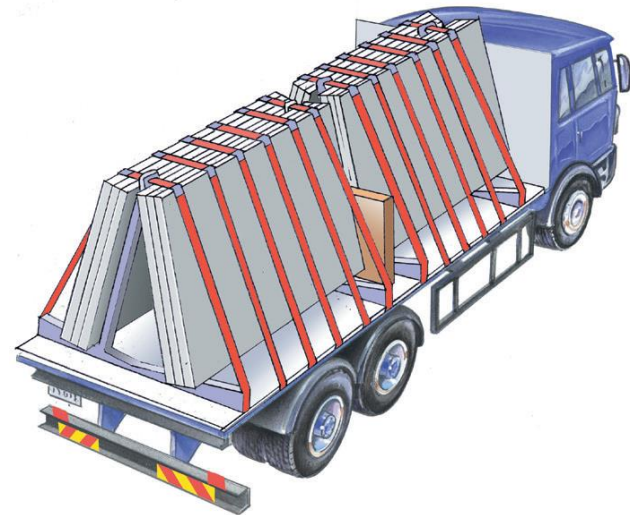
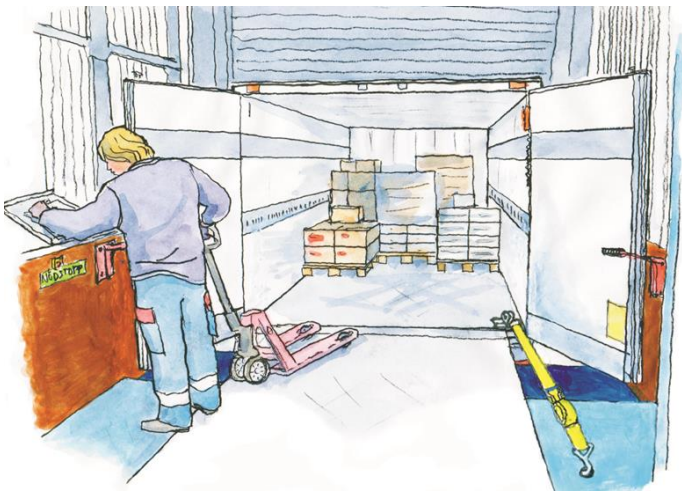
BE AWARE THAT FULLY AUTOMATION IS NOT FEASIBLE



Photo: Axel Öberg

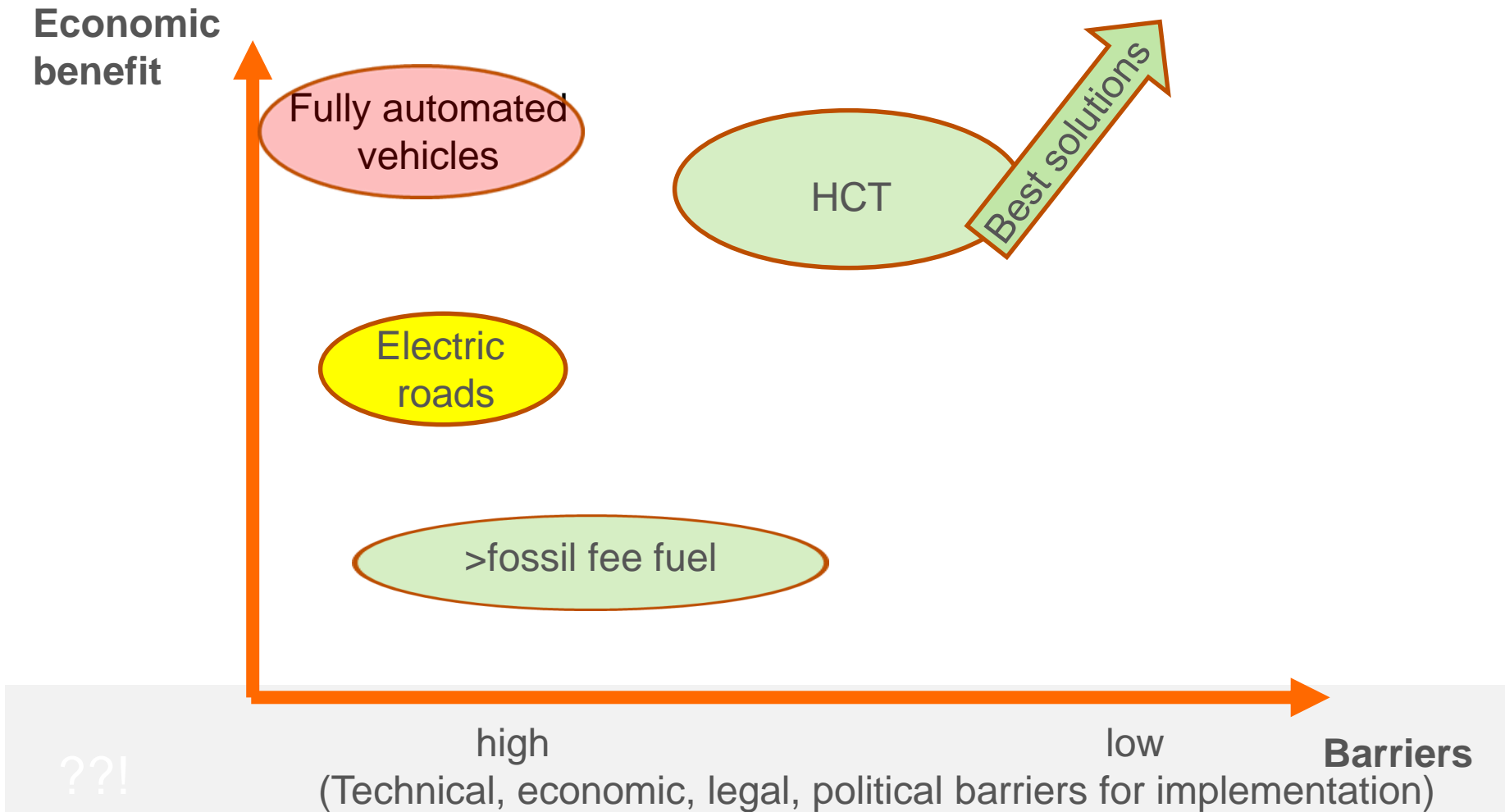


Törnkvist Åkeri AB



IRU International Guidelines on Safe Load Securing for Road Transport

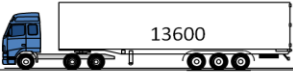




ECONOMIC ROAD FREIGHT



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high low **Barriers**
(Technical, economic, legal, political barriers for implementation)

Capacity comparison

	Gross-weight	Pay-load	Total vehicle length	Length of load area	Load capacity	
					volume (m ³)	EUR-pallets (num.)
	(tonnes)		(metres)			
	40	27	16.5	13.2	90 (100)*	33 (33)*
	40 (44)**	25 (27)**	18.75	14.6	100	36
	60	40	25.25	20.5	140	51
	64 (60)	42 (38)	27	21.9	150	54
	80	56	32	26.4	180	66

ADVICE ON FULLY AUTOMATED ROAD FREIGHT

- What is achieved? - in economy, road safety and climate?
- Handle barriers - lost eye contact, legal issues, accidents, navigation, ADR, property damage, cargo securing, animal collision, driving and rest times, education of other road users, mixed traffic, winter roads.
- Inefficient - platooning, small vehicles means congestions.
- More efficient road transport - HCT, fossil free fuel, logistics, robustness, winter road, flexibility.
- Security –antagonists, hackers, power off, defense policy.
- Step by step, not all but some road freight will be fully automated



THANK YOU!

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