AMBIENT AIR

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ABBREVIATIONS

Short name	Full name
CO	Carbon-monoxide
EüM	Ministry of Health
EOV	Unified National Projection
EPA	Environmental Protection Agency
ERBE	MVM ERBE Zrt.
FVM	Ministry of Agriculture and Rural Development
GDAS	Global Data Assimilation System - assimilation of surface and remote sensor measurements/tests
GFS	Global Forecasting System
KöM	Ministry of Environment
LMp	Point of measurement designated for defining baseline air pollution
MSz	Hungarian Standard
NCDC	National Climatic Data Centre
NCEP	National Centres for Environmental Prediction
NO_2	Nitrogen–dioxide
NO_x	Nitrogen-oxides
NWS	US National Weather Service
O_3	Ozone
OKI	National Institute of Environmental Health, Department of Environmental Health, Air Hygiene Section
PM_{10}	Fraction of particulate matter below 10 µm
SO_2	Sulphur-dioxide
TSPM	Total particulate matter
VM	Ministry of Rural Development
WGS	World Geodetic System

16 AMBIENT AIR

16.1 LEGAL BACKGROUND – AREA CATEGORY, LIMITS

16.1.1 LAWS

Legislation of European Union (Decision, Directive)

European Parliament and Council Directive 2008/50/EC on ambient air quality and the program titled "Clean Air for Europe".

Laws

Act LIII. of 1995 - general rules for the protection of the environment

Government decrees

Government Decree 314/2005. (XII.25.) on environmental impact study and integrated pollution prevention control (IPPC) process
Government Decree 306/2010. (XII.23.) on the protection of clean air

Minister decrees

Decree 4/2002. (X.7.) KvVM general rules for designating air pollution agglomerations and zones
Decree 4/2011. (I.14.) VM on air pollution limits and emission limits of stationary air polluting point sources
Decree 6/2011. (I. 14) VM on rules related to the analysis, control, measurement and assessment of air pollution levels and emission of stationary air polluting sources

Standards applied during ambient air baseline test

MSZ ISO 7996:1993: defining nitrogen oxide mass concentration of ambient air. chemi-luminescence method
MSZ-ISO 2145637/1993: analysis of air gas pollution. To define sulphur dioxide content with UV-fluorescence method
MSZ-ISO 4224:2003: defining carbon monoxide in ambient air. Non-dispersive, IR method
MSZ-EN 12341:2000: Air quality. Defining the PM_{10} fraction of particulate matter Reference method and on-the-spot test to determine equivalence of measurement methods and reference measurement method.
VDI 2463 Blatt 10:1996: Defining total particulate matter with gravimetry
MSZ 21456—26:1994: analysis of air as pollution. Defining ozone with UV-photometric method
MSZ 21454-1:1983: Analysis of solid (PM) pollution in air. Defining mass of settling dust (PM)

Standards applied during propagation calculation

Meteorological characteristics of air pollutants propagation
- MSZ 21457-4:2002 calculation of dynamic characteristics of surface air layer from relevant meteorological data.
- MSZ 21457-7:2002 defining quantities typical for vortex mixing of air pollutants

Definition of air pollutant transmission
- MSZ 21459-1:1981 calculation of polluting impacts of point sources
- MSZ 21459-2:1981 calculation of polluting impacts of surface and line sources

16.1.2 AIR POLLUTION ZONES

Decree 4/2002. (X. 7.) KvVM general rules for designating air pollution agglomerations and zones defines the air pollution zones in the country. The zone category or zone type is an area designated in accordance with the air pollution, where the concentration of the pollutant is on longer term or periodically within any of the ranges defined in Appendix 5 of Decree 4/2011. (I. 14.) VM on air pollution limits and emission limits of stationary air polluting point sources (A; B; C; D; E; F; O-I; O-II categories).

Regarding the air pollutants under this study, Paks and region belong to the zone category *„10. Other area of the country"* in accordance with specified Appendix 1 of Decree 4/2002. (X. 7.) KvVM.

Zone categories by air pollutants					
	SO_2	**NO_2**	**CO**	**PM_{10}**	**Ground level ozone**
10. Other area of the country - Paks	F	F	F	E	O-I

Comment:
E - the area, where the air load level is between the maximum and the lower limits for one or more air pollutants
F - the area, where the air load level is not higher than the lower limit
O-I - the area, where the ground level ozone concentration is higher than the limit (120 μg/m^3)

Table 16.1.2-1: Paks air pollution category

Sulphur-dioxide		
	Health protection	**Vegetation protection**
Higher test limit	60% of the 24-hour limit 75 μg/m^3	60% of the winter critical level 12 μg/m^3
Lower test limit	40% of the 24-hour limit 50 μg/m^3	40% of the winter critical level 8 μg/m^3

Table 16.1.2-2: Sulphur-dioxide maximum and minimum test limits

Nitrogen–dioxide and nitrogen-oxides			
	Human health protection		**Vegetation and natural ecological systems protection**
	hourly limit	**annual limit**	**annual critical level**
	NO_2	**NO_2**	**NO_x**
Maximum test limit	70% of the limit 70 μg/m^3 *	80% of the limit 32 μg/m^3	80% of the critical level 24 μg/m^3
Lower test limit	50% of the limit 50 μg/m3 *	65% of the limit 26 μg/m^3	65% of the critical level 19,5 μg/m^3

Comment:
* only 18 times / annum can be higher than the limit set for calendar year

Table *16.1.2-3: Nitrogen dioxide and nitrogen oxides maximum and minimum test limits*

Carbon-monoxide	
	8-hour average
Maximum test limit	70% of the limit 3500 μg/m^3
Lower test limit	50% of the limit 2500 μg/m^3

Table *16.1.2-4: Carbon-monoxide maximum and minimum test limits*

PM_{10}		
	24-hour average	**Annual average**
Higher test limit	a limit 70 %-a 35 μg/m³ *	a limit 70 %-a 28 μg/m³
Lower test limit	a limit 50 %-a 25 μg/m³ *	a limit 50 %-a 20 μg/m³

Comment:
* only 35 times / annum can be higher than the limit set for calendar year

Table 16.1.2-5: PM_{10} maximum and minimum test limits

In summary: in Paks and region the air quality is clean regarding SO_2, NO_2, CO, and the air load level is not higher than the lower test limit, and the ground level ozone concentration is higher than the limit (120 μg/m³), the PM_{10} category is „E", i.e. slightly loaded.

16.1.3 AIR POLLUTION LIMITS, TARGETS, GUIDANCE VALUES

Air pollutant	**Hourly (μg/m³)**	**24-hour (μg/m³)**	**annual (μg/m³)**
Sulphur dioxide	250	125	50
Nitrogen dioxide	100	85	40
Carbon-monoxide*	10 000	5 000	3 000
Particulate matter PM_{10}	-	50	40
	Maximum of daily 8-hour moving average concentration (μg/m³)		
Ozone	120		
Settling powder, non-toxic	**30 day (g/m², 30 day)**	**annual (t/km², year)**	
	16	120	

Table 16.1.3-1: Air pollution health limits

Air pollutant	**Hourly (μg/m³)**	**24-hour (μg/m³)**	**annual (μg/m³)**
Particulate matter TSPM	200	100	-

Table 16.1.3-2: Planned targets for air polluting materials

Air pollutant	**30-day (g/m², 30 day)**	**annual (t/km², year)**
Settling powder, non- toxic	16	120

Table 16.1.3-3: Settling dust tervezési guidance valuee

16.2 AIR QUALITY IN THE STUDIED AREA

We collected the air pollution data available on the site and within its 30 km environment for the ambient air and analysed and assessed the ambient air load using the collected and measured data.

16.2.1 PROCESSION AND ASSESSMENT OF AVAILABLE DATA AND INFORMATION -1987-2011

16.2.1.1 Environmental Impact Study for operation time extension of Paks Nuclear Plant - 2006

In the following sections we will quota the relevant parts of the Environmental Impact Study [16-1] including the colour codes used in the Study.

4. Status of the environment in the region of the nuclear plant during the pre-operation period

4.3.1. Air quality during the pre-operation period

5. Present status of the environment in the region around the nuclear plant – impact of the plant onto the status of the environment

5.4.1 Air quality in the environment of the nuclear plant

5.4.1.1 Air pollution between 1987-2005 (heating season)

The National Immission Measuring Network (managed by ÁNTSZ Tolna County Institute) has been measuring the settling dust load at Paks since 1987. No gas pollutants were measured.

In January 2002 the Lower-Duna Valley Environment Protection Inspectorate took over charge for the operation of the measuring network. There are 4 measuring stations in the city located as it follows:

Deák F. u. 4. Tolna u. 10, kindergarten Kishegyi u.20 kindergarten Vasút u. 6.

Table 5.4.1. and Figure 5.4.1. present the average settling dust data measured in the city between 1987-2005. As there was no gas pollutant measurement held in the city, the Table 5.4.2. and the Figure 5.4.2. present the data of Szekszárd city for the same period, reflecting the order of magnitude and the tendency. As shown, sulphur-dioxide pollution was low between 1987 and 1997, and a jumping-high data appeared in 1997-98, but remains well below the limit. Since 1998 the SO_2 values have remained at minimum levels. Nitrogen dioxide level has been volatilely increasing from the low level measured in 1987, and in 2002 very high concentration was measured, and the mid-year average was also higher than the limit. The sulphur-dioxide and nitrogen dioxide pollution in Paks can be also assumed within this range. However, there is no indication for a similar peak as in 1997-98, because this was the time when gas supply was introduced in the city and it obviously results in lower polluting materials emission. For the same reasons it is also unlikely that high NO_2 concentration was present in Paks, similarly to the peak measured in 2002-2005 at Szekszárd. Nitrogen dioxide measurements can be recommended also in Paks in order that we can have reliable information related to nitrogen dioxide pollution not only though analogue. This initiative can be also underlined by the fact that the planned M6 motorway has been constructed as aby-pass road avoiding the city.

Period	Average	Period	Average
	g/m²*30-day		g/m²*30-day
87 non-heating season	11,82	96 non-heating season	5,44
87-88 heating	7,59	96-97 heating	4,85
88 non-heating season	8,47	97 non-heating season	5,15
88-89 heating	5,51	97-98 heating	5,77
89 non-heating season	6,49	98 non-heating season	4,86
89-90 heating	3,69	98-99 heating	4,22
90 non-heating season	10,75	99 non-heating season	7,39
90-91 heating	4,19	99-00 heating	7,45
91 non-heating season	5,17	00 non-heating season	6,40
91-92 heating	3,55	00-01 heating	1,94
92 non-heating season	5,61	01 non-heating season	6,00
92-93 heating	18,83	01-02 heating	4,18
93 non-heating season	5,36	02 non-heating season	4,91
93-94 heating	7,51	02-03 heating	7,15
94 non-heating season	7,41	03 non-heating season	7,55
94-95 heating	9,71	03-04 heating	3,94
95 non-heating season	5,22	04 non-heating season	4,51
95-96 heating	5,37	04-05 heating	5,15

Figure 5.4.1: Air pollution at Paks 1987. April – 2005. March

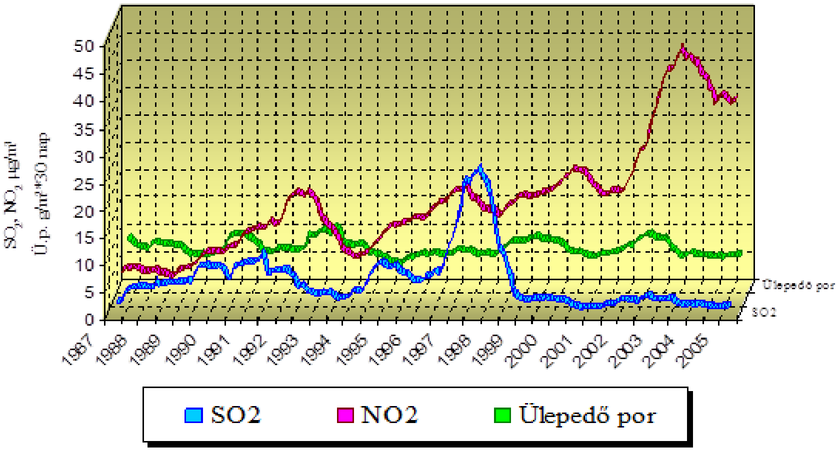
Legend: Ülepedő por - settling dust, 30 nap – 30 days

Period	Sulphur-dioxide			Nitrogen dioxide			Settling dust		
	Average	Exceeding limit	98% freq.	Average	Exceeding limit	98% freq.	Average	Exceeding limit	98% freq.
	μg/m³	%	μg/m³	μg/m³	%	μg/m³	g/m²*30 days	%	g/m²*30 days
87 NF	2,36	0,0	10,00	5,15	0,0	17,00	9,14	9,5	17,11
87-88 F	7,56	0,0	30,60	6,22	0,0	15,00	5,38	0,0	12,53
88 NF	2,39	0,0	9,76	4,97	0,0	20,00	10,44	6,9	39,26
88-89 F	9,54	0,4	49,20	4,54	0,0	19,60	4,73	0,0	11,07
89 NF	2,46	0,0	11,00	8,22	0,0	21,84	6,69	3,6	18,70
89-90 F	15,32	0,4	81,60	10,39	0,0	30,92	5,46	3,6	18,07
90 NF	2,58	0,0	16,74	7,84	0,0	23,54	13,58	20,0	62,14
90-91 F	14,20	0,0	78,28	15,99	0,0	38,00	4,92	3,4	11,84
91 NF	4,02	0,0	12,00	10,84	0,0	22,00	7,99	3,8	15,79
91-92 F	11,31	0,0	52,84	16,96	0,0	37,00	5,89	3,4	15,40
92 NF	4,92	0,0	20,00	21,91	0,0	51,00	7,51	3,6	36,66
92-93 F	5,39	0,0	32,00	16,90	0,0	56,80	12,11	17,2	71,57
93 NF	2,49	0,0	13,96	10,82	0,0	31,58	10,03	6,7	50,42
93-94 F	3,42	0,0	14,96	7,70	0,0	27,94	5,73	0,0	12,27
94 NF	5,35	0,0	33,00	9,29	0,0	31,68	7,16	6,9	24,46

Period	Sulphur-dioxide			Nitrogen dioxide			Settling dust		
	Average	Exceeding limit	98% freq.	Average	Exceeding limit	98% freq.	Average	Exceeding limit	98% freq.
	μg/m³	%	μg/m³	μg/m³	%	μg/m³	g/m²*30 days	%	g/m²*30 days
94-95 F	8,90	0,0	84,00	12,80	0,0	33,00	3,31	4,5	16,42
95 NF	6,95	0,0	62,18	14,00	0,0	36,88	5,26	7,7	19,89
95-96 F	8,90	0,0	56,46	16,75	0,0	45,14	7,04	7,1	35,16
96 NF	6,20	0,0	37,90	16,07	0,0	54,34	6,33	5,9	22,61
96-97 F	10,75	0,0	71,02	21,70	0,3	59,48	6,15	7,5	19,72
97 NF	25,72	5,9	150,00	21,34	0,0	59,00	7,32	4,8	16,10
97-98 F	26,17	5,9	152,16	13,16	0,3	60,92	5,42	7,1	17,46
98 NF	10,38	0,6	76,62	18,01	0,6	54,56	8,97	11,9	27,14
98-99 F	3,07	0,0	15,52	19,16	0,4	46,64	8,03	14,3	23,86
99 NF	2,32	0,0	16,28	18,90	0,0	47,00	10,29	11,9	25,23
99-00 F	3,66	0,0	16,00	21,00	0,3	57,72	6,71	7,3	18,59
00 NF	1,49	0,0	5,24	25,02	0,0	62,12	6,05	4,9	17,18
00-01 F	1,42	0,0	4,00	22,60	0,0	48,44	5,15	0,0	13,30
01 NF	1,27	0,0	3,00	16,70	0,0	43,00	7,03	0,0	14,60
01-02 F	2,80	0,0	15,20	23,95	0,0	48,56	7,13	11,9	22,40
02 NF	2,11	0,0	7,96	29,99	3,6	106,86	11,08	7,9	34,94
02-03 F	3,28	0,0	16,36	39,43	5,4	92,54	7,05	7,7	24,13
03 NF	1,32	0,0	3,62	45,43	14,9	147,36	6,93	5,3	20,42
03-04 F	2,39	0,0	12,00	43,21	6,3	107,4	6,46	5,3	17,67
04 NF	1,25	0,0	3,00	37,77	8,4	102,62	5,28	0,0	11,90
04-05 F	1,51	0,0	6,18	36,88	5,9	106,00	6,50	4,3	19,92

NF = non-heating season
F = heating season

Figure 5.4.2: Air pollution on Szekszárd 1987 – 2005



Legend: Ülepedő por - settling dust, 30 nap – 30 days

As Paks dust load diagram can demonstrate that at the time of commissioning of the nuclear plant Unit No. 4 the load dropped until 1992 from the 16 g/m²˒ figure, which is near to the 30-day limit. From 1993 until 1994-end dust pollution significantly increased in the city, but could not reach the limit. We do not know the exact reason behind the high dust load, the brick factory and pollutions of natural origin might have some role in this event. After this the settling dust quantity moved at fairly low levels at Paks. If comparing with Szekszárd the quantity of settling dust is similar, and its 15-year trend is slightly volatile at medium levels.

5.4.1.2. Present status of air pollution

5.4.1.2.1. Regional environment

Regarding air pollutants that cause environment acidisation, the region is moderately affected in a national-wide comparison (OMSZ data). Quantity of wet deposition:

sulphur compounds	0,58 g/m^2, year
oxidised nitrogen-compounds	0,42 g/m^2, year

Based on data of the background-pollution measuring network operated by the National Meteorological Service and model calculations, the air quality (background-pollution) in the region that is not affected by local polluting sources is the following:

nitrogen dioxide	5,5 µg/m^3
sulphur-dioxide	5,0 µg/m^3
carbon-monoxide	200,0 µg/m^3
ozone	63,8 µg/m^3

These are low concentration data, except ozone.

Decree 4/2002. (X.7.) KvVM designates the air pollution zones in the country. Paks and region belongs to the following zone category (on the scale from A to F (order from lower to higher):

sulphur-dioxide, nitrogen dioxide, carbon-monoxide and benzene	F category
solids (PM_{10})	E category

Concentration ranges are attached to each zone category. Accordingly, concentration ranges defined for E and F zones are presented in Table 5.4.3.

	SO_2	NO_2	PM_{10}	CO
E zone	50-75	26-32	10-14	2500-2500
F zone	below 50	below 26	below 10	below 2500

Table 5.4.3: Concentration ranges for E and F zones [µg/m^3]

The competent environment protection inspectorate has the authority to define the polluted settlements within the zones. The relevant works are still in progress at various environment protection inspectorates.

5.4.1.2.4. Air polluting impacts of traffic

There are two sources for road traffic impacts: traffic on two roads connecting the national highway No. 6 and the plant. Traffic going in and out at the entry gate is also part of this impact.

We know the air polluting impacts of the national highway nr. 6 from model calculations prepared with the traffic data. The impact study prepared by VÁTI's order, as the general contractor (in 2000) present these calculations showing impacts of traffic on the planned M6 Motorway and M6 – 65 speedway project, along the national highway nr. 6. The specific emission figures defined by the KTI …… were used for preparing these calculations, just like for defining any traffic emission. Implementation of the planned motorway will have favourable effects onto the current traffic of the national highway nr. 6. No increase can be expected in the traffic as a consequence of extension of the plant operation time.

Thus pollution caused by traffic on the road section around Paks [in accordance with Government Decree 120/2001. (VI.30.) on the amendment of Government Decree 21/2001. (II. 14.) on certain rules related to the protection of clean air] at 50 m band from the road centreline and under the most unfavourable meteorological circumstances:

carbon-monoxide	85 µg/m^3
nitrogen dioxide	26 µg/m^3

Higher than limit concentration was not measured even at shoulder

We prepared measurements/tests at points along the northern and southern access roads leading to the plant and in the plant area exposed to incoming and outgoing traffic as part of the preliminary environment impact study. These measurements/tests were held during heating (March) and non-heating (May) periods, in a 2x1 month duration. We measured nitrogen dioxide, particulate matter, settling dust and carbon-monoxide pollution levels. Based on the measurement results we may state that no significant air pollution increment can be expected in the area, because no new emission sources appeared. Thus we had the view that no new measurement series was required. This kind of proposal was not presented either in the resolution of the competent authority that closed the preparatory process and prescribed the preparation of the Environmental Impact Study, so now we will repeat and present the results of measurements/tests performed in 2003.

The measuring points were selected at the following locations:

1. measuring point: next to southern access road;
2. measuring point: next to northern access road;
3. measuring point: in the plant area, at fire station

Measurements/tests duration:

2003. March 11. - April 08. 2003. April 29. - May 27.

OKK-National Environmental Health Centre performed the NO2, particulate matter and settling dust measurements/tests, and ENVIPLUS Engineering Office Ltd. the CO measurements/tests. The measurement protocols contain the detailed description of methods and results of measurements/tests. Particulate matter was measured only at measuring station nr. 3, because the conditions required for such measurements were available only on this station (energy supply).

Results from heating period

- **Nitrogen dioxide** pollution was low. Its level was fairly steady during the four weeks of measurement and remained within the range of 5-17,5 µg/m^3, and the third week showed the highest level. Regarding area distribution the highest pollution was measured at measuring point nr. 3 in each period. Out of the four periods three times the measuring point nr. 1 showed the lowest pollution levels. The Table 5.4.12 presents the average results. (the table present rounded-up figures, in line with the measuring accuracy).
- **Settling dust** pollution was the highest at measuring point nr. 3, but the level reached only 50% of the limit, 8 g/m^2 * 30 days.
- **Particulate matter (PM_{10})** pollution was 10 %, 42 % higher than the limit during the second and third weeks. During the first and last week pollution remained below the limit. Concentrations were between 43 and 71 µg/m^3. The dust dominantly came from a non-consolidated soil.
- **Carbon-monoxide** concentrations were the highest at measuring station nr. 2. Level in every measurement remained well below limit and concentrations were between 750 and 2200 µg/m^3.

Period	1. measuring point	2. measuring point	3. measuring point
Nitrogen dioxide (µg/m^3)			
1. week	6	12	8
2. week	8	15	7
3. week	12	18	16
4. week	5	8	7
Settling dust (g/m^2,30 days)			
full month	1,0	6,0	8,0
Particulate matter PM_{10} (µg/m^3)			
1. week	n.a.	n.a.	48
2. week	n.a.	n.a.	55
3. week	n.a.	n.a.	71
4. week	n.a.	n.a.	43
Carbon monoxide (µg/m^3)			
1. week	1390	1980	1040
2. week	1160	1520	1400
3. week	1610	2200	1680
4. week	750	870	810

Table 5.4.12: Pollution measured in March 2003

Results of measurement during the non-heating period:

- The **nitrogen dioxide** pollution was low and quite steady during the four weeks of the measurement and remained between 5-20 µg/m^3, and the first and second week showed the higher levels. Regarding the area distribution the highest pollution was measured in every period at measuring point No. 2. Out of the four periods three times the measuring point nr. 1. showed the lowest pollution levels. The Table 5.4.13. presents the average results.
- The **settling dust** load was quite steady and well below the limit, 6-7 g/m^2 * 30 days. The sample could not be assessed at measuring station nr. 3 due to third party intervention.
- The **particulate matter (PM_{10})** pollution on the second week was slightly above the limit. The concentration was between 23 and 54 µg/m^3. The dust dominantly came from a sandy and non-consolidated soil.
- The **carbon-monoxide** concentrations were the highest at measuring station nr 2. Every measurement presented levels well below the limit, and concentrations were between 950 and 2420 µg/m^3.

Period	1. measuring point	2. measuring point	3. measuring point
Nitrogen dioxide (µg/m^3)			
1. week	11	15	12
2. week.	9	20	9
3. week	5	15	8
4. week	8	17	9
Settling dust (g/m^2,30 days)			
full month	6	7	*
Particulate matter PM_{10} (µg/m^3)			
1. week	n.a.	n.a.	31
2. week.	n.a.	n.a.	54
3. week	n.a.	n.a.	23
4. week	n.a.	n.a.	27
Carbon-monoxide (µg/m^3)			
1. week	950	1200	800
2. week.	1440	2420	1750
3. week	1200	1800	1540
4. week	1330	1300	1120

* third party intervention, assessment is not possible

Table 5.4.13: Pollution measured in May 2003

Emission from road traffic

2004 traffic data present total traffic in the region of the nuclear plant using traffic count for national road no. 6: 11 059 vehicle/day (KTI traffic count data). Based on this figure, the total average traffic going into the plant is 1000 vehicle/day. Peak hour traffic is 10% of the daily traffic. Thus emission:

based on traffic on road no. 6.:
CO 7215 g/km, hour; CH 1776 g/km, hour; NO_x 3330 g/km, hour; SO_2 44 g/km, hour;

based on traffic on the access road to the nuclear plant:
CO 720 g/km, hour; CH 178 g/km, hour; NO_x 330 g/km, hour; SO_2 4 g/km, hour.

We used the specific figures prepared by KTI (Institute for Transport Sciences Non-profit Ltd.)

5.4.1.2.5. Assessment of the current air pollution based on the measurements/tests

Table 5.4.14 presents air pollution health limits, in abstracts. Simplified abstract, without tolerance limit, in accordance with Decree 4/2004.(IV.7.) KvVM-ESzCsM-FVM amending Decree 14/2001. (V.9.) KöM-EüM-FVM on emission limits for air pollution and stationary air polluting point sources

Air pollutant	hourly ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	annual ($\mu g/m^3$)
Sulphur dioxide	250	125	50
Nitrogen dioxide	100	85	40
Nitrogen oxides	200	150	70
Carbon monoxide*	10 000	5 000*	3 000
Particulate matter PM_{10}	-	50	40
Particulate matter TSPM	200	100	50
Lead	-	-	0,3
Benzene ***	-	10	5
	Daily 8-hour moving average concentration maximum ($\mu g/m^3$)		
Ozone	120**		
Settling dust , non-toxic	**30 days** (g/m^2, 30 days)	**annual** (t/km^2, year)	
	16	120	

* daily 8-hour moving average concentration maximum
** maximum values shall be selected from 8-hour moving average values based on the hourly average figures
*** carcinogenic air pollutant

Table 5.4.14: Air pollution health care limits ($\mu g/m^3$)

Measurements performed in the environment of Paks Nuclear Plant are assessed in the following summary

Measuring station	Period	Nitrogen dioxide ($\mu g/m^3$)	Carbon monoxide ($\mu g/m^3$)	particulate matter ($\mu g/m^3$)	settling dust (g/m^2, 30 days)
1. measuring station next to south access road	heating season	8	1228	-	0,9
	non-heating season	8	1230	-	6,1
2. measuring station next to north access road	heating season	13	1643	-	5,6
	non-heating season	17	1680	-	7,1
3. measuring station behind fire station	heating season	9	1233	54	8,0
	non-heating season	9	1303	34	-
Total measuring station	heating-non-heating season average	10,7	1385	44	5,5

Table 5.4.15: Air pollution average values in the environment of Paks Nuclear Plant 2003.

We can draw the following conclusions from the table and figures:

- The average of two measurements cycle was is below the limit for every analysed material. Settling dust, nitrogen dioxide and carbon-monoxide concentration levels were well below the permitted limit. However the particulate matter load was several times above the permitted limit.
- There is no significant difference between values measured in heating and non-heating periods, except settling dust load, which is higher during the non-heating period.
- Regarding nitrogen dioxide and carbon-monoxide, 2. measuring station (north entry road) is more polluted than the other two stations. This measuring point was located closer to the road.
- **Particulate matter was the critical pollutant.** Out of 8 tests higher than limit concentration was measured on 3 days. The exceeding limit was within the range of 8-42%. Particulate matter most probably comes into the air pre-dominantly from unconsolidated, sandy soil.
- Air pollution arising from access roads and plant area does not hit any residential area. Impact of air pollution from the plant practically does not spread beyond the plant area, where limits specified by safety regulations in effect in the working area shall be followed.

Concentration of „conventional” (i.e. not radiating) air pollutants present in the nuclear plant environment cannot cause any damage to health, or unpleasant and disturbing effects. The air pollution does not cause any other damage to the environment and the ecology. Air pollution measured for the protective forest is not harmful, and its effect is extremely advantageous to the air quality.

16.2.1.2 National Air Pollution Measuring Network

In Hungary the air quality was controlled on stations operated by the Regional Immission Control (RIV) reporting to the National Air Pollution Measuring Network (OLM) (previously: National Immission Measuring Network (OIH)) and at the so-called Phare monitor stations. The networks were established and operated under the professional control of OKI Air Hygienic Section. RIV measuring stations measured the daily average NO_2, SO_2 concentration and 30-day quantity of settling dust (PM), whereas the Phare monitor stations measured the NO_2, NO_x, SO_2, CO, ozone and PM_{10} concentration in every 30 minutes.

In 2002 the measuring network was transferred under the control of the local environment protection inspectorates. The National Meteorological Service, Climate and Air Environment Department, Clean Air Protection Reference Centre (before: VITUKI KHT LRK Air Pollution Data Centre, even before KGI-KVI RKL Air Pollution Data Centre) collects and 'validates' the measured data.

From an environmental health care aspects, the National Environmental Health Institute (former name: Fodor József National Public Health Centre National Environmental Health Institute) processes and assesses the data.

