

SUGAR

PIEK: Low noise solutions

Night time deliveries

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Barcelona 26-5-2010

Topics

- **Who am I: Platform sustainable transport**
- **24 hour economy: Need for low noise products**
- **The PIEK noise limits**
- **PIEK product development 2001 - 2004**
- **PIEK Implementation 2004 – 2008**
- **PIEK certification, why?**
- **International developments 2003 - 2010**

Platform sustainable transport

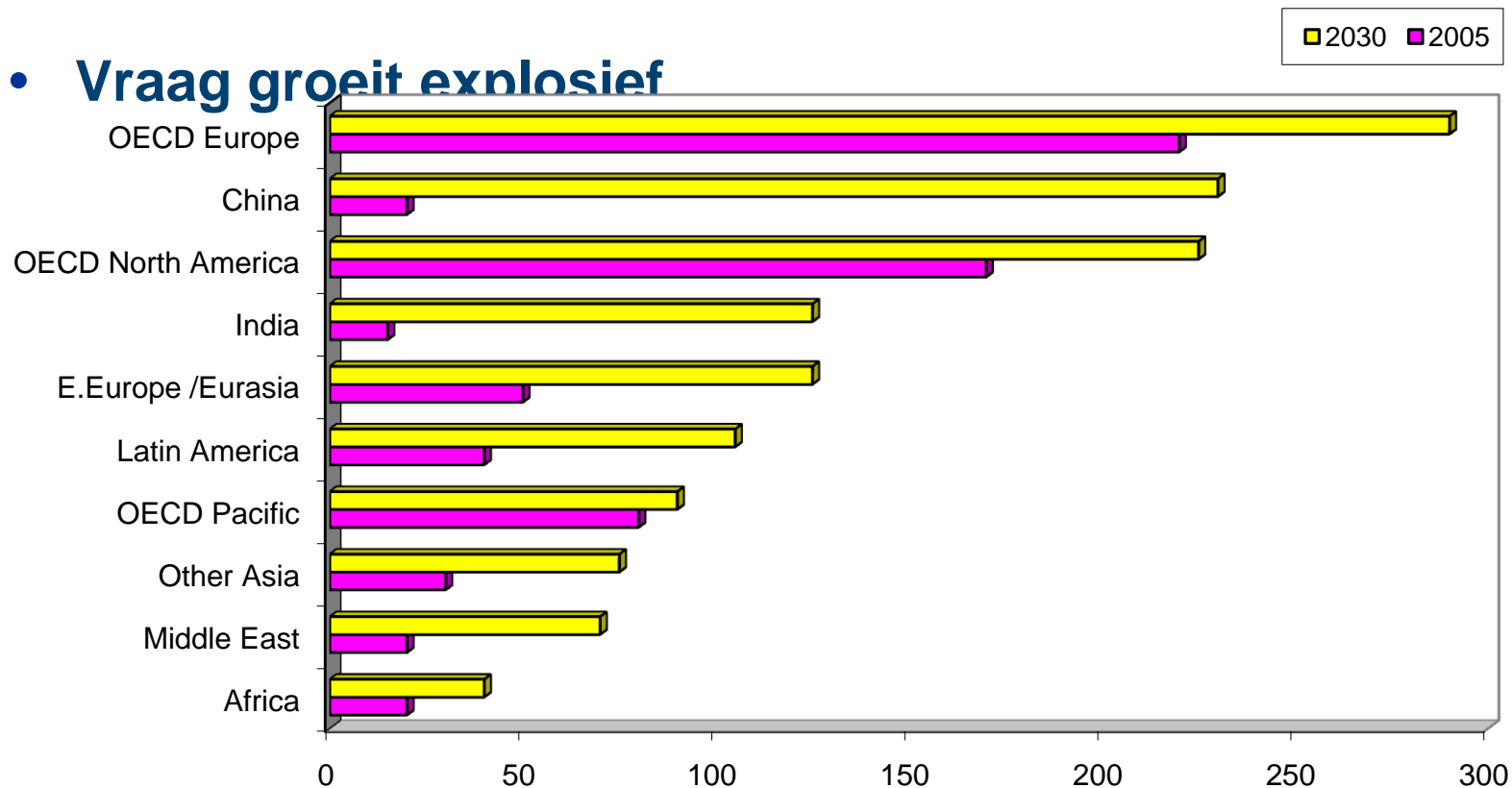
- **Public Private Enterprise**
- **6 departments: Environment, Transport**
- **10 companies Shell, Philips, DSM, Schiphol, Rotterdam**
- **5 platforms**
- **Energy strategy Netherlands 2025 – 2050**

