

# PMinter

MARIBOR, 18. - 19. SEPTEMBER 2013

www.pminter.eu



## Air Quality Policy in Munich since 2004

Ulrich Teichmann

City of Munich  
Department of Health and Environment  
Environmental Protection  
Environmental Planning  
Traffic and Air Pollution, Urban Climate



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PMinter



## Air Quality in Munich

(in general decreasing air pollution, e.g. SO<sub>2</sub>, CO, ....)

**BUT**

Tagesmittelwert Feinstaub PM<sub>10</sub> (Grenzwert 2005: 50 µg/m<sup>3</sup>, bei 35 zulässigen Überschreitungen)

PM10 daily LV exceedances (LV 2005: 50 µg/m<sup>3</sup>, 35 exceedances allowed)

LÜB-Stationen	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>	PM <sub>10</sub>
	Tage 2003	Tage 2004	Tage 2005	Tage 2006	Tage 2007	Tage 2008	Tage 2009	Tage 2010	Tage 2011	Tage 2012	
<i>Beurteilungsgröße</i> <i>(Grenzwert+Toleranzmarge)</i>	60 µg/m <sup>3</sup>	55 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	15.09. 2013
Stachus	56 (123)	44 (59)	51	52	30	21	33	47	35	14 (11*)	15
Luise-Kiesselbach- Platz	42 (69)	29 (36)	30	44	24	17	-	-	-	-	
Johanneskirchen	4	3	18	26	12	13	13	23	9	4	8
Lothstraße	29 (51)	22 (35)	24	39	19	11	16	27	11	5	11
Landshuter Allee	-	-	107	92	53	61	52	65	48	27 (17*)	26 (22*)
Prinzregentenstraße	-	-	40	39	15	14	15	31	17	-	
Andechs	5	4	4	15	7	7	1	11	4	5	2

Lufthygienisches Landesüberwachungssystem (LÜB)

\*abzüglich Winterdienst

(Streusalztage)

\*less winter salting

Source: Bavarian Environmental Protection Agency

**Luck, good weather and/or good measures?**





Stickstoffdioxid NO<sub>2</sub> Jahresmittelwert (Grenzwert 2010: 40 µg/m<sup>3</sup>)

Nitrogen Dioxid NO<sub>2</sub> annual mean (LV 2010: 40 µg/m<sup>3</sup>)

LÜB- Stationen	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<i>Beurteilungsgröße (Grenzwert+Toleranzmarge)</i>	54 µg/m <sup>3</sup>	52 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	48 µg/m <sup>3</sup>	46 µg/m <sup>3</sup>	44 µg/m <sup>3</sup>	42 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>
Stachus	<b>68</b>	<b>69</b>	<b>76</b>	<b>79</b>	<b>71</b>	<b>74</b>	<b>78</b>	<b>74</b>	<b>76</b>	<b>60</b>
Luise-Kiesselbach- Platz	<b>75</b>	<b>68</b>	<b>72</b>	<b>74</b>	<b>69</b>	<b>63</b>	-	-	-	-
Johanneskirchen	26	24	30	33	30	28	30	28	23	22
Lothstraße	42	42	44	45	42	35	35	35	33	31
Moosach	45	39	43	45	35	37	38	39	39	35
Landshuter Allee	-	-	<b>92</b>	<b>98</b>	<b>89</b>	<b>85</b>	<b>92</b>	<b>99</b>	<b>85</b>	<b>81</b>
Prinzregentenstraße	-	-	<b>66</b>	<b>68</b>	<b>71</b>	<b>77</b>	<b>74</b>	<b>68</b>	<b>61</b>	-
Andechs	-	18	11	10	13	14	10	8	7	7



# Air Quality Policy in Munich



## Air Quality Plan for Munich, AQP (28.12.2004)

mostly general traffic related measures, Small Combustion Regulation for Munich

Air Quality Plan is not a closed process, but a permanent challenge

- judgement Federal Administrative Court of Germany (BVerwG) 27.09.2007

1<sup>st</sup> update AQP 19.10.2007 HDV ban

- judgement European Court of Justice 25.07.2008

2<sup>nd</sup> update AQP 21.08.2008 Implementation Low Emission Zone (LEZ) stage 1