Annual air quality assessment is published under the title: „**Recapitulative assessment on Hungary's air quality**".

Results of measuring network are assessed based on the air pollution index and statistical indicators. Results are graphically presented on air pollution maps.

<u>Assessment based on air pollution index</u>

The air pollution index was determined for each pollutant using the annual average values. Values presented with the colour codes applied for the assessment can be quantified based on the following table.

Index	Értékelés	*Nitrogén-oxidok (mint NO_2) (µg/m^3)*	*Nitrogén-dioxid (µg/m^3)*	*Kén-dioxid (µg/m^3)*	*Ózon (µg/m^3)*	*PM10 (µg/m^3)*	*TSPM (µg/m^3)*	*Szén-monoxid (µg/m^3)*	Benzol (µg/m^3)
		középérték	*középérték*	*középérték*	*középérték*	*középérték*	*középérték*	*középérték*	*középérték*
		éves	*éves*	*éves*	*éves**	*éves*	*éves*	*éves*	*éves*
1	kiváló	0-28	0-16	0-20	0-48	0-16	0-20	0-1200	0-2
2	jó	28-56	16-32	20-40	48-96	16-32	20-40	1200-2400	2-4
3	megfelelő	56-70	32-48	40-50	96-120	32-40	40-50	2400-3000	4-9
4	szennyezett	70-140	48-80	50-100	120-220	40-80	50-100	3000-6000	9-10
5	erősen szennyezett	140-	80-	100-	220-	80-	100-	6000-	10-

Index – Index
Értékelés – Assessment
Nitrogén-oxidok – Nitrogen oxides
Nitrogén-dioxid – Nitrogen-dioxide
Kén-dioxid – Sulphur-dioxide
Ózon – Ozone
Szén-monoxid – Carbor-monoxide
Benzol – Benzene
középérték – mid-rate
éves – annual
kiváló – excellent
jó – good
megfelelő – acceptable
szennyezett – polluted
erősen szennyezett – extremely polluted

Figure 16.2.1-1: Colour codes applied for air pollution index

Assessment based on statistical indicators

Assessment is performed using the following statistical indicators:

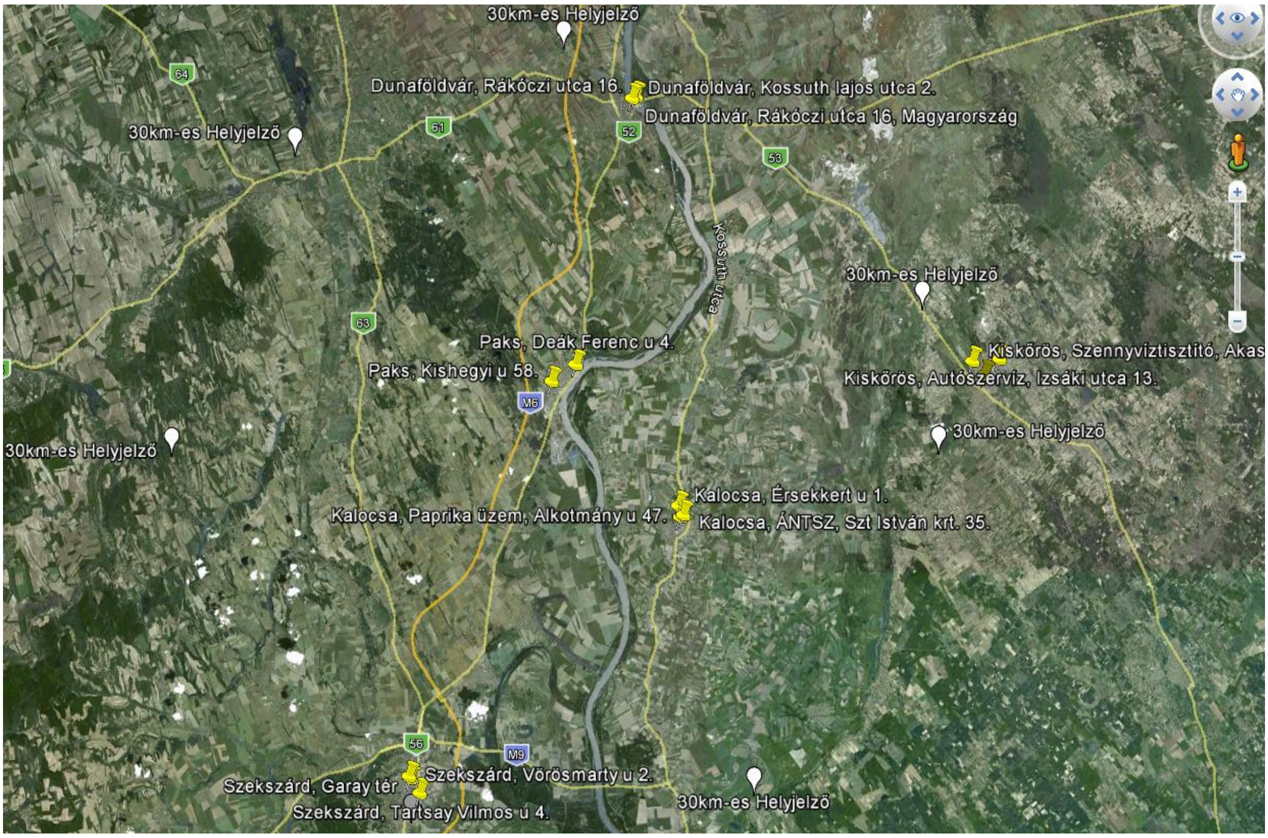
- annual average (μg/m³ and g/m²*30 days),
- maximum (μg/m³ and g/m²*30 days),
- 50% percentile [50 minutes.],
- 98% percentile [98 minutes.],
- 99,9% percentile [99,9 minutes.],
- theoretical number of data [theoretical number]
- number of measurement data available on the settlement and in the region [data number],
- value of data availability expressed in percentage [data availability %],
- number of 24-hour average values in excess of the limit on the settlements and in the regions hourly (for settling dust: 30-day data) [limit. average. number],
- percentage of limit excess cases [limit, average, %],
- and indicator calculated for the annual average indicator (annual average/annual limit).

Regarding OIH and OLM, only the air settling dust load values were measured on the site and in the vicinity of the site at Paks, and no NO_x, NO_2, SO_2, CO, PM_{10} immission data were measured.

16.2.1.2.1 2007 recapitulative assessment of Hungary's air quality based on manual measuring network [16-2]

There is no automatic measuring station in operation within 30 km zone from Paks.

Manual measuring stations are working in several cities, their location is shown on Figure 16.2.1-2 and Table 16.2.1-1.



Helyjelző – place marker, utca – street, szennyvíztisztító – sewage cleaning plant, paprika üzem – pepper processing plant

Figure 16.2.1-2: Location of manual measuring stations

Measuring stations	measured air pollutant	Location
Paks *Kishegyi u 58.* *Deák Ferenc u 4.*	Settling dust	Traffic Traffic
Dunaföldvár *Kossuth u. 2.* *Rákóczi u. 16.*	Settling dust	City centre. Main polluting source: heating, traffic. Traffic, high-density residential area. Main polluting source: traffic and heating.
Kalocsa *Alkotmány u 49. Paprika plant* *Szent I. krt. 35. ÁNTSZ building* *Érsekkert u 1. Communal institution*	NO_2, Settling dust	Industrial measuring point high-density residential area. village-type environment. Main polluting source: industrial combustion machinery, traffic, residential heating. City centre, high-density residential area. Main polluting source: traffic, communal operation, institutions, residential heating. Recreation are (park, sports field). Main polluting source: residential heating.
Kiskőrös *Akasztó u. 49.* *Petőfi Sándor tér 1.* *Izsáki u 13.*	Settling dust	-
Szekszárd *Tartsay u 4.* *Garay tér* *Vörösmarty u 2.*	NO_2, SO_2, Settling dust	Traffic, next to road no. 56 City centre, heavy traffic road nearby City centre, heavy traffic road nearby

Table 16.2.1-1: Manual measuring stations characteristics - 2007

The 2007 air quality assessment was prepared using the methods defined by Decree 17/2001. (VIII.3.) KöM and its amendments and the health limits defined by Decree 14/2001 (V.9) KöM-EüM-FVM and its amendments.

Air pollution index

The air pollution index was determined for NO_2, SO_2 and ÜP based on annual average values, and for the aggregated air pollution index of cities/villages based on the polluting materials with the highest index measured in the cities/villages. The following table presents the 2007 aggregated results of assessment based on the air pollution index.

Settlement	Air pollution Index			Aggregated Index
	NO_2	SO_2	Settling dust	
Paks	-	-	good (2)	good (2)
Dunaföldvár	-	-	good (2)	good (2)
Kalocsa	excellent (1)	-	good (2)	good (2)
Kiskőrös	-	-	good (2)	good (2)
Szekszárd	good (2)	excellent (1)	good (2)	good (2)

Table 16.2.1-2: Air pollution Index - 2007

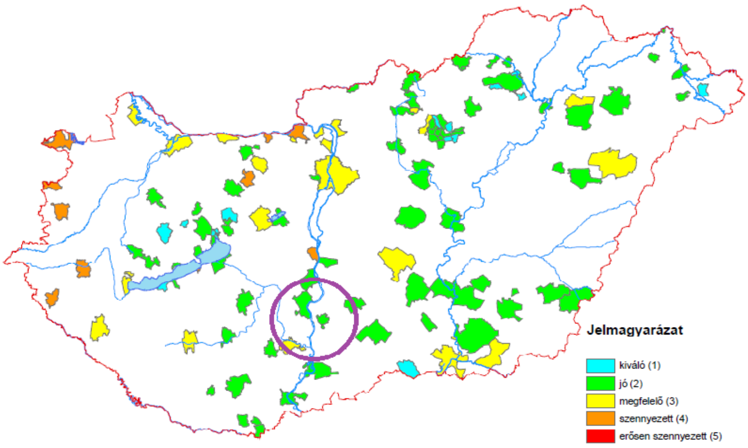
Statistical indicators

The following table presents the statistical indicators for the studied settlements based on settling dust and nitrogen dioxide annual average figures measured in 2007:

Settlement	Annual average	based on 24-hour averages									Indicator
		max.	50 %.	98 %.	99,9%	theoretical	data	data	limit avr.	limit avr.	
	g/m²*30nap µg/m³	g/m²*30nap µg/m³	%	%	%	pcs	pcs	%	pcs	%	I/In
Settling dust											
Paks	5,62	12,1	4,7	10,84	12,04	24	22	91,67	0	0	0,562
Dunaföldvár	6,6	11,2	6,2	10,65	11,17	24	24	100	0	0	0,66
Kalocsa	6,63	33	5	27,56	32,73	46	35	76,09	0	0	0,663
Kiskőrös	5,46	18	5	17,32	17,97	35	35	100	0	0	0,546
Szekszárd	6,51	11,2	6,35	10,51	11,17	49	44	89,8	0	0	0,651
NO2											
Kalocsa	15,71	96	13	46	79,05	1095	998	91,14	1	0,1	0,34
Szekszárd	33,33	127	26	103	126,56	514	437	85,02	22	5,03	0,72

Table 16.2.1-3: Air pollution determined by statistical indicators - 2007

Air pollution map



Jelmagyarázat – Legend, kiváló – excellent, jó – good, megfelelő – acceptable, szennyezett – polluted, erősen szennyezett – extremely polluted

Figure 16.2.1-3: Air pollution map – 2007

16.2.1.2.2 2008 recapitulative assessment of Hungary's air quality based on manual measuring network [16-3]

The following table presents the manual measuring stations in operation in 2008.

Measuring stations		Measured components	Measuring stations		Measured components
Paks	*Kishegyi u 58.* *Deák Ferenc u 4.*	Settling dust	**Kalocsa**	*Alkotmány u 49.* *Szent I. krt. 35.* *Érsekkert u 1.*	NO_2
Dunaföldvár	*Kossuth u. 2.* *Rákóczi u. 16.*	Settling dust	**Szekszárd**	*Tartsay u 4.* *Garay tér* *Vörösmarty u 2.*	NO_2

Table 16.2.1-4: A manual measuring stations characteristics i - 2008

The air quality assessment was also in 2008 prepared using the methods defined in Decree 17/2001. (VIII.3.) KöM and amendments, and health limits defined by Decree 14/2001 (V.9) KöM-EüM-FVM and amendments.

Air pollution index

Settlement	Air pollution Index			Aggregated Index
	NO_2	SO_2	Settling dust	
Paks	-	-	good (2)	good (2)
Dunaföldvár	-	-	good (2)	good (2)
Kalocsa	excellent (1)	-	-	excellent (1)
Szekszárd	acceptable (3)	-	-	acceptable (3)

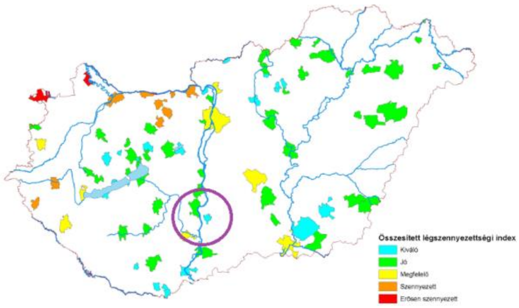
Table 16.2.1-5: Air pollution Index - 2008

Statistical indicators

Settlement	Annual average	based on 24-hour average values									Indicator
		max.	50 %.	98%	99,9%.	theoretical	data	data	limit avr.	limit avr.	
	g/m²*30days µg/m³	g/m²*30days µg/m³	%	%	%	pcs	pcs	%	pcs	%	I/In
Settling dust											
Paks	5,09	10,03	4,6	9,77	10,27	24	23	95,83	0	0	0,509
Dunaföldvár	6,23	11,2	6,25	10,86	11,18	24	22	91,67	0	0	0,623
NO_2											
Kalocsa	12,51	70	11	36	60,98	1053	1008	95,73	0	0	0,284
Szekszárd	37,82	152	31	118	149,14	1071	956	89,26	67	7,01	0,859

Table 16.2.1-6: Air pollution determined by statistical indicators - 2008

Air pollution map



Jelmagyarázat – Legend, Összesített index - Aggregated Index, kiváló – excellent, jó – good, megfelelő – acceptable, szennyezett – polluted, erősen szennyezett – extremely polluted

Figure 16.2.1-4: Summarised air pollution map – 2008

16.2.1.2.3 2009 recapitulative assessment Hungary's air quality based on manual measuring network [16-4]

The following table presents characteristics of manual measuring stations providing the measurement results.

Measuring stations		Measured components	Measuring stations		Measured components
Paks	*Kishegyi u 58.* *Deák Ferenc u 4.*	Settling dust	**Kalocsa**	*Alkotmány u 49.* *Szent I. krt. 35.* *Érsekkert u 1.*	NO_2
Dunaföldvár	*Kossuth u. 2.* *Rákóczi u. 16.*	Settling dust	**Szekszárd**	*Tartsay u 4.* *Garay tér* *Vörösmarty u 2.*	NO_2

Table 16.2.1-7: Characteristics of manual measuring stations - 2009

Air quality assessment in 2009 was also prepared in accordance with the methods specified in Decree 17/2001. (VIII. 3.) KöM and its amendments, and the health care limits defined in Decree 14/2001 (V. 9) KöM-EüM-FVM and amendments.

Air pollution index

Settlement	Air pollution Index		Aggregated Index
	NO_2	Settling dust	
Paks	-	good (2)	good (2)
Dunaföldvár	-	excellent (1)	excellent (1)
Kalocsa	excellent (1)	-	excellent (1)
Szekszárd	good (2)	-	good (2)

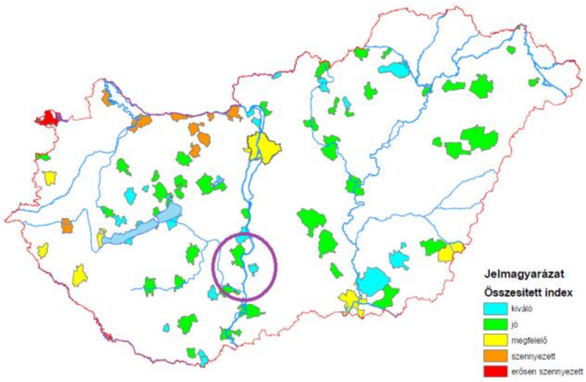
Table 16.2.1-8: Air pollution Index - 2009

<u>Statistical indicators</u>

Settlement	Annual average	max.	50 %.	98%	99,9%	theore-tical	data	data	limit avr.	limit avr.	Indicator
	g/m²*30days µg/m³	g/m²*30 days µg/m³	%	%	%	pcs	pcs	%	pcs	%	I/In
Settling dust – based on 30-day average values											
Paks	6,59	15,6	6,25	14	15,52	24	22	91,67	0	0	0,66
Dunaföldvár	5,78	16,3	4,9	13,88	16,18	24	23	95,83	1	4,35	0,58
based on NO_2 – 24-hour average values											
Kalocsa	10,35	56	8	31	41,94	1032	1029	99,71	0	0	0,25
Szekszárd	30,09	332	26	81,42	280,91	1046	930	88,91	15	1,61	0,72

Table 16.2.1-9: Air pollution determined by statistical indicators - 2009

<u>Air pollution map</u>



Jelmagyarázat – Legend, Összesített index - Aggregated Index, kiváló – excellent, jó – good, megfelelő – acceptable, szennyezett – polluted, erősen szennyezett – extremely polluted

Figure 16.2.1-5: Summarised air pollution map – 2009

16.2.1.2.4 2010 recapitulative assessment Hungary's air quality based on manual measuring network [16-5]

The following table presents location of the manual measuring stations in operation.

Measuring stations		Measured components	Measuring stations		Measured components
Paks	*Kishegyi u 58.* *Deák Ferenc u 4.*	Settling dust	**Kalocsa**	*Alkotmány u 49.* *Szent I. krt. 35.* *Érsekkert u 1.*	NO_2
Dunaföldvár	*Kossuth u. 2.* *Rákóczi u. 16.*	Settling dust	**Szekszárd**	*Tartsay u 4.* *Garay tér* *Vörösmarty u 2.*	NO_2

Table 16.2.1-10: Characteristics of manual measuring stations - 2010

Air quality assessment in 2010 was also prepared in accordance with the methods specified in Decree 17/2001. (VIII. 3.) KöM and its amendments and health care limits defined in Decree 14/2001 (V. 9) KöM-EüM-FVM and amendments.

<u>Air pollution index</u>

Settlement	Air pollution Index		Aggregated Index
	NO_2	Settling dust	
Paks	-	good (2)	good (2)
Dunaföldvár	-	good (2)*	good (2)
Kalocsa	excellent (1)	-	excellent (1)
Szekszárd	good (2)	-	good (2)

<u>Comment:</u> * data availability lower than 75%

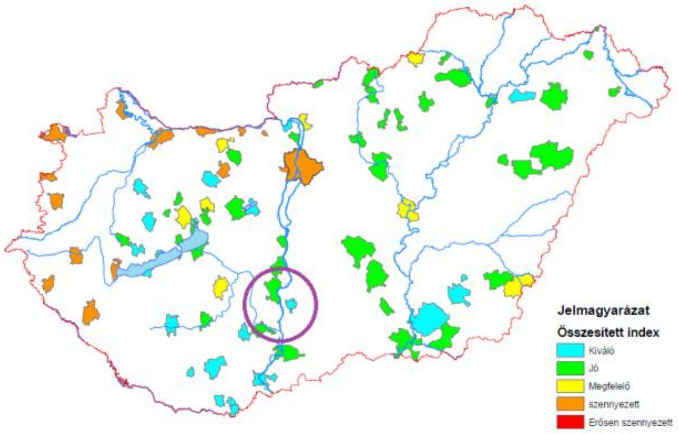
Table 16.2.1-11: Air pollution Index - 2010

Statistical indicators

Settlement	Annual average	max.	50 %.	98 %.	99,9 %.	theore-tical	data	data	limit avr.	limit avr.	Indicator
	g/m²*30 days µg/m³	g/m²*30 days µg/m³	%	%	%	pcs	pcs	%	pcs	%	I/In
Settling dust – based on 30-day average values											
Paks	5,15	13,5	4,9	11,6	13,41	24	20	83,33	0	0	0,52
Dunaföldvár	6,75	16,1	6,35	14,46	16,02	36	22	61,11	1	4,55	0,68
NO_2 - based on 24-hour average values											
Kalocsa	11,12	50	10	31,52	46,86	1083	1025	94,64	0	0	0,28
Szekszárd	28,25	328	23	76	327,14	1095	864	78,90	12	1,39	0,71

Table 16.2.1-12: Air pollution determined by statistical indicators - 2010

Air pollution map



Jelmagyarázat – Legend, Összesített index - Aggregated Index, kiváló – excellent, jó – good, megfelelő – acceptable, szennyezett – polluted, erősen szennyezett – extremely polluted

Figure 16.2.1-6: Summarised air pollution map – 2010

16.2.1.2.5 2011. recapitulative assessment Hungary's air quality based on manual measuring network [16-6]

The following table presents location of manual measuring stations in operation.

Measuring stations		Measurement components	Measuring stations		Measurement components
Paks	*Kishegyi u 58.* *Deák Ferenc u 4.*	Settling dust	**Kalocsa**	*Alkotmány u 49.* *Szent I. krt. 35.* *Érsekkert u 1.*	NO_2
Dunaföldvár	*Kossuth u. 2.* *Rákóczi u. 16.*	Settling dust	**Szekszárd**	*Tartsay u 4.* *Garay tér* *Vörösmarty u 2.*	NO_2

Table 16.2.1-13: Characteristics of manual measuring stations - 2011

The 2011 air quality assessment was prepared using methods defined in Decree 6/2011. (I.14.) VM, based on health limits defined in Decree 4/2011 (I.14) VM. The Decree in 2011 terminated limits for settling dust, thus they are not presented in the statistical tables. Sampling of nitrogen-dioxide was held daily or every second day, while settling dust in 30-day cycles. Though settling dust limits were terminated, categories in the air pollution index assessment were not modified. The tables don't show the number of limit excess, their % and the indicators among the statistical indicators.

Air pollution index

Settlement	Air pollution Index		Aggregated Index
	NO_2	Settling dust	
Paks	-	excellent (1)	excellent (1)
Dunaföldvár	-	good (2)	good (2)
Kalocsa	excellent (1)	-	excellent (1)
Szekszárd	good (2)	-	good (2)

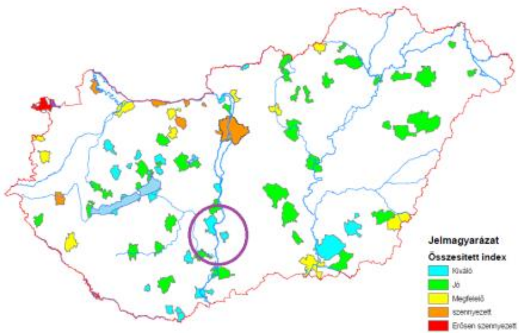
Table 16.2.1-14: Air pollution Index - 2011

Statistical indicators

Settlement	Annual average	max.	50 %.	98 %.	99,9 %.	theore-tical	data	data	limit avr.	limit avr.	Indicator
	g/m^2*30 days $\mu g/m^3$	g/m^2*30 days $\mu g/m^3$	%	%	%	pcs	pcs	%	pcs	%	I/In
Settling dust – 30 days average											
Paks	3,37	8,6	2,5	8,38	8,59	24	23	95,83	-	-	-
Dunaföldvár	5,08	12,7	4,7	11,03	12,62	24	23	95,83	-	-	-
NO_2 - based on 24-hour average values											
Kalocsa	15,03	59	14	34,78	53,95	1014	1012	99,8	0	0	0,38
Szekszárd	31,94	432	28	76	154,9	1052	950	90,3	12	1,26	0,80

Table 16.2.1-15: Air pollution determined by statistical indicators - 2011

Air pollution map



Jelmagyarázat – Legend, Összesített index - Aggregated Index, kiváló – excellent, jó – good, megfelelő – acceptable, szennyezett – polluted, erősen szennyezett – extremely polluted

Figure 16.2.1-7: Summarised air pollution map – 2011

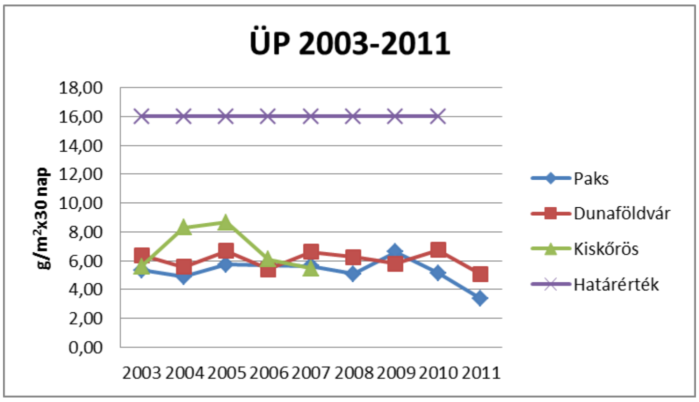
16.2.1.2.6 Assessments based on annual average values between 2003-2011

The following table presents annual average figures of settling dust concentration in 2003-2011 within a 30 km zone:

Settling dust 2003-2011	Paks	Dunaföldvár	Kiskőrös	Limit
	g/m^2x30 days			
2003	5,35	6,39	5,61	30 days 16 g/m^2x30 days Annual 120 t/km^2xév
2004	4,88	5,56	8,30	
2005	5,72	6,67	8,67	
2006	5,70	5,40	6,07	
2007	5,62	6,60	5,46	
2008	5,09	6,23	-	
2009	6,59	5,78	-	
2010	5,15	6,75	-	
2011	3,37	5,08	-	-

Table 16.2.1-16: Settling dust annual average concentration – 2003 - 2011

Air pollution health limits were in effect until 2010 in conformity with Appendix 1 of Decree 14/2001. (V. 9.) KöM-EüM-FVM on air pollution limits, and emission limits from stationary air polluting point sources. The new Decree 4/2011. (I. 14.) VM on air load limits and emission limits from stationary air polluting point sources contains no limit for settling dust.



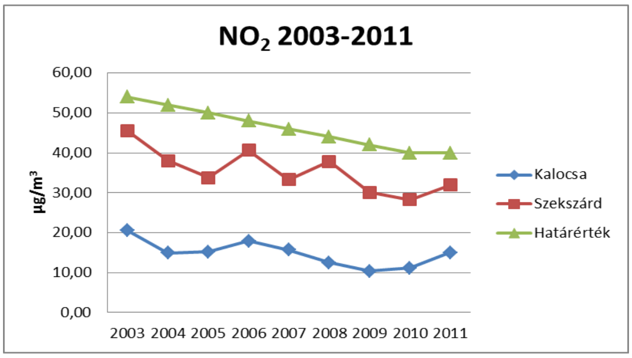
ÜP – Settling dust, Határérték – limit

Figure 16.2.1-8: Changes in settling dust data in the region between 2003-2011

The following table presents annual average figures of nitrogen dioxide concentration in 2003-2011 within a 30 km zone:

NO_2 2003-2011	Kalocsa	Szekszárd	Annual limit	Annual limit
	μg/m³			
2003	20,55	45,52	40	54
2004	14,89	38,04		52
2005	15,18	33,79		50
2006	17,87	40,60		48
2007	15,72	33,33		46
2008	12,51	37,82		44
2009	10,35	30,09		42
2010	11,12	28,25		40
2011	15,03	31,94		-

Table 16.2.1-17: Nitrogen dioxide annual average concentration – 2003 - 2011



Határérték – limit

Figure 16.2.1-9: NO_2 in the region between 2003-2011

16.2.1.3 Studies prepared within the NAÜ program in 2010-2011 - AEKI [16-7]

AEKI held measurements in a NAÜ program in 2010-2011 during summer and the heating season with the purpose to analyse changes in air quality (heating-fossil components) in mid-year.

The following table presents the locations of measurements/tests and the measured components.

AEKI 2010, 2011		
Settlement	**Measurement components**	**Location**
Paks *Dózsa György road 95.* *Gagarin street*	PM_{10} (TEOM) element composition (XRF)	Traffic Park
Fadd *Öreg street*	PM_{10} (with gravimetry) element composition (XRF)	village

Table 16.2.1-18: Measurement characteristics of study prepared under the NAÜ program in 2010-2011

The following Google Earth figure presents the measuring points.