Goals energy strategy transport

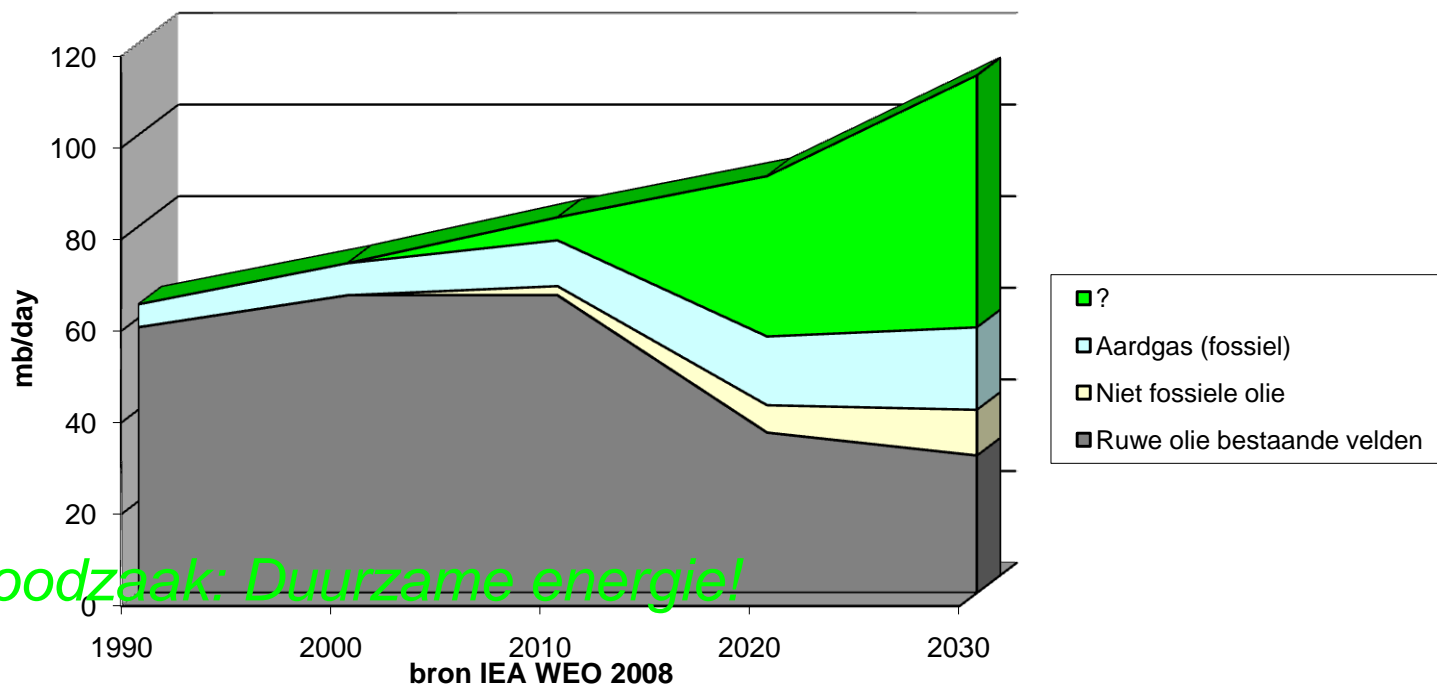
- Less dependent on oil →
- Climate change →
Reduction CO2 West Europe 80 %
- Create changes Dutch economy

