HAGEN

Air quality depending traffic management for lorries in the inner city of Hagen

View of Hagen from south east. ***Source****: Ingo Kramer*

HAGEN

Agenda

1. General information
   - traffic situation
   - climatic conditions

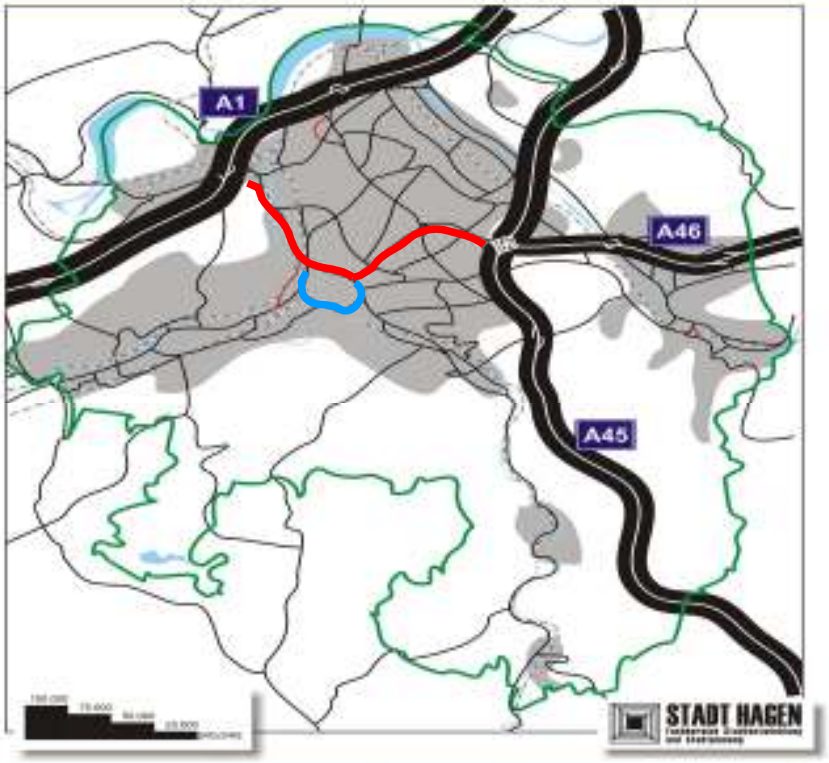
2. Results
   - factors of influence
   - environmental effects
   - transferability

3. Conclusion for Clean Air Planning

HAGEN

TRAFFIC SITUATION

BAB-Verkehrsbelastung
(Quelle: Straßenverkehrszählung 2005)



Durch 3 Autobahnen (A1, A45, A46) mit 6 Anschlüssen ist Hagen sehr gut an das Fernstraßennetz angebunden.

Ausschnitt Innenstadt

Nicht nur die überregionale Verteilerfunktion, sondern auch der starke Ziel-/ Quellverkehr der Innenstadt führen auf einigen Straßenabschnitten des Innenstadtringes zu einer kritischen Zunahme der Schadstoffbelastungen.