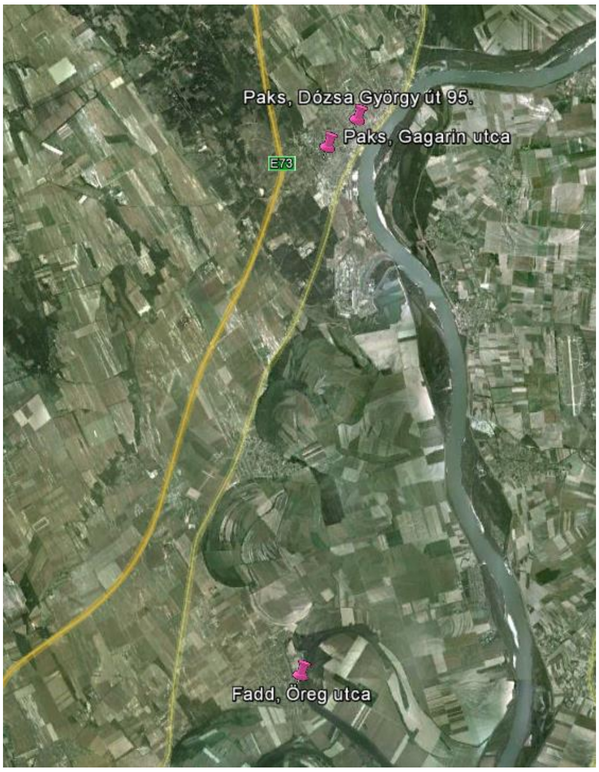
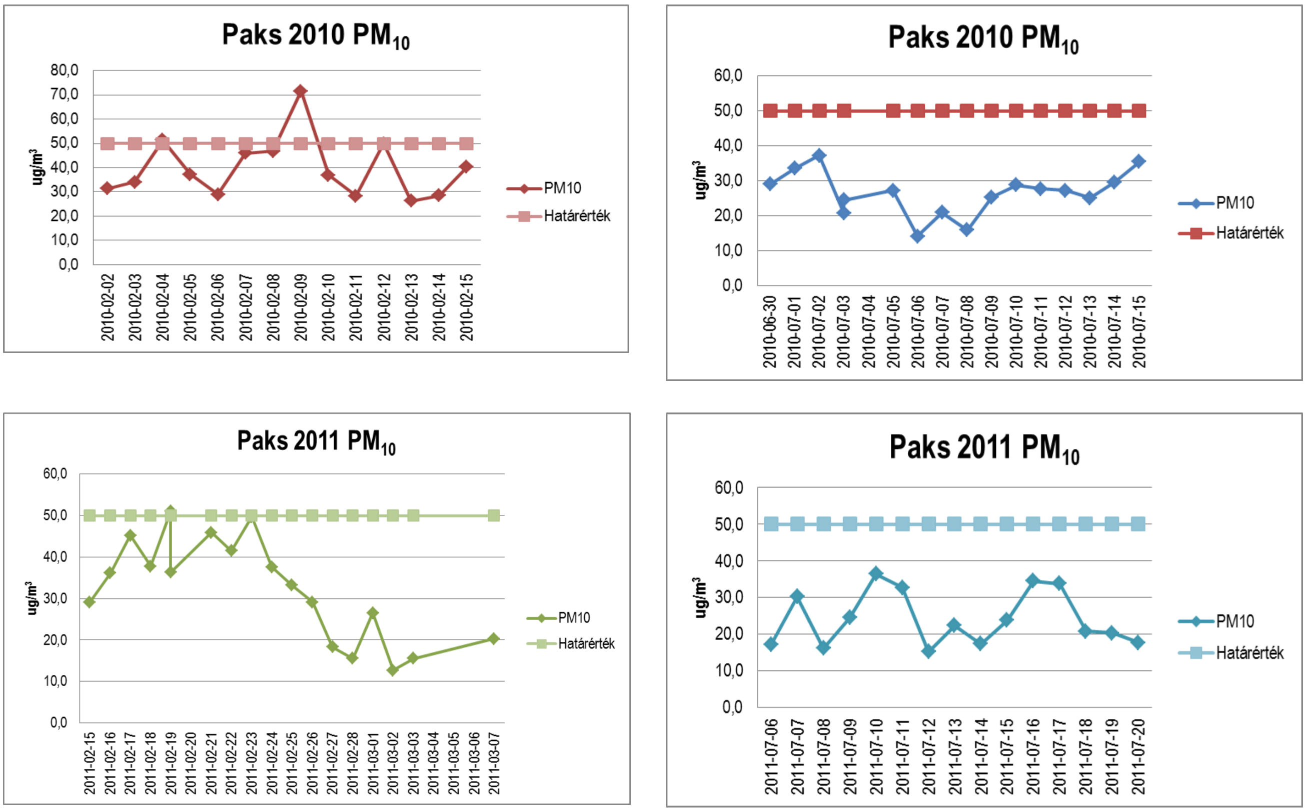


Figure 16.2.1-10: Measuring points under the NAÜ program in 2010-2011

Table 16.2.1-19 presents the detailed results of PM_{10}, soot and composition values measured **at Paks**, and Figure 16.2.1-11 presents the PM_{10} run-off curves:

	PM_{10}	BC (soot)	S	Cl	K	Ca	Ti	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Br	Rb	Sr	Pb
	ug/m³		ng/m³																	
Paks 2010																				
Average	32,7	1,7	472,0	486,8	260,0	495,4	33,1	2,5	11,8	261,5	2,8	2,0	4,6	20,1	1,3	0,6	2,6	0,7	2,0	10,1
Max	71,6	3,4	1157,1	1023,4	458,8	1331,8	92,9	3,6	26,1	526,5	4,2	3,2	7,7	43,2	3,2	0,7	6,2	1,1	7,8	26,5
Min	14,1	0,3	152,7	93,2	110,6	87,0	3,3	1,6	4,1	67,3	0,8	0,9	1,9	3,5	0,6	0,4	1,3	0,3	0,4	2,1
98%	59,8	3,4	1031,5	1010,5	457,1	1193,2	84,8	3,6	22,6	507,0	4,1	3,2	7,5	41,4	2,7	0,7	5,2	1,1	6,6	26,5
Nr. of daily test	29	27	28	8	29	29	22	14	22	29	20	5	20	29	13	18	29	19	25	28
Paks 2011																				
Average	28,6	1,1	747,0	202,5	305,7	370,9	16,3	2,1	8,8	262,6	2,7	1,1	4,3	28,8	2,0	0,8	4,5	0,9	1,3	13,0
Max	51,0	1,9	2018,7	303,2	674,6	841,1	40,8	4,6	17,4	535,7	5,8	1,8	10,5	94,1	6,0	1,9	11,6	1,9	2,5	41,6
Min	12,7	0,8	152,5	44,8	90,3	104,7	3,7	1,0	3,5	98,2	1,1	0,8	1,4	4,8	0,5	0,3	0,9	0,4	0,4	1,3
98 %rc.	50,2	1,8	2018,7	303,2	674,6	785,6	33,1	4,0	16,2	465,7	5,2	1,7	9,2	90,7	5,8	1,9	11,2	1,9	2,2	36,1
Nr. of daily test	33	15	31	15	33	33	30	19	33	33	27	7	32	33	20	32	33	22	29	33

Table 16.2.1-19: Measurement results of study prepared under the NAÜ program in 2010-2011 at Paks



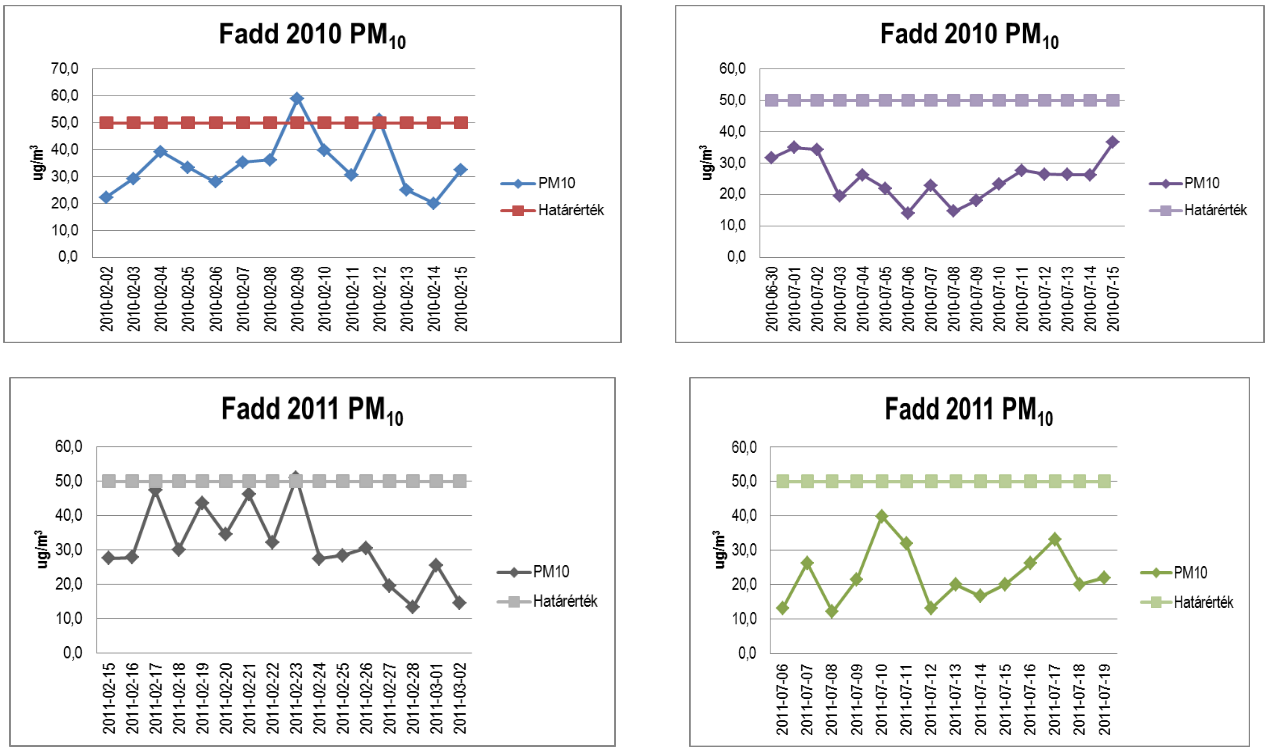
Határérték – limit

Figure 16.2.1-11: Run-off curves of values measured under the NAÜ program in 2010-2011 at Paks

Table 16.2.1-20 presents detailed results of M_{10},, soot measured at **Fadd** and their composition, and Figure 16.2.1-12 presents the PM_{10} run-off curves:

	PM_{10}	BC (soot)	S	Cl	K	Ca	Ti	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Br	Rb	Sr	Pb
	ug/m³		ng/m³																	
Fadd 2010																				
Average	29,6	no data	569,4	181,0	284,3	343,5	51,7	4,0	14,0	186,4	2,3	2,0	2,7	18,1	1,2	0,6	2,7	0,6	1,7	10,4
Max	59,0		1613,3	588,5	751,4	709,0	190,2	8,6	37,0	452,3	4,7	2,1	5,1	41,5	2,5	0,8	6,9	1,2	5,2	38,1
Min	14,1		134,6	21,2	104,8	47,5	3,9	1,6	3,4	31,0	1,1	2,0	1,2	4,1	0,5	0,4	1,3	0,4	0,5	2,2
98 %.	54,5		1522,8	568,7	606,5	667,4	171,7	8,2	35,1	395,2	4,6	2,1	4,8	39,0	2,4	0,8	6,3	1,1	5,1	33,8
nr. of daily tests	30		27	11	30	30	29	11	29	30	16	2	25	30	5	15	30	15	19	30
Fadd 2011																				
Average	27,1	no data	774,2	122,0	325,3	541,7	22,1	3,2	9,8	299,0	3,2	1,4	3,3	24,6	2,5	0,8	4,2	1,0	1,7	12,2
Max	51,1		2433,6	256,7	655,6	2699,8	85,6	6,7	30,0	1012,4	10,1	2,0	7,9	83,5	6,4	1,7	10,2	2,4	6,2	35,4
Min	12,1		151,1	39,0	103,7	52,8	4,0	1,8	2,3	81,5	1,2	1,1	1,1	3,4	0,7	0,3	1,1	0,4	0,4	1,4
98 %.	48,9		1905,4	236,2	653,6	1834,2	69,7	6,0	23,0	735,1	8,0	1,9	7,2	81,0	5,8	1,5	10,1	2,2	4,5	34,8
nr. of. daily tests	27		31	15	33	33	30	19	33	33	27	7	32	33	20	32	33	22	29	33

Table 16.2.1-20: Measurement results of study ppprepared under the NAÜ program in 2010-2011 at Fadd



Határérték=limit

Figure 16.2.1-12: Run-off curves of PM_{10} values measured under the NAÜ program in 2010-2011 at Fadd

16.2.1.1 Preliminary consultation documentation (PCD) – 2011 [16-8]

In the PCD the following points contain the information relevant to air quality.

3.: Current status of the environment in the vicinity of the site

3.3.1. Air quality

The air quality was described by legal category and existing data, no measurements/tests were specifically performed for preparing the PCD.

When the status was described, results of measurements/tests of settling dust (PM) as part of the National Air Pollution Measuring Network at Paks were used. Baseline pollution of nitrogen oxides (NO, NO_2, NO_x), particulate matter (PM_{10}) and carbon monoxide (CO) could only be estimated as there were no measurements/tests held. For these estimates data of emission from residential areas, services, industry and traffic was used.

4. Presentation of environmental impacts of the implementation and construction of the planned new units in every option or version

4.2.1 Impacts of construction upon the air quality

The document states that the conventional load onto the air from the planned nuclear plant units during construction, abandonment and de-commissioning will most probably be significantly higher (with orders of magnitude) than during operations. Emission into the ambient air during construction from heavy-duty machines (dust, exhaust gases), and from technology operations (gases, steam and vapours), during earth moving, landscaping, terrain arrangement and foundation works will emerge from dust and particles from the soil and dusting materials, as well as from transportation (material and passenger). Describing each type of emissions in details – ***without propagation calculations*** – we can state that „construction of new units will cause significant air pollution for several years. Air quality will deteriorate not only at the workplaces but also in their environment and along the roads affected by transportation. However, under ordinary circumstances the total load arising from construction works will be qualified for the residential areas as *tolerable-neutral*."

5. Environmental impacts from operation of the planned new units onto the relevant options

5.2.2. Impacts onto air quality

Here we can mainly also find the list of emission parameters.

6. Description of aggregated environmental impacts from nuclear facilities operating simultaneously at Paks site

6.2.1. Impacts onto air quality

7. Consequences of operational disturbances and accidents onto the options assumed for the new units

7.5.1. Operational disturbances and accidents causing air quality deterioration

8. Environmental impacts from or related to abandonment onto the options assumed for the new units

9. Delineation of impact zones for the options assumed for the new units

9.2.1. Impacts onto the air quality form the impact zone

11. Issues defined in the Environmental Impact Study and/or that require studies in more details

Air quality survey

Authors of PCD also propose to perform air pollution tests within the expected impact zone in the planned new units.

16.2.2 AIR POLLUTION BASELINE SURVEY – 2012-2013

The purpose of the survey was to define the baseline air pollution level required for analysing the environmental protection impacts of the new nuclear plant units with on-the-spot measurements/tests, because on-the-spot measurement results for determining the details of the ambient air pollution levels are not available for the site and residential areas located in the vicinity of the site.

The *National Environmental Health Institute, Environmental Health Department, Air Hygiene Section (*OKI) performed the on-the-spot measurements/tests.

The air pollution baseline was determined on the basis of measurements/tests performed during eight weeks on six points, evenly distributed during 2012.

16.2.2.1 Scope of the survey

The scope of the air pollution baseline survey will cover the following issues:

- Continuous test of concentration of nitrogen dioxide (NO_2), nitrogen oxides (NO_X), sulphur-dioxide (SO_2) and carbon monoxide (CO) integrated for one hour average time using an analyser installed into a mobile measuring station, through 4 x 14 days in every measuring point.
- Pollution test of fraction of total particulate matter (TSPM) smaller than 10 µm (PM_{10}), through 4 x 14 days in every measuring point with 24-hour exposition time, using phased active test technique.
- Continuous test of concentration of ozone (O_3) integrated for one hour average time using an analyser installed into a mobile measuring station, through 4x14 days in Paks city at the measuring point located in the vicinity of Kölesdi road.
- Pollution test of settling dust through 12 x 30 days using passive test technique at every measuring point.
- Continuous registry of meteorological characteristics (temperature, humidity, wind speed/direction) integrated for 1 hour using instruments installed into mobile measuring stations, parallel with the air pollution tests.

16.2.2.2 Review of requirements for methodology

There are requirements for ambient air pollution test and assessment defined in various laws and standards. OKI measured the ambient air pollution in accordance with its accreditation and the following standards:

MSZ ISO 7996:1993: Ambient air. Definition of nitrogen oxides mass concentration. chem-iluminescence method

MSZ-ISO 2145637/1993: Gas pollution survey of air. Definition of A sulphuric oxide content with UV-fluorescence method

MSZ-ISO 4224:2003: Ambient air. Definition of carbon monoxide. Non-dispersive, IR method

MSZ-EN 12341:2000: Air quality. Definition of PM_{10} fraction of particulate matter dust. Reference method and on-the-spot analysis for defining equivalence of the measurement methods and the reference measurement methods.

VDI 2463 Blatt 10:1996: Definition of total particulate matter with gravimetry

MSZ 21456—26:1994: Gas pollution survey of air. Definition of ozone with UV-photometric method

MSZ 21454-1:1983: Solids pollution survey of air. Definition of settling dust mass

During measurements the SCANAIR 2000 data collection and transmission software was applied.

Parallel with the air pollution test, meteorological characteristics (temperature, humidity, wind speed, wind direction) were also registered using instruments installed into the mobile measuring station.

Prior to the surveys sampling plans, site plans and during measurements sampling protocols were prepared. The measurement results were recorded in measurement protocols.

The National Environmental Health Institute Environmental Health Department Testing Laboratory has an accreditation issued by the National Accreditation Board for such tests and surveys, its registration number: ***NAT-1-1070/2010****. The accreditation document will be valid until August 14, 2014.*

16.2.2.3 Methodology applied for the measurements/tests

16.2.2.3.1 Continuous measurements/tests

- *Nitrogen oxides (MSZ ISO 7996:1993)*

NO_2, NO_X are measured with a two-channel analyzer. The analyzer directly measures nitrogen monoxide content in ambient air. Results of NO_2 measurements will go through the converter and thus it will reduce the NO_2 to NO, and will be fed into the reaction chamber. The received electric signal is proportionate with the total quantity of nitrogen oxides. The difference between the two values defines the nitrogen dioxide quantity. The instrument calculates the average of the continuously measured concentration values in every 60 minutes. /Analyzer type a: AC 31 M (Environment SA)/

- *Sulphur-dioxide (MSZ-ISO 2145637/1993, E-06)*

When using the UV fluorescent measurement method, the sulphur-dioxide molecules will be transformed into induced status due to UV light, and then the higher energy level of the molecules will be terminated with UV-photon emission. Converting the emitted fluorescent light onto electric signal, it will be proportionate with the sulphur-dioxide content of the air sample. The instrument calculates the average of the continuously measured concentration values in every 60 minutes. /Analyzer type a: AF-21M (Environment SA)/

- *Carbon-monoxide (MSZ-ISO 4224:2003)*

The basis of this measurement method is that the carbon-monoxide molecules have selective light absorption capacity in the infrared band. Based on the level of light absorption (which is proportionate with the number of the carbon monoxide molecules in the air sample) we can determine the unknown concentration. The instrument calculates the average of the continuously measured concentration values in every 60 minutes. /Analyzer type a: CO 11 M (Environment SA)/.

- *Ozone (MSZ 21456—26:1994)*

The basis of the determination method is that ozone molecules in UV band (253,7 nm) maximum absorption capacity, thus we can determine the ozone concentration from the level of absorption (which is proportionate with the number of the ozone molecules in the air sample). The instrument calculates the average of the continuously measured concentration values in every 60 minutes. /Analyzer type a: O3 41M (Environment SA)/

16.2.2.3.2 Phased, active surveys

- *Particulate matter (PM_{10}) (MSZ-EN 12341:2000)*

During the sampling process the air sample will be pumped at 2,3 m^3/hour volumetric flowrate, and through 24 hours in the sampler instrument equipped with a pre-separator that can separate particles with larger than 10 μm diameter. Particles (dust fraction) below the given grain size will be collected on the surface of the quartz filter with 47-50 mm diameter installed after the impactor. The stabile speed of the flowing air sample is secured throughout the total sampling process.

After the sampling, we will apply gravimetry as the relevant analytical method. We measure the mass of the filters before and after the sampling, following conditioning performed in a location with acceptable temperature and relative humidity. We calculate the mass concentration of the dust fraction from the separated dust quantity based on the volume of the air sample and the relevant ambient parameters. The sampler type: Sequential Sampler, SEQ 47/50 (Sven Leckel Ingenierbüro GmbH).

- *Total particulate matter (TSPM) (VDI 2463 Blatt 10:1996)*

As part of the total particulate matter analysis, we perform the sampling with a sequential dust sampler instrument of the same type as for sampling the particulate matter fraction smaller than 10 μm with the difference that that now we use a TSPM sampler head and 3m^3/h speed of flow.

The analytical method (gravimetry) after the sampling and the mass concentration calculation will be identical with the process applied for testing the PM_{10} fraction.

16.2.2.3.3 Phased, passive survey

- *Definition of surface load of settling dust (MSZ 21454-1:1983)*

During the sampling process we put the collection vessel onto the holder easel with 1.2-1.5 m height, free of shadow from trees and buildings, and pour dust absorption liquid (ultra purity water). Dust will be settled into the collection vessel throughout 30 days in a natural manner and after the end of the exposition period the vessel will be sent to a laboratory for procession. We determine the collected dust quantity with mass measurement. As we know the surface of the collection vessel we will determine the settling dust surface load in g/m^2 * 30 days (as the unit of measurement).

16.2.2.3.4 Measurement of meteorological parameters

Parallel with the measurement of air pollution parameters we also perform measurements for meteorological characteristics, temperature, humidity, wind speed, wind direction. The measuring truck will have the following meteorological sensors and instruments:

Wind direction and wind speed measurement (at 5 metres height): Obsermet OMC-160
Temperature humidity measurement: Obsermet OMC-402
Solar radiation measurement: Obsermet OMC-604
Barometric pressure measurement: Obsermet OMC-506.

16.2.2.4 Methodology applied for the assessment

Assessment of air pollution was performed by ERBE in accordance with the following decrees or regulations:

Government Decree 306/2010. (XII. 23.) on air protection measurement

Decree 4/2002. (X.7.) KvVM on designation of air pollution agglomerations and zones

Decree 4/2011. (I.14.) VM on air load limits and emission limits for stationary air polluting point sources

Decree 6/2011. (I. 14) VM on rules for analysis, control and assessment of air load levels and emission of stationary air polluting sources.

During this work we used the measurement results of the National Air Pollution Measuring Network (http://www.kvvm.hu/olm), as data source.

We structured the NO_2, NO_x, SO_2, CO, PM_{10} values measured by OKI into a database, determined the number of measurements/tests suitable for assessment, number of cases when the hourly limit were exceeded, and calculated the average, minimum - maximum values, the 98% percentile value, daily average, and heating (FF) and non-heating semi-annual (NF) average values. Explanation of main indicators determined during data procession:

Value exceeding limit	*number of event when the hourly air quality limits were exceeded*
average	*arithmetic average of hourly values measured in the given period*
minimum	*hourly, daily minimum value measured in the given period*
maximum	*hourly, daily maximum value measured in the given period*
98% percentile	*value measured with 98% frequency of the hourly values in the given period*
daily average	*arithmetic average of the total hourly values measured on the given days*
heating season (FF)	*winter period between October 1. and March 31.*
non-heating season (NF)	*summer period between April 1. and March 31.*

When the measurement results were assessed, the measured 1hour and 24-hour average concentration values were analysed comparing them to health limits defined in Decree 4/2011. (I.14.) VM. In case the Decree did not define any limit for a given measured component, then we applied the limits defined in the formerly valid Decree 14/2001.(V.9.) KöM-EüM-FVM.

16.2.2.5 On-the-spot air pollution measurements

The following measurement points were defined for measuring the baseline air pollution:

- 1 point on the Plant site (1. LMp – area selected for Plant development)
- 1 point next to the northern access road (2. LMp – next to the northern access road)
- 1 point next to the southern access road (3. LMp- next to the southern access road, Meteorological Station)
- 1 point in Paks-Csámpa settlement, residential buildings along highway nr. 6 (4. LMp - Csámpa, Kis street)
- 1 point at the left bank of the River Danube (5. LMp - Dunaszentbenedek, 2/3 Dam keeper house)
- 1 point in Paks city, next to Kölesdi road (6. LMp - Paks, OVIT site, Dankó Pista street 1.)

The primary criterion for selecting the measurement points was to ensure that the measurement points are located as close as possible to the sites defined in the technical appendix of the contract, and the secondary criterion was the availability of power supply and security of the equipments and instruments used for the measurements/tests.

Location of measuring points

Figure 16.2.2-2 presents the locations of the selected measuring points.

Figure 16.2.2-1: Location of air pollution measuring points

We recorded the coordinates of measurement point in order that the measurement point can be later identified.

Measuring point code	Location of measuring point	WGS coordinates		EOV coordinates	
1. LMp	Paks, Nuclear plant; Mobilisation Area	N46°35'11.22"	E18°51'42.66"	635 775	138 024
2. LMp	Paks, north access road, plant north access road	N46°34'57.90"	E18°50'48.16"	634 613	137 616
3. LMp	Paks, south access road, Meteorological Station	N46°34'25.32"	E18°50'43.80"	634 518	136 610
4. LMp	Csámpa, Kis street	N46°33'55.66"	E18°49'40.84"	633 175	135 698
5. LMp	Dunaszentbenedek, Dam keeper house	N46°35'25.59"	E18°52'56.82"	637 353	138 464
6. LMp	Paks, OVIT site, Dankó Pista street 1.	N46°36'19.26"	E18°50'36.38"	634 369	140 129

Table 16.2.2-1: Measurement points coordinates

Draft of on-the-spot measurements schedule:

	Mo	Tu	We	Th	Fr	Sa	Su
January							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
February	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	1	2	3	4
March	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	1
April	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
May	30	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	1	2	3
June	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	

	Mo	Tu	We	Th	Fr	Sa	Su
July	Truck technical inspection (2-6.)						1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
Augusta	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	1	2
September	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
October	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
November	29	30	31	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	1	2
December	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30

	Mo	Tu	We	Th	Fr	Sa	Su
January	31	1	2	3	4	5	6
	7*	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	1	2	3
February	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	1	2	3
March	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
April	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30					

*INSTRUMENT CALIBRATION

SHIFT days
NEW CYCLE

Table 16.2.2-2: Schedule of the planned on-the-spot measurements

16.2.2.5.1 Paks, Nuclear plant; Mobilisation Area - 1. LMp

mérés - measurement/test

source : Google Earth

Figure 16.2.2-2: 1. LMp location

1. TEST

2. TEST

3. TEST

4. TEST

SETTLING DUST SAMPLING UNITS

Figure 16.2.2-3: Location of testing truck and settling dust sampling unit location at 1. LMp point

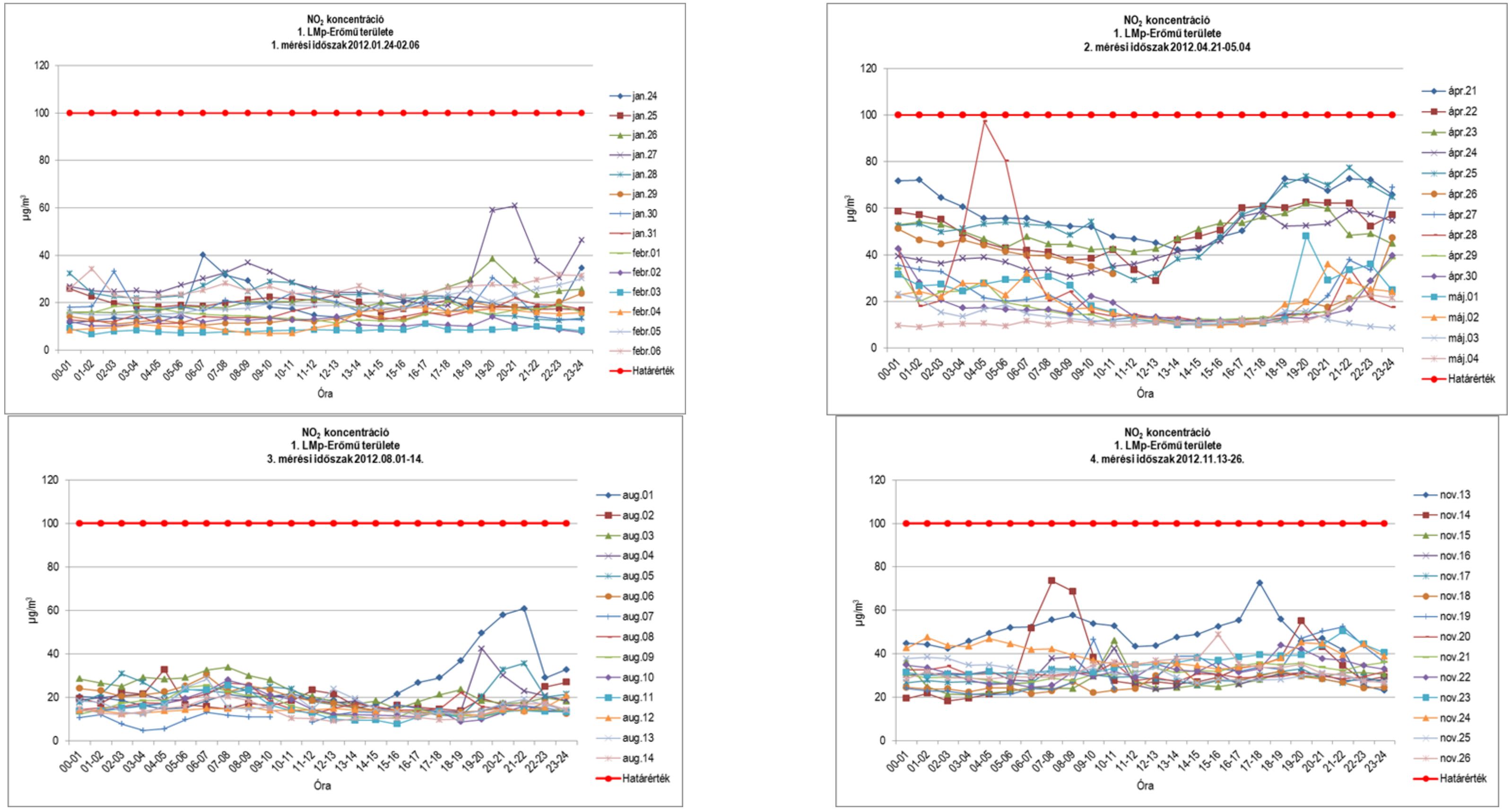
NO_2 immission

NO_2 concentration																			
Based on daily assessment based on hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver -age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver -age	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
Jan.24	20	12	40	38	Apr.21	58	42	73	73	Aug.01	26	15	61	60	Nov.13	48	23	73	66
Jan.25	20	16	26	25	Apr.22	50	29	63	63	Aug.02	19	13	33	30	Nov.14	34	18	74	71
Jan.26	21	16	39	34	Apr.23	50	41	62	61	Aug.03	23	15	34	33	Nov.15	27	21	46	41
Jan.27	31	19	61	60	Apr.24	43	31	59	59	Aug.04	20	13	42	37	Nov.16	30	24	42	41
Jan.28	22	13	32	32	Apr.25	54	29	77	76	Aug.05	21	11	36	34	Nov.17	29	26	33	33
Jan.29	14	11	24	22	Apr.26	29	10	51	50	Aug.06	19	12	30	28	Nov.18	26	22	35	34
Jan.30	19	13	33	32	Apr.27	22	11	69	55	Aug.07	12	5	17	17	Nov.19	32	21	53	52
Jan.31	15	11	22	21	Apr.28	26	12	97	90	Aug.08	17	12	27	26	Nov.20	31	27	36	35
Febr.01	15	11	21	20	Apr.29	18	11	38	36	Aug.09	16	10	26	25	Nov.21	31	26	36	36
Febr.02	11	8	15	14	Apr.30	18	11	43	41	Aug.10	16	9	28	27	Nov.22	32	25	44	43
Febr.03	8	7	11	11	May 01	23	10	48	42	Aug.11	15	8	25	25	Nov.23	36	30	50	48
Febr.04	13	7	18	18	May 02	20	10	36	34	Aug.12	14	12	21	18	Nov.24	40	33	48	47
Febr.05	19	15	30	29	May 03	13	9	23	22	Aug.13	17	12	29	27	Nov.25	31	26	38	38
Febr.06	26	22	34	33	May 04	12	9	23	22	Aug.14	14	9	20	20	Nov.26	33	27	49	44
Avrg	**18**	**13**	**29**	**28**		**31**	**19**	**54**	**52**		**18**	**11**	**31**	**29**		**33**	**25**	**47**	**45**

Comment:
The measurement was suspended on January 31 between 12.00 – 13.00 hours due to calibration.
The measurement was suspended on April 26 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on August 7 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 19 between 11.00-12.00 hours due to calibration.

