

SUGAR

Low noise products

Off peak deliveries

Goevaers Consultancy
Bologna 26-10-2011

Topics

- Who am I:
- Trends sustainable transport
- 24 hour economy: Need for low noise products
- The PIEK noise limits
- PIEK product development 2001 - 2011
- PIEK Implementation 2004 – 2008
- PIEK certification, why?
- International developments 2003 - 2011

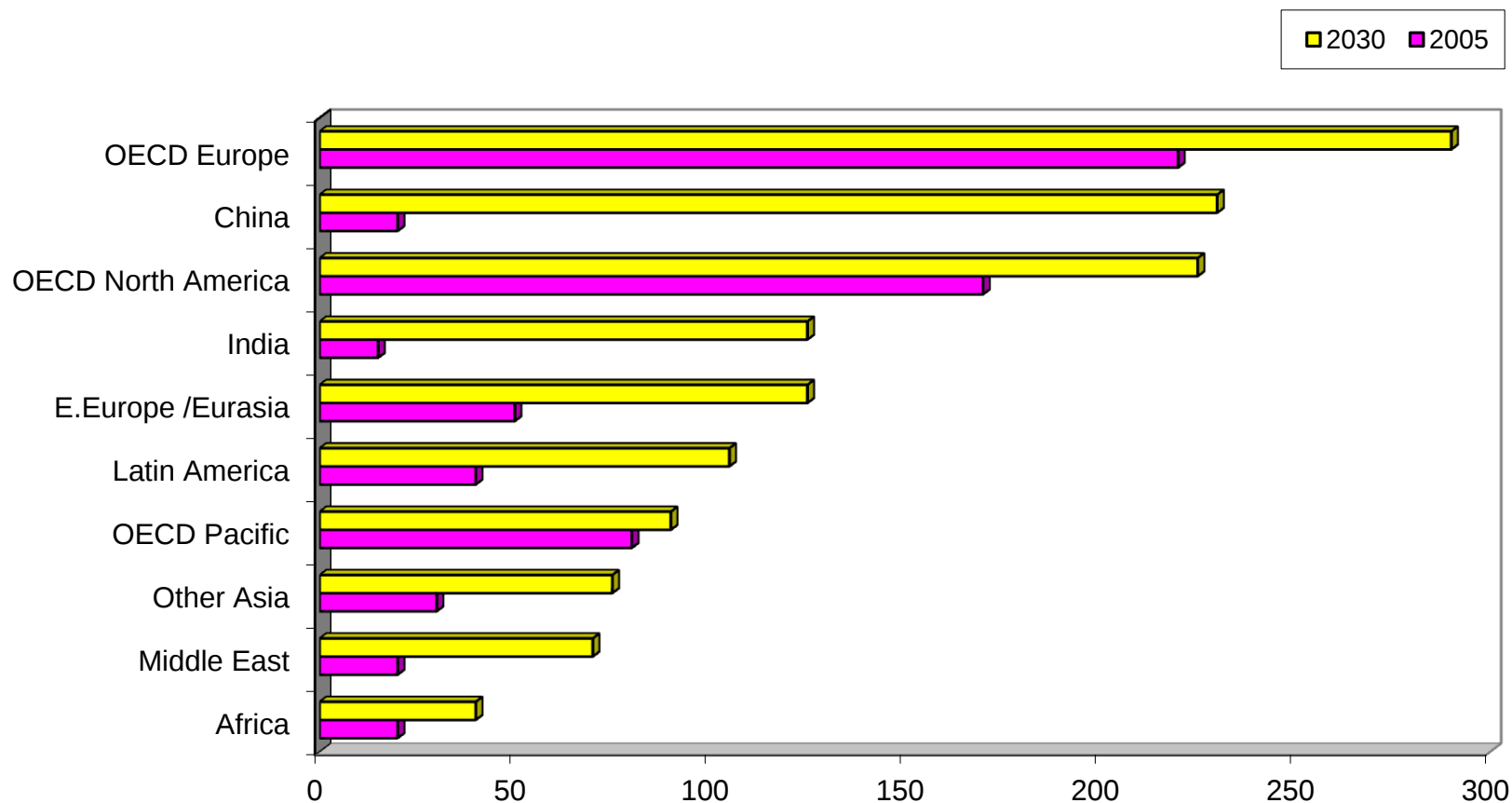
Goevaers Consultancy

- **2001 – 2008: Manager PIEK program**
- **2008 – 2010: Strategy sustainable transport Government NL**
- **2011: RE launch company GC**
 - Business case sustainable transport
 - New engine technology
 - ICT & transport
 - Integrate sustainable transport & municipalities