Demand for oil

- Vraag groeit explosief**

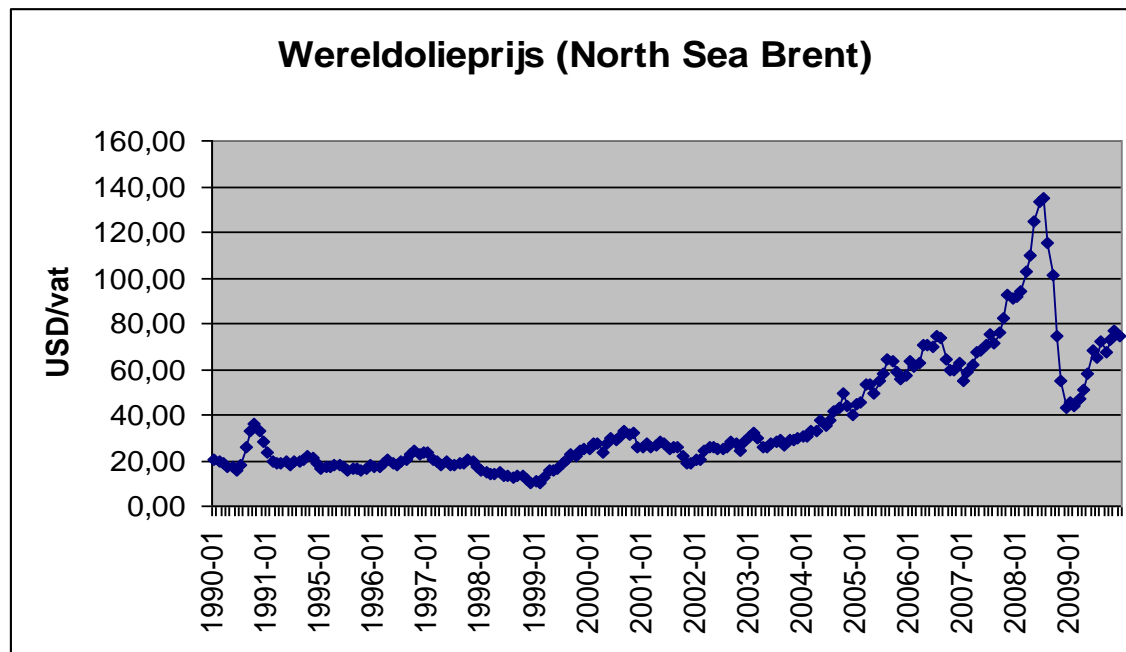


Shortage 2030

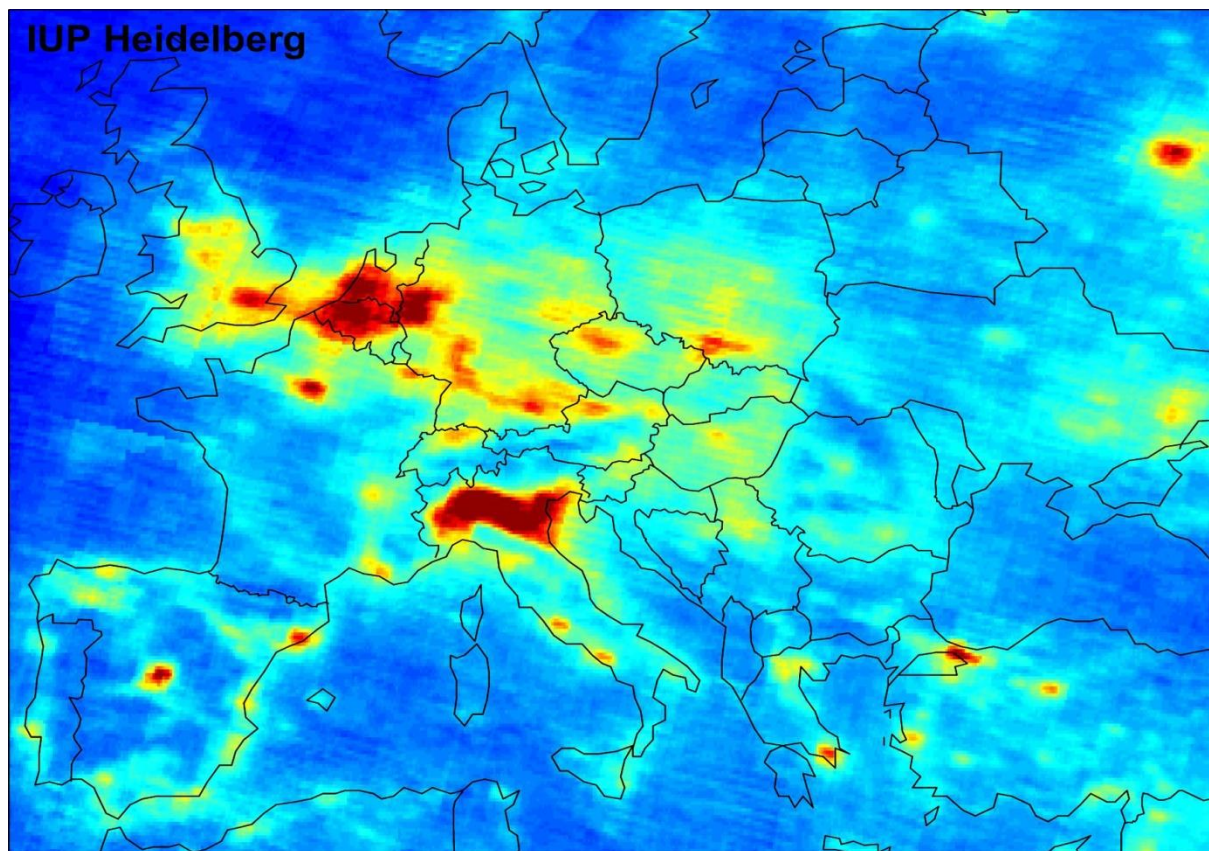


Noodzaak: Duurzame energie!