Table 16.2.2-3: 1. LMp on-the-spot measurements/tests – NO2

The following figures present the hourly NO_2 concentration values.

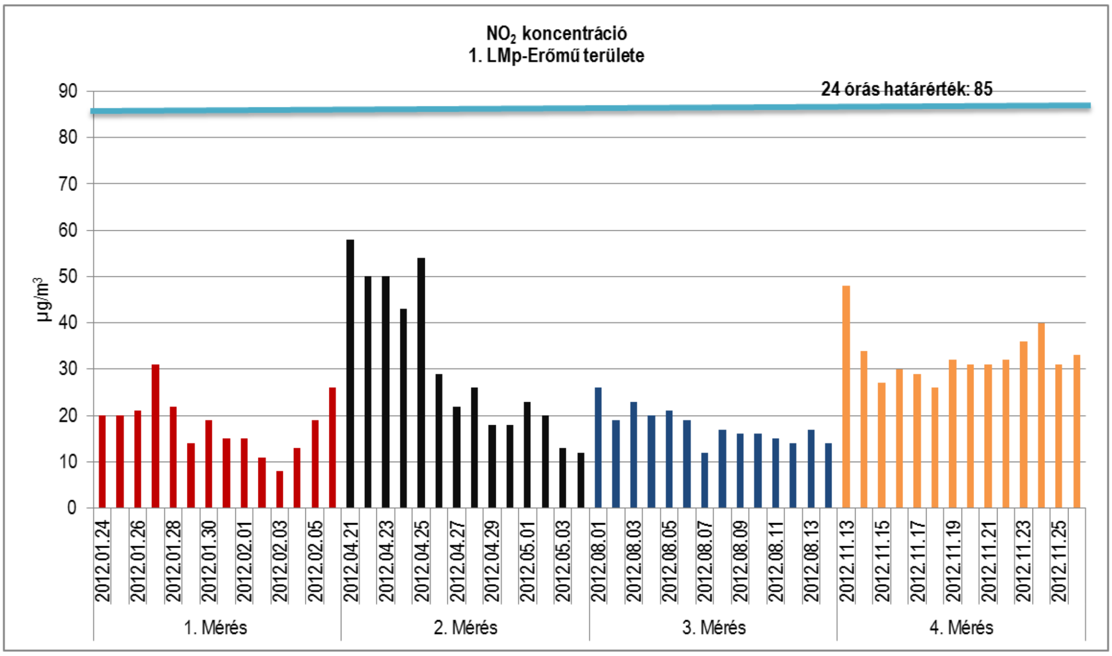


koncentráció - concentration, erőmű területe - power plant area, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-4: 1. LMp - NO_2 hourly run-off curves

NO_2 concentration Based on hourly measurement values **(μg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. **TEST** (2012. 01. 24-02.06.)	18	13	29	28
2. **TEST** (2012. 04. 21-05.04.)	31	19	54	52
3. **TEST** (2012. 08. 01-14.)	18	11	31	29
4. **TEST** (2012. 11. 13-26.)	33	25	47	45

Table 16.2.2-4: 1. LMp NO_2 measurements/tests results – measurement by periods



koncentráció - concentration, erőmű területe - power plant area, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-5: 1. LMp - NO_2 daily average concentration values

NO_2 hourly values measured during the 4-times 2-week measurement periods at 1. LMp point did not exceed the 100 μg/m³ hourly limit.

Neither exceeded the 24-hour average concentrations the 85 μg/m³ daily limit.

The highest hourly NO_2 value measured during the 2nd measuring period, on April 28, 2012. was 97 μg/m³.

The 2-week average values measured during the four measuring period of **NO_2** measurements/tests were **18 μg/m³**, **31 μg/m³**, **18 μg/m³**, **33 μg/m³**.

NO_2 measurement results showed the volatility not in line with the heating-non-heating seasons, and values measured in April were higher than values measured during the January and November heating seasons.

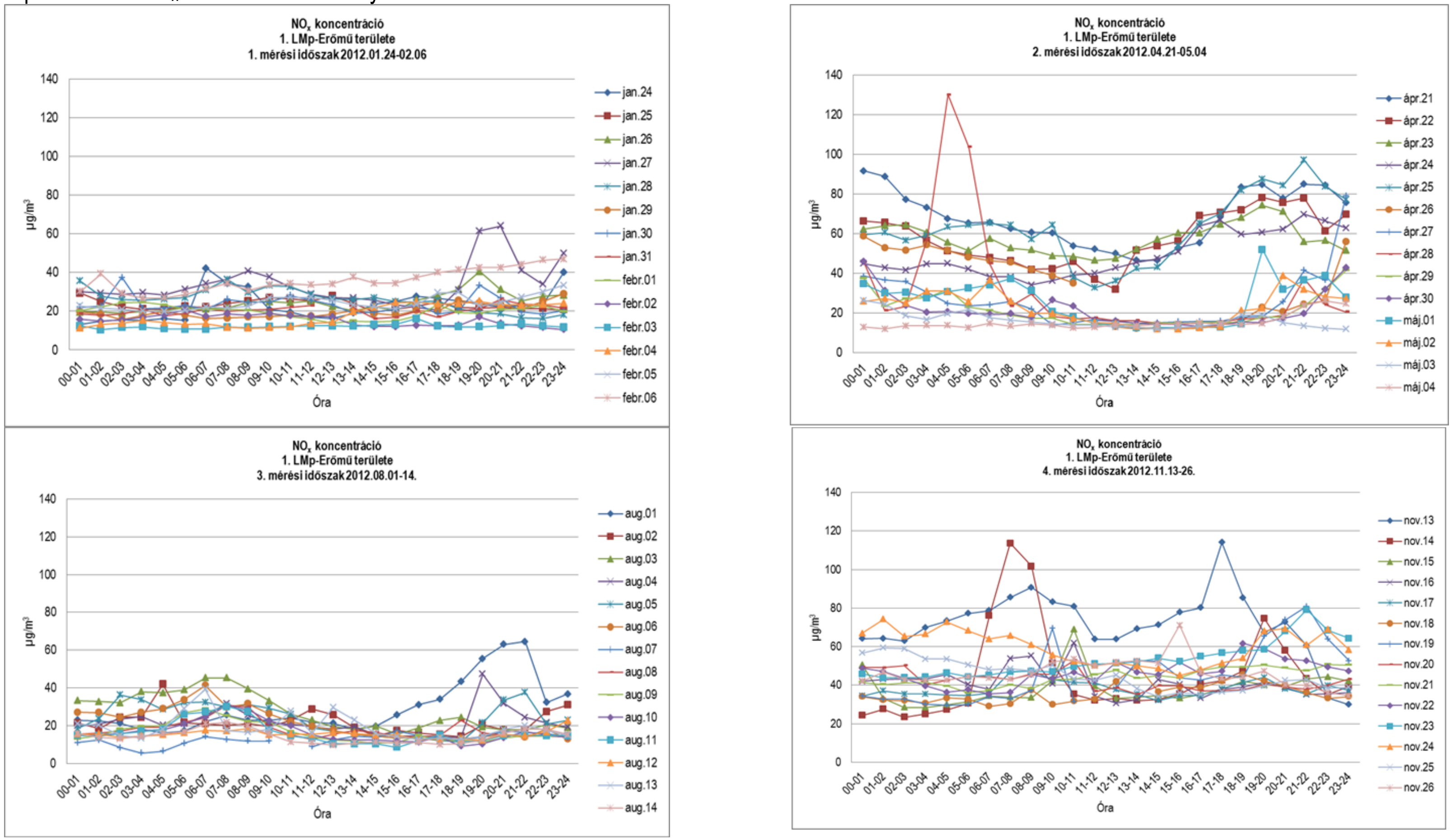
NO_x immission

NO_x concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
Jan.24	23,1	13,2	42,2	41,2	Apr.21	67,9	46,5	91,6	90,3	Aug.01	29,2	16,2	64,5	63,8	Nov.13	71,7	29,9	114,0	103,3
Jan.25	23,3	19,7	29,3	28,6	Apr.22	57,6	32,0	78,2	78,1	Aug.02	21,7	14,2	41,8	36,8	Nov.14	45,1	23,4	113,6	108,1
Jan.26	24,4	19,0	40,5	36,3	Apr.23	57,7	46,6	74,3	72,8	Aug.03	27,4	15,4	45,3	45,3	Nov.15	38,1	28,5	69,1	60,6
Jan.27	33,9	20,8	64,0	62,8	Apr.24	49,5	34,3	69,8	68,4	Aug.04	22,0	13,7	47,3	40,2	Nov.16	41,1	30,7	61,9	58,8
Jan.28	26,0	16,3	36,5	36,1	Apr.25	62,9	32,8	97,2	92,8	Aug.05	23,9	11,5	37,6	36,9	Nov.17	38,2	32,1	47,3	47,1
Jan.29	19,9	15,7	29,0	27,4	Apr.26	33,4	12,1	58,7	57,5	Aug.06	21,3	12,3	41,3	37,8	Nov.18	36,1	29,1	50,5	48,2
Jan.30	23,4	18,7	37,4	35,6	Apr.27	25,9	14,0	79,0	61,8	Aug.07	12,6	5,6	17,1	17,0	Nov.19	45,7	29,6	80,9	77,8
Jan.31	20,4	16,2	26,2	25,1	Apr.28	31,7	14,7	130,1	118,0	Aug.08	17,9	12,9	30,8	30,4	Nov.20	42,1	35,3	52,9	51,6
Febr.01	19,7	13,9	24,7	24,5	Apr.29	21,4	14,2	41,6	39,7	Aug.09	16,5	10,7	29,0	28,0	Nov.21	44,3	36,0	50,8	50,6
Febr.02	15,3	10,6	20,8	19,9	Apr.30	21,5	13,4	45,9	44,5	Aug.10	16,5	9,1	30,8	29,7	Nov.22	46,5	35,4	61,6	60,4
Febr.03	12,2	10,4	16,2	15,0	May 01	25,9	12,5	51,9	46,0	Aug.11	16,0	8,6	30,0	28,8	Nov.23	53,1	43,8	79,1	74,2
Febr.04	17,8	11,3	25,1	25,0	May 02	22,9	12,1	39,0	37,9	Aug.12	15,5	12,3	22,7	20,7	Nov.24	59,9	45,2	74,2	73,6
Febr.05	24,5	19,9	33,5	31,9	May 03	16,3	11,8	26,4	25,5	Aug.13	19,1	12,8	39,2	34,8	Nov.25	44,9	34,1	59,4	59,2
Febr.06	35,9	26,7	46,9	46,7	May 04	15,4	12,1	26,3	25,6	Aug.14	14,3	9,7	21,6	21,3	Nov.26	46,2	34,6	71,0	62,9
Average	**23**	**17**	**34**	**33**		**36**	**22**	**65**	**61**		**20**	**12**	**36**	**34**		**47**	**33**	**70**	**67**

Comment:
The measurement was suspended on January 31 between 12.00 – 13.00 hours due to calibration.
The measurement was suspended on April 26 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on August 7 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 19 between 11.00-12.00 hours due to calibration.

Table 16.2.2-5: 1. LMp on-the-spot measurements/tests – NOx.

The following figures present the NO_x concentration hourly values

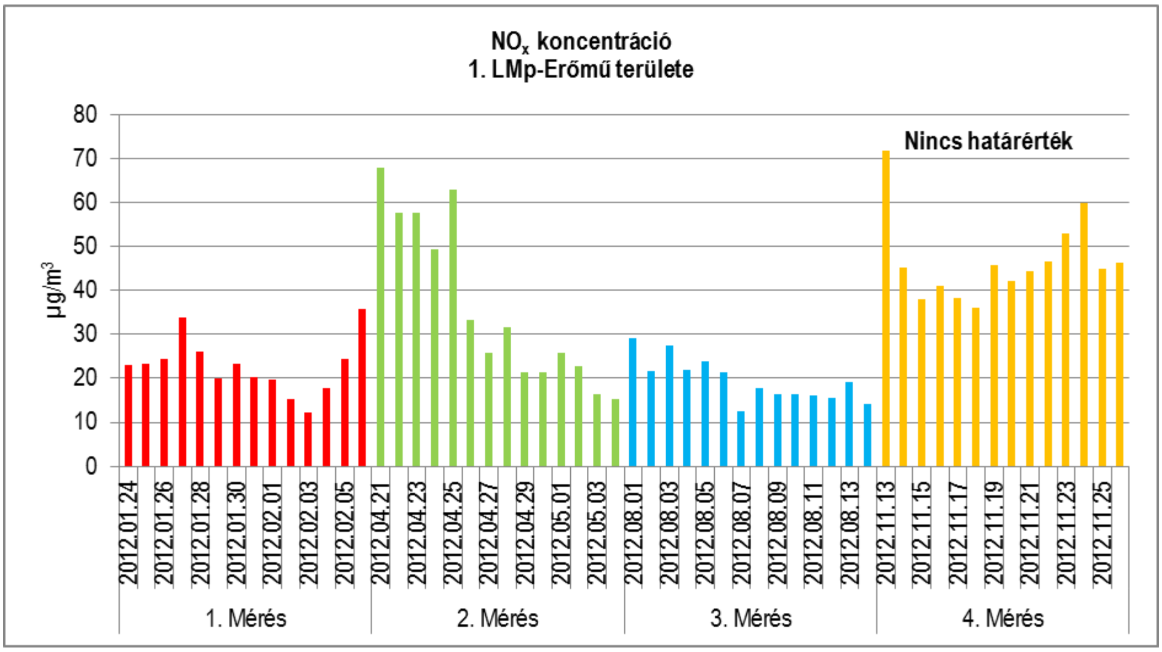


koncentráció - concentration, erőmű területe - power plant area, mérési időszak - measurement period, óra - hour

Figure 16.2.2-6: 1. LMp - NO_x hourly run-off curves

NO_x concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 01. 24-02.06.)	23	17	34	33
2. TEST (2012. 04. 21-05.04.)	36	22	65	61
3. TEST (2012. 08. 01-14.)	20	12	36	34
4. TEST (2012. 11. 13-26.)	47	33	70	67

Table 16.2.2-6: 1. LMp NO_x measurements/tests results – measurement by periods



koncentráció - concentration, erőmű területe - power plant area, nincs határérték - no limit, mérés - measurement/test

Figure 16.2.2-7: 1. LMp - NO_x daily average concentration values

Decree 4/2011. (I. 14.) VM on air load limits and emission limits for stationary air polluting point sources does not define any immission limit for NO_x .

The former Decree 14/2001.(V.9.) KöM-EüM-FVM defined 200 µg/m³ hourly, 150 µg/m³ 24-hour, 70 µg/m³ annual limit for the NO_x.

Based on the above figures we can state that the measured NO_x values were not higher than the hourly and the 24-hour limits.

The NO_x hourly and daily values showed almost the same characteristics as the NO_2–values.

The highest measured hourly NO_x value measured during the 2nd measuring period on April 28, 2012between 4.00-5.00 a.m. was 130 µg/m³.

Average values of **NO_x** measurements during the 4 measuring periods were: **23 µg/m³**, **36 µg/m³**, **20 µg/m³, 47 µg/m³**.

NO_x measurement results – similarly to NO_2 measurement results – showed the volatility not in line with the heating-non-heating seasons, and values measured in April were higher than values measured during the January heating seasons.

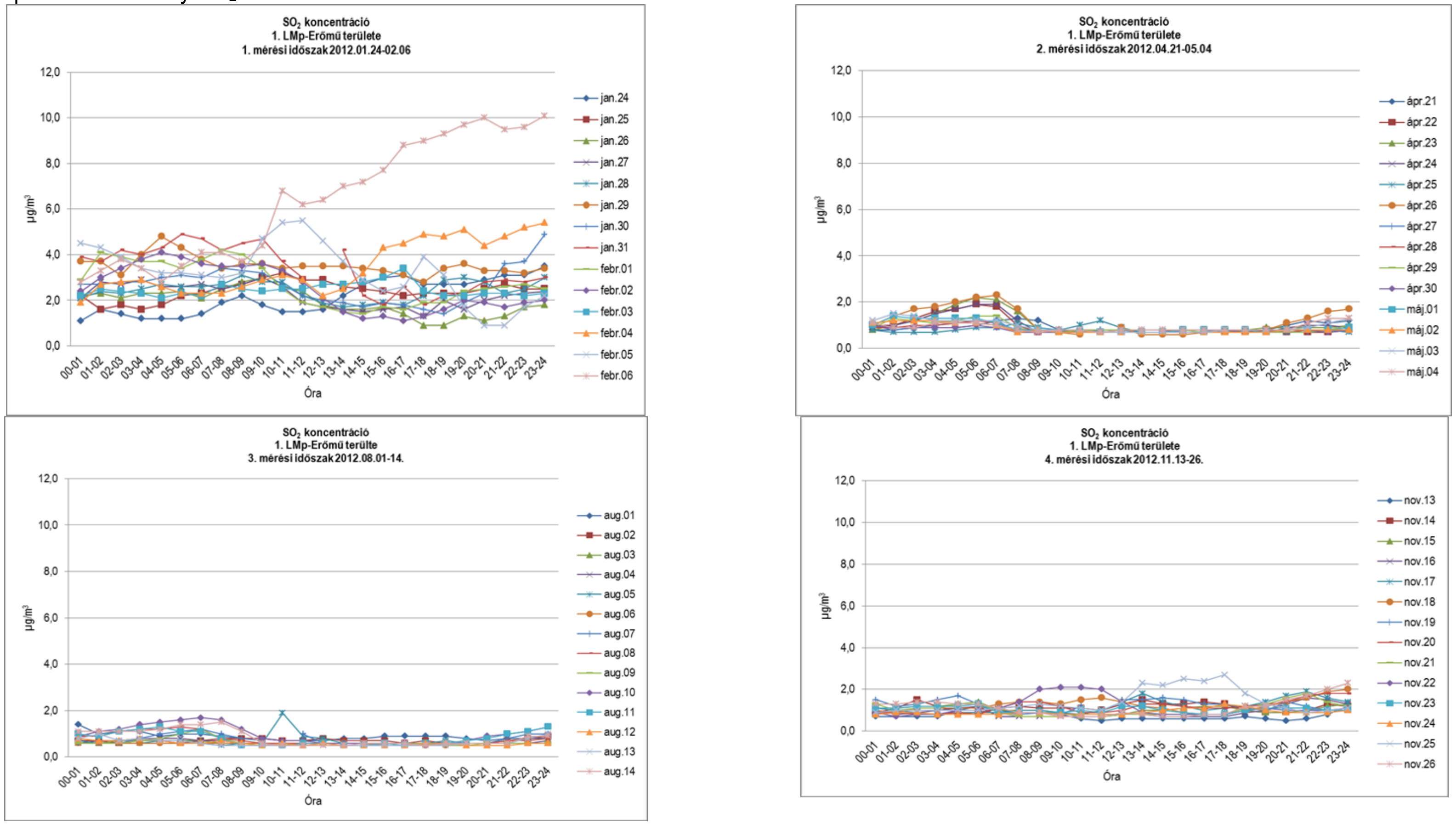
SO_2 immission

SO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. Test					2. Test					3. Test					4. Test				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
Jan.24	2,1	1,1	3,5	3,3	Apr.21	0,9	0,7	1,3	1,3	Aug.01	0,9	0,7	1,4	1,3	Nov.13	0,7	0,5	1,2	1,2
Jan.25	2,4	1,6	3,2	3,1	Apr.22	0,9	0,7	1,9	1,9	Aug.02	0,7	0,6	0,9	0,9	Nov.14	1,1	0,9	1,5	1,5
Jan.26	1,9	0,9	3,0	2,9	Apr.23	1,0	0,7	2,2	2,2	Aug.03	0,6	0,6	0,7	0,7	Nov.15	1,1	0,7	1,4	1,4
Jan.27	2,2	1,3	3,0	3,0	Apr.24	1,0	0,7	1,9	1,9	Aug.04	0,6	0,6	0,8	0,8	Nov.16	0,9	0,7	1,6	1,6
Jan.28	2,4	1,7	3,1	3,1	Apr.25	0,8	0,7	1,2	1,2	Aug.05	0,7	0,5	1,9	1,4	Nov.17	1,2	0,8	1,9	1,9
Jan.29	3,5	2,8	4,8	4,6	Apr.26	1,2	0,6	2,3	2,3	Aug.06	0,6	0,5	0,6	0,6	Nov.18	1,3	0,8	2,0	2,0
Jan.30	2,7	1,4	4,9	4,3	Apr.27	0,8	0,7	1,2	1,2	Aug.07	0,8	0,6	1,2	1,2	Nov.19	1,2	0,8	1,7	1,7
Jan.31	3,4	1,8	4,9	4,8	Apr.28	0,8	0,7	1,2	1,2	Aug.08	0,8	0,6	1,3	1,3	Nov.20	1,2	0,8	1,8	1,8
Febr.01	2,7	1,4	4,2	4,2	Apr.29	0,9	0,7	1,4	1,4	Aug.09	0,6	0,5	1,2	1,1	Nov.21	1,0	0,7	1,8	1,7
Febr.02	2,5	1,1	4,1	4,0	Apr.30	0,8	0,7	1,0	1,0	Aug.10	1,0	0,5	1,7	1,7	Nov.22	1,2	0,7	2,1	2,1
Febr.03	2,5	2,1	3,4	3,2	May 01	0,9	0,7	1,4	1,4	Aug.11	0,8	0,5	1,3	1,3	Nov.23	1,0	0,8	1,3	1,3
Febr.04	3,4	1,9	5,4	5,3	May 02	0,8	0,7	1,2	1,2	Aug.12	0,6	0,5	0,8	0,8	Nov.24	0,9	0,8	1,3	1,3
Febr.05	3,3	0,9	5,5	5,5	May 03	1,0	0,7	1,5	1,5	Aug.13	0,6	0,5	1,0	1,0	Nov.25	1,4	0,9	2,7	2,6
Febr.06	6,4	2,8	10,1	10,1	May 04	0,9	0,7	1,3	1,3	Aug.14	0,8	0,5	1,5	1,5	Nov.26	1,2	0,7	2,3	2,2
Average	**3**	**2**	**5**	**4**		**1**	**1**	**2**	**1**		**1**	**1**	**2**	**1**		**1**	**1**	**2**	**2**

Comment:
The measurement was suspended on January 31 between 12.00 – 13.00 hours due to calibration.
The measurement was suspended on April 26 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on August 7 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 19 between 11.00-12.00 hours due to calibration.

Table 16.2.2-7: 1. LMp on-the-spot measurements/tests – SO2.

The following figures present the hourly SO_2 concentration values.

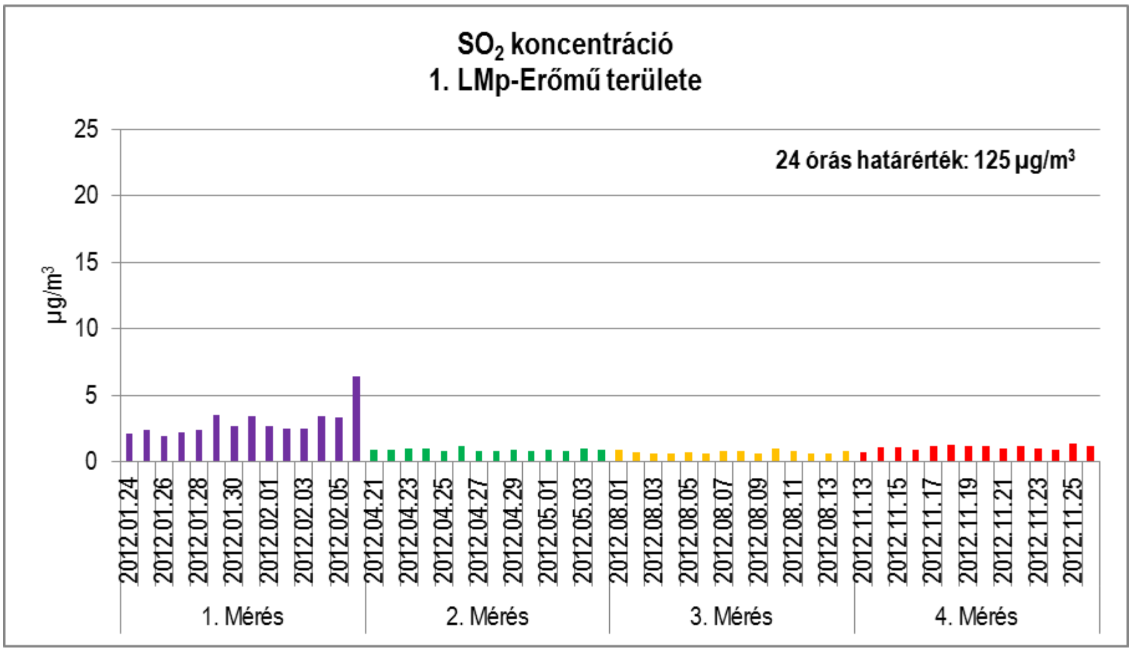


koncentráció - concentration, erőmű területe - power plant area, mérési időszak - measurement period, óra - hour

Figure 16.2.2-8: 1. LMp - SO_2 hourly run-off curves

SO_2 concentration Based on hourly measurement values (µg/m³)				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 01. 24-02.06.)	3	2	5	4
2. Test (2012. 04. 21-05.04.)	1	1	2	1
3. Test (2012. 08. 01-14.)	1	1	2	1
4. Test (2012. 11. 13-26.)	1	1	2	2

Table 16.2.2-8: 1. LMp SO_2 measurements/tests results - – measurement by periods



koncentráció - concentration, erőmű területe - power plant area, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-9: 1. LMp – SO_2 daily average concentration values

The measured hourly SO_2 immission values were well below the 250 µg/m³ hourly limit.

Among measurement results, concentration values measured during the 1st measuring period are higher than the concentration values of the other measuring periods, the highest hourly concentration was also measured during this measurement period, the value was 10,1 µg/m³, 4% of the hourly limit.

The 24-hour average concentration values were well below the 125 µg/m³ daily limit.

Average values of the **SO_2** measurements during the four measuring periods were: **3 µg/m³**, **1 µg/m³**, **1 µg/m³**, **1 µg/m³**.