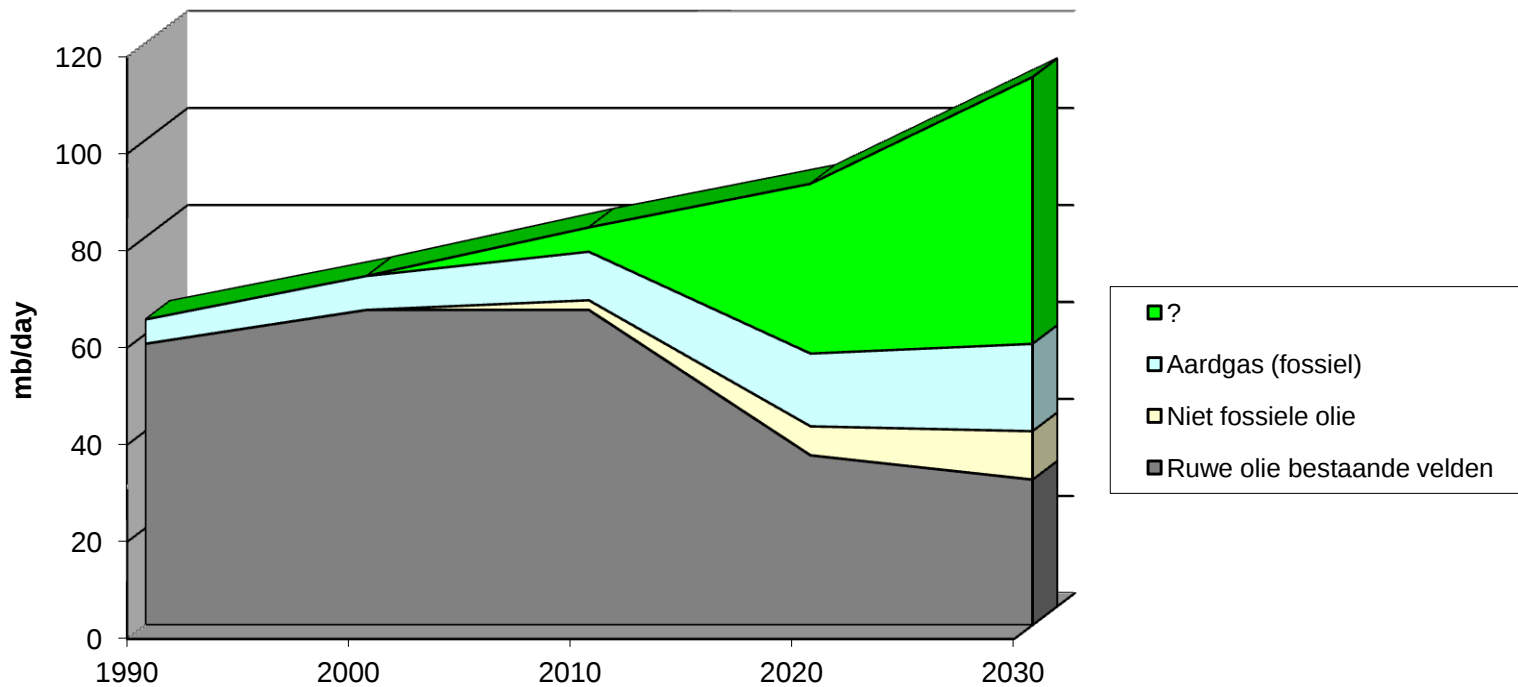
Goals energy strategy transport

- Less dependent on oil → Alternative fuels
- Air quality → cleaner engines
- Climate change →
Reduction CO2 West Europe 80 %