3<sup>rd</sup> update AQP 12.04.2012 Involving the outer conurbation area (ongoing process)

4<sup>th</sup> update AQP 05.09.2010 Implementation LEZ stage 2

Implementation LEZ stage 3 01.10.2012

after impact study of LEZ and check of reasonability

5<sup>th</sup> update was commissioned in 2011 including speed restrictions (Landshuter Allee, highway A96)

- judgement Bavarian High Administrative Court (VGH) 09.10.2012 (e.g. expansion of LEZ), DUH,

judgement BVerwG (05.09.2013)

- objectives were raised by EU against time extension for NO<sub>2</sub>-LV 20.02.2013

- 5<sup>th</sup> update autumn 2013 ???



# Measures

- Enhancement of Public Transport (PT)  
better network, acceleration, Test Hybrid-buses
- Better exhaust standards for PT-Buses (EEV standard)
- Better municipal car fleet (natural gas, electric vehicles, no Diesel cars)
- Enhancement Park & Ride (32 sites 7460 places)  
Enhancement Bike & Ride (25000 places and 3 indoor parking garages)
- Parking place management
- Environmental friendly traffic management
- City-Logistic hubs
- Synchronised traffic lights (better traffic flow)
- Enhancement of bicycle traffic (14% → 17%)
- Munich Small Combustion Regulation
- Action Programme Climate Protection



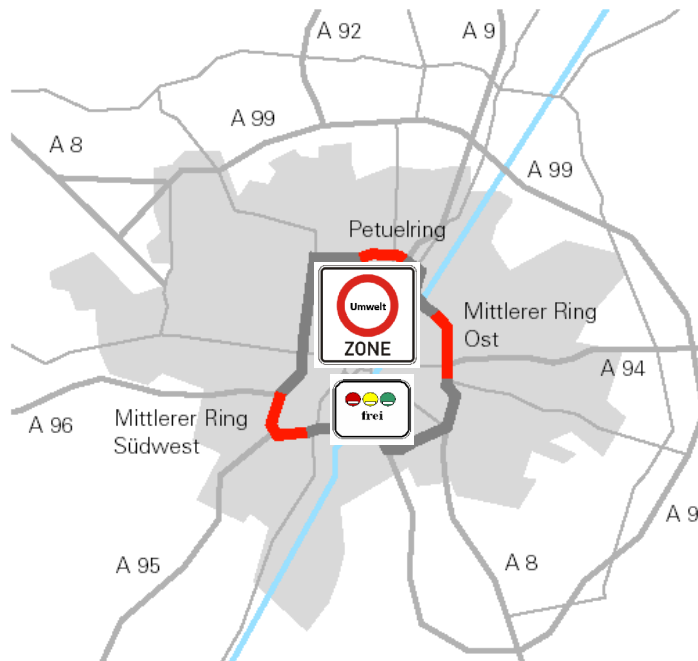


# Decision of City Council 26.07.2006: Implementation of 'LEZ'

4 alternative szenarios were discussed  
whole city  
inside middle ring road  
inside middle ring road incl. ring road  
inner ring road

Impact calculation  
with IMMIS<sup>net/em/luft</sup>

Munich		(Berlin)
44 km <sup>2</sup>	15 %	(10 %)
426284 inh.	33 %	(30 %)



Der Mittlere Ring im großräumigen Verkehrsnetz





# Labelling Ordinance 10.10.2006

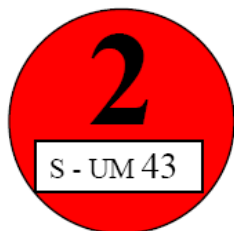
(in force 01.03.2007), revised November 2007



Pollution Group 1  
no sticker

**Gasoline cars without controlled catalyst**  
and all cars which are not meeting Group 4  
**Diesel cars:** EURO 1 or less