CO immission

CO concentration

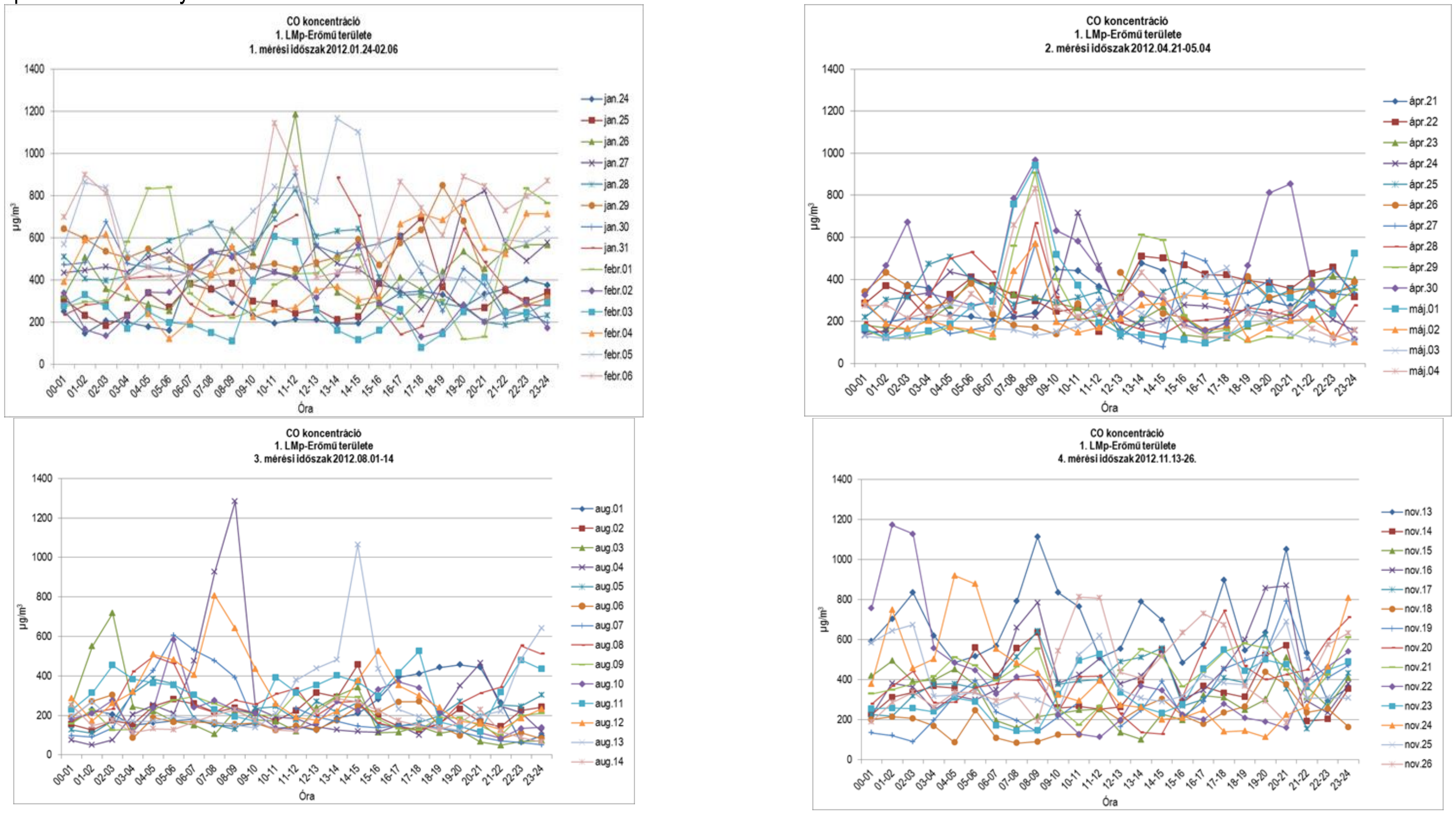
Based on daily assessment hourly concentration values *

1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Aver-age	Min	Max	98% percent	Measur. period	Aver-age	Min	Max	98% percentile	Measur. period	Aver-age	Min	Max	98% percentile	Measur. period	Aver-age	Min	Max	98% percent
	µg/m³					µg/m³					µg/m³					µg/m³			
Jan.24	272,0	148,0	443,0	423,7	Apr.21	293,5	138,0	477,0	463,7	Aug.01	223,8	64,0	456,0	450,0	Nov.13	656,2	294,0	1112,0	1084,4
Jan.25	324,7	184,0	694,0	653,5	Apr.22	356,2	152,0	510,0	505,4	Aug.02	214,7	126,0	456,0	391,1	Nov.14	370,7	193,0	634,0	605,0
Jan.26	467,5	255,0	1186,0	976,2	Apr.23	252,1	122,0	415,0	408,6	Aug.03	201,8	48,0	717,0	640,2	Nov.15	301,3	101,0	512,0	503,7
Jan.27	492,2	261,0	824,0	796,9	Apr.24	286,5	135,0	716,0	601,0	Aug.04	271,3	50,0	1283,0	1118,8	Nov.16	442,9	224,0	870,0	864,0
Jan.28	463,0	187,0	829,0	765,5	Apr.25	331,4	126,0	507,0	491,4	Aug.05	219,6	110,0	385,0	373,0	Nov.17	391,6	154,0	644,0	635,3
Jan.29	504,0	253,0	848,0	770,3	Apr.26	294,3	140,0	431,0	431,0	Aug.06	171,3	82,0	304,0	288,8	Nov.18	210,4	84,0	437,0	408,9
Jan.30	488,0	197,0	903,0	834,9	Apr.27	279,5	79,0	567,0	547,2	Aug.07	214,7	51,0	606,0	572,6	Nov.19	317,7	91,0	791,0	675,3
Jan.31	398,8	142,0	886,0	807,2	Apr.28	272,1	113,0	665,0	602,4	Aug.08	288,9	124,0	553,0	533,7	Nov.20	393,2	129,0	742,0	727,3
Febr.01	416,1	119,0	839,0	836,7	Apr.29	271,3	101,0	906,0	769,8	Aug.09	205,2	99,0	313,0	305,2	Nov.21	431,2	174,0	610,0	596,2
Febr.02	317,4	130,0	567,0	552,3	Apr.30	432,3	116,0	966,0	914,5	Aug.10	223,0	84,0	584,0	485,6	Nov.22	406,6	113,0	1172,0	1151,3
Febr.03	256,8	81,0	607,0	595,0	May 01	281,3	96,0	941,0	856,8	Aug.11	321,8	117,0	525,0	504,3	Nov.23	343,8	143,0	548,0	538,8
Febr.04	457,3	121,0	772,0	746,2	May 02	229,8	102,0	571,0	510,7	Aug.12	326,3	128,0	806,0	729,6	Nov.24	405,5	114,0	919,0	900,1
Febr.05	644,0	313,0	1166,0	1136,1	May 03	209,3	90,0	453,0	434,6	Aug.13	294,2	123,0	1064,0	869,9	Nov.25	406,3	246,0	688,0	681,6
Febr.06	658,9	310,0	1145,0	1045,6	May 04	280,4	123,0	831,0	751,9	Aug.14	169,9	66,0	285,0	277,6	Nov.26	439,6	185,0	813,0	810,7
Average	**440**	**193**	**836**	**781**		**291**	**117**	**640**	**592**		**239**	**91**	**595**	**539**		**394**	**160**	**749**	**727**

Comment:
* Maximum of daily 8-hour moving average concentrations. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. . The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on January 31 between 12.00 – 13.00 hours due to calibration.
The measurement was suspended on April 26 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on August 7 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 19 between 11.00 - 12.00 due to calibration.

Table 16.2.2-9: 1. LMp on-the-spot measurements/tests – CO

The following figures present the hourly CO concentration values.

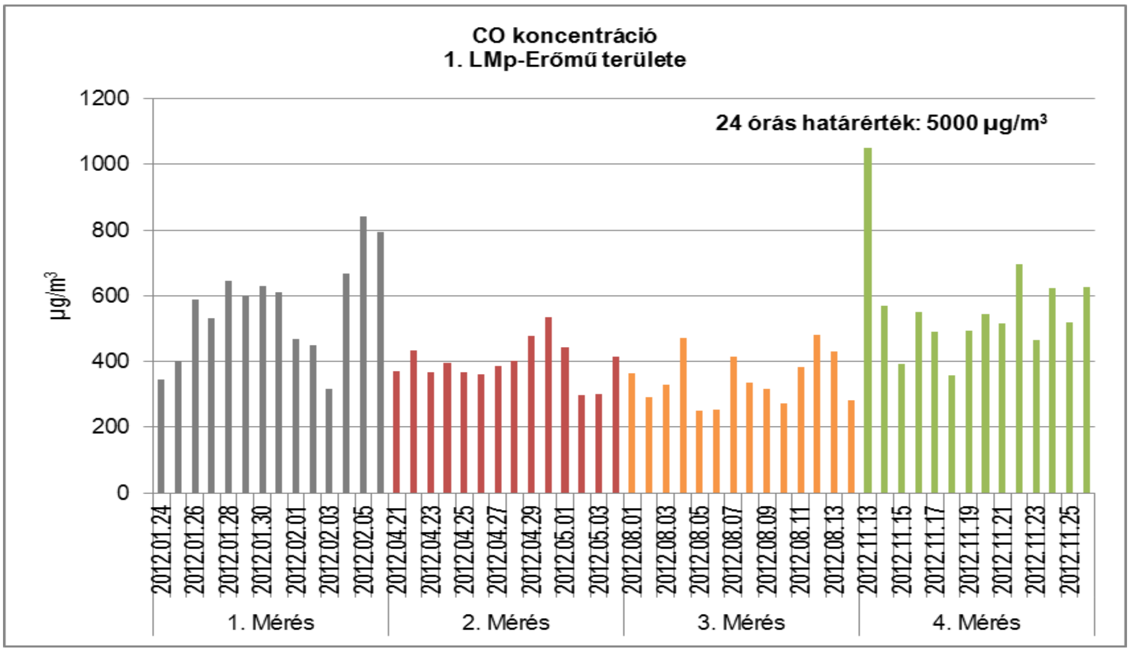


koncentráció - concentration, erőmű területe - power plant area, mérési időszak - measurement period, óra - hour

Figure 16.2.2-10: 1. LMp - CO hourly run-off curves

CO concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. **Test** (2012. 01. 24-02.06.)	564	318	841	829
2. **Test** (2012. 04. 21-05.04.)	396	297	536	521
3. **Test** (2012. 08. 01-14.)	348	251	482	480
4. **Test** (2012. 11. 13-26.)	564	357	1050	958

Table 16.2.2-10: 1. LMp CO measurements/tests results – measurement by periods



koncentráció - concentration, erőmű területe - power plant area, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-11: 1. LMp – CO daily average concentration

The measured hourly CO immission values always were well below the 10 000 µg/m³ hourly limit.

The highest measured hourly concentration during the 3rd measurement period was 1283 µg/m³, 13% of the limit.

Average concentration values generated from the 8-hour moving maximum values remained below 20% of the 24-hour limit (5 000 µg/m³).

Bi-weekly average values of the **CO** measurements were: **564 µg/m³**, **396 µg/m³**, **348 µg/m³, 564 µg/m³**.

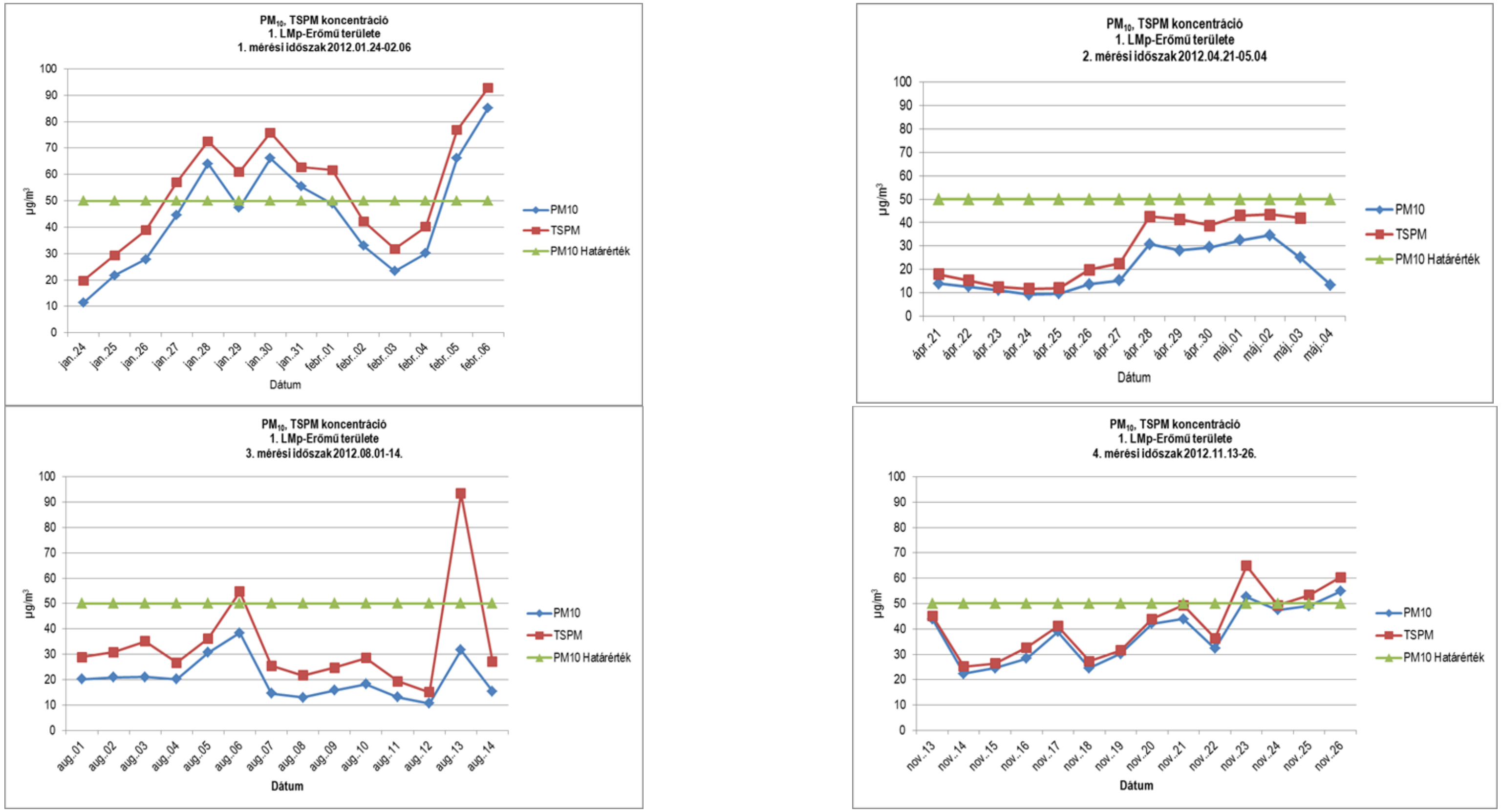
The CO measurement results show the volatility in conformity with the heating-non-heating seasons.

PM_{10}, TSPM 24-hour concentration

Measuring period	**PM_{10}**	**TSPM**	Measuring period	**PM_{10}**	**TSPM**	Measuring period	**PM_{10}**	**TSPM**	Measuring period	**PM_{10}**	**TSPM**
	µg/m³			µg/m³			µg/m³			µg/m³	
Jan.24	11	20	Apr.21	14	18	Aug.01	20	29	Nov.13	44	45
Jan.25	22	29	Apr.22	13	15	Aug.02	21	31	Nov.14	22	25
Jan.26	28	39	Apr.23	11	13	Aug.03	21	35	Nov.15	25	26
Jan.27	45	57	Apr.24	9	12	Aug.04	20	27	Nov.16	28	33
Jan.28	64	73	Apr.25	10	12	Aug.05	31	36	Nov.17	39	41
Jan.29	47	61	Apr.26	14	20	Aug.06	38	55	Nov.18	25	27
Jan.30	66	76	Apr.27	15	23	Aug.07	15	25	Nov.19	30	32
Jan.31	55	63	Apr.28	31	43	Aug.08	13	22	Nov.20	42	44
Febr.01	49	62	Apr.29	28	41	Aug.09	16	25	Nov.21	44	49
Febr.02	33	42	Apr.30	29	39	Aug.10	18	29	Nov.22	32	36
Febr.03	23	32	May 01	32	43	Aug.11	13	19	Nov.23	53	65
Febr.04	30	40	May 02	35	44	Aug.12	11	15	Nov.24	47	49
Febr.05	66	77	May 03	25	42	Aug.13	32	93	Nov.25	49	53
Febr.06	85	93	May 04	13	-	Aug.14	15	27	Nov.26	55	60
min	**11**	**20**		**9**	**12**		**11**	**15**		**22**	**25**
max	**85**	**93**		**35**	**44**		**38**	**93**		**55**	**65**
Average	**45**	**54**		**20**	**28**		**20**	**33**		**38**	**42**

Table 16.2.2-11: 1. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The following figures present the PM_{10} and TSPM daily concentration values:



koncentráció - concentration, erőmű területe - power plant area, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-12: 1. LMp - PM_{10} and a TSPM daily run-off curves

The 24-hour average **PM_{10}** values were higher than the limit during the 1st measuring period throughout 5 days. We analysed also the results measured at other measuring points of the country, and between January 28-31 the measured values were between 85-29 µg/m^3, and between February 5-6 they were between 62-42 µg/m^3. On the subsequent days high (70-130 µg/m^3) concentration values were dominant all over the country.

During the 2nd and 3rd measuring periods the 24-hour average and maximum PM_{10} values remained blow the limit.

During the 4th measuring period the 24-hour average PM_{10} values were for 2 days less than 10% lower than the limit: the concentration value was 53 µg/m^3 on November 23 and 55 µg/m^3 November 26. During this period the limit higher than the limit were measured at several other measuring points of the country.

Decree 4/2011. (I. 14.) VM on air load limits and emission limits for stationary air polluting point sources defines no limit for **TSPM**.

The former Decree 14/2001.(V.9.) KöM-EüM-FVM defined for the TSPM 200 µg/m^3 hourly, 100 µg/m^3 24-hour, and 50 µg/m^3 annual limit values.

Having analysed the measurement results we can state that the daily concentration of the measured TSPM values remained below the former 24-hour limit.

Settling dust

Settling dust concentration		
First days	**Last days**	**g/m^{2}x30nap**
2012.01.23	2012.02.23	1,04
2012.02.23	2012.03.28	1,8
2012.03.28	2012.04.26	2,2
2012.04.26	2012.05.22	6,6
2012.05.22	2012.06.25	3,7
2012.06.25	2012.07.31	3,5
2012.07.31	2012.08.30	5,2
2012.09.11	2012.10.12	2,3
2012.10.12	2012.11.12	0,6
2012.11.12	2012.12.12	0,5
2012.12.12	2013.01.11	0,3
2013.01.11	2013.02.12	0,9
2013.02.25	2013.03.29	0,9

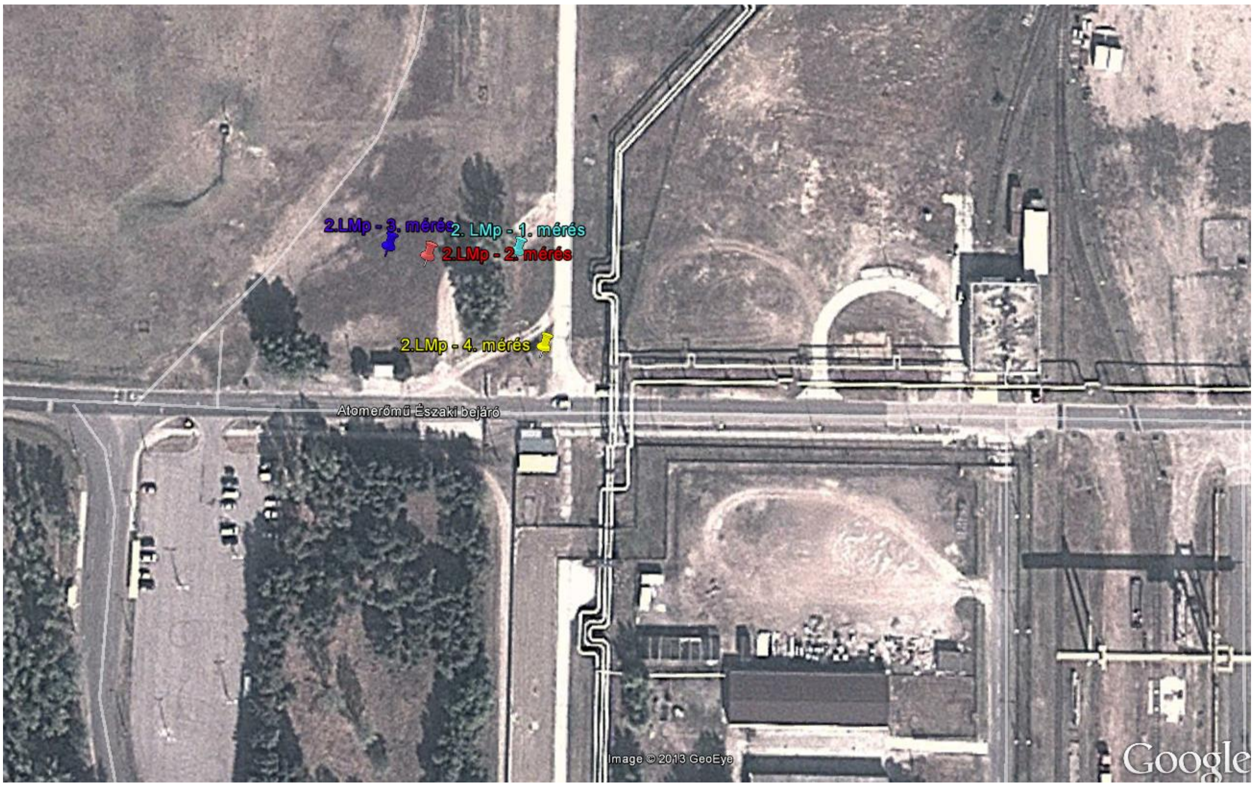
Table 16.2.2-12: 1. LMp on-the-spot measurements/tests – Settling dust

The Decree 4/2011. (I. 14.) VM. on air load limits and emission limits for stationary air polluting point sources defines no limit for **settling dust** either.

The annulled Decree 14/2001.(V.9.) KöM-EüM-FVM defined 16 g/m^2 x 30 daily and 120 t/km^2 x annual limit.

Having analysed the measurement results we can clearly see that the measurement results during the former 30 days remained below the limit, as 41% of the highest limit.

16.2.2.5.2 Paks, Northern access road, Plant Northern Access road - 2. LMp



mérés - measurement/test

source : Google Earth

Figure 16.2.2-13: 2. LMp location

1. TEST

2. TEST

3. TEST

4. TEST

SETTLING DUST SAMPLING UNITS

Figure 16.2.2-14: Location of testing truck and settling dust sampling units at 2 LMp points

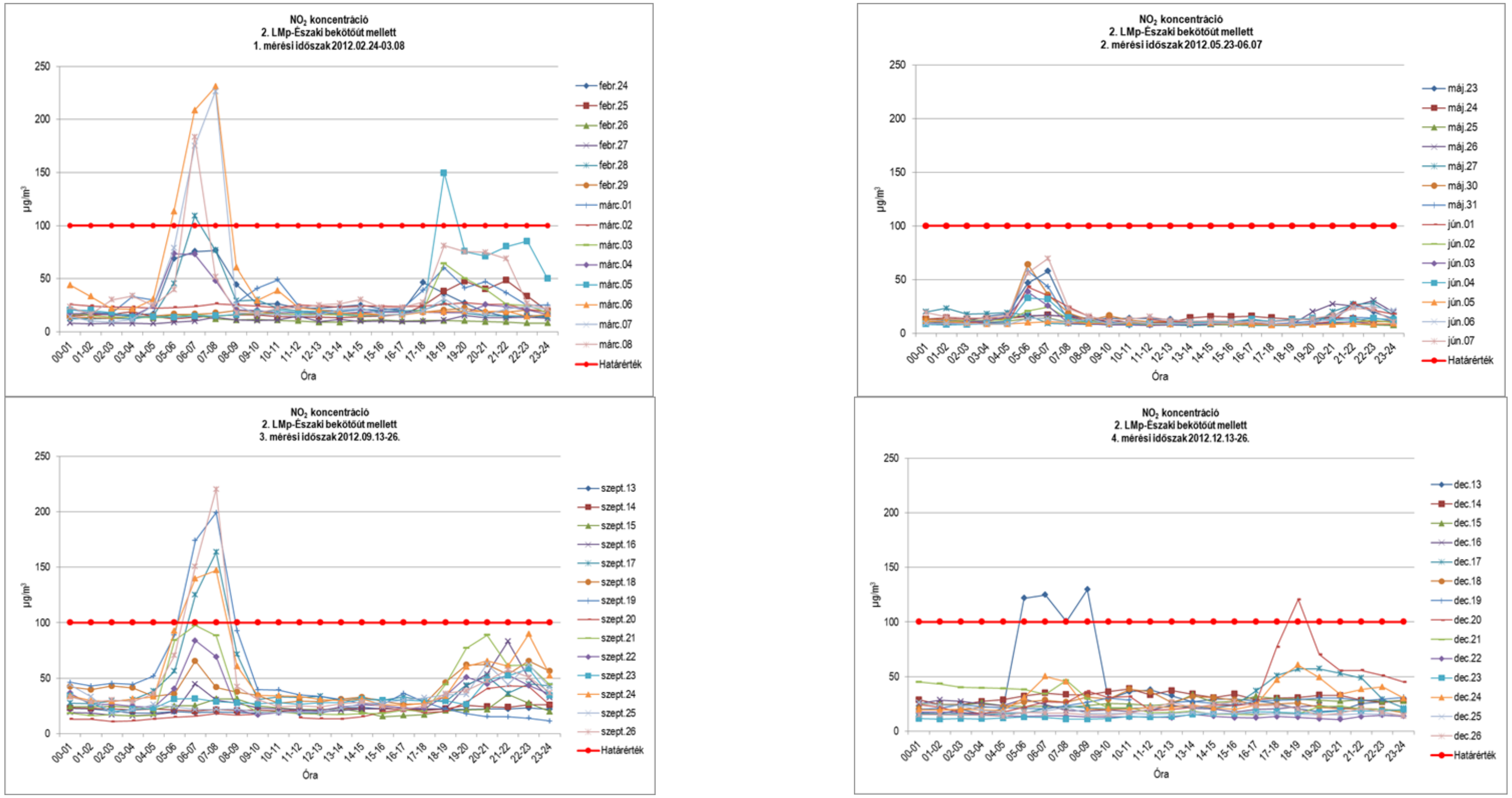
NO_2 immission

NO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. Test					**2. Test**					**3. Test**					**4. Test**				
Measur. period	Aver-age	Min	Max	98% percentile	Measur. period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measur. period	Average	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
Febr.24	29	14	77	76	May 23	17	10	58	53	Sept.13	21	18	24	23	Dec.13	41	16	130	127
Febr.25	21	12	48	48	May 24	14	10	17	17	Sept.14	22	20	26	26	Dec.14	31	24	39	38
Febr.26	12	8	19	17	May 25	10	7	14	14	Sept.15	23	15	36	34	Dec.15	26	22	33	33
Febr.27	11	8	15	15	May 26	14	8	31	29	Sept.16	29	16	83	70	Dec.16	22	18	29	29
Febr.28	26	12	109	94	May 27	13	7	28	28	Sept.17	46	27	164	146	Dec.17	28	15	57	57
Febr.29	17	13	22	21	May 30	15	9	64	51	Sept.18	41	27	66	66	Dec.18	26	17	38	37
March01	30	17	60	56	May 31	14	9	58	51	Sept.19	49	11	199	188	Dec.19	26	20	31	31
March02	24	19	27	27	June 01	15	8	43	40	Sept.20	20	11	43	43	Dec.20	37	17	121	101
March03	21	13	64	58	June 02	11	8	24	23	Sept.21	39	16	98	94	Dec.21	26	15	46	46
March04	25	15	73	73	June 03	11	7	39	33	Sept.22	34	17	84	77	Dec.22	14	11	18	17
March05	34	14	150	120	June 04	13	8	33	32	Sept.23	31	20	59	56	Dec.23	14	11	20	19
March06	44	15	231	221	June 05	9	8	12	11	Sept.24	51	26	147	144	Dec.24	30	19	61	56
March07	36	9	227	203	June 06	12	9	25	25	Sept.25	31	18	63	63	Dec.25	18	15	26	25
March08	41	17	183	136	June 07	19	10	70	63	Sept.26	47	22	220	188	Dec.26	18	13	27	27
Average	**27**	**13**	**93**	**83**		**13**	**8**	**37**	**34**		**35**	**19**	**94**	**87**		**25**	**17**	**48**	**46**

Comment:
The measurement was suspended on February 29 between 11.00 – 12.00 hours due to calibration, on March 1 between 6.00-8.00 hours due to voltage volatility.
The measurement was suspended from May 28. 00.00 hour until May 29. 24.00 hour and in June 1 between 10.00 – 11.00 hours due to power shortage.
The measurement was suspended on August 20 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on December 19 between 11.00 – 12.00 hours due to calibration.

Table 16.2.2-13: 2. LMp on-the-spot measurements/tests – NO_2.