Demand for oil

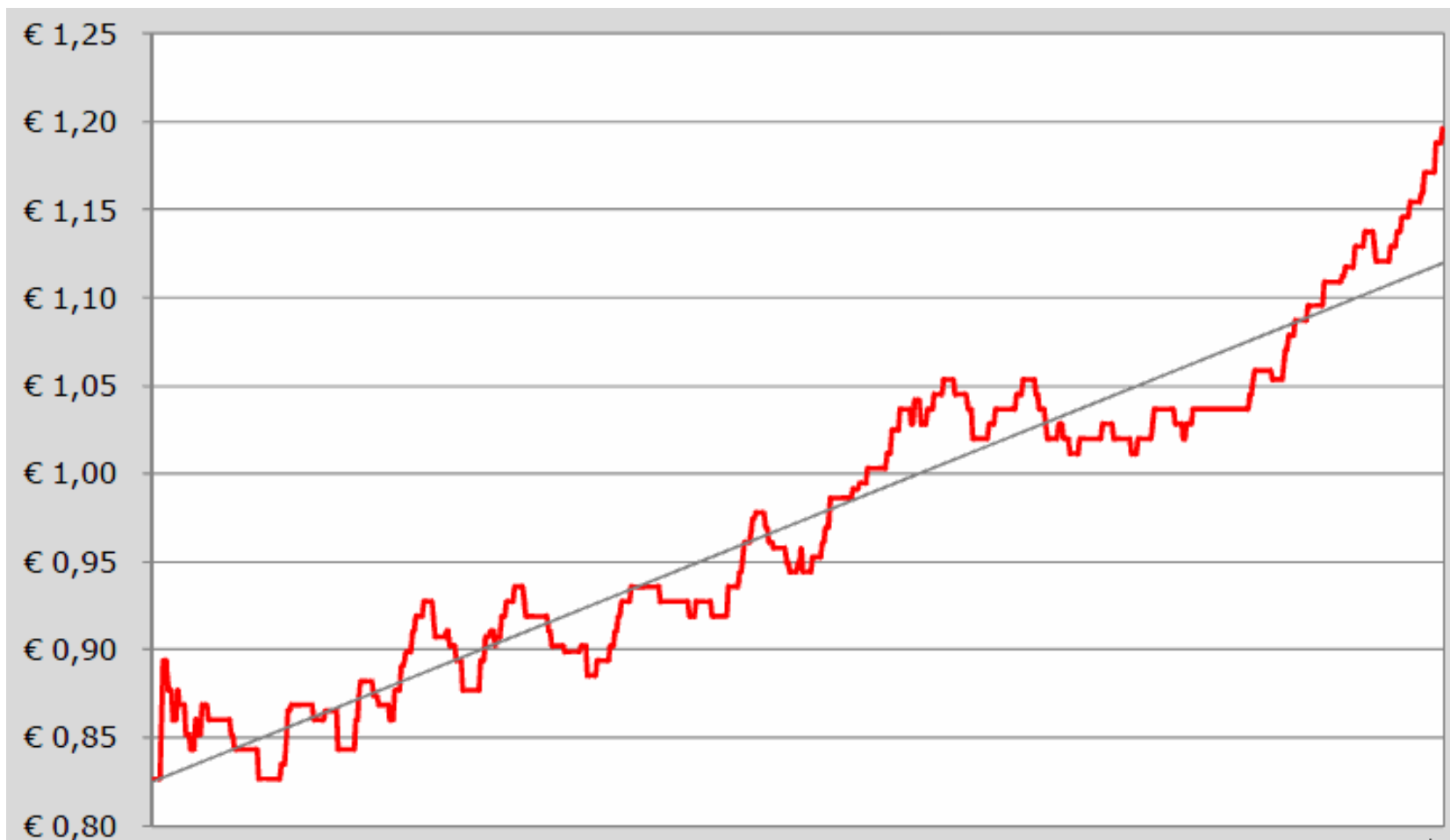


Shortage 2030

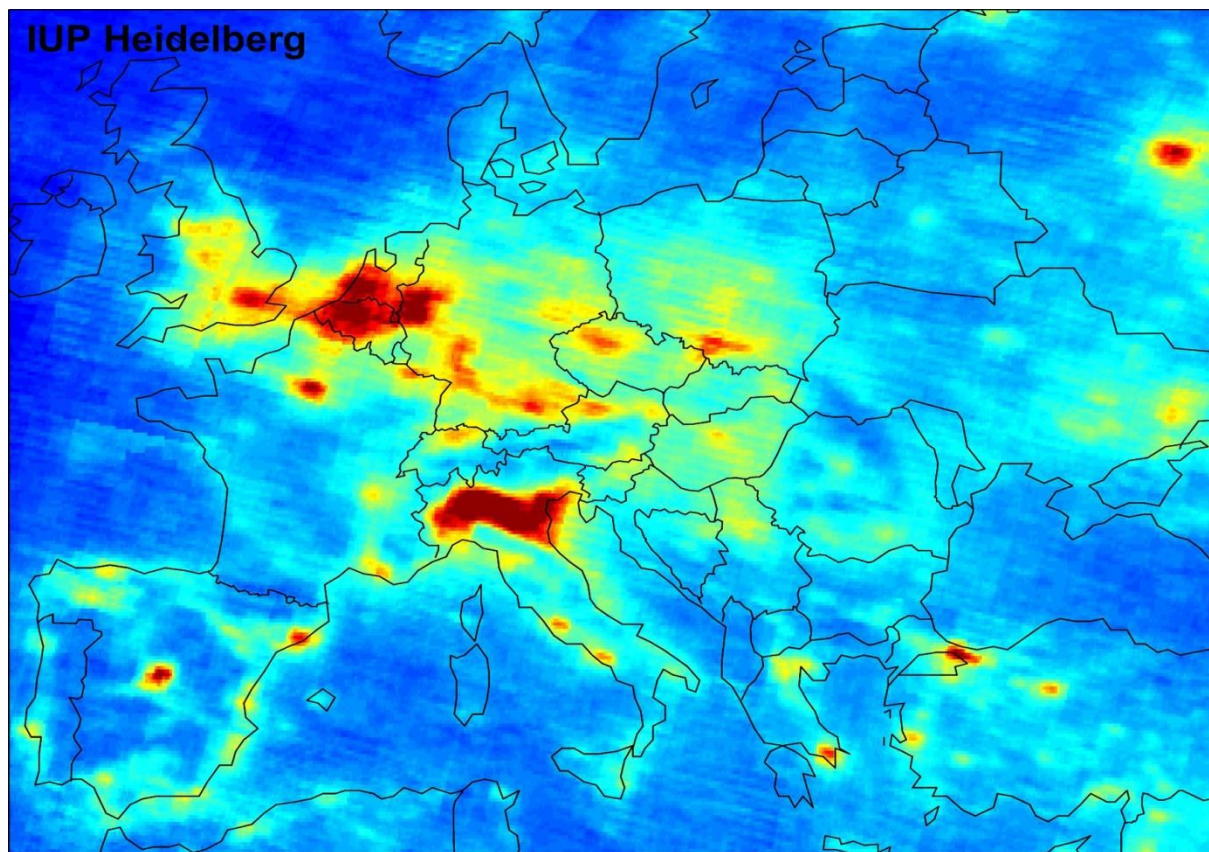


bron IEA WEO 2008

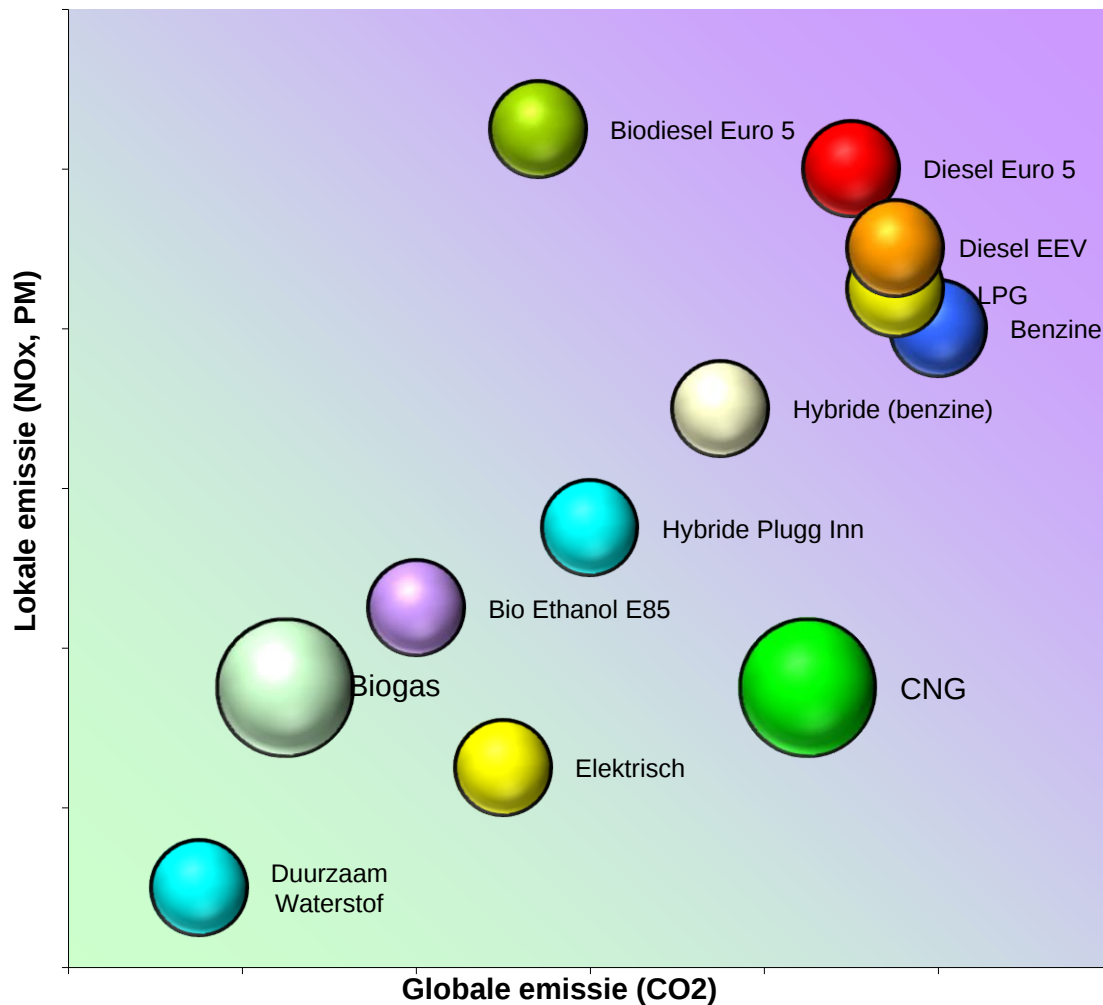
Price of gazoil 2009 - 2011



Air quality in Europe



Alternatives



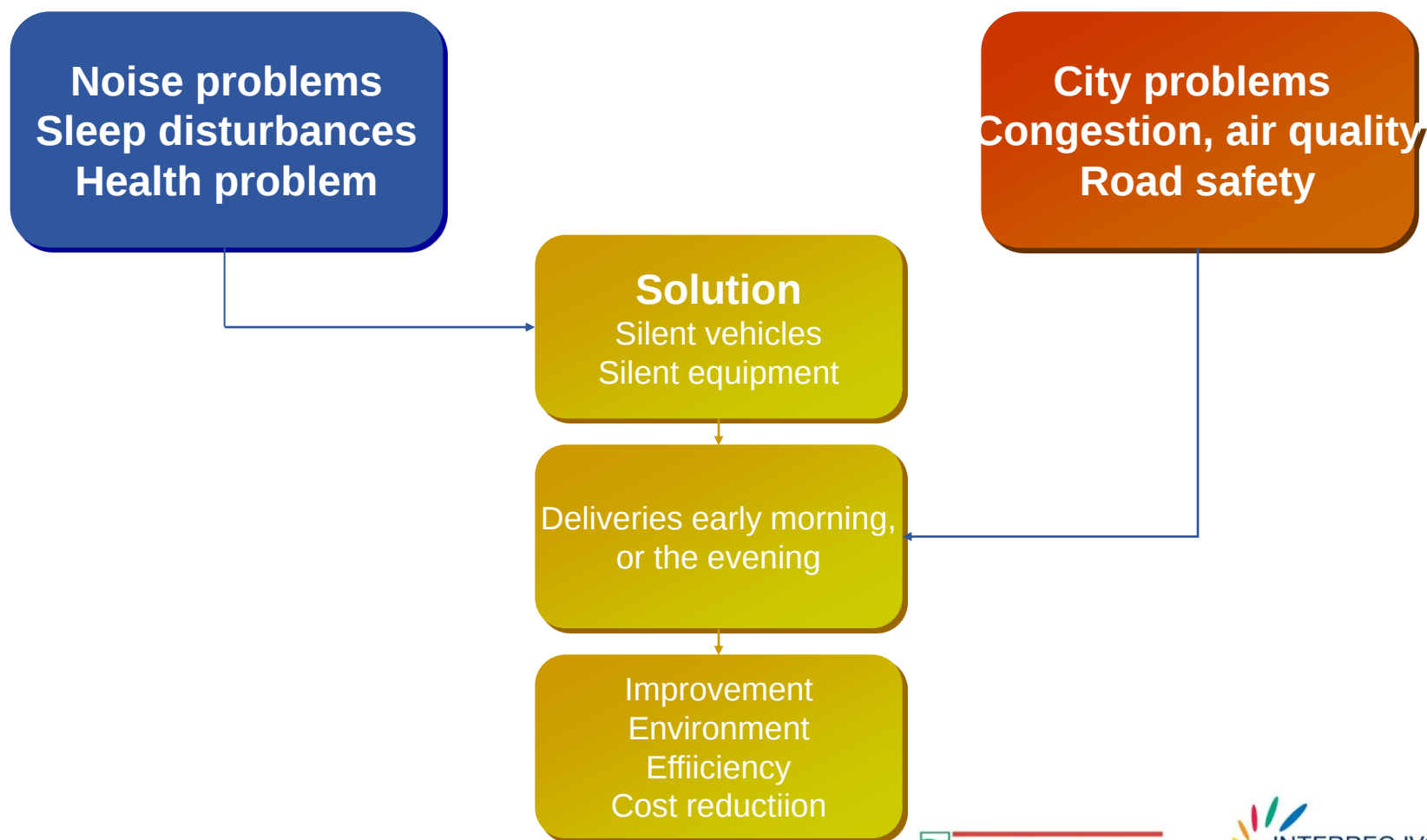
Alternative fuels

Truck fabrikant	Type	Motorinhoud [l]	Vermogen [PK]	Waterstof	CNG Mono-Fuel	LNG Mono-Fuel	LCNG Dual-Fuel	CNG/Diesel Dual-Fuel	LNG/Diesel Dual-Fuel
Scania	P270	9	270		•				
	P310	9	305		•		•		
	P330	9	330		•		•		
Volvo	FL	7	240					•	
	FE	13	340					•	
	FM	13	460						•
MAN	TGM	-	150					•	•
	TGL	-	220					•	•
	TGS	-	320					•	•
	TGX	-	440					•	•
Mercedes-Benz	Econic NGT	7	279		•		•		
	Econic NGT	7	279			•	•		
Iveco	Stralis	8	270		•				
	Stralis	8	330				•		
Renault	Premium/ Midlum	-	300		•				

Sustainable transport

- **Sustainable transport = efficient transport**
- **Truck in congestion: Fuel consumption * 2,4**
- **City distribution: Complex process**
- **Efficient transport = full trucks**
- **Different deliveries in the city:**
 - Internet shopping → small delivery
 - Small shops – small deliveries, more stops
 - Chain related shops – Several addresses, different locations
 - Supermarkets – Large volume, 1 adress
- **PIEK is about large volumes → Big trucks is difficult Unless?**

Aim of the PIEK project

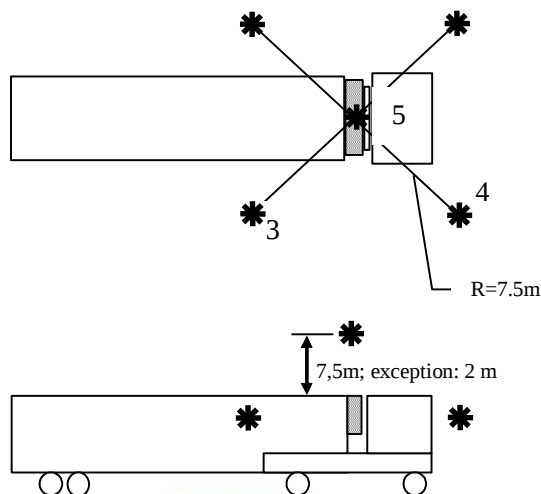