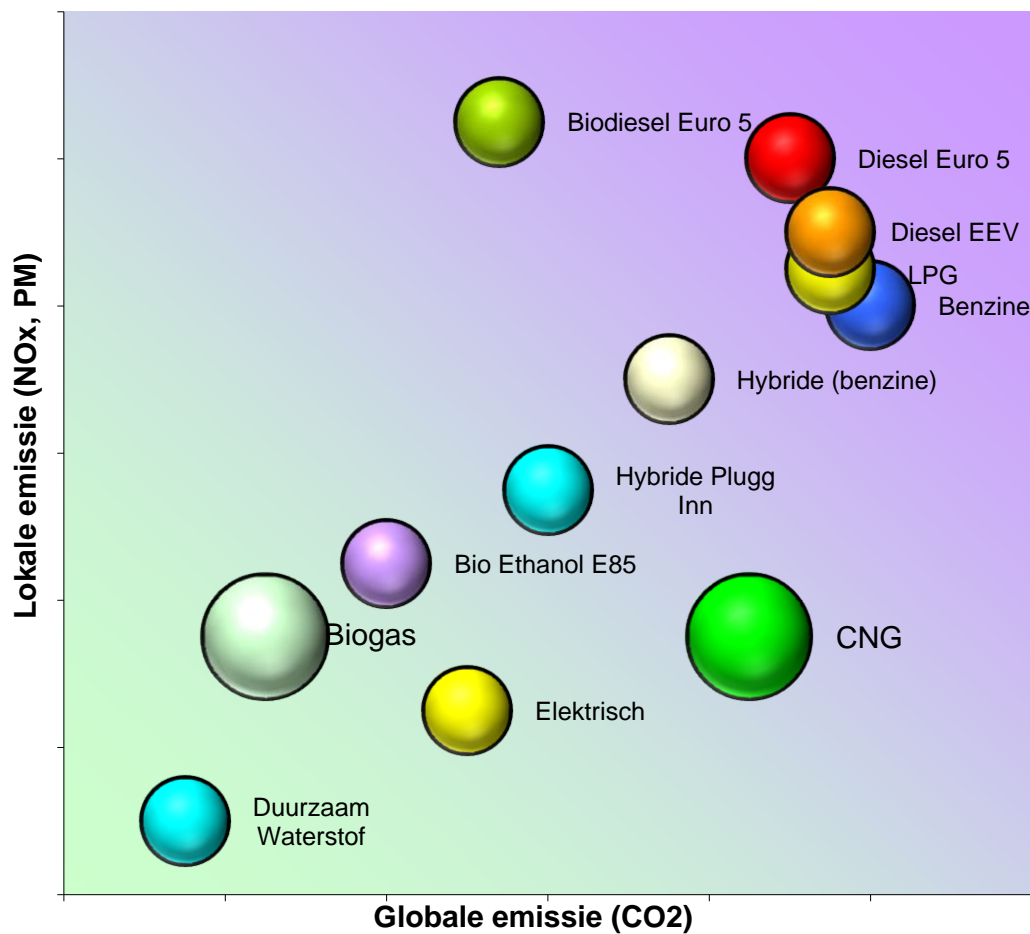
Development price of oil



Air quality in Europe

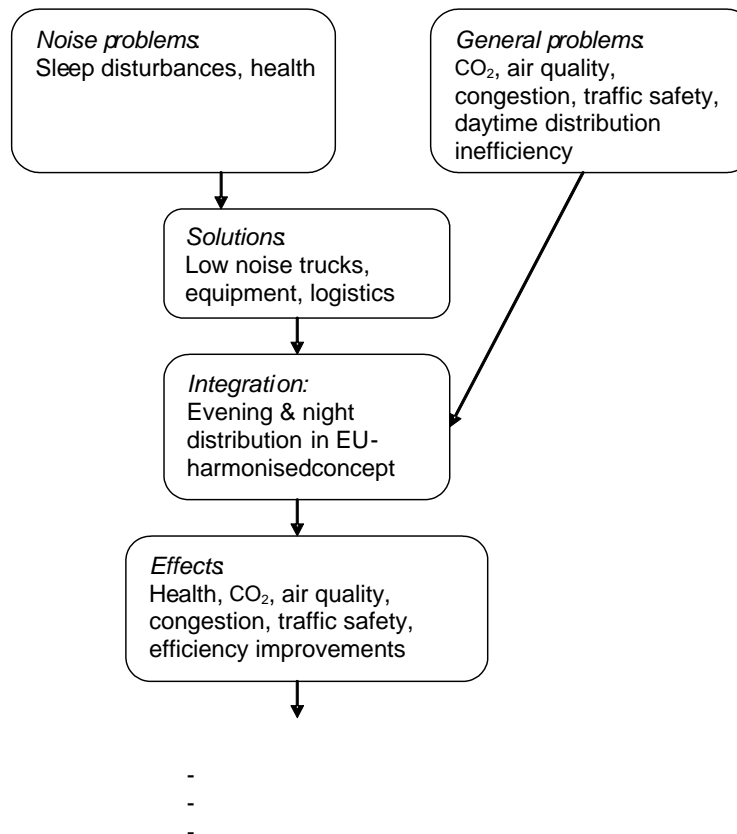


Alternatives

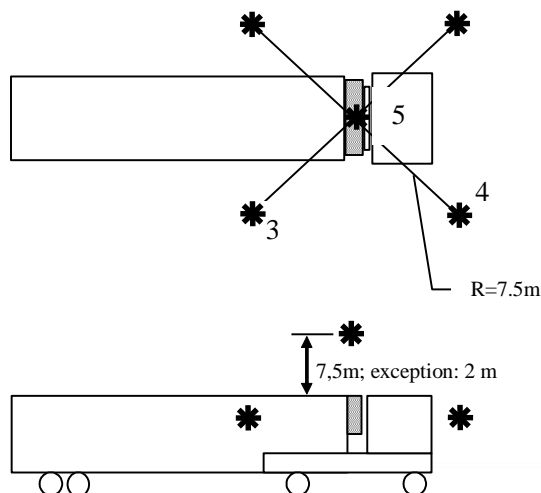
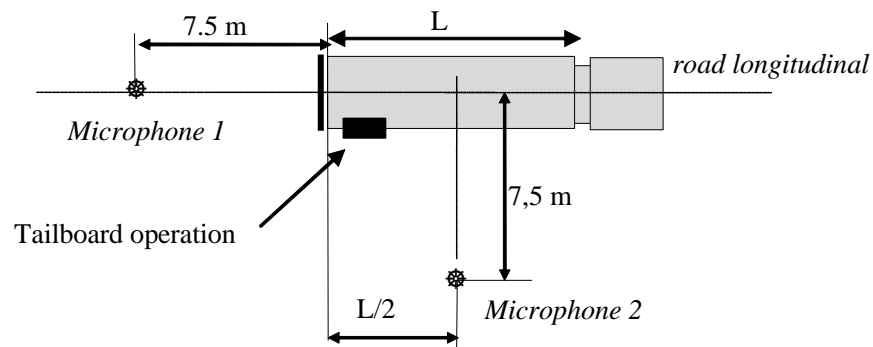
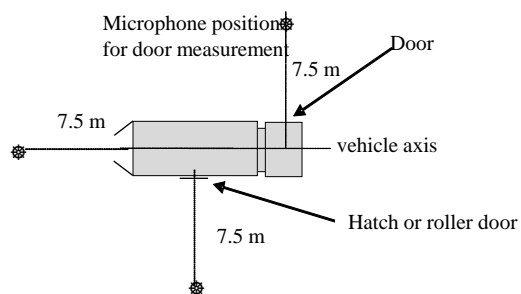


24 hour economy → Need to develop low noise products

Basic idea behind the PIEK project



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, 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 product development 2001 - 2004

A blue-toned line drawing of a warehouse interior. It shows a large open space with a grid floor, several forklifts, and a truck parked near a loading dock. The drawing is positioned at the top left of the slide.

Development of silent vehicles