The following figures present the NO_2 concentration hourly values:

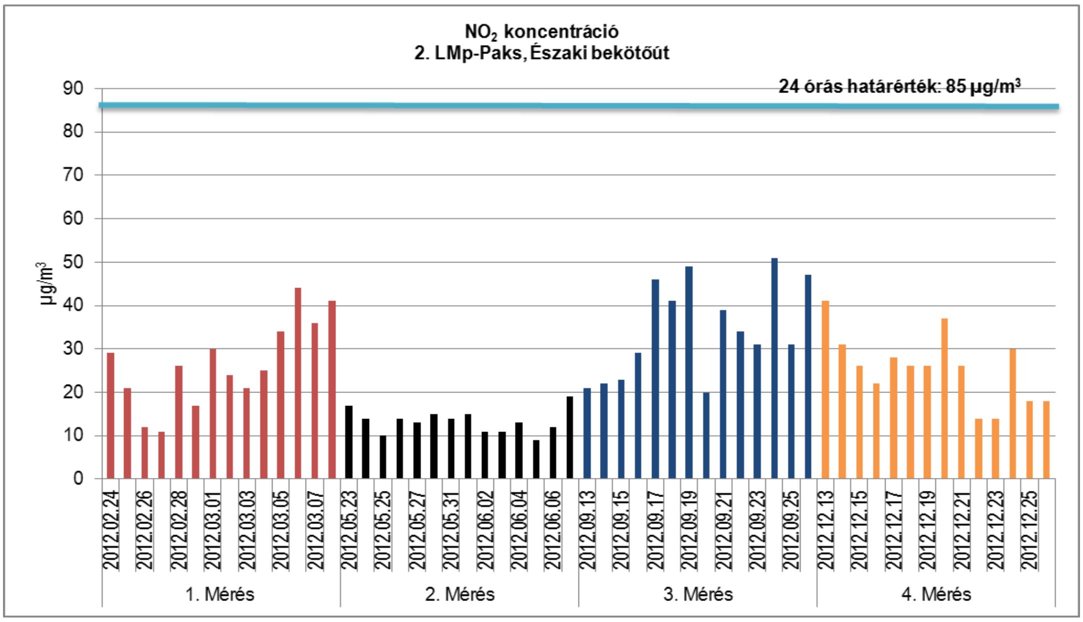


koncentráció - concentration, Északi bekötőút mellett - along the north access road, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-15: 2. LMp - NO_2 hourly run-off curves along the north access road

NO_2 concentration Based on hourly measurement values **(μg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 02. 24-03.08.)	27	13	93	83
2. TEST (2012. 05. 23-06.07.)	13	8	37	34
3. TEST (2012.09.13-26.)	35	19	94	87
4. TEST (2012.12.13-26.)	25	17	48	46

Table 16.2.2-14: 2. LMp NO_2 measurements/tests results – measurement by periods



koncentráció - concentration, Északi bekötőút mellett - along the north access road, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-16: 2. LMp - NO_2 daily average concentration at the north access road

The NO_2 hourly values measured during the four measuring periods were higher than the 100 μg/m³ hourly limit in 21 occasions, during the 1st measuring period 8 times, in the 3rd measuring period also in 8 times, and in the 4th measuring period 5 times.

There was no excess to the 24-hour limit.

The hourly run-off curves can well characterise the daily volatility. NO_2 concentration increased in the morning hours between 04.00-09.00 a.m., and limits were also exceeded during this period. NO_2 concentration also increased during the evening hours.

There was no factor detected at the beginning of the 1st measuring period that could have direct impact onto the measurement results, but the nearly parking lot was still shut down later due to an event, thus passenger cars were parked next to the measuring bus during the second half of the test. This had significant effects onto the measurement results, primarily at the beginning and end of the working time, as this is clearly demonstrated by the hourly run-off curves showing an significantly rising NO_2 concentration.

The hourly limit exceeding values were 1-131%higher than the limit. The highest hourly NO_2 value was measured during the 1st measuring period on March 6, 2012 between 07.00-08.00 a.m., its value was 231 μg/m³.

Bi-weekly average values of **NO_2** measurements/tests were: **27 μg/m³**, **13 μg/m³**, **35 μg/m³**, **25 μg/m³**.

The volatility shown in the NO_2 measurement results showed no relation with the heating-non-heating seasons, and the dominant impacts of traffic along the access road can be clearly seen.

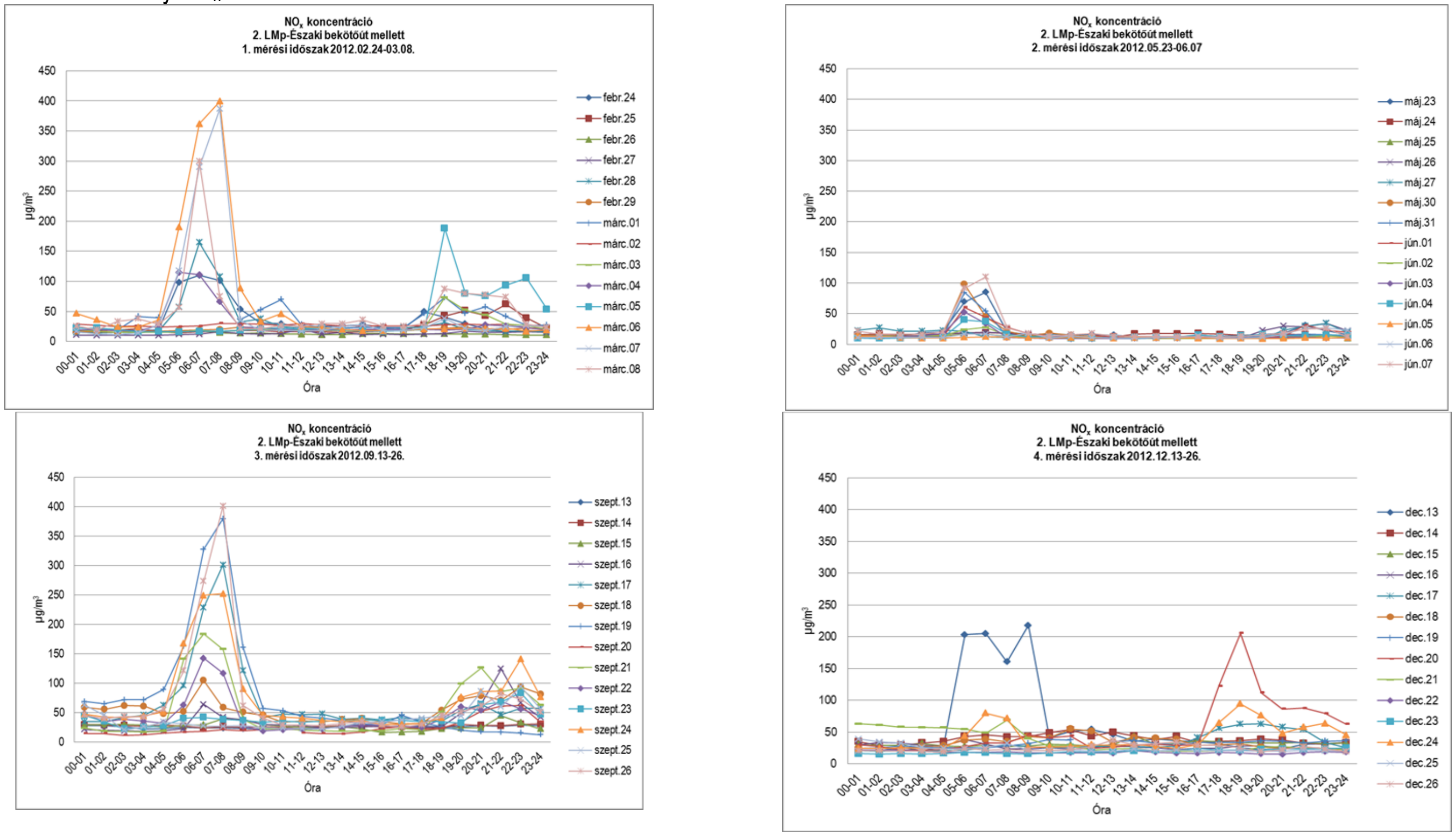
NO_x immission

NO_x concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measur. period	Aver -age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.24	35,7	16,3	109,7	105,8	May 23	21,6	12,0	85,3	78,0	Sept.13	25,5	21,4	29,6	29,4	Dec.13	60,1	20,4	217,9	212,0
Febr.25	24,1	14,5	62,1	57,1	May 24	15,7	11,6	19,4	18,8	Sept.14	26,8	23,3	30,3	30,2	Dec.14	39,0	29,3	53,6	51,9
Febr.26	13,9	10,4	21,0	19,8	May 25	12,3	9,9	17,1	16,9	Sept.15	27,1	16,3	44,7	42,1	Dec.15	31,4	27,2	43,4	40,1
Febr.27	13,1	9,8	19,8	18,7	May 26	16,2	10,0	34,6	32,5	Sept.16	36,3	17,6	123,8	97,2	Dec.16	27,2	22,5	38,1	36,0
Febr.28	32,4	14,3	164,7	138,3	May 27	16,2	9,4	34,6	32,4	Sept.17	69,1	34,2	301,0	267,7	Dec.17	32,9	19,6	62,8	62,6
Febr.29	19,4	15,1	24,1	23,8	May 30	18,3	10,0	97,9	73,9	Sept.18	55,1	30,8	104,2	99,0	Dec.18	33,3	21,6	55,0	53,6
March01	36,4	19,2	73,0	71,6	May 31	17,2	10,3	84,6	70,6	Sept.19	78,1	12,1	379,4	355,4	Dec.19	31,8	24,4	38,5	38,1
March02	26,5	20,5	30,0	29,8	June 01	18,0	9,7	60,4	53,2	Sept.20	24,4	11,4	61,6	61,2	Dec.20	52,9	21,4	205,4	167,2
March03	23,4	15,2	73,1	63,5	June 02	12,6	9,2	27,8	26,0	Sept.21	54,8	16,5	183,6	171,5	Dec.21	36,0	20,0	68,6	65,9
March04	30,4	17,3	114,8	113,0	June 03	13,6	9,1	52,4	43,9	Sept.22	44,8	18,5	142,2	130,4	Dec.22	18,3	15,1	22,1	22,1
March05	39,1	15,8	187,7	150,0	June 04	14,6	9,5	40,0	38,8	Sept.23	39,9	22,1	83,3	76,2	Dec.23	19,5	15,3	25,0	24,6
March06	64,3	16,8	399,1	381,9	June 05	10,8	9,1	13,5	13,1	Sept.24	75,7	29,8	251,9	250,5	Dec.24	42,6	24,4	94,6	87,8
March07	52,0	11,5	386,4	342,0	June 06	14,0	10,5	26,9	26,6	Sept.25	39,5	20,3	94,3	90,5	Dec.25	23,7	19,7	38,9	36,8
March08	50,5	19,1	299,2	201,8	June 07	23,8	11,9	109,7	101,3	Sept.26	71,7	25,0	400,9	342,1	Dec.26	24,5	18,5	37,2	36,0
Average	**33**	**15**	**140**	**123**		**16**	**10**	**50**	**45**		**48**	**21**	**159**	**146**		**34**	**21**	**71**	**67**

Comment:
The measurement was suspended on February 29 between 11.00 – 12.00 hours due to calibration, on March 1 between 6.00-8.00 hour due to voltage volatility.
The measurement was suspended from May 28. 00.00 hour until May 29. 24.00 hours, and on June 1 between 10.00 – 11.00 hours due to power outage.
The measurement was suspended on August 20. between 10.00 – 11.00 hours due to calibration .
The measurement was suspended on December 19 between 11.00 – 12.00 hours due to calibration.

Table 16.2.2-15: 2. LMp on-the-spot measurements/tests – NO_x

The following figures present the hourly NO_x concentration values:

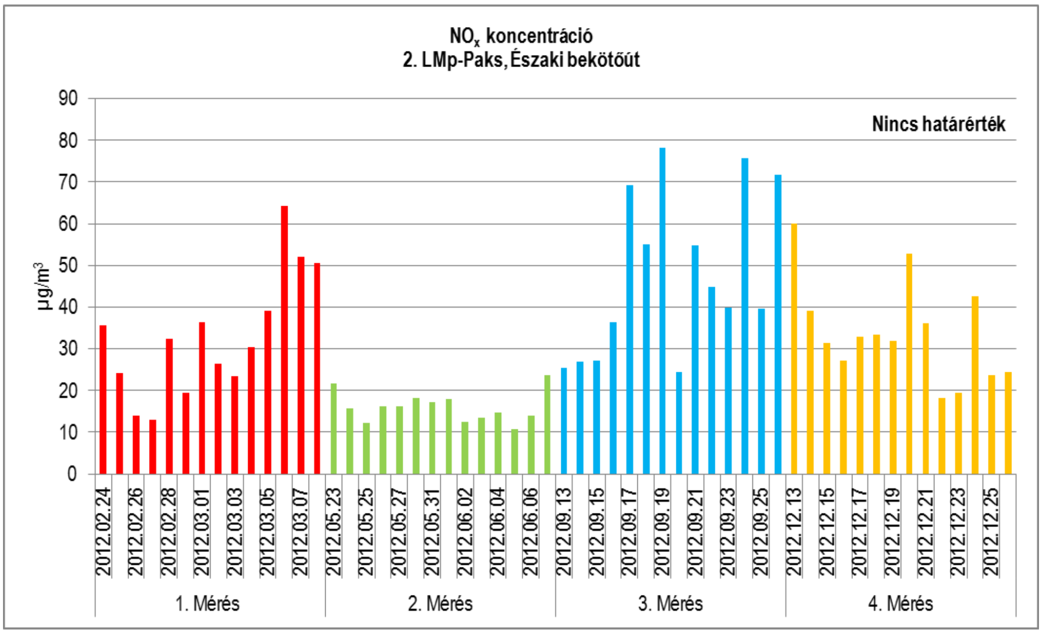


koncentráció - concentration, Északi bekötőút mellett - along the north access road, mérési időszak - measurement period, óra - hour

Figure 16.2.2-17: 2. LMp - NO_x hourly run-off curves along the north access road

NO_x concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 02. 24-03.08.)	33	15	140	123
2. TEST (2012. 05. 23-06.07.)	16	10	50	45
3. TEST (2012.09.13-26.)	48	21	159	146
4. TEST (2012.12.13-26.)	34	21	71	67

Table 16.2.2-16: 2. LMp NO_x measurements/tests results



koncentráció - concentration, Északi bekötőút mellett - along the north access road, nincs határérték - no limit, mérés - measurement/test

Figure 16.2.2-18: 2. LMp - NO_x daily average concentration along the north access road

Decree 4/2011. (I. 14.) VM defines no immission limit for NO_x. The former Decree 14/2001.(V.9.) KöM-EüM-FVM defined for the NO_x 200 µg/m³ hourly, 150 µg/m³ 24-hour, and 70 µg/m³ annual limit. Thus the hourly values were higher than the permitted limit 5 times during the 1st measuring period, 8 times during the 3rd measuring period, and 4 times during the 4th measuring period. The values were 1-200 % higher than the limit formerly in effect.

The highest NO_x value was measured during the 3rd measuring period, on September 26, 2012 between 07.00-08.00 a.m., its value was 401 µg/m³.

There was no factor detected at the beginning of the 1st measuring period that could have direct impact onto the measurement results, but the nearly parking lot was still shut down later due to an event, thus passenger cars were parked next to the measuring bus during the second half of the test. (Unfortunately we were informed about this only when we were looking for the reason behind the high immission values after we closed the measurements.) This had significant effects onto the measurement results, primarily at the beginning and end of the working time

There was no excess to the 24-hour limit.

Bi-weekly average values of the **NO_x** measurements/tests were: **33 µg/m³**, **16 µg/m³**, **48 µg/m³**, **21 µg/m³**.

The NO_x hourly and daily values show a run-off similar to the NO_2 values. The volatility in NO_x measurement results – similarly to the NO_2 measurement results – were not in line with the heating-non-heating seasonality, and the hourly run-off curves can well characterise the daily volatility. Similarly to NO_2, NO_x concentration also increased in the morning between 04.00-09.00 hours and in the evening between 17.00-24.00 hours.

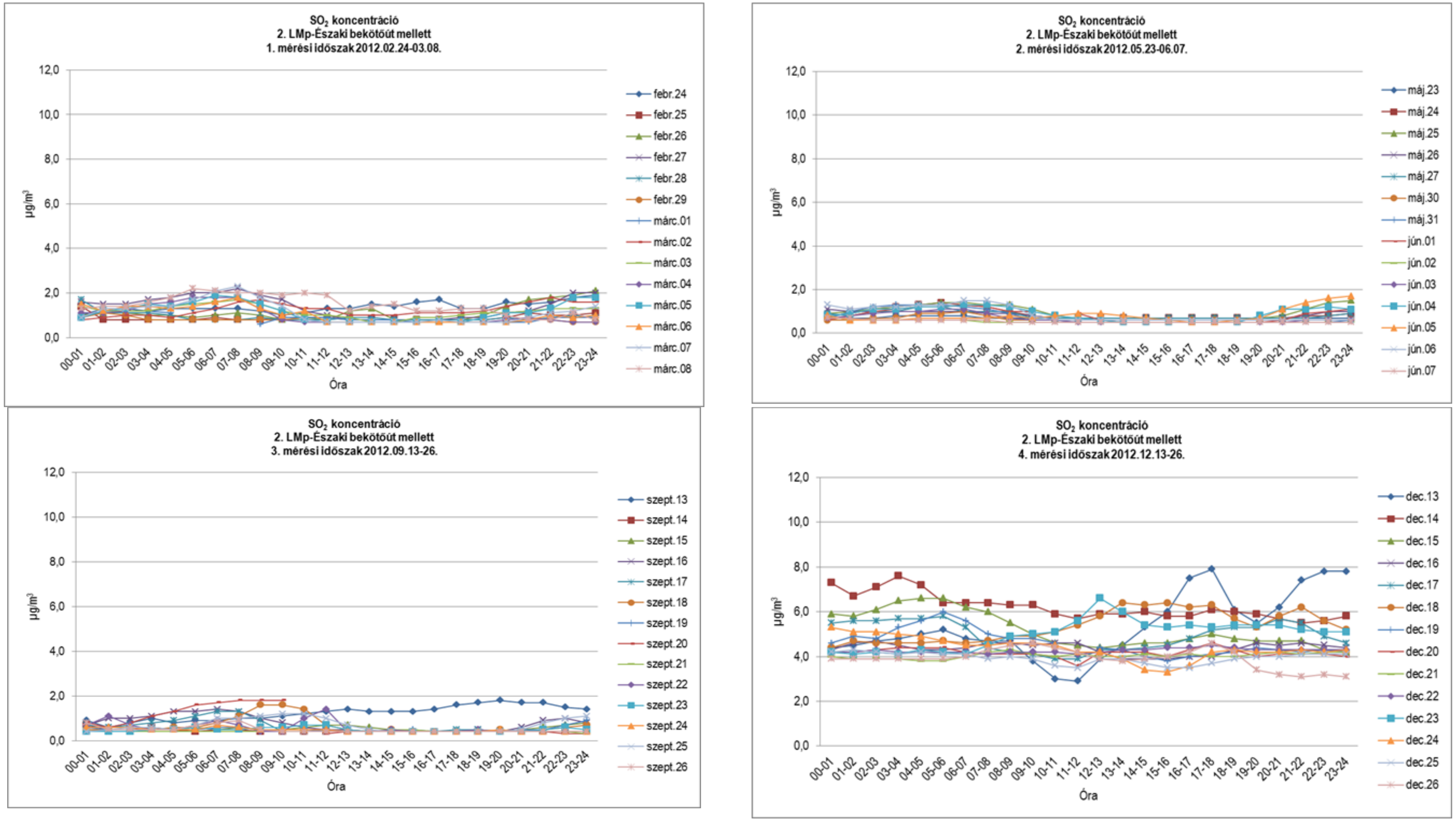
SO_2 immission

SO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. Test					**2. Test***					**3. Test**					**4. Test**				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.24	1,4	1,0	1,9	1,9	May 23	0,7	0,7	0,8	0,8	Sept.13	1,2	0,6	1,8	1,8	Dec.13	2,9	7,9	7,9	5,4
Febr.25	0,9	0,8	1,4	1,3	May 24	0,9	0,7	1,4	1,4	Sept.14	0,4	0,4	0,7	0,7	Dec.14	5,5	7,6	7,5	6,2
Febr.26	1,1	0,8	2,1	2,0	May 25	1,0	0,7	1,5	1,5	Sept.15	0,5	0,4	0,8	0,8	Dec.15	4,2	6,6	6,6	5,2
Febr.27	1,4	0,8	2,2	2,1	May 26	0,8	0,7	1,1	1,1	Sept.16	0,8	0,4	1,4	1,4	Dec.16	3,9	4,7	4,7	4,4
Febr.28	0,9	0,8	1,7	1,4	May 27	0,8	0,7	1,2	1,2	Sept.17	0,6	0,4	1,3	1,3	Dec.17	3,9	5,8	5,8	4,9
Febr.29	0,8	0,7	1,1	1,1	May 30	0,7	0,6	1,0	1,0	Sept.18	0,7	0,4	1,6	1,6	Dec.18	4,4	6,4	6,4	5,4
March01	0,9	0,6	1,2	1,2	May 31	0,7	0,5	1,3	1,3	Sept.19	0,5	0,4	0,9	0,8	Dec.19	3,8	6,0	5,8	4,6
March02	1,2	0,8	1,8	1,8	June 01	0,8	0,5	1,3	1,3	Sept.20	0,8	0,3	1,8	1,8	Dec.20	3,6	4,6	4,5	4,2
March03	1,2	0,7	1,7	1,7	June 02	0,5	0,5	0,8	0,7	Sept.21	0,4	0,3	0,5	0,5	Dec.21	3,8	4,3	4,3	4,0
March04	1,0	0,7	1,8	1,8	June 03	0,7	0,5	1,1	1,1	Sept.22	0,6	0,4	1,4	1,3	Dec.22	4,1	4,5	4,5	4,3
March05	1,2	0,7	1,9	1,9	June 04	0,9	0,5	1,3	1,3	Sept.23	0,5	0,4	0,7	0,7	Dec.23	4,1	6,6	6,3	5,0
March06	1,0	0,7	1,8	1,7	June 05	0,8	0,5	1,7	1,7	Sept.24	0,5	0,4	0,7	0,7	Dec.24	3,3	5,3	5,2	4,4
March07	1,1	0,7	2,3	2,2	June 06	0,9	0,6	1,5	1,5	Sept.25	0,7	0,4	1,2	1,2	Dec.25	3,5	4,3	4,3	3,9
March08	1,5	0,8	2,2	2,2	June 07	0,5	0,5	0,7	0,7	Sept.26	0,5	0,4	0,9	0,9	Dec.26	3,1	4,6	4,6	3,9
Average	**1**	**1**	**2**	**2**		**1**	**1**	**1**	**1**		**1**	**0**	**1**	**1**		**5**	**4**	**6**	**6**

Comment:
The measurement was suspended on February 29 between 11.00 – 12.00 hours due to calibration, on March 1 between 6.00-8.00 hours due to voltage volatility
The measurement was suspended from May 28. 00.00 hour until May 29. 24.00 hours and on June 1 between 10.00 – 11.00 hours due to power outage.
* Based on the hourly measurements/tests the SO_2 levels were below the lower measurement limit.
The measurement was suspended on August 20. between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on December 19 between 11.00 – 12.00 hours due to calibration.

Table 16.2.2-17: 2. LMp on-the-spot measurements/tests – SO_2

The following figures present the hourly SO_2 concentration values:



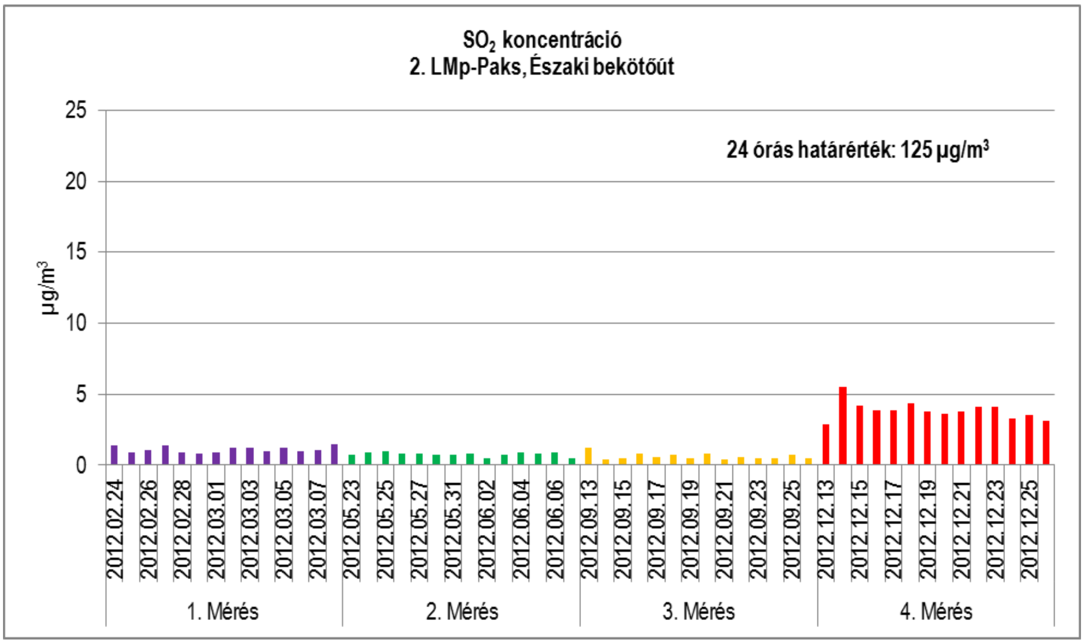
Comment:
During the 2nd measuring period the result of the SO_2 measurement was below the lower limit.

koncentráció - concentration, Északi bekötőút mellett - along the north access road, mérési időszak - measurement period, óra - hour

Figure 16.2.2-19: 2. LMp - SO_2 hourly run-off curves along the north access road

SO_2 concentration Based on hourly measurement values **(µg/m^3)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 02. 24-03.08.)	1	1	2	2
2. TEST (2012. 05. 23-06.07.)	1	1	1	1
3. TEST (2012.09.13-26.)	1	0	1	1
4. TEST (2012.12.13-26.)	5	4	6	6

Table 16.2.2-18: 2. LMp SO_2 measurements/tests results



koncentráció - concentration, Északi bekötőút mellett - along the north access road, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-20: 2. LMp – SO_2 daily average concentration along the north access road

The measured hourly SO_2 immission values were well below the 250 µg/m^3 hourly limit.

The highest hourly concentration values were measured during the 4th measurement period on December 13, between 17.00-18.00 hours, the value was 7,9 µg/m^3, 35 of the hourly limit.

The 24-hour average concentration values were also well below the 125 µg/m^3 daily limit.

Bi-weekly average values of the **SO_2** measurements/tests were: **1 µg/m^3**, **1 µg/m^3**, **1 µg/m^3**, **5 µg/m^3**.