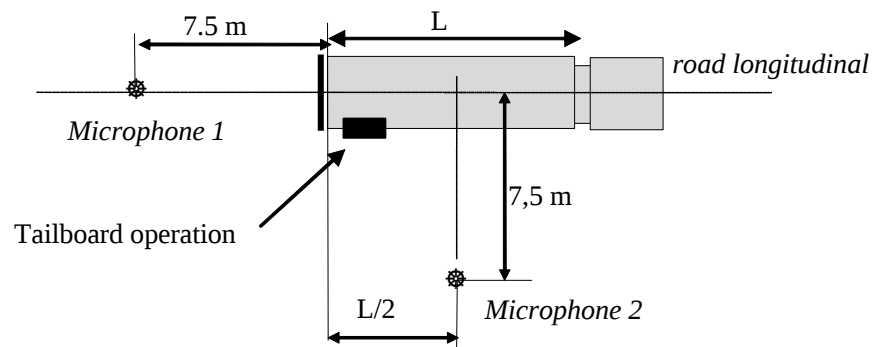
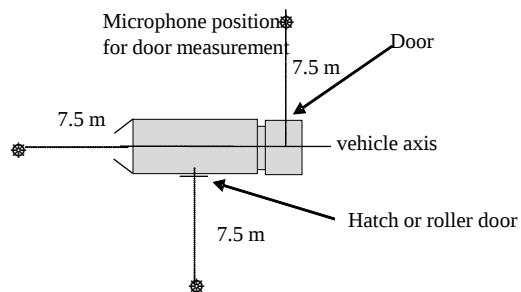


**24 hour economy →
Need to develop low noise products**

PIEK, night time distribution

- In the city we have to:
 - Live
 - Work
 - Shop
 - Recreate
 - Sleep
- Noise reduction in urban environment
- Legislation in the Netherlands (based on WHO)
 - 19.00 - 23.00 : 65 dB(A)
 - 23.00 - 07.00 : 60 dB(A)
- A challenge, a threat an opportunity

PIEK – TNO test procedure



Peak noise without 'quiet' development

	Peak level at 7,5 m in dB(A)
• Slamming door	: 74
• Driving up/away	: 67 – 83
• Load hatch	: 65 – 92
• Containers over load floor	: 74 – 85
• Refrigeration kicking in	: 70 – 78
• Removing onboard forklift	: 77 – 82

PIEK product development 2001 - 2011

Development of silent vehicles

Activities 2001 - 2011

- Encouraging quiet behaviour 2002
- Loading location 2002 - 2004
- Trailer, body 2001 - 2011
- Refrigeration 2001 – 2011
- Roll containers 2010
- Truck, engine driveline noise 2010 - 2011

Encouraging quiet behaviour



Loading and unloading locations



Trailer, body

	dB(A)
• Floor	85
• Wall	74
• Tailgate	83
• Reversing alarm	110

Solutions:

- Coatings, Aluminium floor
- Hydraulic system modification
- Camera,





Aluminium floor



Reversing alarm



Refrigeration

- Noise level: 69 - 74 dB(A)
- Engine, ventilator
- Solutions:
 - Incapsulation
 - Cryogen refrigeration