Activities 2001 - 2004

- Encouraging quiet behaviour
- Loading location
- Truck
- Trailer, body
- Refrigeration
- Roll containers

Encouraging quiet behaviour



Loading and unloading locations



Engine, drive line noise

	dB(A)
• Engine	79
• Gear box	68
• Brakes	72

Solutions:

- PRM limiter
- Incapsulation
- Motor management
- Automatic gearbox

Truck driveline < 65 dB(A)



Electric propulsion Amsterdam Nimwegen 50 vehicles



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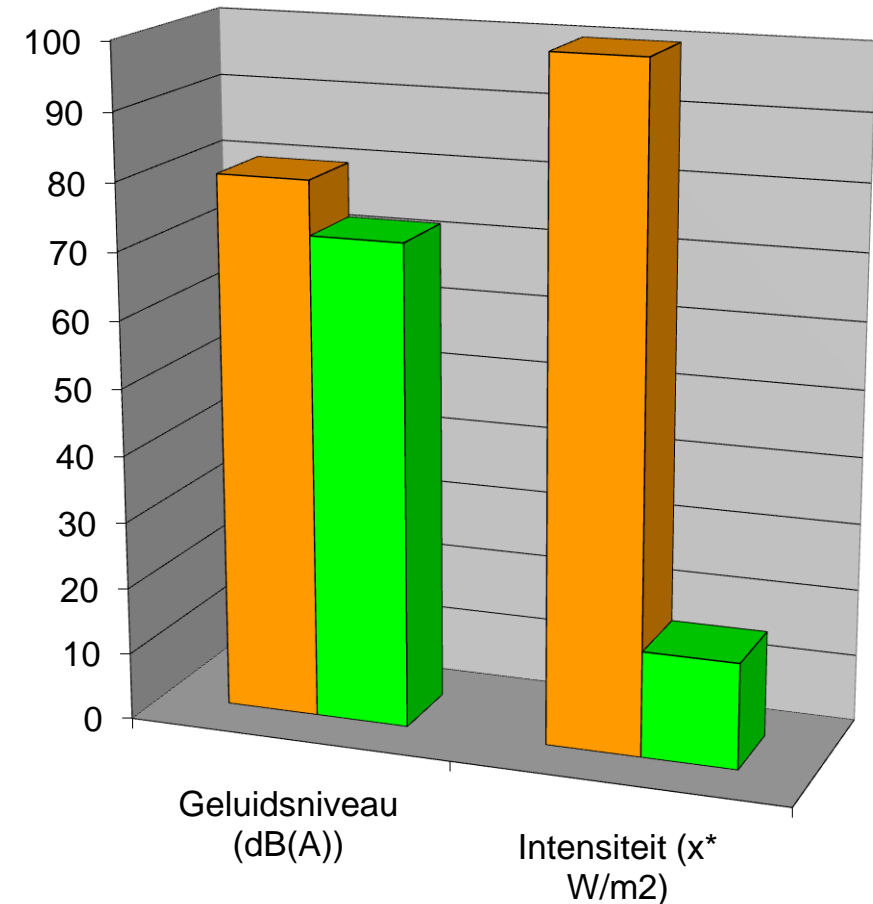
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Trucks on

- **PIEK-test**
 - Accelerate 7
 - Brake 72 dB
 - Constant sp
 - Reverse 66
- **Max 72 dB(A)**



■ Cursor 8 310 pk Diesel ■ Cursor 8 270 pk CNG

PIEK light 72 dB(A)