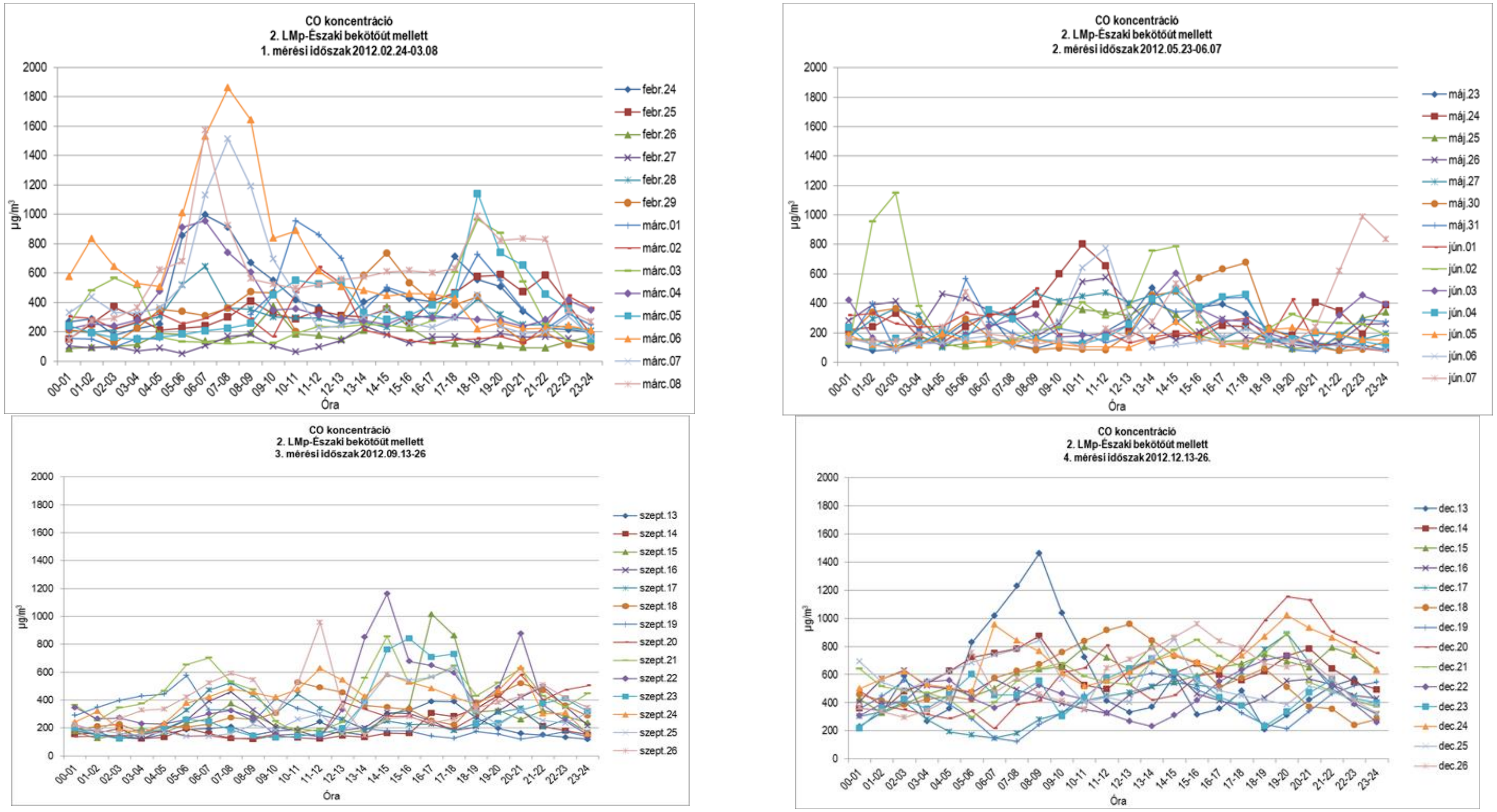
CO immission

CO concentration																			
Daily assessment hourly concentration values *																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.24	446,9	178,0	996,0	957,8	May 23	204,3	77,0	506,0	454,0	Sept.13	202,5	118,0	390,0	389,1	Dec.13	557,7	211,0	1463,0	1355,4
Febr.25	346,3	151,0	588,0	586,6	May 24	304,0	135,0	800,0	733,3	Sept.14	191,7	118,0	435,0	391,8	Dec.14	614,2	343,0	874,0	832,6
Febr.26	162,3	87,0	374,0	372,2	May 25	211,2	92,0	414,0	412,2	Sept.15	298,3	124,0	1015,0	945,5	Dec.15	609,7	327,0	803,0	799,8
Febr.27	131,5	51,0	243,0	218,2	May 26	287,6	93,0	574,0	561,6	Sept.16	257,3	123,0	495,0	478,4	Dec.16	478,1	324,0	630,0	624,9
Febr.28	304,0	194,0	646,0	588,5	May 27	280,5	78,0	475,0	473,6	Sept.17	273,3	121,0	523,0	499,5	Dec.17	426,0	147,0	889,0	837,9
Febr.29	322,9	93,0	736,0	669,6	May 30	253,9	78,0	677,0	656,3	Sept.18	322,4	168,0	528,0	524,3	Dec.18	568,2	241,0	959,0	938,8
March01	403,2	94,0	956,0	918,0	May 31	248,9	73,0	565,0	508,0	Sept.19	267,3	120,0	576,0	514,4	Dec.19	397,1	125,0	610,0	594,2
March02	279,1	125,0	639,0	586,6	June 01	241,7	78,0	499,0	466,0	Sept.20	259,1	124,0	581,0	547,1	Dec.20	598,7	216,0	1153,0	1142,0
March03	322,9	118,0	963,0	920,7	June 02	341,8	91,0	1147,0	1059,1	Sept.21	456,1	169,0	856,0	785,6	Dec.21	580,4	296,0	892,0	871,3
March04	386,9	219,0	956,0	935,8	June 03	265,8	92,0	604,0	534,5	Sept.22	404,5	138,0	1161,0	1029,9	Dec.22	453,7	232,0	735,0	719,4
March05	379,3	149,0	1140,0	955,1	June 04	235,4	109,0	495,0	478,4	Sept.23	316,7	122,0	842,0	804,3	Dec.23	457,6	219,0	711,0	679,3
March06	651,8	212,0	1861,0	1760,7	June 05	155,6	98,0	276,0	256,7	Sept.24	401,0	156,0	632,0	629,7	Dec.24	694,1	479,0	1020,0	990,1
March07	448,0	168,0	1513,0	1364,9	June 06	197,6	82,0	775,0	713,8	Sept.25	283,5	138,0	631,0	609,4	Dec.25	559,0	383,0	852,0	848,8
March08	610,8	147,0	1572,0	1302,9	June 07	283,5	104,0	989,0	918,6	Sept.26	382,2	147,0	955,0	788,5	Dec.26	572,1	295,0	958,0	915,2
Average	**371**	**142**	**942**	**867**		**251**	**91**	**628**	**588**		**308**	**135**	**687**	**638**		**540**	**274**	**896**	**868**

Comment:
* Daily 8-hour moving average concentrations maximum. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. . The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on February 29 between 11.00 – 12.00 hours due to calibration on March 1 between 6.00-8.00 hour due to voltage volatility.
The measurement was suspended between May 28. 00.00 hour and May 29. 24.00 hours, and on June 1 between 10.00 – 11.00 hours due to power outage.
The measurement was suspended on August 20. between 10.00 – 11.00 hours due to calibration.

Table 16.2.2-19: 2. LMp on-the-spot measurements/tests – CO

The following figures present the hourly CO concentration values:

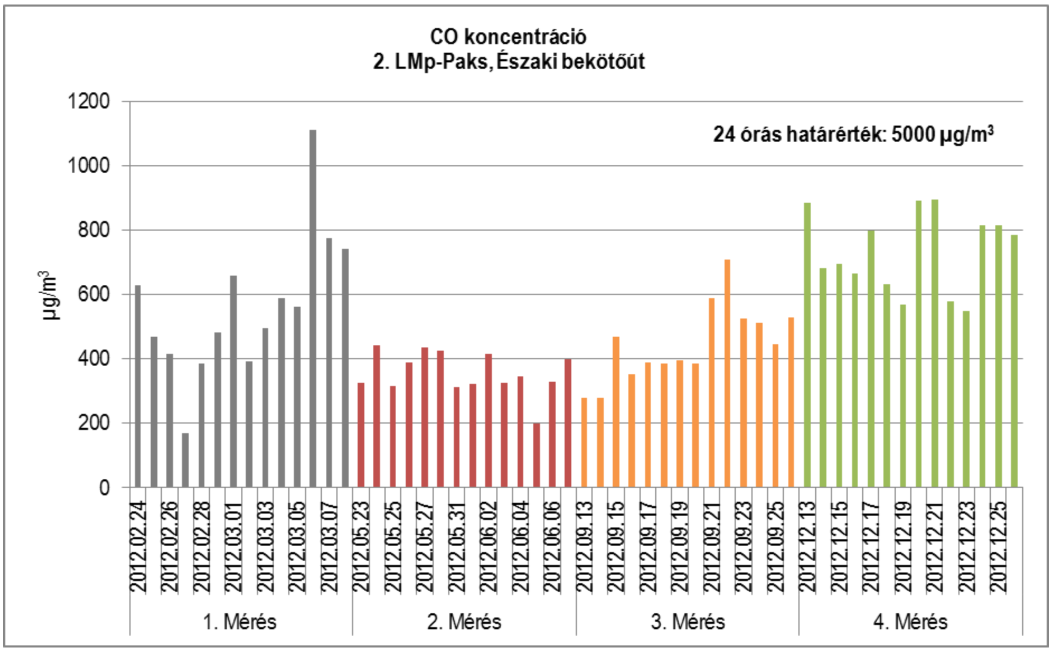


koncentráció - concentration, Északi bekötőút mellett - along the north access road, mérési időszak - measurement period, óra - hour

Figure 16.2.2-21: 2. LMp - CO hourly run-off curves along the north access road

CO concentration Based on hourly measurement values (µg/m³)				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 02. 24-03.08.)	563	170	1112	1024
2. Test (2012. 05. 23-06.07.)	356	198	443	441
3. Test (2012.09.13-26.)	446	280	708	677
4. Test (2012.12.13-26.)	733	550	895	894

Table 16.2.2-20: 2. LMp CO measurements/tests results



koncentráció - concentration, Északi bekötőút mellett - along the north access road, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-22: 2. LMp – CO daily average concentration along the north access road

The measured hourly CO immission values were always well below the 10 000 µg/m³ hourly limit.

The highest concentration value was measured during the 1st measurement period on March 6 between 7.00-8.00 a.m., the value was 1861 µg/m³, representing 19% of the hourly limit.

The maximum value of the 8-hour moving average values was lower than 20% of the 24-hour limit (5 000 µg/m³).

Bi-weekly average values of the **CO** measurements/tests were: **563 µg/m³**, **356 µg/m³**, **446 µg/m³**, **733 µg/m³**.

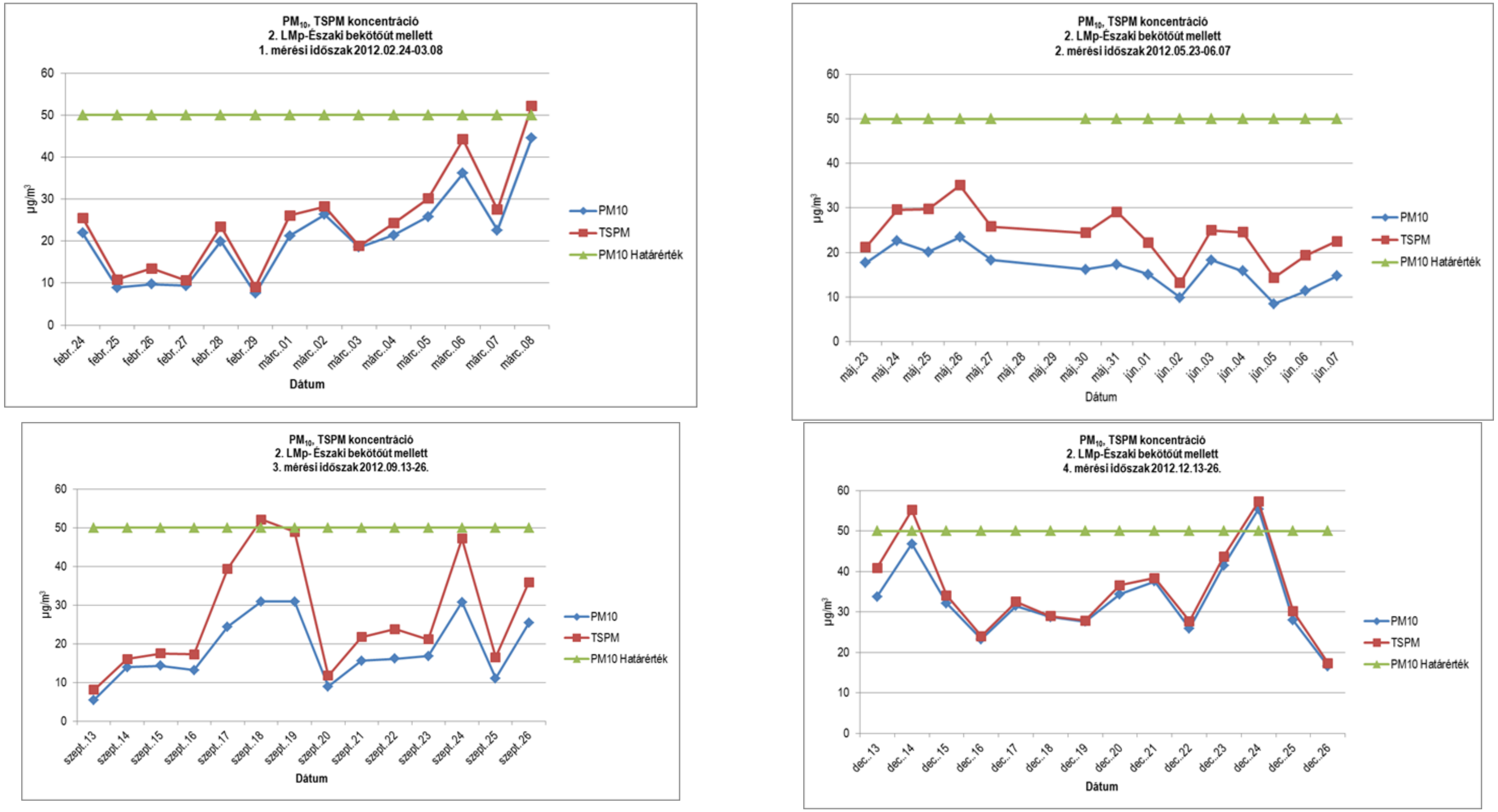
The CO measurement results were slightly higher during winter, and their volatility was in line with the heating-non-heating season.

PM_{10}, TSPM 24-hour concentration

Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM
	µg/m³			µg/m³			µg/m³			µg/m³	
Febr.24	22	26	May 23	18	21	Sept.13	5	8	Dec.13	34	41
Febr.25	9	11	May 24	23	30	Sept.14	14	16	Dec.14	47	55
Febr.26	10	13	May 25	20	30	Sept.15	14	18	Dec.15	32	34
Febr.27	9	11	May 26	23	35	Sept.16	13	17	Dec.16	23	24
Febr.28	20	23	May 27	18	26	Sept.17	24	39	Dec.17	31	33
Febr.29	8	9	May 30	16	24	Sept.18	31	52	Dec.18	29	29
March 01	21	26	May 31	17	29	Sept.19	31	49	Dec.19	28	28
March 02	26	28	June 01	15	22	Sept.20	9	12	Dec.20	34	37
March 03	19	19	June 02	10	13	Sept.21	16	22	Dec.21	38	38
March 04	21	24	June 03	18	25	Sept.22	16	24	Dec.22	26	28
March 05	26	30	June 04	16	25	Sept.23	17	21	Dec.23	41	44
March 06	36	44	June 05	8	14	Sept.24	31	47	Dec.24	55	57
March 07	23	27	June 06	11	19	Sept.25	11	17	Dec.25	28	30
March 08	45	52	June 07	15	22	Sept.26	25	36	Dec.26	17	17
min	**8**	**9**		**8**	**13**		**5**	**8**		**17**	**17**
max	**45**	**52**		**23**	**35**		**31**	**52**		**55**	**57**
Average	**21**	**25**		**16**	**24**		**18**	**27**		**33**	**35**

Table 16.2.2-21: 2. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The following figures present the PM_{10} and a TSPM daily concentration values:



koncentráció - concentration, Északi bekötőút mellett - along the north access road, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-23: 2. LMp - PM_{10} and a TSPM daily run-off curves along the north access road

PM_{10} 24-hour average and maximum values during the 1st, 2nd and 3rd measuring periods did not exceed the limit. During the 4th measuring period the PM_{10} 24-hour average value measured on December 24 was higher than the limit, as this value was 55 µg/m^3.

Decree 4/2011. (I. 14.) VM defines no limit for the **TSPM**. The formerly valid Decree 14/2001.(V.9.) KöM-EüM-FVM defined for the TSPM 200 µg/m^3 hourly, 100 µg/m^3 24-hour, and 50 µg/m^3 annual limit, and the measurement results did not exceed such limit values.

Settling dust

Settling dust concentration		
First days	**Last days**	**g/m^{2}x30nap**
2012.01.23	2012.02.23	1,2
2012.02.23	2012.03.28	1,6
2012.03.28	2012.04.26	2,2
2012.04.26	2012.05.22	2,6
2012.05.22	2012.06.25	3,7
2012.06.25	2012.07.31	2,3
2012.07.31	2012.08.30	1,6
2012.09.11	2012.10.12	3,7
2012.10.12	2012.11.12	0,9
2012.11.12	2012.12.12	0,8
2012.12.12	2013.01.11	0,8
2013.01.11	2013.02.12	1,6
2013.02.25	2013.03.29	1,3

Table 16.2.2-22: 2. LMp on-the-spot measurements/tests – settling dust

Decree 4/2011. (I. 14.) VM defines no limit for **Settling dust** either. The annulled Decree 14/2001.(V.9.) KöM-EüM-FVM defines 16 g/m^2 x 30 days and 120 t/km^2 x year limit. Based on the above referred measurement results we can state that settling dust measurement results remained below the 30-day limit, and the highest value was only 23% of the limit.

16.2.2.5.3 Paks, Southern access road, Meteorological Station - 3. LMp

mérés - measurements/tests

source : Google Earth

Figure 16.2.2-24: 3. LMp location

1. TEST

2. TEST

3. TEST

4. TEST

SETTLING DUST SAMPLING UNITS

Figure 16.2.2-25: Location of testing truck and settling dust sampling units at 3 LMp site

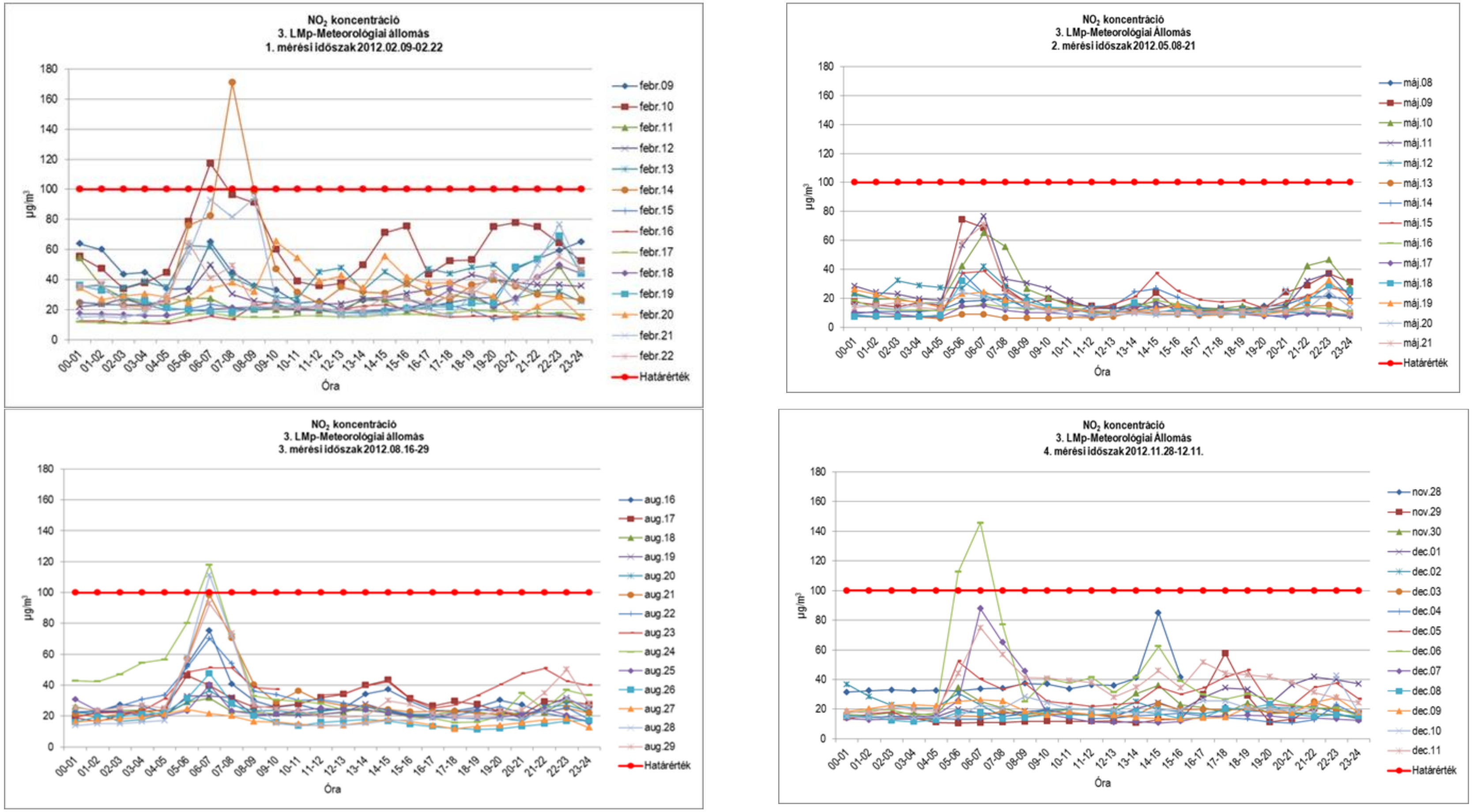
NO_2 immission

NO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. Test					2. Test					3. Test					4. Test				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.09	39	20	65	65	May 08	14	9	21	21	Aug.16	30	17	75	65	Nov.28	32	14	85	66
Febr.10	61	34	117	108	May 09	23	11	74	72	Aug.17	29	17	46	45	Nov.29	17	11	58	45
Febr.11	27	18	54	52	May 10	24	12	65	61	Aug.18	24	21	32	31	Nov.30	20	15	36	35
Febr.12	31	19	50	47	May 11	24	11	77	67	Aug.19	24	19	33	33	Dec.01	23	15	42	41
Febr.13	40	25	63	62	May 12	17	8	42	37	Aug.20	23	16	37	33	Dec.02	21	13	37	34
Febr.14	43	22	171	138	May 13	9	6	15	15	Aug.21	31	19	98	86	Dec.03	17	13	25	24
Febr.15	20	14	25	24	May 14	14	7	37	33	Aug.22	30	18	70	63	Dec.04	15	11	23	22
Febr.16	17	11	25	24	May 15	19	7	39	38	Aug.23	36	19	51	51	Dec.05	29	13	52	50
Febr.17	16	11	20	19	May 16	13	11	19	19	Aug.24	38	16	118	100	Dec.06	39	15	146	130
Febr.18	24	16	50	47	May 17	10	7	15	15	Aug.25	23	16	40	36	Dec.07	21	11	88	77
Febr.19	28	18	69	62	May 18	14	7	32	31	Aug.26	19	11	48	40	Dec.08	16	11	23	22
Febr.20	34	15	65	61	May 19	16	9	32	29	Aug.27	17	12	25	23	Dec.09	20	13	28	27
Febr.21	36	15	94	94	May 20	14	8	26	25	Aug.28	26	14	111	93	Dec.10	20	14	43	36
Febr.22	33	19	64	60	May 21	17	9	71	65	Aug.29	32	19	93	84	Dec.11	36	18	75	66
Average	**32**	**18**	**67**	**62**		**16**	**9**	**40**	**38**		**27**	**17**	**63**	**56**		**23**	**13**	**54**	**48**

Comment:
The measurement was suspended on February 16 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on May 15 09.00 – 10.00 hour due to calibration.
The measurement was suspended on August 23 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 28 between 16.00-17.00 hours due to maintenance, and on December 4 between 10.00-11.00 hour due to calibration.

Table 16.2.2-23: 3. LMp on-the-spot measurements/tests – NO_2

The following figures present the hourly NO_2 concentration values:

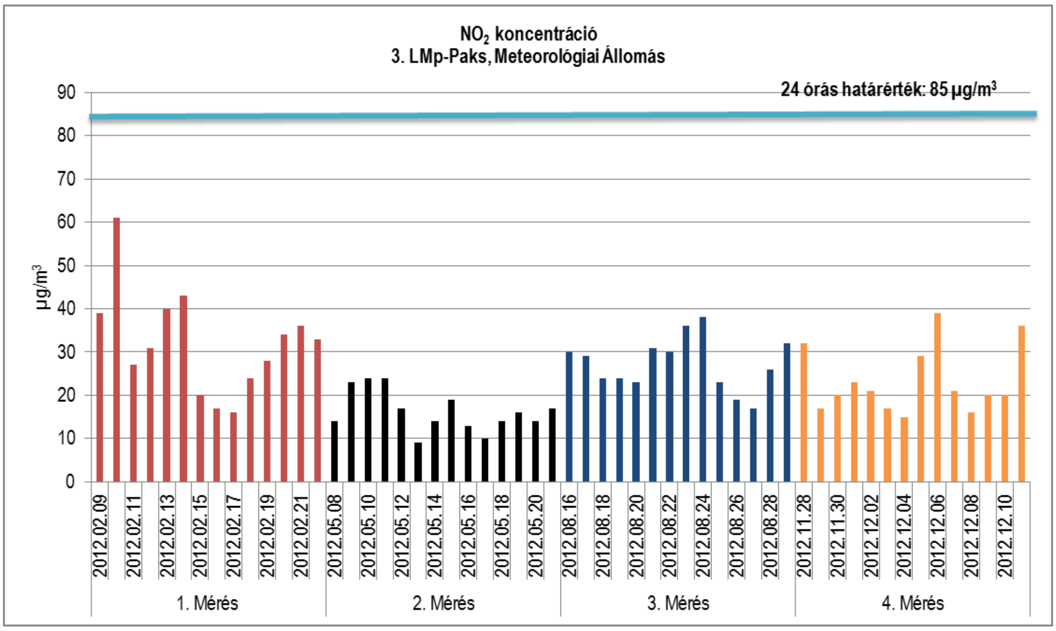


koncentráció - concentration, Meteorológiai állomás - meterorogical station, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-26: 3. LMp - NO_2 hourly run-off curves at 3 LMp meterorogical station

NO_2 concentration Based on hourly measurement values **(μg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 02. 09-02.22.)	32	18	67	62
2. TEST (2012. 05. 08-21.)	16	9	40	38
3. TEST (2012. 08. 16-29.)	27	17	63	56
4. TEST (2012. 11. 28-12.11.)	23	13	54	48

Table 16.2.2-24: 3. LMp NO_2 measurements/tests results



koncentráció - concentration, Meteorológiai Állomás - meteorological station, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-27: 3. LMp - NO_2 daily average concentration at 3 LMp meteorological station

Among the measured NO_2 hourly values the 6-hourl figure was higher than the 100 μg/m³ hourly limit, for 2-2-2 hours during the 1st, the 3rd and the 4th measuring periods alike.

The measured NO_2 hourly run-off curves can well characterise the daily volatility. NO_2 concentration significantly increased in the morning between 04.00-09.00 hours, and values higher than the limit were measured during this period. Concentration slightly increased also in the afternoon between 13.00-17.00 hours, and in the evening between 20.00-24.00 hours.

The hourly Value exceeding limits were 11-71% higher than the limit.

The highest hourly NO_2 value was measured during the 1st measuring period on February 14, 2012 between 07.00-08.00 a.m., it was 171 μg/m³.

Bi-weekly average values of the **NO_2** measurements/tests 2-week average values: **32 μg/m³**, **16 μg/m³**, **27 μg/m³**, **23 μg/m³**.

The volatility in NO_2 measurement results reflected the heating-non-heating seasons. Increasing hourly measurement results reflect the impacts of traffic along the Nuclear Plant southern access road, in connection with higher traffic when workers commuted to work and left home after the shift.