CO2 refrigeration



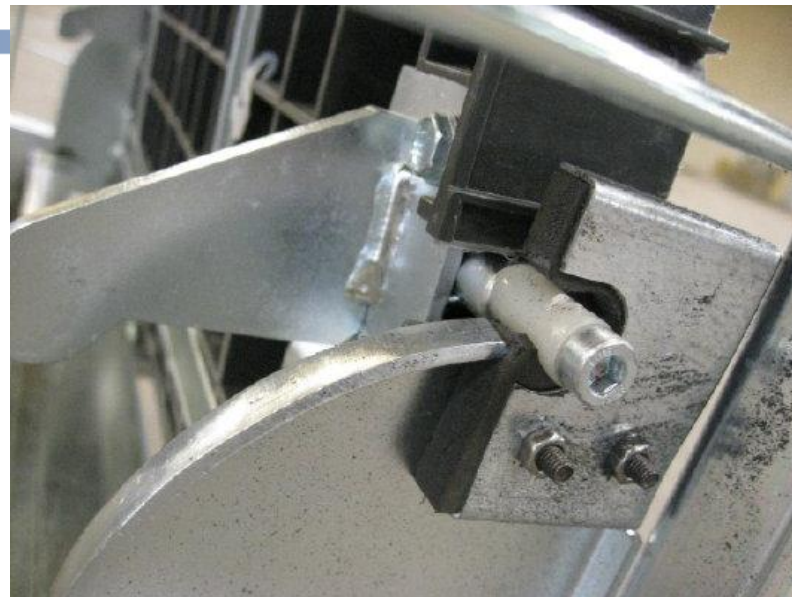
Unloading equipment

- Hand pallet truck
- Roll cage

Problems:

- Wheels, bearings, collision noise
- 92 db (A)

Roll cage 2010

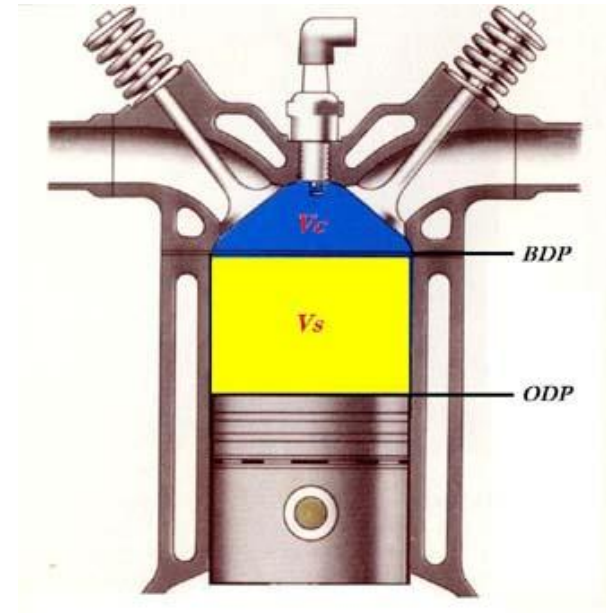


Roll cage 2010



Why is LNG quiet?

- Compression ratio
- Otto vs Diesel
 $(V_c + V_s) / V_c = 1:11$ vs $1:16$
- => Pressure is – 45 %!
- => Noise is 8 by dB(A) reduced



Engine, drive line noise

- Engine
- Gear box
- Brakes

dB(A)

79

68

72

82 dB(a)

Mercedes Econic CLG, LNG



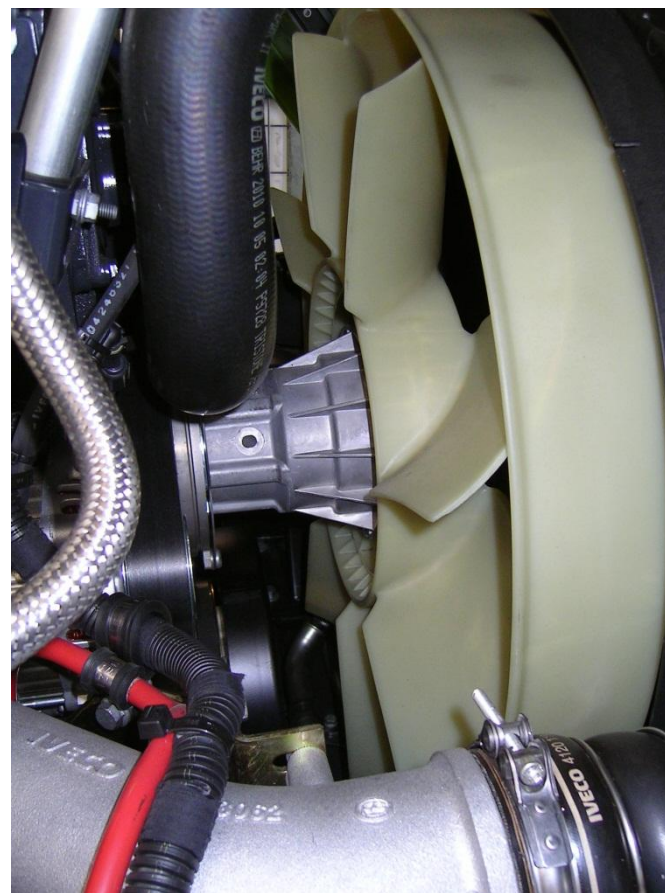
Quiet 72 dB(A)
TRUCK
www.piek-international.com

monitored by
Piek

PIEK light 72 dB(A)