Pollution Group



**Diesel cars**, keeping EURO 2 standard (in force 1996)



**Diesel cars**, keeping EURO 3 standard or retrofitted with DPF (in force 2000)



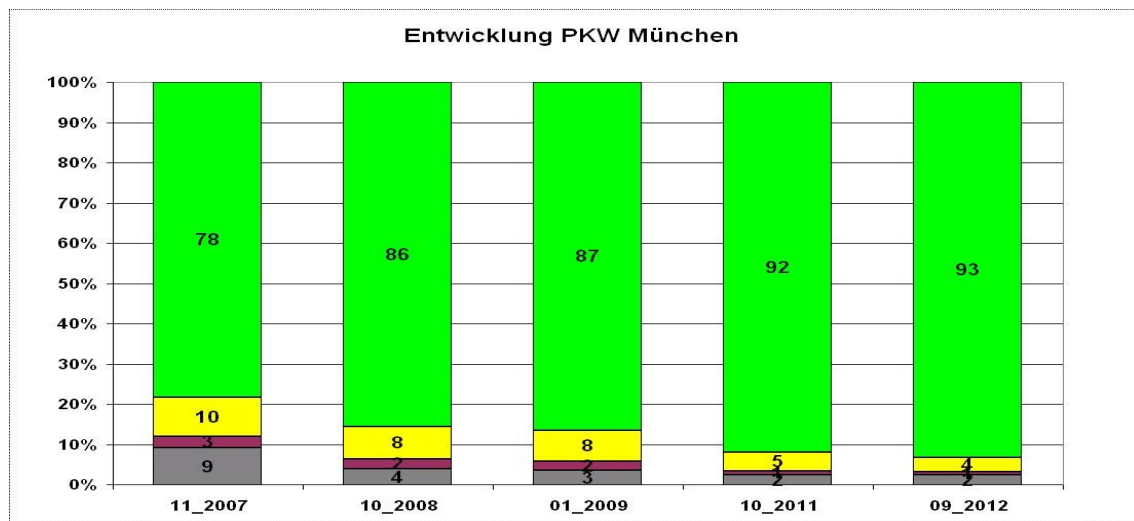
**Gasoline cars with controlled catalyst**  
electric vehicles, fuel cell cars  
**Diesel cars**, keeping EURO 4 or EURO 5 standards or retrofitted by  
DPF (in force 2005)