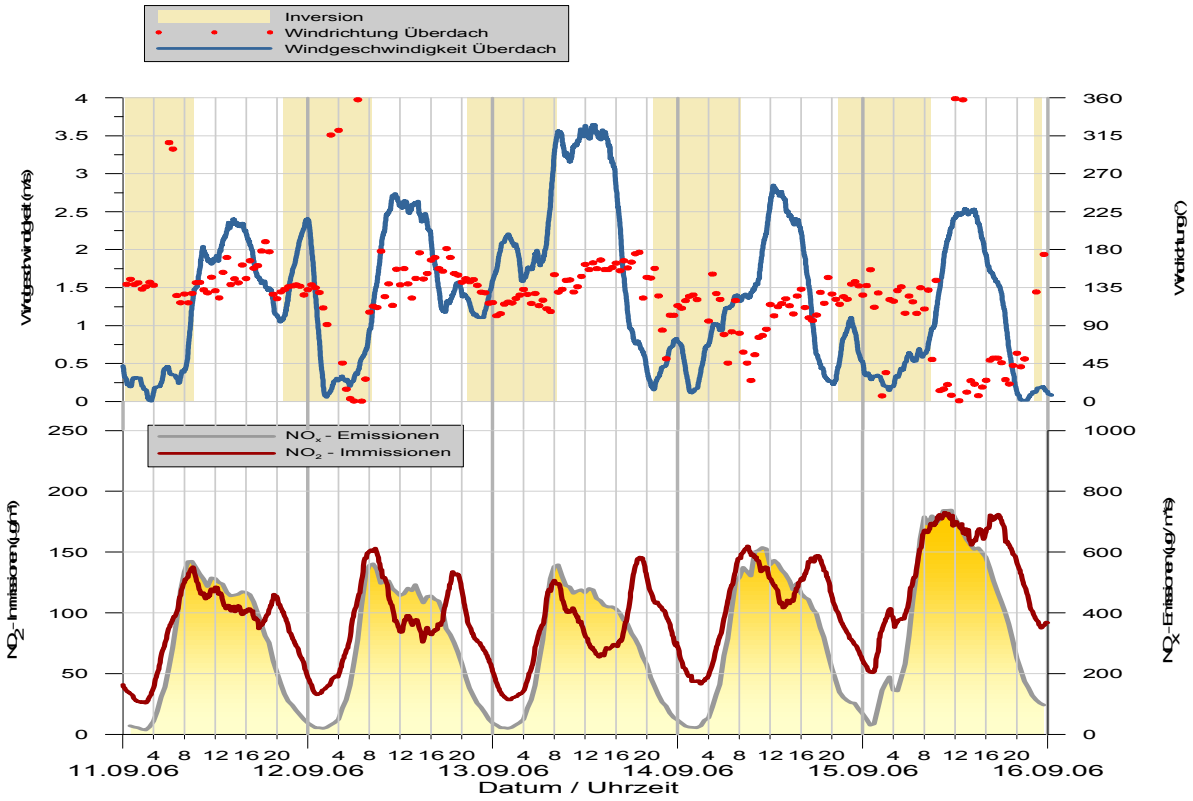
HAGEN

Climatic and Topographic Conditions

Strong atmospheric inversion (direction of view inner city).

- lowest point of the city area is at 86 m, the highest at 438 m
- high number of days with low wind speed
- high number of strong atmospheric inversions