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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:
 - Incapsuation
 - Cryogen refrigeration



CO₂ refrigeration

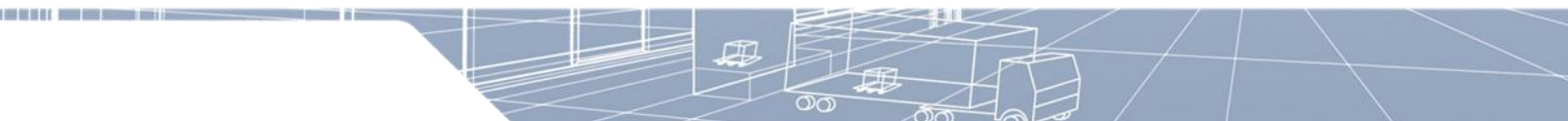


Unloading equipment

- Hand pallet truck
- Roll cage

Problems:

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



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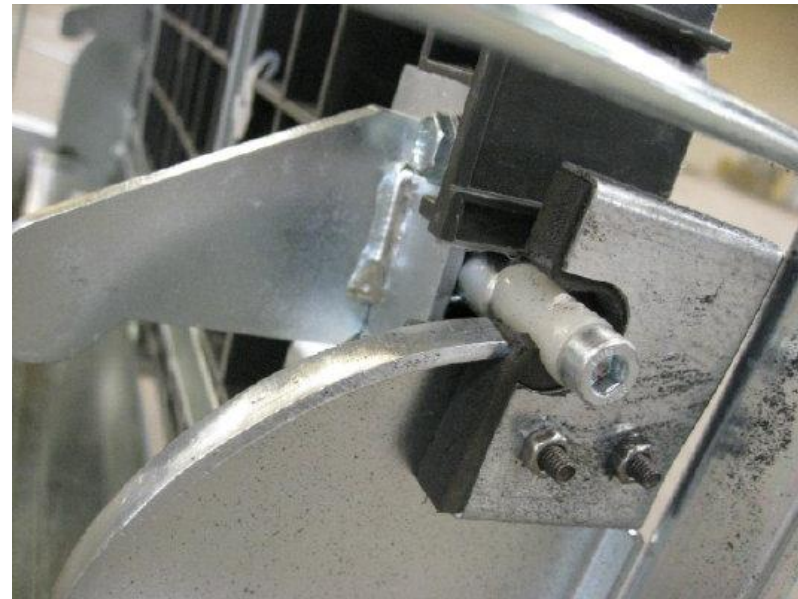
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Roll cage