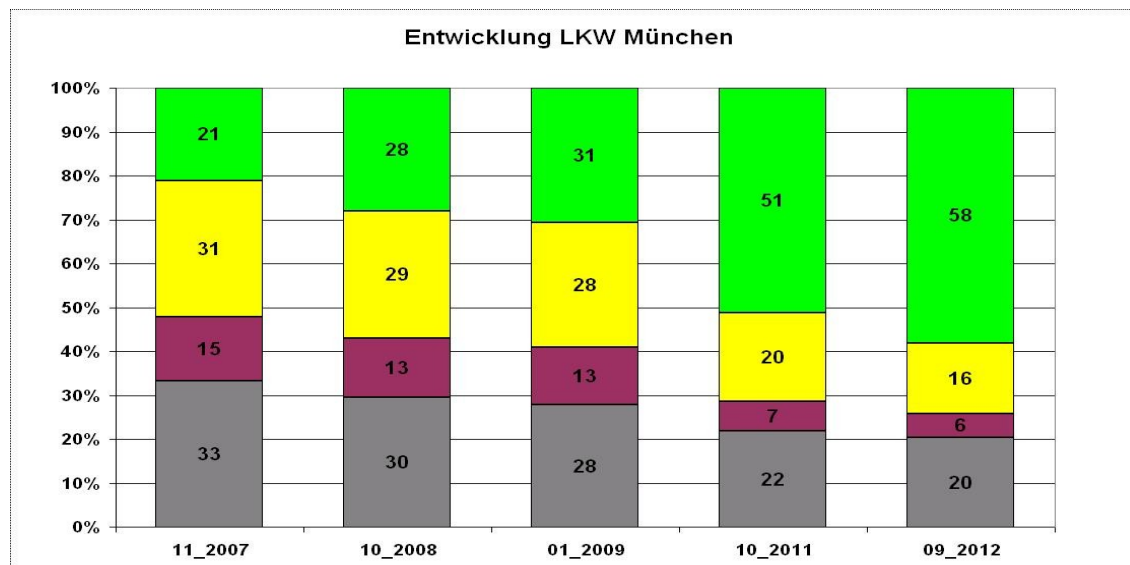


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and Environment

### Trend passenger cars in Munich



### Trend HDV in Munich



Licensed cars in Munich (Source: Department of Public Order)



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## Impact analysis LEZ Munich (IMMIS<sup>luft</sup>)

- Obvious modernisation of vehicle fleet compared to situation before LEZ

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Decrease of exhaust emissions (no change in traffic amount, same year): PM<sub>10</sub> up to 30 % (stage 1), ca. 2 % (stage 2)

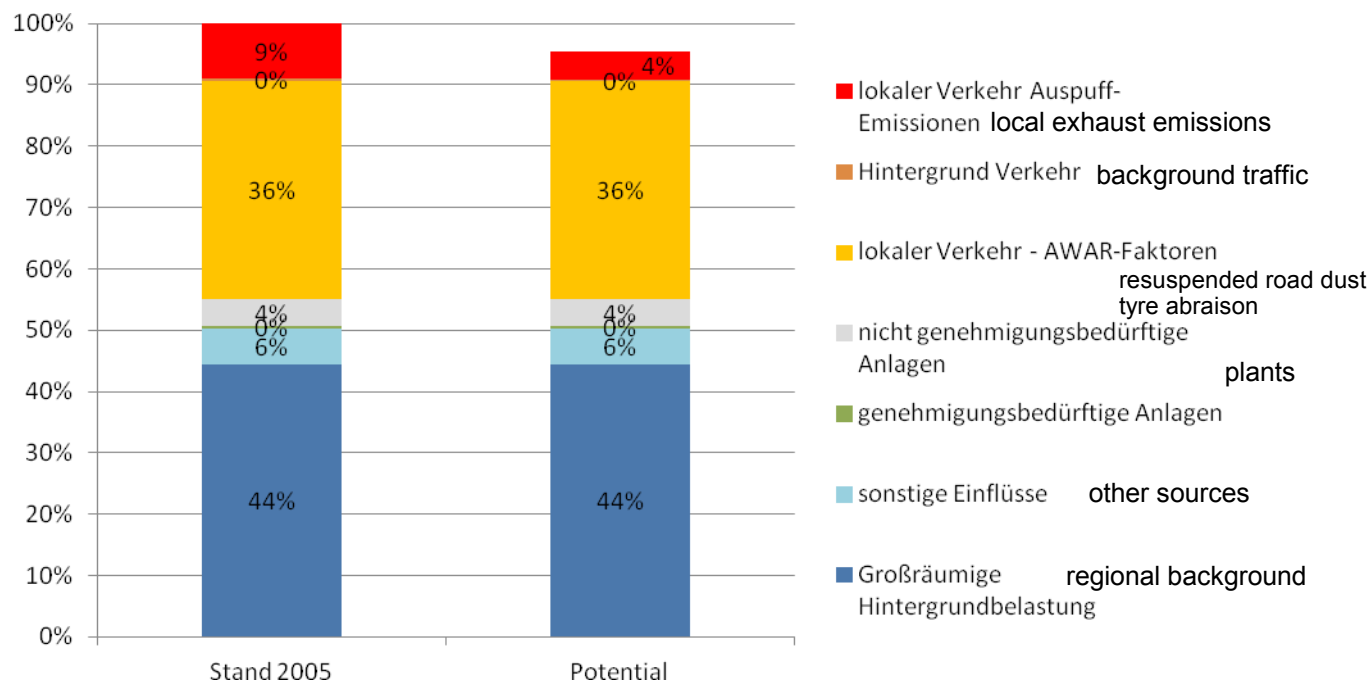
--->

Potential of Immission Reduction in particular streets (stage 1 + 2): PM<sub>10</sub> up to 5 % (8 days) soot/black carbon up to more than 50 % (health relevance!)