Interaction of Influencing Factors

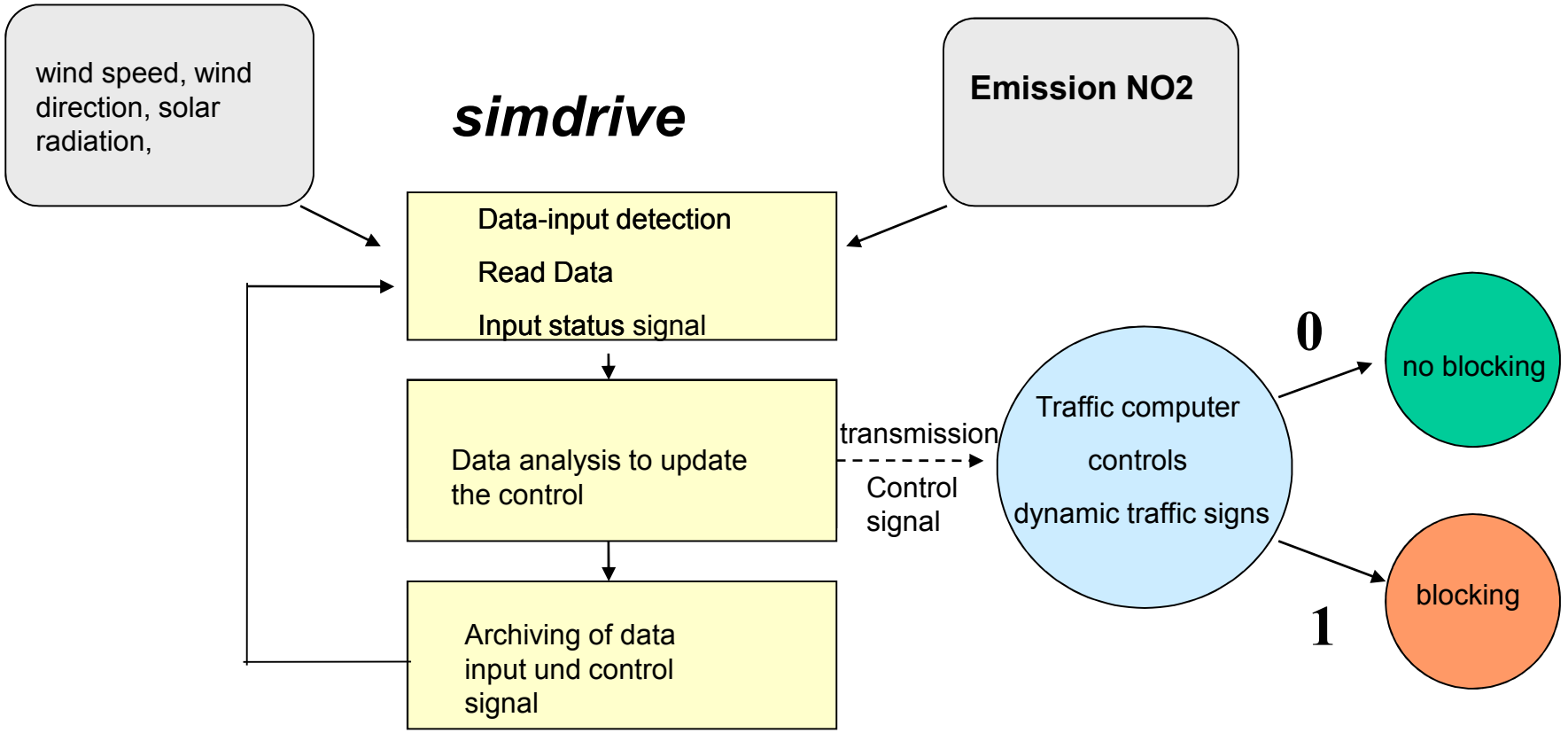


Time series analysis - Interaction between different parameters (1 week)

- high NO2 Emissions on week-days only (6:00 am to 8:00 pm)
- high NO2 Emissions at low wind speed (< 1,6 m/s)
- high NO2-Immissions with wind directions from N, NW, and NE
- solar radiation is relevant (but only in summer)

HAGEN

Flow chart of the control program



HAGEN

Temporary Traffic Management Conditions

- Locking only on weekdays (Monday to Friday) between 06:00 am and 08:00 pm.
- Temporary closures minimum 3 hours.
- Prolongation of closure for 1,5 hours in case of no improvement.

HAGEN

Practical Test

Contempt of road closure.

- 70% of disobeying
- police control is necessary

HAGEN

Expected Change

Blocking Phase			**dynamic II**	**dynamic II**
			(test operation)	(calculated)
Trucks Volume		%	29	100
NO2 (annual mean)		µg/m³	2	4 – 9
NO2 (hourly mean > 200 µg/m³		no of Days	6	9 – 14
PM10 (annual mean)		µg/m³	0.5	1.7 – 1.8
PM10 (daily mean > 50 µg/m³)		no of Days	0	3 – 10