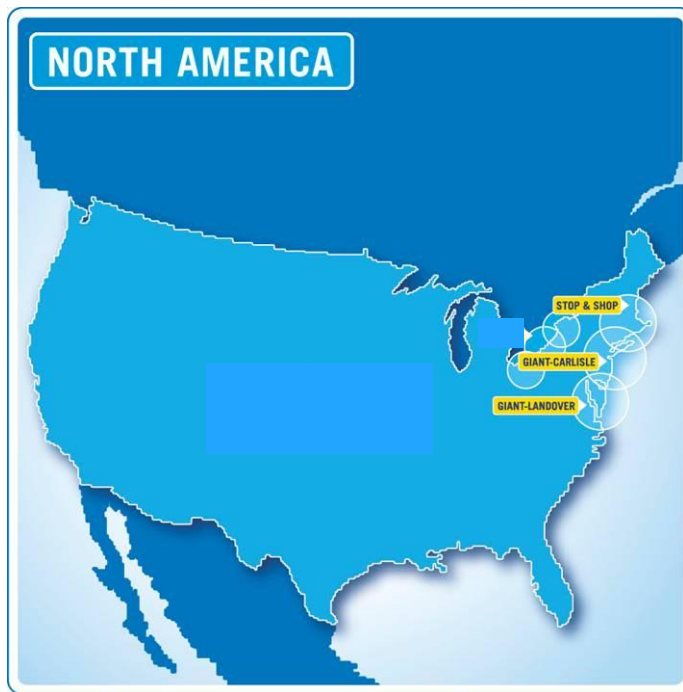
PIEK Implementation 2004 - 2008

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

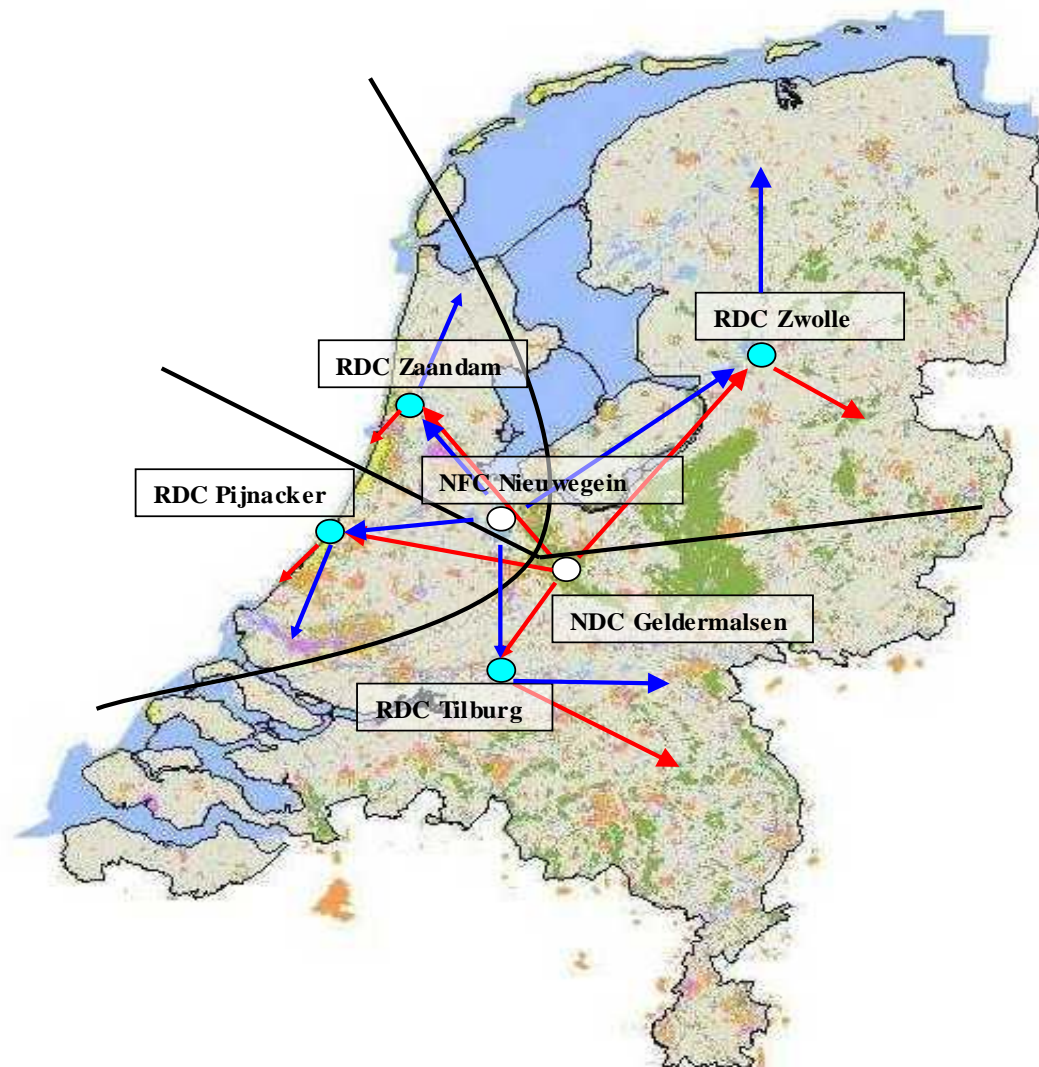
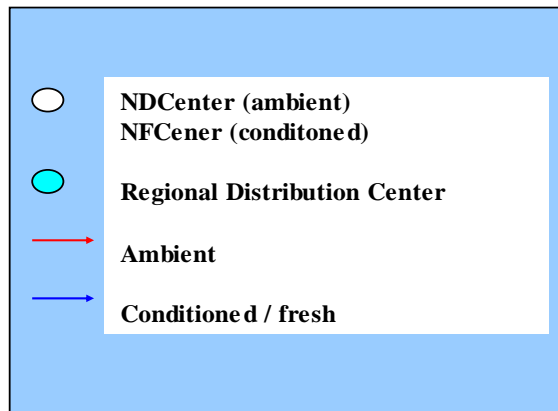


Albert Heijn in Netherlands

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



Distribution center Albert Heijn



Challenge: Congestion and deliveries

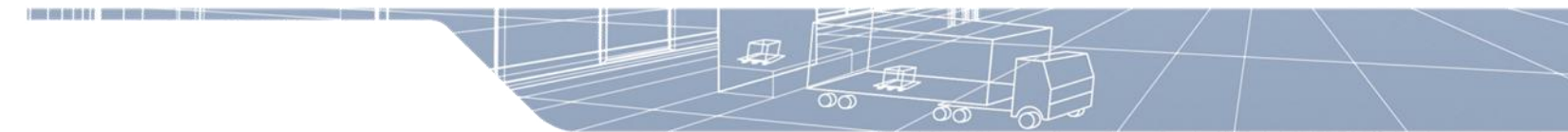


Trials 2007

- **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**

Logistic impact 1: Less congestion

- Time reduction 1 location
- Average time before : 1.30
- Average time trial : 0.30

	Before	After
Tilburg - Eindhoven distance	35 km	35 km
Average time	1:30	0:30
Vehicle	Volvo FH400	Volvo FH400
Distance year	210000	210000
Average fuel consumption	43 l	33 l
Labour cost (23 - 27 euro)	20700	8100
Fuel euro	90300	69300
Cost per year per truck	111000	77400

	Before	After
Tilburg - Eindhoven distance	35 km	35 km
Average time	1:30	0:30
Vehicle	Volvo FH400	Volvo FH400
Distance year	210000	210000
Fuel consumption	43 liter	33 liter
Emission CO2	244 ton	187 ton
Emission HC	4 kg	4 kg
Emission Nox	633	486
Emission PM10	10 kg	7 kg