## Which source fraction of PM<sub>10</sub> can we influence by a LEZ?

No LEZ                      LEZ



Source: em-plan 2012





# Federal Ordinance for Labelling Cars-Exemptions

– No car traffic in LEZ except:

1. General exemptions for (§ 2 sec. 3 / appendix 3):  
mobile and off road machines, military vehicles, ambulances, police, fireworkers, handicaped people, oldtimer cars, ...
2. Labelled cars (§ 2 sec. 1)



3. Single exemptions (§ 1 sec. 2)



A lot of paperwork for the City





# Rules of exemptions §2 sec. 1 + Recommendations of the German Association of Cities and Towns

Exemption only if vehicle **can not be retrofitted with DPF**

**and**

- at least one of the following requirements is given

2.1. Inhabitant or firm inside LEZ

2.2. Supply of population with essential goods, e.g. food

2.3. Supply of population with essential services, e.g. conservation or repair of essential technical plants

2.4. Individual interests, e.g. medical consultations

Munich specific exemptions: market hall, slaughterhaus, Oktoberfest





City of Munich  
Department of Health  
and Environment



Until now ca. 25000 exemptions  
(incl. repetitions and extensions)

Less refusals because of consultation service

fees: 10 € to 200 €

Public relation activities: ca. 200000 €

[www.muenchen.de/umweltzone](http://www.muenchen.de/umweltzone)



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## Infringements (fines)

Munich traffic supervision (only parked cars)  
Police (moving traffic and parked cars)

	2009	2010	2011	2012 (bis Okt.)
MVÜ	9707	1225*		
Police			9355	4319
			moving traffic: 1077 (1011)	parked cars: 8278 (2729)

\*only until April



## Measures reviewed or discussed:

- Winter salting                   necessity and wet cleaning  
  use of CMA  
  heating to avoid salting
- Road traffic                      speed reductions, teilweise Sperrung  
  judgement VGH: not reasonable
- Road tunnels                     feasibility study 'Middle Ring Road' (ongoing)  
  treatment of tunnel air (filters?), costs
- Shift of bus stop
- Photocatalytic treatment of streets, sidewalks and walls
- .....





## Summary

- Air quality policy in Munich covers more than only LEZ
- A lot of activities, achievements were made, but LV are still exceeded, measures are ongoing
- Only measures on local level can not solve the problem: national + EU-level  
→ Revision of TSAP 2013/2014  
→ general reduction of traffic
- Infringement procedure by EU?







## Aktuelle Entwicklungen bei NO<sub>2</sub>:

Speed reduction (60 km/h → 50 km/h, strict control): NO<sub>2</sub> immission reduction by 13 % in 2015 at hot spot 'Landshuter Allee', but no chance to meet the limit LV in 2015 or 2020 without additional measures:  
We should reduce traffic by 52 % - 84 % to meet the LV in 2015  
We are running out of 'local' ideas for reasonable measures