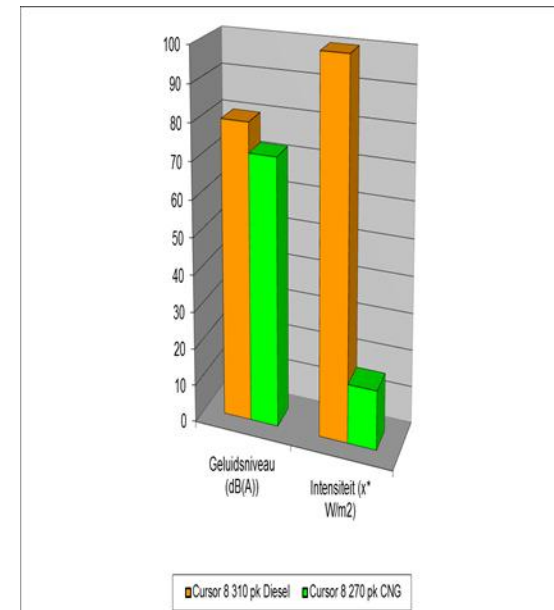


Some details

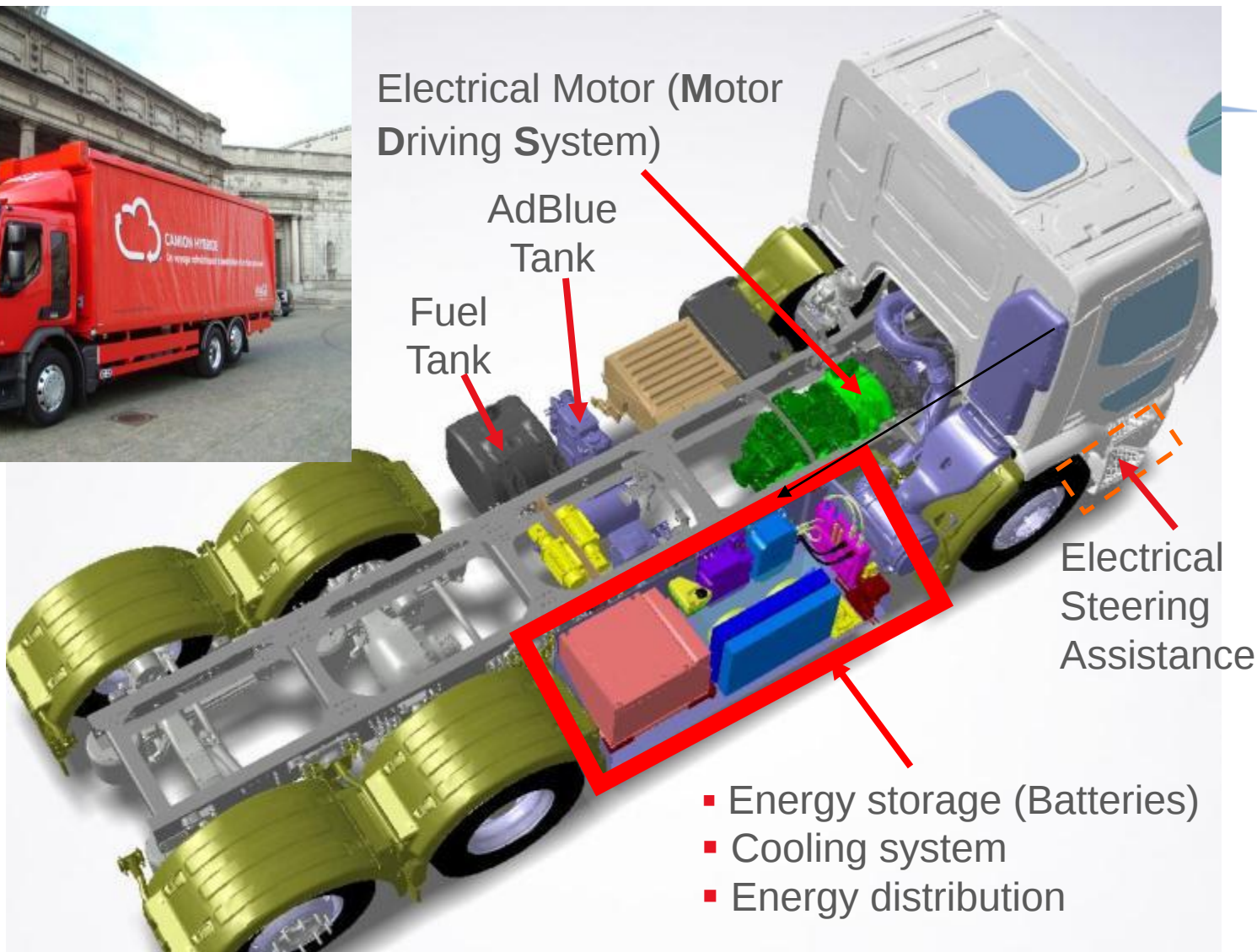


Trucks on CNG

- **PIEK-test**
 - Accelerate 71 dB(A)
 - Brake 72 dB(A)
 - Constant speed 68 dB(A)
 - Reverse 66 dB(A)
- **Max 72 dB(A) < “PIEK-Light”**



INSTALLATION



PIEK Implementation 2004 - 2008

Logistic implementation > 2004

- Companies hesitating to invest
- Traffic congestion problem
- Deliveries < 7.00 0'clock not allowed unless Peak, quiet vehicle
- Noise reduction accomplished → Evening-night distribution option
- Investment quiet equipment + 15 %
- Cost reduction > 20 %?
- Trials Albert Heijn

Albert Heijn

- 7,000 shops
- 230,000 Employees

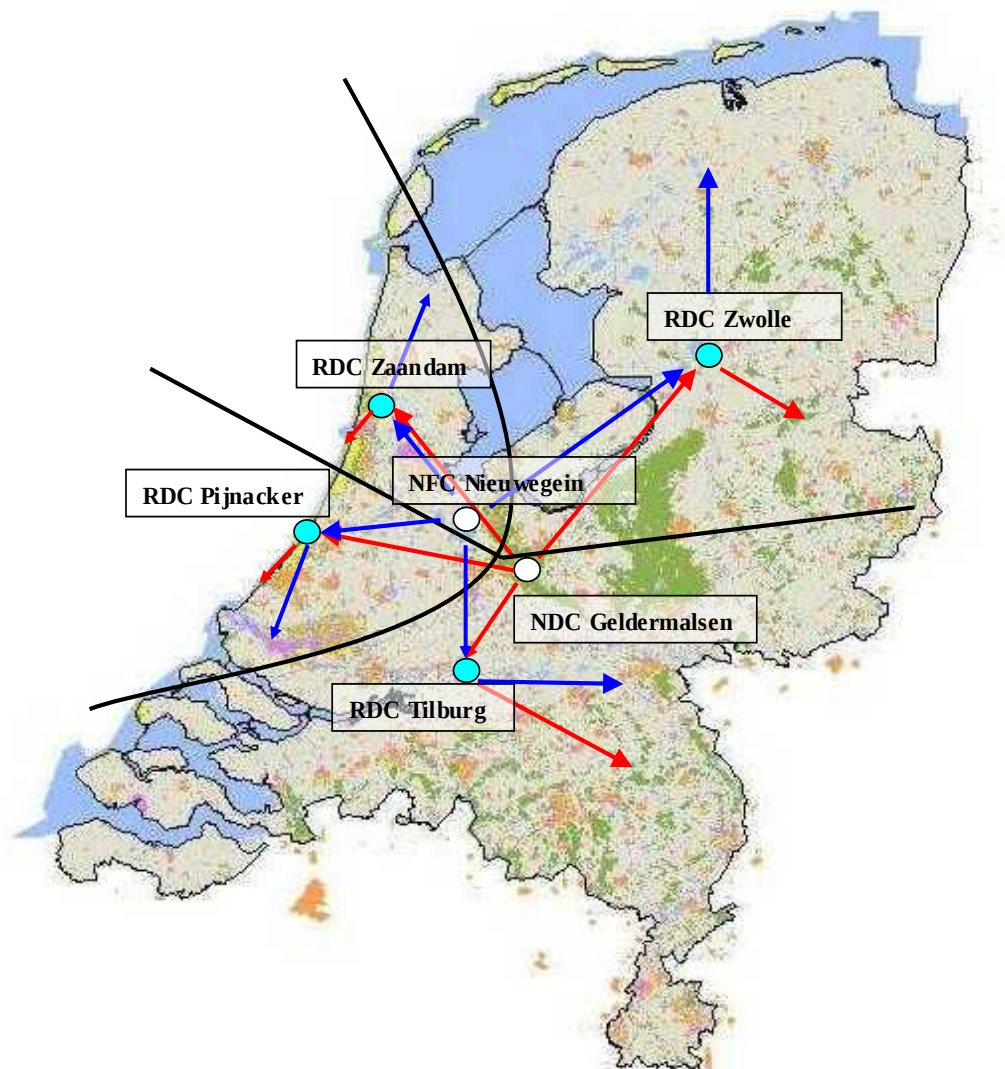
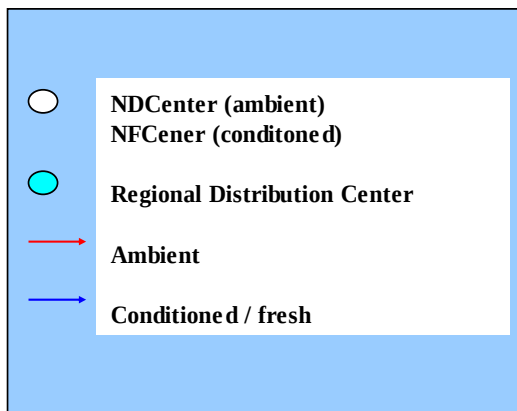