HAGEN

Transferability

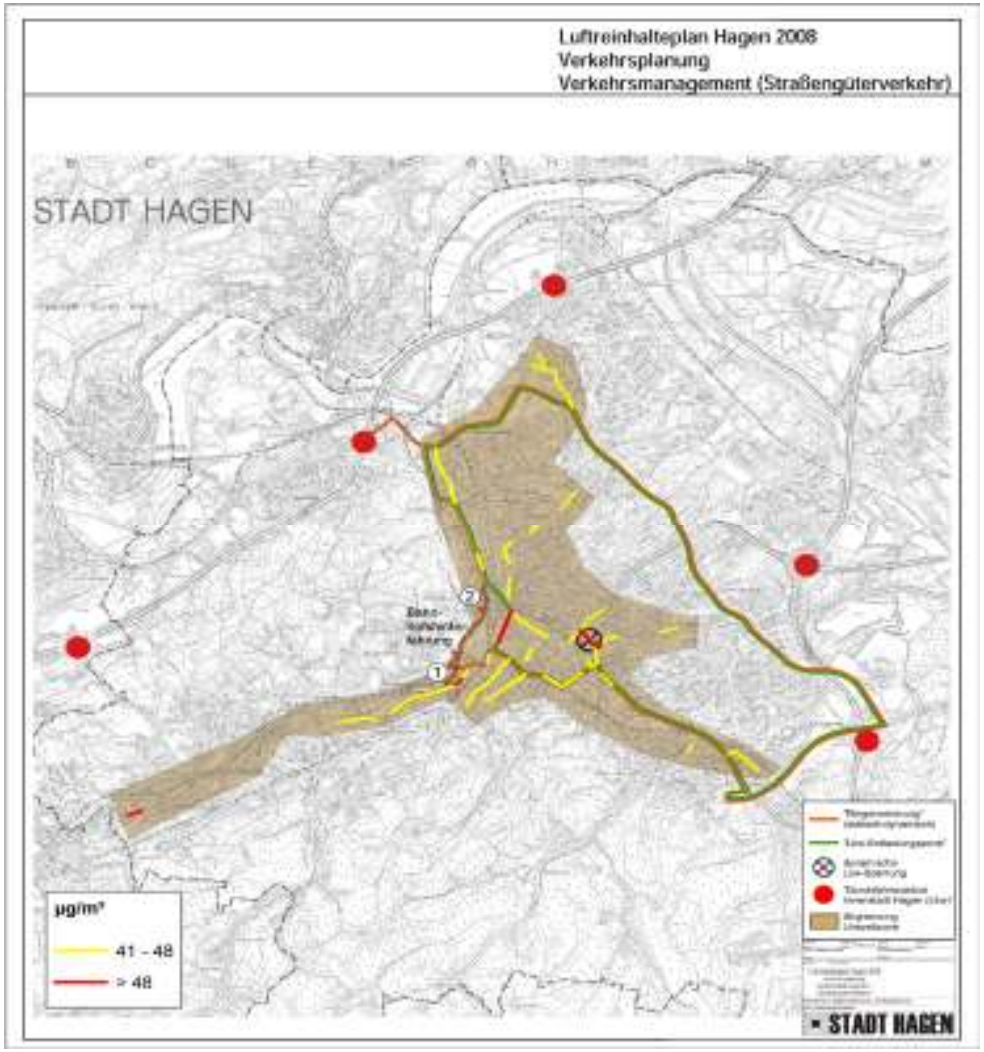
- This method can principally be transferred to other cities.
- The system must be adapted to a given local situation based on measurements.
- For online-mode meteorological parameters (wind direction, wind speed, solar radiation) are sufficient.
- Alternative and emission free routes are absolutely necessary!

HAGEN

Conclusion for Clean Air Planning in Hagen

- A dynamic, temporary blocking of HDV traffic alone will not succeed in compliance to air quality standards.
- Positive effects on the air quality are achievable by a „HDV-routing system“.
- The dynamic immission-relevant re-routing system should be implemented as an additional control instrument to distribute HDV traffic to less polluted roads.

Clean air plan: main focus on trucks, buses and car traffic



- ✓ lorry route concept combined with air quality based traffic management
- ✓ retrofitting of public transport (SCRT) and buying new hybrid-buses (impl. status 90%)

road bypass for inner city (planning finished)

setting up an environmental zone (subject to the resolution of the city council)