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## Reserve-Slides



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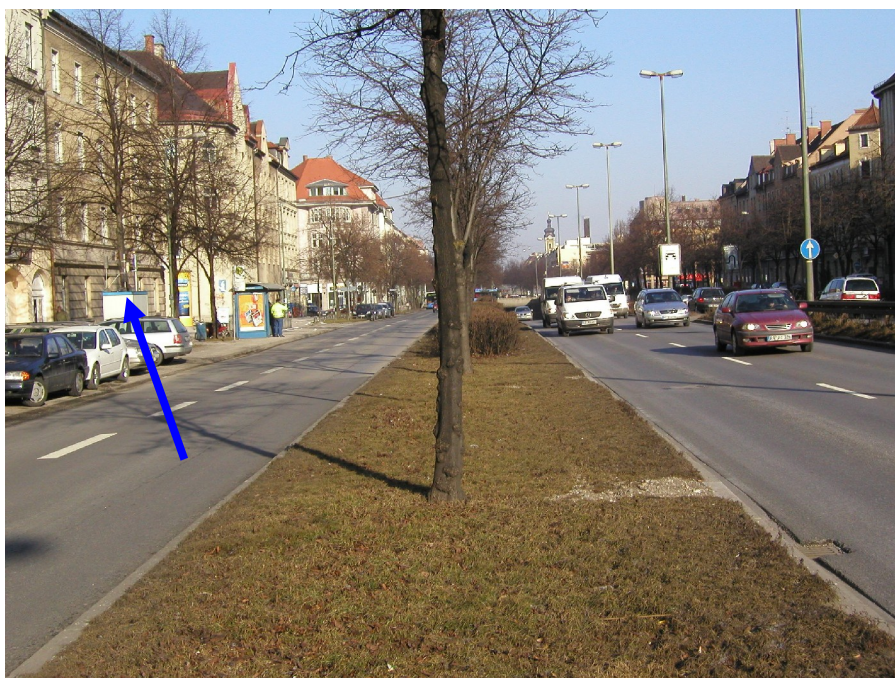


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from 07/2004

Traffic (daily average):

138.000, HDV 7.700 (5.6 %)  
width: 55 m, 4-5 floor buildings

tunnel portal (approx. 200 m)

107 exceedances of PM<sub>10</sub> daily LV in  
2005

99 µg/m<sup>3</sup> NO<sub>2</sub> yearly average in 2010



# Comparison 2007/2008 HDV > 12 t

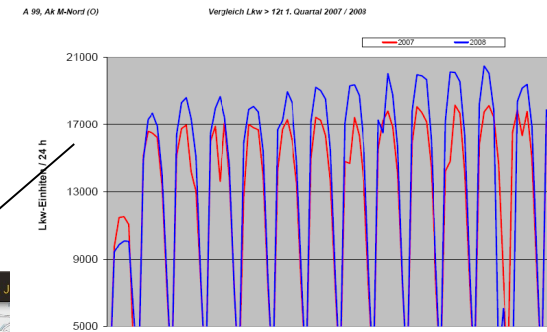
Counting points: Autobahn Authority of Southern Bavaria