Albert Heijn in Netherlands

- 4 types of shops
- 1700 shops in total
- Turnover 8 billion euro
- 70.000 employees



Distribution center Albert Heijn



Challenge: Congestion and deliveries



Trials 2007

- **Distribution night without noise complaints?**
- **10 shops, 9 cities**
- **1000 Deliveries morning and evening**
- **Trials 3 months**
- **Monitor:**
 - Noise complaints
 - Local environment
 - Greenhouse impact (emission)
 - Logistic improvement
 - Costs

Trials

- **Albert Heijn 5 trials in 2007**
 - Deliveries between 05:00 and 07:00
 - Deliveries between 19:00 and 02.00
 - > 1000 Deliveries, 1 complaint
- **Results**
 - Very positive
 - Less emission (noise and air)
 - Cost-savings
 - » Better usage of capacity
 - » Profits from upgrading Rigid to Euro-trailer
 - » Less jam delays / waiting hours / km's



How to monitor a trial

- Noise
- Logistics
- Environment
- Financially

Delivery early morning Tilburg

Gegevens	Toelichting	Oud	Toelichting Nieuw	
Afstand Eindhoven Tilburg		35		35
Gem reistijd enkele reis in minuten		90		30
Gem verbruik in liters per 100 km		43		33
Afstand per jaar per voertuig	=300*35*2	21000	=300*1035	21000
Gem verbruik in liters per 100 km	analyse Volvo	43		28
Arbeidskosten per uur		25		28
Variabele kosten voertuig per km (ex brandstof)		0,085		0,085
Variabele kosten voertuig per uur (ex brandstof)		15		15
Brandstof kosten per liter		1,15		1,15
Kosten vergelijk				
Brandstof kosten	= 21000/100*43*1	7852,1739	= 21000/100*33*1	7969,5
Voertuigkosten var per km	=21000*0,085	1785	=21000*0,085	1785
Voertuigkosten var per uur	=(90/60)*2*300*15	13500	=(30/60)*2*300*15	4500
Arbeidskosten	=(90/60)*2*300*25	22500	=(30/60)*2*300*28	8400
Totale kosten per jaar		45637,174		22654,5
Milieu vergelijk				
CO2 emissie in kg		24406		18736
HC emissie in kg		0		0
Nox emissie in kg		63		49
PM10 emissie		1		0,7

Delivery evening Rotterdam

Gegevens	Toelichting	Oud	Toelichting	Nieuw
Afstand Avond spits rotterdam		1035		1035
Gem reistijd min		3541		1035
Afstand per jaar per voertuig	=300*1035	310500	=300*1035	310500
Gem verbruik in liters per 100 km		60		28
Arbeidskostenper uur		25		28
Variabele kosten voertuig per km (ex brandstof)		0,085		0,085
Variabele kosten voertuig per uur (ex brandstof)		15		15
Brandstof kosten per liter		1,15		1,15
Kosten vergelijk				
	=			
Brandstof kosten	310500/100*60*1,15	214245	= 310500/100*28*1,15	99981
Voertuigkosten var per km	=310500*0,085	26392,5	=310500*0,085	26392,5
Voertuigkosten var per uur	=(3541/60)*300*15	265575	=(1035/60)*300*15	77625
Arbeidskosten	=(3541/60)*300*23	442625	=(1035/60)*300*28	144900
Totale kosten per jaar		948837,5		348898,5
Milieu				
CO2 emissie in kg		502572		234732
HC emissie in kg		6		6
Nox emissie in kg		1304		609
PM10 emissie		19		9

Larger vehicles in the night

Exchange rigid for city trailer

Gegevens	Toelichting	Oud	Toelichting Nieuw	
Type voertuig		FM 11 liter euro V		FH 13 liter euro V
Gem reistijd enkele in minuten	56 - 72 min enkele reis	120	40 min	80
Gem verbruik in liters per 100 km		43		33
Afstand per jaar per voertuig(en)	=300*25*2*2	30000	=300*25*2*1	15000
Arbeidskosten per uur		25		28
Variabele kosten voertuig per km (ex brandstof)		0,085		0,115
Variabele kosten voertuig per uur (ex brandstof)		13		15
Brandstof kosten per liter		1,15		1,15
Kosten vergelijk				
Brandstof kosten	= 30000/100*43*1,15	14835	= 15000/100*30*1,15	5692,5
Voertuigkosten var per km	=30000*0,085	2550	=15000*0,0115	1725
Voertuigkosten var per uur	=(120/60)*2*300*13	15600	=(80/60)*1*300*15	12000
Totaal		32985		19417,5
Milieu				
CO2 emissie in kg		184920		60840
HC emissie in kg		3		1
Nox emissie in kg		421		158
PM10 emissie		6		2

Replace 1000 vehicles in 2010

PIEK implemented in 50 cities

1400 PIEK deliveries per week



Lessons learned

- Where to start
 - Low noise products are more expensive
 - Why would you buy a low noise product?
 - What is the ROI on low noise product?
-
- Assess stakeholders
 - Find opportunities for each stakeholder
 - Transform noise advantage into advantages for each stakeholders

Define the stakeholders

-

Opportunities, threats manufactures PIEK equipment

-

Opportunities, threats shipper

-

Opportunities, threats transport operator

-

Opportunities threats, city (per interest group)

-

Opportunities, threats residents

-

PIEK certification, why?