Logistic impact 2: Larger vehicles in the night

- Big supermarket centre of Den Bosch
- Before : 3 rigids 28 roll containers
- After: Trailer 62 roll containers

	Before	After
nombre de camions	3 rigids	1 trailer
Total distance	225.000 km	75.000 km
temps de conduite	2 hour	1,3 hour
gazoil	74.250 liter	24.750 liter
cout fixe / heure	45	49
total coûts fixes	81000	19110
	$=3*2*300*45$	$=1*1,3*300*49$
coût gazoil	96750	24750
TOTAL	177750	43860

	Before	After
distance moyenne	300 km,	300 km
nombre de camions	3 rigids	1 trailer
distance totale	225.000 km	75.000 km
Vehicle	Volvo FH400	Volvo FH400
Gazoil	74.250 liter	24.750 liter
Emission CO2	201 ton	67 ton
Emission HC	4 kg	1 kg
Emission Nox	521 kg	174
Emission PM10	8 kg	3 kg

Replace 1000 vehicles in 2010

PIEK implemented in 50 cities

1400 PIEK deliveries per week



Lessons learned

- **Asses 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?

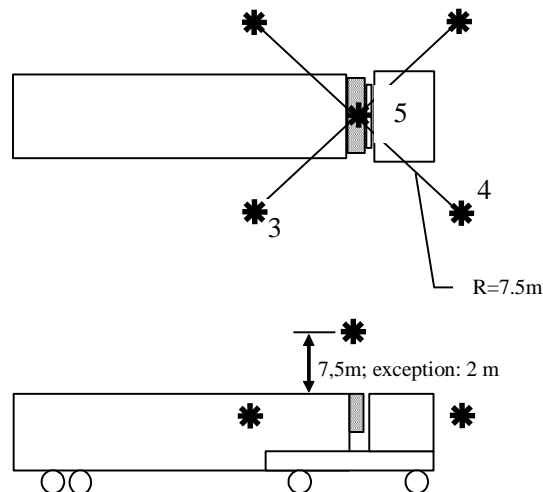
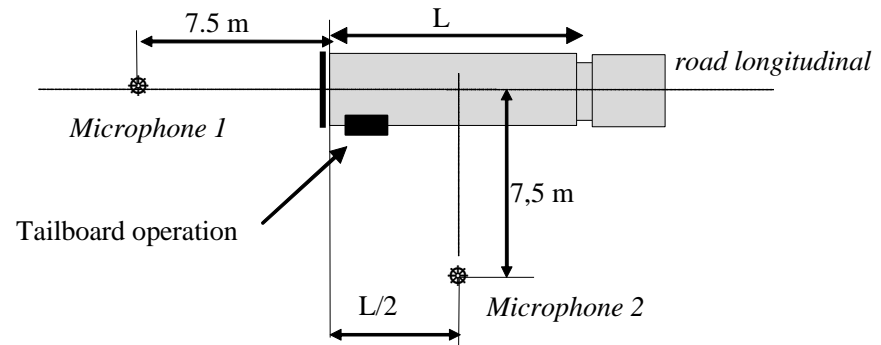
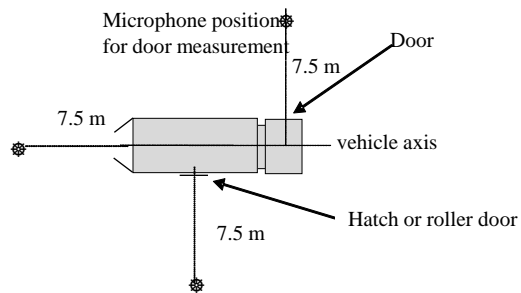
The need for Certification PIEK

- 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 (3 months)

- 38 trailer manufactures
- 24 component manufactures
- 1200 PIEK certified products sold

Products, suppliers PIEK certified

Quiet *72 dB(A)*
TRUCK

www.piek-international.com

monitored by



Countries certification PIEK

- **England: Noise Abatement Society**
- **France: Cemafrica**
- **Belgium: Universiteit van Antwerpen**
- **Germany: TÜV**
- **Netherlands: Stichting PIEK-keur (RAI, FOCWA)**
- **Ireland: Dublin Institute of Technology**

International developments 2003 - 2010

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



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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



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McDonalds tests in Lyon



Germany

- Schmitz congress 2005
- Cooperation TÜV-Nord
- IAA Hanover Krone 2008
- Cooperation Stadte Tag
400 Cities
- Trials 2009
 - Mercedes
 - FrigoBlock
 - Krone
 - Bar



IAA Hanover Germany 2008



Belgium

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



Sweden

- Volvo
- ICA



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Activities scheduled 2010

Denmark

- Roll cage development
- Cooperation Spar, Ikea
- Trials 2010

Italy

- Iveco: CNG PIEK trucks on market 2010
- Trials 2010?

Spain

- Mercadona, Condis (2000-2008)
- SOR, Mirofret Trials 2010?

More information

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