Counting points: City of Munich

Landshuter Allee: -18 %

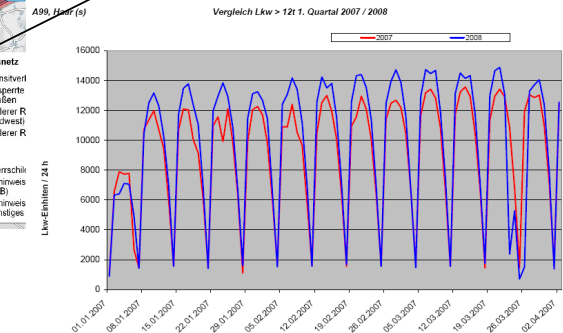
Heckenstallerstraße: -15 %

HDV > 3.5 t

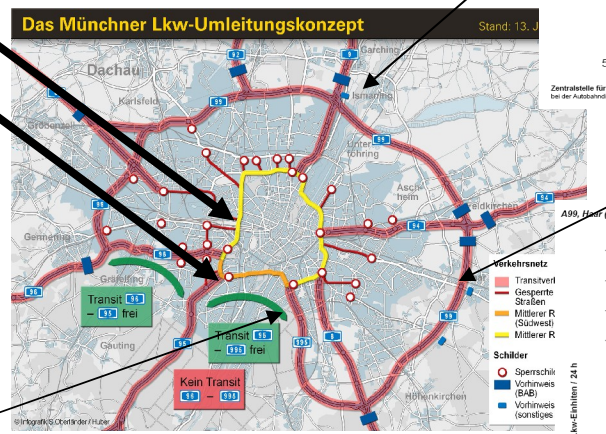


Zentralstelle für Informationssysteme bei der Autobahndirektion Südbayern

## A 99

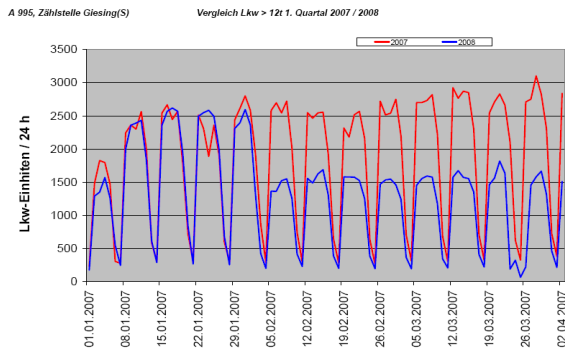


Zentralstelle für Informationssysteme bei der Autobahndirektion Südbayern



Arrows pointing from the text on the left to specific locations on the map: Landshuter Allee and Heckenstallerstraße.

## A 995 Giesing



Zentralstelle für Informationssysteme (ZIS) bei der Autobahndirektion Südbayern

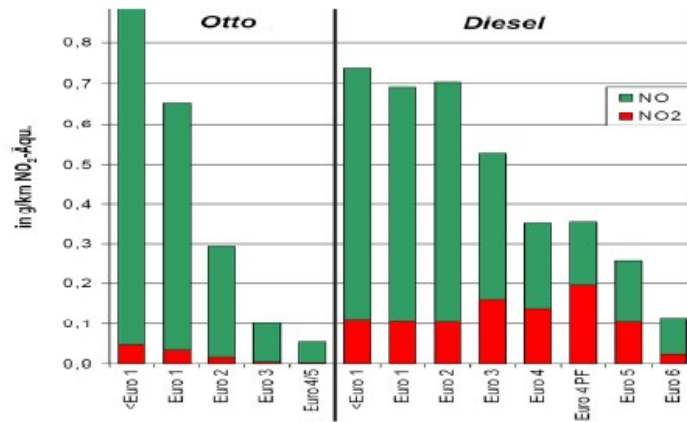


# Handbuch für Emissionsfaktoren

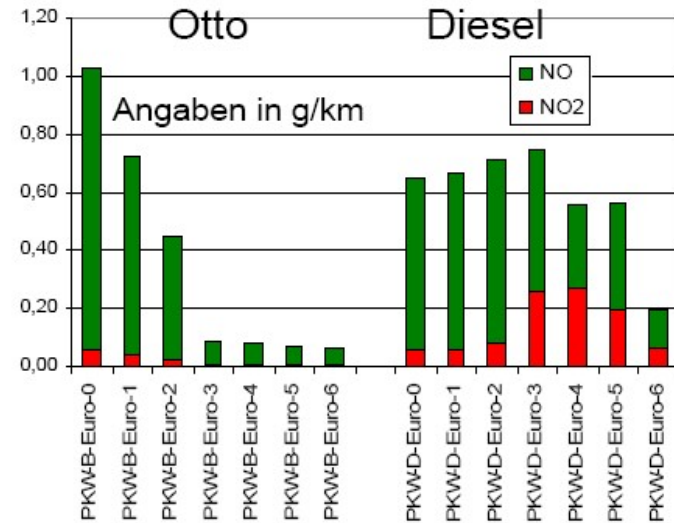
## IFEU Heidelberg 2007 HBEFA 2.1

## IFEU Heidelberg 2010 HBEFA 3.1

Mittlere Emissionsfaktoren



Mittlerer Emissionsfaktoren HBEFA 3.1





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# Munich Small Combustion Regulation (Münchner Brennstoffverordnung)

Ulrich Teichmann

Department of Health and Environment  
City of Munich  
Environmental Protection  
Air Pollution and Traffic, Urban Climate

Direct Contact Person: Gerald Höfler  
[gerald.hoefler@muenchen.de](mailto:gerald.hoefler@muenchen.de)



no federal regulation in 1.BImSchV

Motivation for an urban small combustion regulation:

- availability of new technologies (BAT)
- use of CO<sub>2</sub> neutral fuels (climate change mitigation)
- save of fossil fuels
- raising costs for fossil fuels