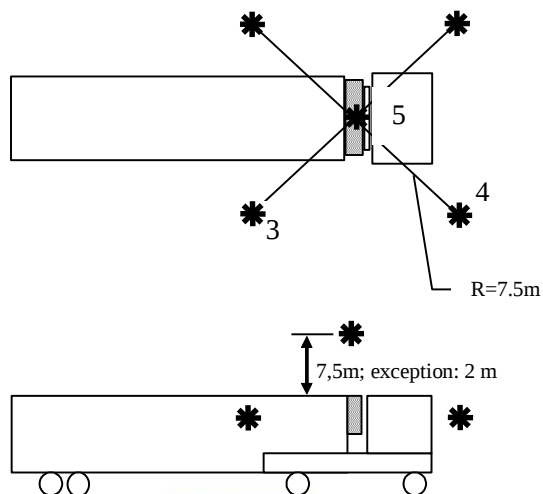
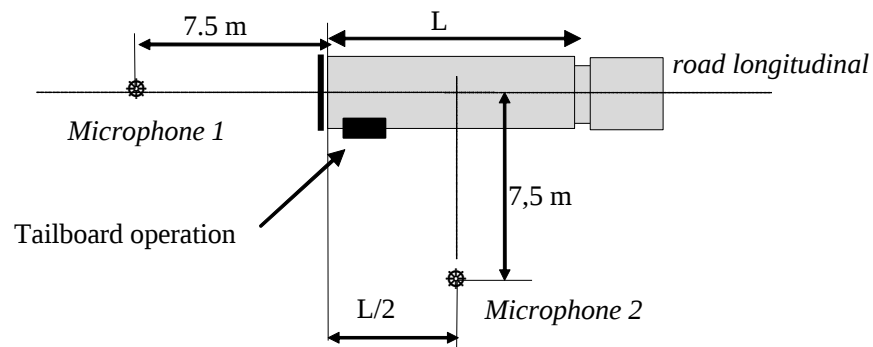
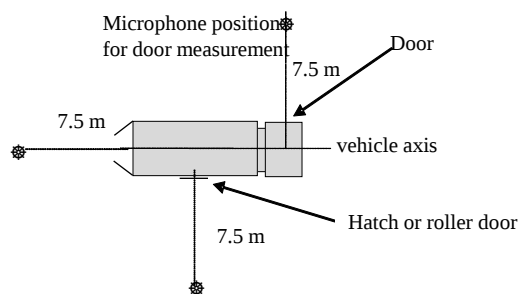
The need for Certification PIEK

- Night time deliverance only allowed for low noise vehicles
- The deliver in the evening/night assurance it is done by low noise vehicle
- PIEK is unique selling points → competitive advantage: protect the PIEK brand
- PIEK = sustainable urban freight delivery

Components certification

- Total approach: The whole trailer is tested
- Component approach trailer
The individual products are certified
- Noise levels assessment (TNO protocol)
- All registered products : www.piek-international.com
- Confirmation of production
- All products recognizable by PIEK logo

PIEK – Test protocol TNO



First PIEK certificate 2005



Products, suppliers PIEK certified

2008

- 27 trailer manufactures
- 18 component manufactures
- 1400 PIEK certified products sold

2009

- 27 trailer manufactures
- 24 component manufactures
- 1400 PIEK certified products sold

2010

- 38 trailer manufactures
- 24 component manufactures
- 1778 PIEK certified products sold

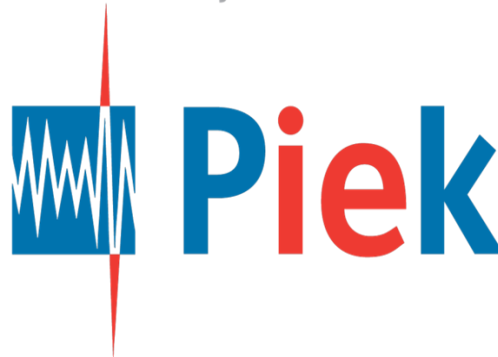
2011 (Septemer)

- 1702 PIEK certified products sold

Products, suppliers PIEK certified



monitored by



Countries certification PIEK

- **England: Noise Abatement Society**
- **France: Cemafricaid**
- **Belgium:Universite d'Anvers**
- **Germany: TUV**
- **Netherlands: Stichting PIEK-keur (RAI, FOCWA)**
- **Ireland: Dublin Institute of Technology**

International developments 2003 - 2011

Why international development is crucial?

- Source approach
- Truck industry is international
- Level playing field
- Sustainable transport is European problem
- Congestion is a world wide problem
- Standardization
- Same rule, bigger market

Why international development is crucial?

- Source approach
- Truck industry is international
- Level playing field
- Same rule, bigger market
- Low noise truck
- PIEK noise standard in Europe

Ireland 2003



England 2006

- Noise Abatement Society
- Transport for London
- FTA
- Sainsburys
- Tesco
- Carrier (John Connel 2007)
- Gray & Adams
- EcoFridge
- Brigade
- Dhollandia
- ThermoKing
- EcoFridge
- TDS (John Connel 2009)



Equipment UK 2007, 2008





France 2008



Trials in Paris



Lamberet, DHL, Casino



Congres Renault 12 mei

McDonalds tests in Lyon



IAA Hanover Germany 2008



ELASTROGAN GMBH



Made possible by the INTERREG IVC programme

Belgium

- Colruyt 2008
- Cooperation university Antwerp
- 10 Trials September 2010
- Evaluation



PIEK partners in Europe



- **Netherlands: Stichting PIEK-keur (RAI, FOCWA)**
- **United Kingdom: Noise Abatement Society**
- **France: Cemafrroid**
- **Belgium: Universite d'Anvers**
- **Germany: TÜV**
- **Ireland: Dublin Institute of Technology**
- **Italy: Research institute Romanga ?**
- **Denmark: Danisch Technical Institute ?**
- **Spain: AECOC ?**



Activities scheduled 2011, 2012

Denmark

- Roll cage development
- Cooperation Spar, Ikea
- Trials 2011

Italy, Spain?

- Iveco: CNG PIEK trucks on market 2010
- Industry is interested
- Trials 2012?

New York

- Proposal prepared
- Trials 2012?

EU IEE

- Proposal prepared

More information

- www.piek-keur.nl
- www.piek-international.com
- E-mail: [**g_c@telfort.nl**](mailto:g_c@telfort.nl)
- **0031-6-23656402**



Robert Goevaers

Name: **Robert Goevaers**

Company: **Goevaers Consultancy**

Company info:

Goevaers Consultancy (GC) is a company specialized in the development of business models for sustainable transport.

Most shippers and transport operators want to be involved in sustainable transport but often don't know how to make an investment in sustainable technologies worthwhile.

GC is specialized in how to implement new technologies such as low noise technology, electrical propulsion, gas technology, hybrid technology' in combination with new logistic models.

GC has a European network with the truck industry, shippers, transport operators and cities in order to support the implementation of sustainable transport.

Working experience

- 2010 - 2008 Mr Goevaers worked in the past for the government responsible for sustainable transport strategy of the Netherlands 2020 / 2050
- 2008 - 2006 Responsible for implementation of Off peak deliveries with low noise equipment in France, Belgium, Germany, Spain, UK, Ireland, Denmark and Sweden
- 2006 / 2003 Development of low noise technologies and the implementation of sustainable low noise equipment logistics
- 1998 / 2003 Implementation of quality management of transport operators and shippers on behalf of the IRU.

Background: Studies, Career, Hobbies...additional items you would like to share:

Robert graduated from the University of Tilburg with a MSc. in Economy in 1987. In 1993 he earned the title of scattered controller in finance from the University in Amsterdam.

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