HAGEN

Look- Out

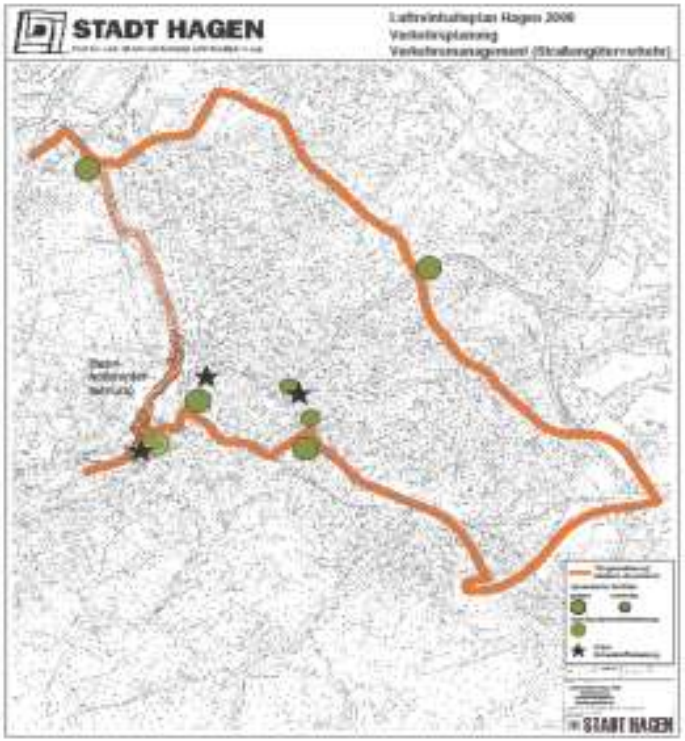
- The final monitoring results are expected in April next year.
- In parallel, the EU Notification for NO_2 will be prepared.
- From today's perspective, additional short term actions are necessary to get an extension of time for NO2 reduction, e.g.
  - setting up an environmental-zone

HAGEN

Thank you for your attention!

HAGEN

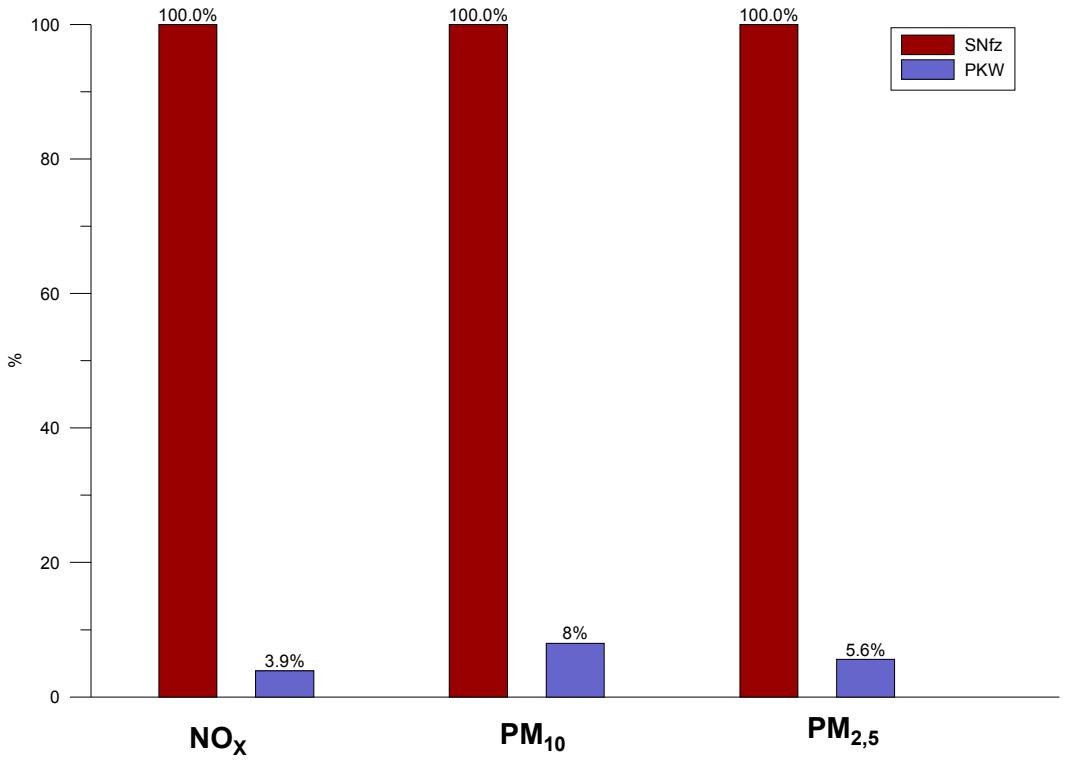
Basic concept: Ring extension



- temporary blocking trucks > 3,5 tons (dynamic signs)
- rerouting-concept (static signs)
- road bypass for inner city (main station)

HAGEN

EMISSIONS CAUSED BY TRAFFIC



Comparison of emissions by HDV and Cars

- 25 times more NOx
- 18 times more PM10
- 18 times more PM 2,5