- Munich Small Combustion Regulation (City Council Oct. **1999**)

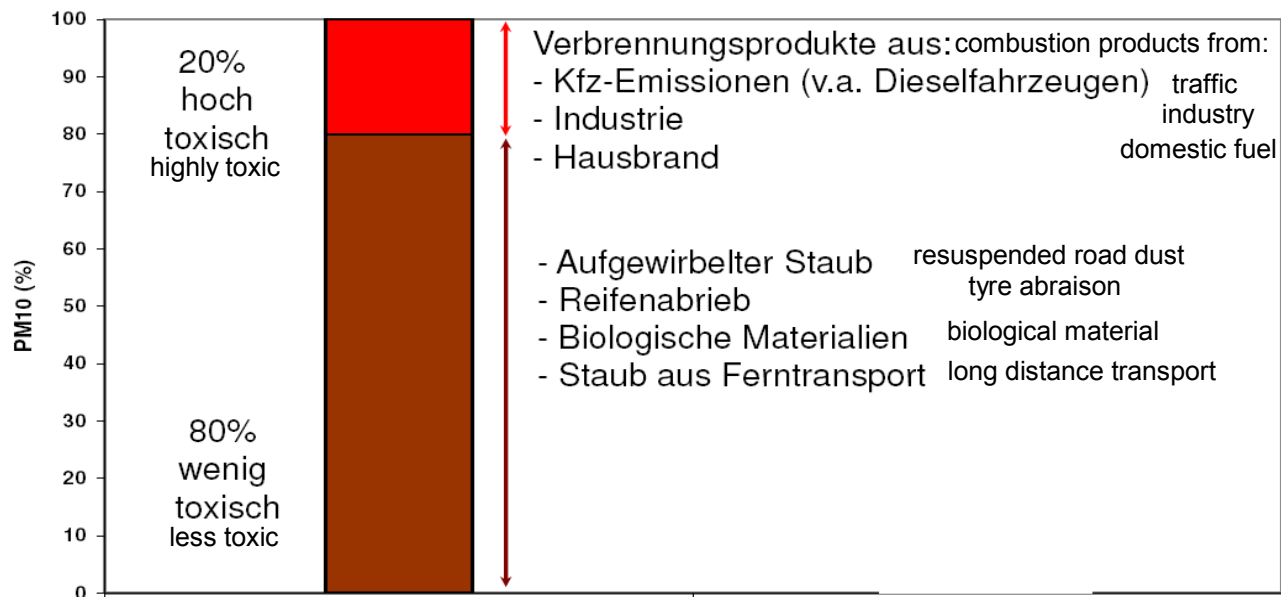
**Concerned:** heating plants < 15 kW for additional use (new installations, e.g. manually loaded single wood burning stoves),  
**In principal there is a general ban, BUT exceptions if a plant is achieving emission limit values for**

- CO: < 1.5 g/m<sup>3</sup> (2011:1,25)
- Dust: < 150 mg/m<sup>3</sup> (2006: 75, 2011: 40)
- NO<sub>x</sub>: < 200 mg/m<sup>3</sup> (new from 2006)

Revision in 2006 due to immission limit values (LVs) for PM<sub>10</sub>, NO<sub>2</sub>



## Welche Komponenten im Feinstaub sind gefährlich? Which components of PM<sub>10</sub> are harmful?







## Revision of 1<sup>st</sup> Ordinance for the Implementation of the Federal Immission Control Act (1. BImSchV, LVs), March 2010)

Concerned: heating plants < 15 kW

Is there still a need for an urban regulation?

YES!

### **Revision of urban regulation in September 2011**

Implementation of lower federal limit values stage 2 (2015) from now on  
No NO<sub>x</sub> limit values at all in federal ordinance

New:

no more certification of exceptions, only duty to give notice,  
but control by city authorities and chimney sweeper assoc.

After 2015 ???

Existing stocks???



## Some data

- Total number of exceptions/notices: **13.626**  
(estimation: ~50.000 small combustion plants in Munich)
- Overall decreasing number of complaints about smoke and smell disturbances