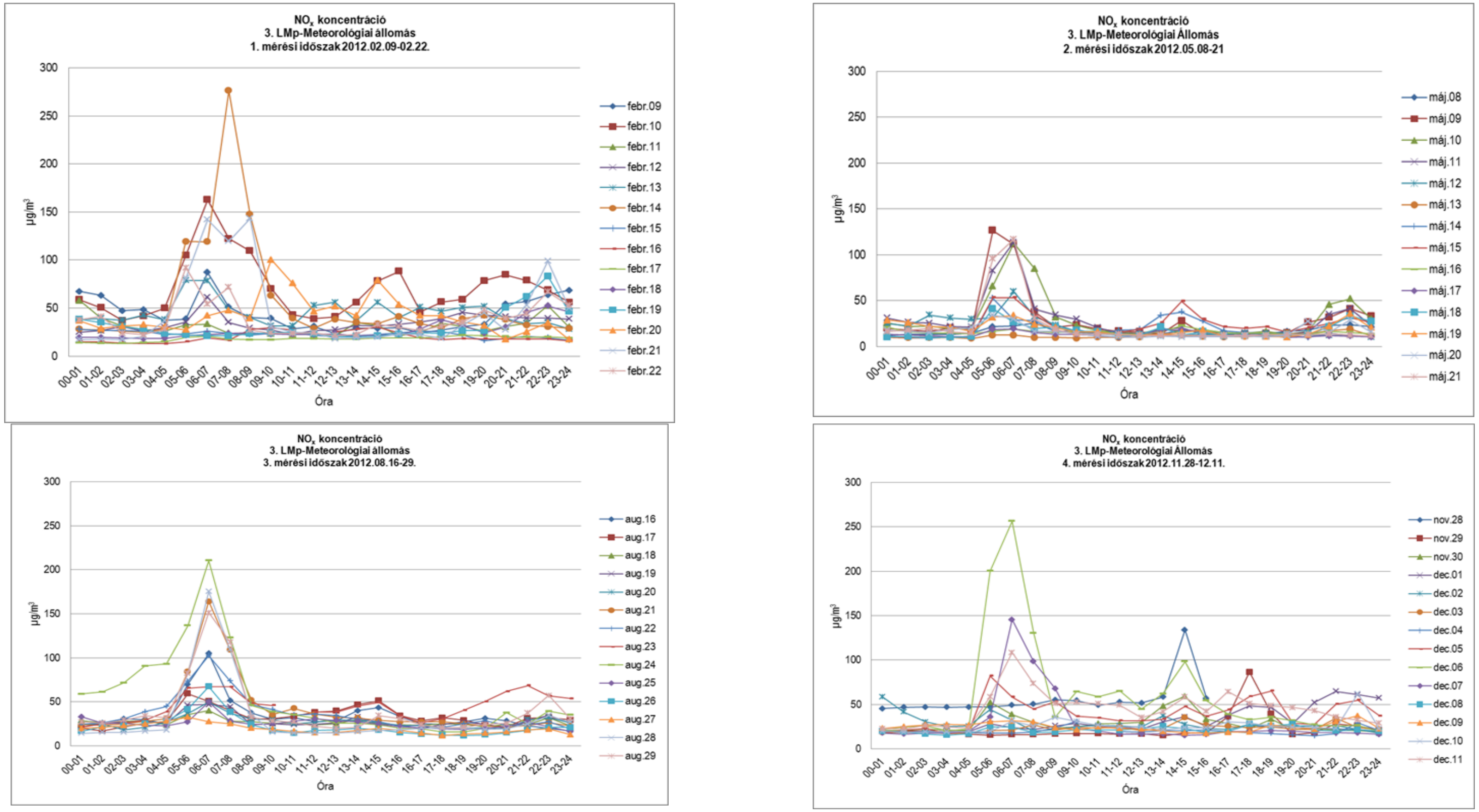
NO_x immission

NO_x concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.09	43,7	23,8	87,0	78,4	May 08	16,7	11,7	25,9	24,8	Aug.16	34,5	17,2	104,9	88,8	Nov.28	45,8	19,4	134,1	100,7
Febr.10	70,0	37,1	162,6	144,0	May 09	29,5	13,0	126,6	119,7	Aug.17	33,1	17,1	59,3	55,6	Nov.29	23,0	14,9	86,4	64,9
Febr.11	30,8	20,7	57,7	55,3	May 10	30,6	13,3	112,6	99,8	Aug.18	26,7	21,8	39,9	37,9	Nov.30	28,9	19,1	59,2	56,1
Febr.12	34,2	22,3	61,4	54,0	May 11	29,1	12,7	113,9	99,8	Aug.19	28,1	19,4	46,9	46,6	Dec.01	32,8	19,1	64,7	63,0
Febr.13	45,1	28,4	78,9	78,7	May 12	20,3	10,5	59,9	48,2	Aug.20	27,0	18,2	49,8	44,0	Dec.02	28,5	17,5	58,6	52,1
Febr.14	56,3	25,1	276,0	216,9	May 13	11,6	8,9	18,9	18,0	Aug.21	40,4	21,1	163,9	138,6	Dec.03	23,2	17,4	35,2	34,9
Febr.15	22,8	16,2	28,0	27,3	May 14	18,8	9,6	52,7	45,8	Aug.22	36,7	19,2	102,5	89,2	Dec.04	19,9	14,8	30,8	30,1
Febr.16	19,8	13,0	29,9	29,8	May 15	23,9	10,0	53,4	53,3	Aug.23	44,6	21,2	68,4	67,8	Dec.05	39,9	17,2	82,2	74,4
Febr.17	18,1	13,2	21,8	21,5	May 16	15,8	13,1	22,6	21,9	Aug.24	54,2	15,8	210,3	176,4	Dec.06	59,3	19,6	256,4	230,6
Febr.18	26,7	18,3	52,4	49,6	May 17	13,2	10,3	19,2	19,0	Aug.25	25,5	16,3	50,0	42,2	Dec.07	29,7	15,3	145,5	123,8
Febr.19	31,0	20,3	83,2	73,4	May 18	17,1	10,2	41,1	37,5	Aug.26	22,0	11,5	67,2	55,4	Dec.08	21,3	15,7	28,0	27,8
Febr.20	42,2	17,3	100,4	90,6	May 19	19,4	10,6	35,7	34,8	Aug.27	19,2	11,6	32,8	30,6	Dec.09	24,9	17,6	37,4	34,6
Febr.21	46,0	17,4	143,3	142,7	May 20	16,5	10,2	34,4	32,4	Aug.28	32,4	14,3	175,3	145,0	Dec.10	26,1	18,8	62,1	49,9
Febr.22	38,4	21,6	92,1	82,7	May 21	22,4	11,4	117,2	107,3	Aug.29	39,8	20,0	151,2	135,8	Dec.11	45,6	22,5	108,5	92,4
Average	**37**	**21**	**91**	**82**		**20**	**11**	**60**	**54**		**33**	**17**	**94**	**82**		**32**	**18**	**85**	**74**

Comment:
The measurement was suspended on February 16 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on May 15 09.00 – 10.00 hour due to calibration.
The measurement was suspended on August 23 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 28 between 16.00-17.00 hours due to maintenance, and on December 4 10.00-11.00 hour due to calibration.

Table 16.2.2-25: 3. LMp on-the-spot measurements/tests – NO_x

The following figures present the hourly NO_x concentration values.

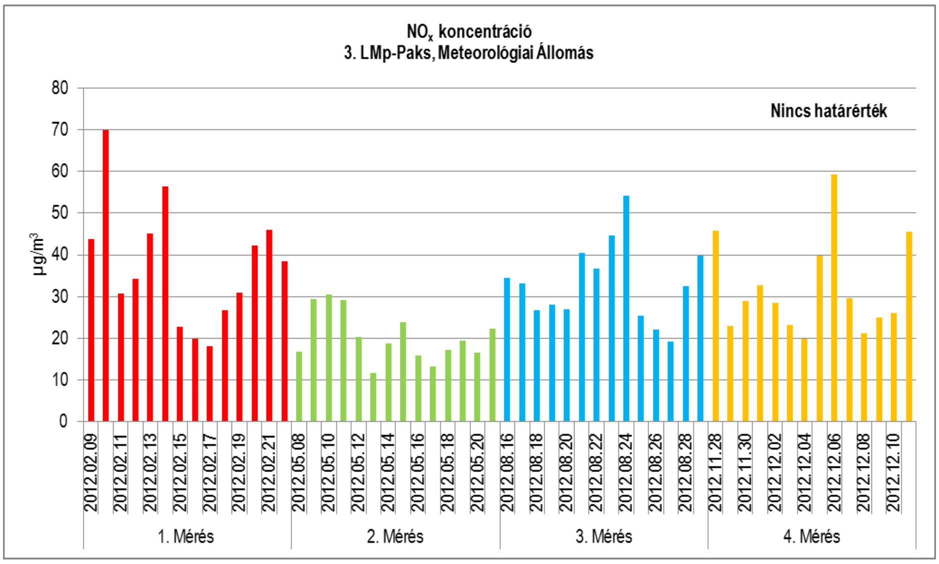


koncentráció - concentration, Meteorológiai állomás - meterorogical station, mérési időszak - measurement period, óra - hour

Figure 16.2.2-28: 3. LMp - NO_x hourly run-off curves at 3 LMp meteorological station

NO_x concentration Based on hourly measurement values **($\mu g/m^3$)**				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 02. 09-02.22.)	37	21	91	82
2. Test (2012. 05. 08-21.)	20	11	60	54
3. Test (2012. 08. 16-29.)	33	17	94	82
4. Test (2012. 11. 28-12.11.)	32	18	85	74

Table 16.2.2-26: 3. LMp NO_x measurements/tests results



koncentráció - concentration, Meteorológiai Állomás - meteorological station, nincs határérték - no limit, mérés - measurement/test

Figure 16.2.2-29: 3. LMp - NO_x daily average concentration at 3 LMp meteorological station

The presently effective Decree 4/2011. (I. 14.) VM defined no immission limit to NO_x.

The former Decree defined for the NO_x 200 $\mu g/m^3$ hourly, 150 $\mu g/m^3$ 24-hour, and 70 $\mu g/m^3$ annual limit. Thus the hourly values were higher than the limit once-once during the 1st and 3rd measuring periods, and twice during the 4th measuring period. The hourly values were 5-38 % higher than the permitted limit.

The highest hourly NO_x value measured during the 1st measuring period on February 14, 2012 between 07.00-08.00 a.m., and it was 276 $\mu g/m^3$.

The 24-hour limit was never exceeded during any measurement period.

The hourly run-off curves can well describe the daily volatilities. NO_x concentration increased in the morning between 04.00-09.00 hours, in the afternoon between 13.00-17.00 hours and in the evening between 20.00-24.hours. The NO_x hourly and daily values showed a run-off profile similar to NO_2.

Bi-weekly average values of the **NO_x** measurements/tests were: **37 $\mu g/m^3$**, **20 $\mu g/m^3$**, **33 $\mu g/m^3$**, **32 $\mu g/m^3$**.

Volatility in NO_x measurement results reflected the heating-non-heating seasons, the measurement results present the impacts of the Nuclear Plant southern access road traffic, similarly to the NO_2 measurement results.

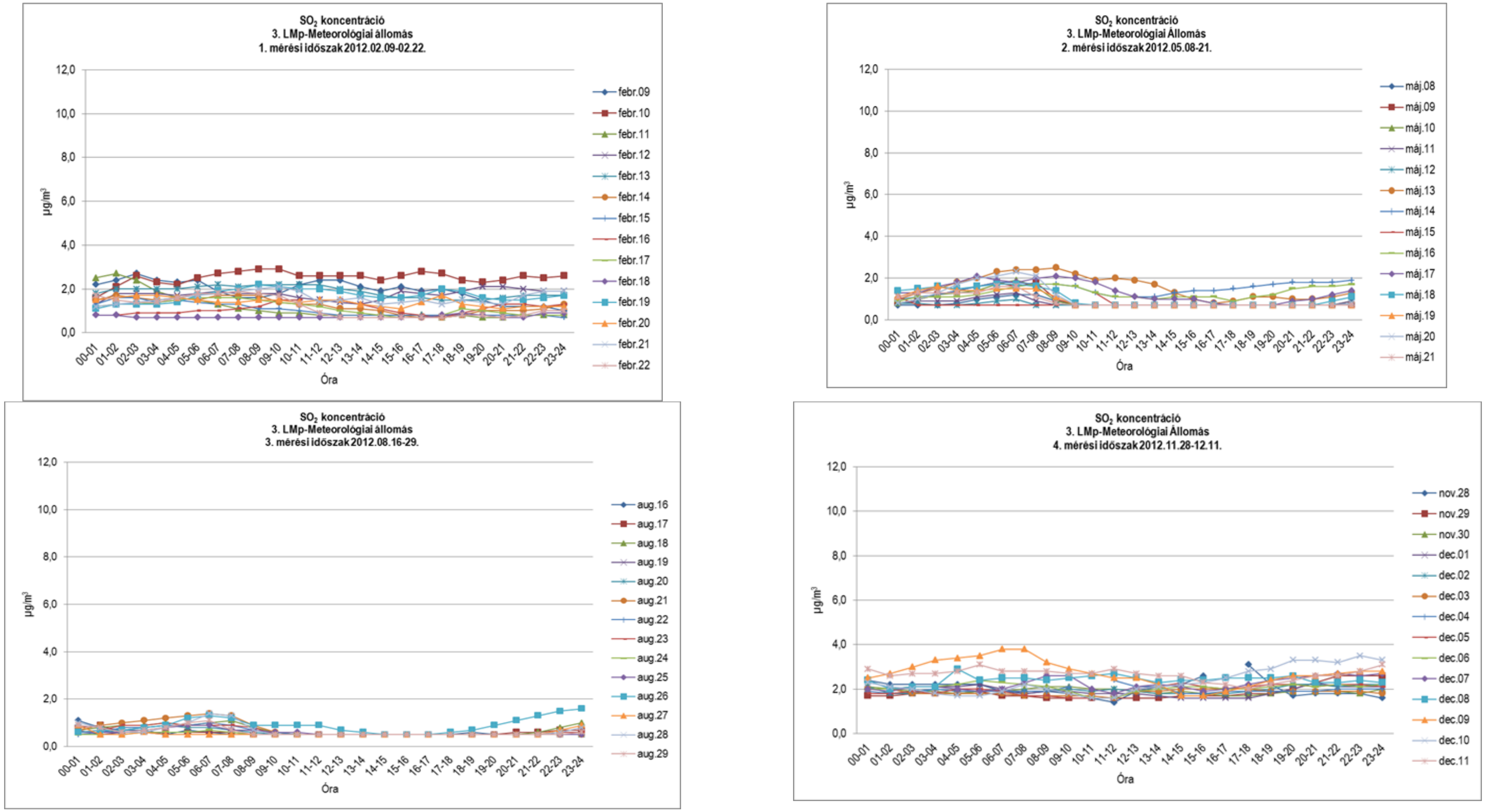
SO_2 immission

SO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Febr.09	1,9	1,0	2,7	2,6	May 08	0,8	0,7	1,2	1,2	Aug.16	0,6	0,5	1,1	1,0	Nov.28	2,0	1,4	3,1	2,9
Febr.10	2,5	1,6	2,9	2,9	May 09	0,9	0,7	1,8	1,8	Aug.17	0,6	0,5	0,9	0,9	Nov.29	1,9	1,6	2,6	2,6
Febr.11	1,2	0,7	2,7	2,6	May 10	0,9	0,7	1,9	1,8	Aug.18	0,7	0,5	1,1	1,1	Nov.30	1,9	1,7	2,1	2,1
Febr.12	1,8	1,3	2,1	2,1	May 11	0,8	0,7	1,3	1,3	Aug.19	0,5	0,5	0,7	0,7	Dec.01	1,9	1,6	2,3	2,3
Febr.13	1,9	1,5	2,2	2,2	May 12	0,7	0,7	1,0	1,0	Aug.20	0,6	0,5	0,9	0,9	Dec.02	2,0	1,8	2,2	2,2
Febr.14	1,3	0,7	1,7	1,7	May 13	1,6	0,8	2,5	2,5	Aug.21	0,7	0,5	1,4	1,4	Dec.03	1,9	1,6	2,0	2,0
Febr.15	1,0	0,7	1,6	1,6	May 14	1,5	1,0	1,9	1,9	Aug.22	0,6	0,5	1,0	1,0	Dec.04	2,0	1,8	2,4	2,3
Febr.16	1,1	0,7	1,5	1,5	May 15	0,7	0,7	1,3	1,2	Aug.23	0,6	0,5	1,0	1,0	Dec.05	2,0	1,6	2,3	2,3
Febr.17	1,1	0,7	1,6	1,6	May 16	1,3	0,9	1,7	1,7	Aug.24	0,5	0,5	0,7	0,7	Dec.06	2,1	1,6	2,4	2,4
Febr.18	0,7	0,7	0,9	0,9	May 17	1,4	0,7	2,1	2,1	Aug.25	0,6	0,5	0,9	0,9	Dec.07	2,2	1,8	2,7	2,7
Febr.19	1,7	1,1	2,2	2,2	May 18	1,1	0,7	1,7	1,7	Aug.26	0,9	0,5	1,6	1,6	Dec.08	2,4	2,0	2,9	2,8
Febr.20	1,4	1,1	1,7	1,7	May 19	1,0	0,7	1,6	1,6	Aug.27	0,5	0,5	0,9	0,9	Dec.09	2,7	1,7	3,8	3,8
Febr.21	1,6	1,2	2,1	2,1	May 20	1,0	0,7	2,3	2,2	Aug.28	0,7	0,5	1,4	1,4	Dec.10	2,3	1,6	3,5	3,4
Febr.22	1,2	0,7	1,9	1,9	May 21	0,9	0,7	1,6	1,6	Aug.29	0,6	0,5	1,1	1,1	Dec.11	2,7	2,0	3,1	3,1
Average	**1**	**1**	**2**	**2**		**1**	**1**	**2**	**2**		**1**	**1**	**1**	**1**		**2**	**2**	**3**	**3**

Comment:
The measurement was suspended on February 16 between 11.00 – 12.00 a.m. due to calibration.
The measurement was suspended on May 15 between 09.00 – 10.00 a.m. due to calibration.
The measurement was suspended on August 23 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 28 between 16.00-17.00 hour due to maintenance, and on December 4, between 10.00-11.00 a.m. due to calibration.

Table 16.2.2-27: 3. LMp on-the-spot measurements/tests – SO_2

The following figures present the SO_2 concentration hourly test values.

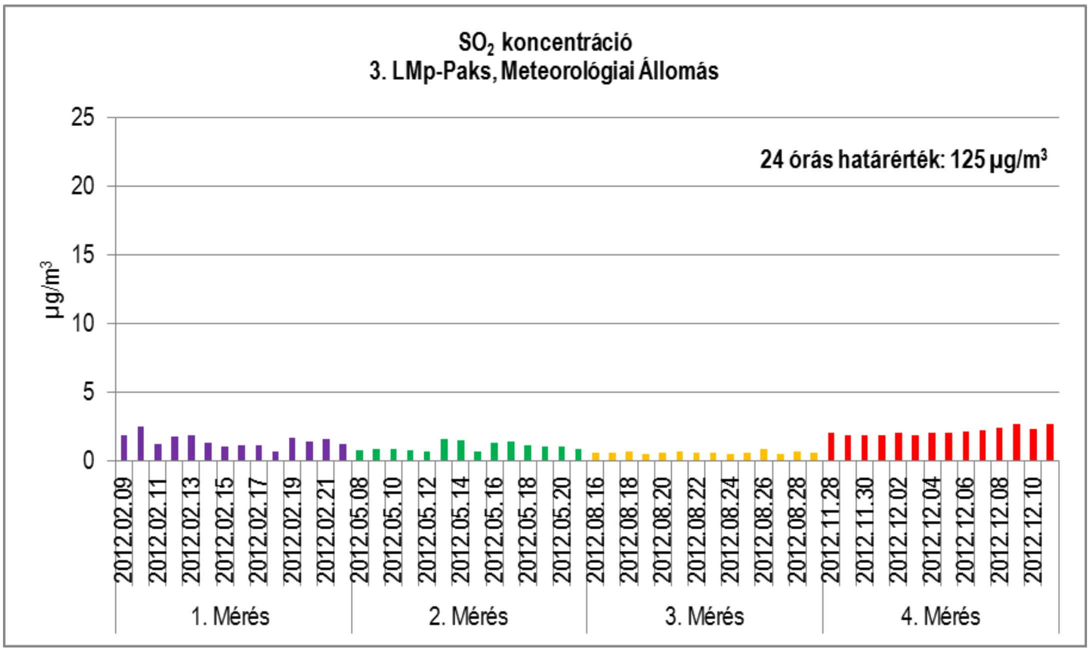


koncentráció - concentration, Meteorológiai állomás - meterorogical station, mérési időszak - measurement period, óra - hour

Figure 16.2.2-30: 3. LMp - SO_2 hourly run-off curves at 3 LMp meteorological station

SO_2 concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 02. 09-02.22.)	1	1	2	2
2. Test (2012. 05. 08-21.)	1	1	2	2
3. Test (2012. 08. 16-29.)	1	1	1	1
4. Test (2012. 11. 28-12.11.)	2	2	3	3

Table 16.2.2-28: 3. LMp SO_2 measurements/tests results



koncentráció - concentration, Meteorológiai Állomás - meteorological station, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-31: 3. LMp – SO_2 daily average concentration at 3 LMp meteorological station

The measured hourly SO_2 immission values were well below the 250 µg/m³ hourly limit.

The highest hourly value was measured during the 4th measurement period on December 9 between 06.00-08.00 a.m., this value was 3,8 µg/m³, 25 of the hourly limit.

The 24-hour average concentration values were also well below the 125 µg/m³ daily limit.

Average values of the **SO_2** measurements/tests average values were: **1 µg/m³**, **1 µg/m³**, **1 µg/m³, 2 µg/m³**.

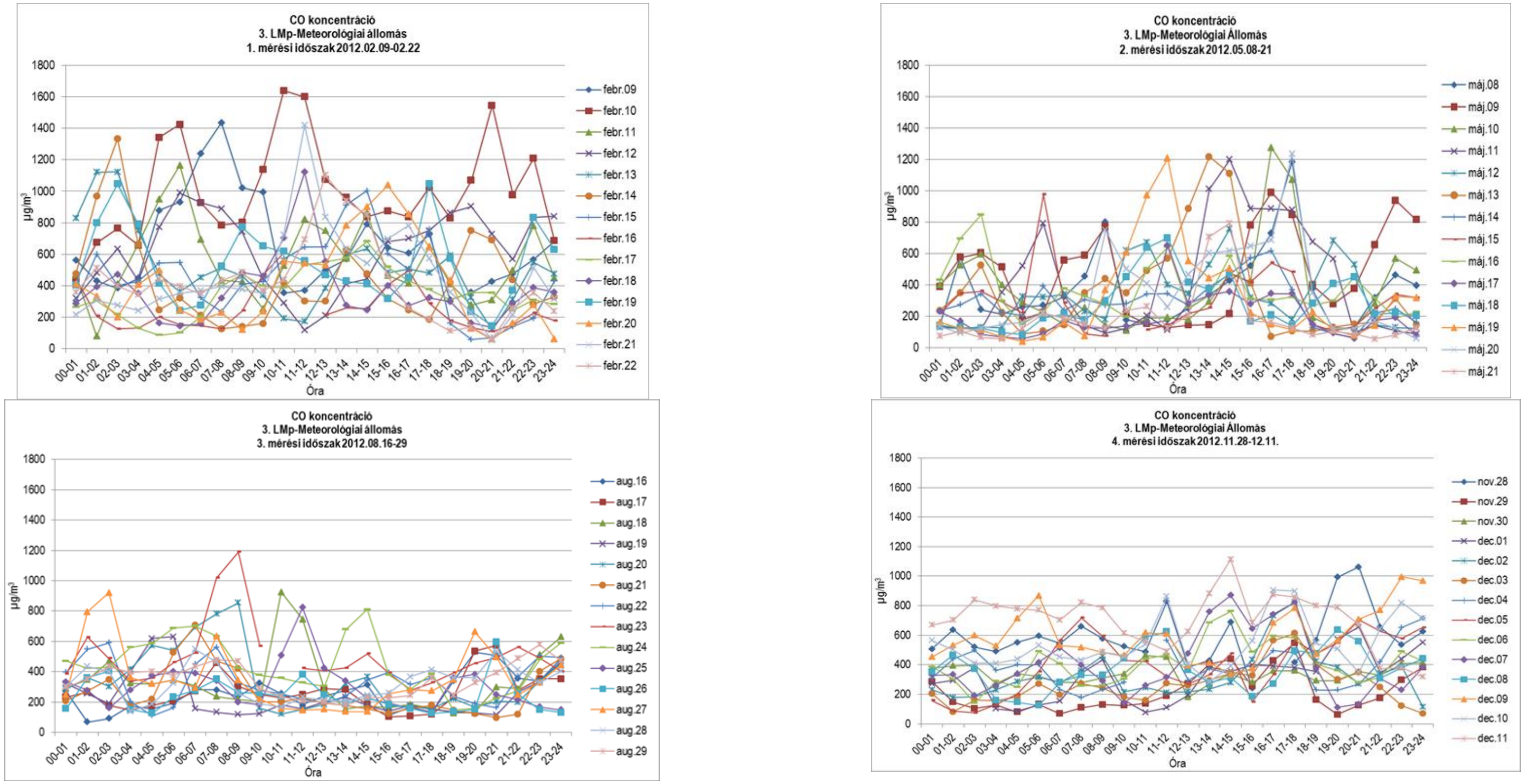
CO immission

CO concentration																			
Based on daily assessment hourly concentration values *																			
1. Test					**2. Test**					**3. Test**					**4. Test**				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m^3					μg/m^3					μg/m^3					μg/m^3			
Febr.09	654,3	311,0	1436,0	1345,8	May 08	375,9	111,0	1185,0	1008,4	Aug.16	262,8	67,0	529,0	518,0	Nov.28	587,8	241,0	1063,0	1032,6
Febr.10	1004,1	436,0	1638,0	1620,1	May 09	478,0	128,0	988,0	965,0	Aug.17	265,5	103,0	573,0	555,5	Nov.29	216,2	63,0	548,0	496,9
Febr.11	555,2	78,0	1165,0	1065,2	May 10	373,9	110,0	1275,0	1181,2	Aug.18	326,3	126,0	924,0	842,1	Nov.30	337,5	180,0	464,0	458,5
Febr.12	623,9	118,0	989,0	960,5	May 11	411,0	88,0	1199,0	1112,5	Aug.19	241,5	115,0	631,0	625,9	Dec.01	315,0	78,0	656,0	617,4
Febr.13	510,0	120,0	1123,0	1122,1	May 12	334,5	125,0	758,0	722,6	Aug.20	341,4	121,0	854,0	820,9	Dec.02	326,6	115,0	823,0	782,1
Febr.14	434,5	126,0	1334,0	1165,6	May 13	361,5	72,0	1216,0	1167,2	Aug.21	263,8	97,0	706,0	623,2	Dec.03	261,8	71,0	613,0	590,9
Febr.15	455,0	59,0	1003,0	961,6	May 14	293,8	63,0	616,0	595,3	Aug.22	329,0	109,0	591,0	578,1	Dec.04	381,1	178,0	714,0	686,7
Febr.16	250,0	108,0	608,0	559,2	May 15	295,7	74,0	975,0	783,2	Aug.23	501,2	277,0	1190,0	1114,8	Dec.05	406,9	75,0	717,0	711,9
Febr.17	353,8	86,0	681,0	632,7	May 16	368,1	150,0	847,0	777,1	Aug.24	445,5	146,0	810,0	759,9	Dec.06	406,0	141,0	762,0	727,0
Febr.18	365,2	136,0	1121,0	928,7	May 17	198,5	58,0	652,0	516,8	Aug.25	302,1	135,0	823,0	678,6	Dec.07	402,1	112,0	870,0	848,8
Febr.19	541,7	145,0	1048,0	1047,1	May 18	283,1	84,0	698,0	670,4	Aug.26	238,9	125,0	595,0	507,1	Dec.08	371,8	124,0	637,0	631,0
Febr.20	410,4	60,0	1039,0	976,0	May 19	298,3	41,0	1207,0	1098,9	Aug.27	356,0	136,0	921,0	862,6	Dec.09	599,5	336,0	996,0	983,6
Febr.21	462,1	52,0	1419,0	1151,7	May 20	347,5	57,0	1234,0	1010,4	Aug.28	322,8	138,0	548,0	542,0	Dec.10	546,3	284,0	906,0	902,8
Febr.22	424,4	63,0	1102,0	1026,6	May 21	184,7	56,0	792,0	752,9	Aug.29	346,4	179,0	579,0	536,7	Dec.11	704,6	319,0	1112,0	1007,1
Average	**503**	**136**	**1122**	**1040**		**329**	**87**	**974**	**883**		**324**	**134**	**734**	**683**		**419**	**165**	**777**	**748**

Comment:
* Maximum of daily 8-hour moving average concentrations. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on February 16 between 11.00 – 12.00 hours due to calibration.
The measurement was suspended on May 15 between 09.00 – 10.00 hours due to calibration.
The measurement was suspended on August 23 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on November 28 between 16.00-17.00 hour due to maintenance, and on December 4 between 10.00-11.00 hours due to calibration.

Table 16.2.2-29: 3. LMp on-the-spot measurements/tests – CO

The following figures present the CO concentration hourly test values:

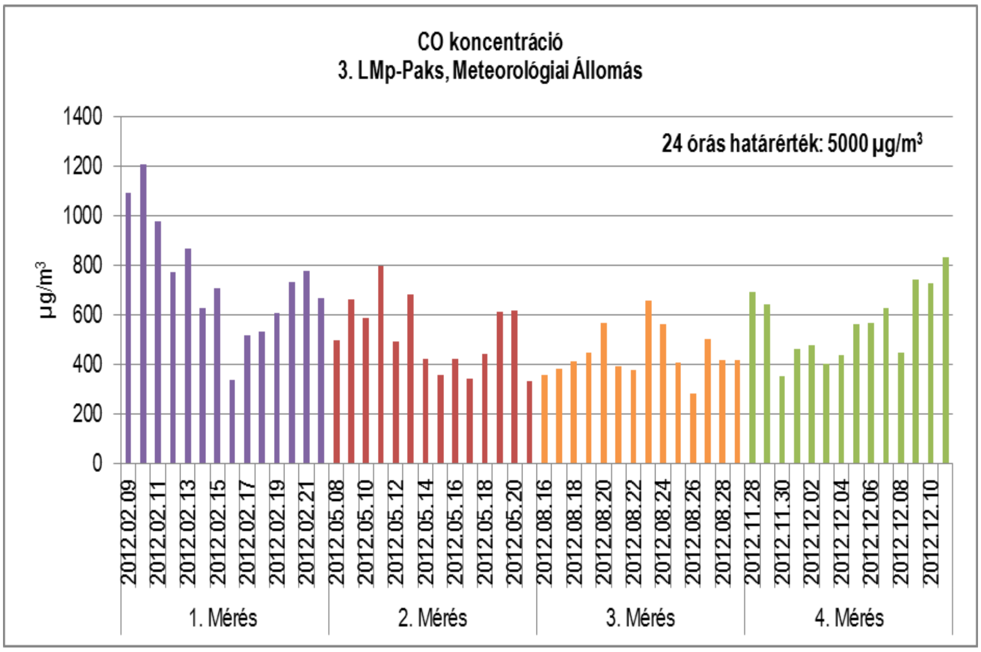


koncentráció - concentration, Meteorológiai állomás - meterorogical station, mérési időszak - measurement period, óra - hour

Figure 16.2.2-32: 3. LMp - CO hourly run-off curves at 3 LMp meteorological station

CO concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 02. 09-02.22.)	744	339	1207	1177
2. Test (2012. 05. 08-21.)	519	333	797	768
3. Test (2012. 08. 16-29.)	441	280	656	633
4. Test (2012. 11. 28-12.11.)	569	351	834	811

Table 16.2.2-30: 3. LMp CO measurements/tests results



koncentráció - concentration, Meteorológiai Állomás - meteorological station, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-33: 3. LMp – CO daily average concentration at 3 LMp meteorological station

The measured hourly CO immission values were always below the 10 000 µg/m³ hourly limit.

The highest concentration was measured during the 1st measurement period on February 10 between 10.00-11.00 a.m., this value was 1638 µg/m³, 16% of the hourly limit.

The maximum of the 8-hour moving average values did not reach even 20% of the 24-hour limit (5 000 µg/m³).

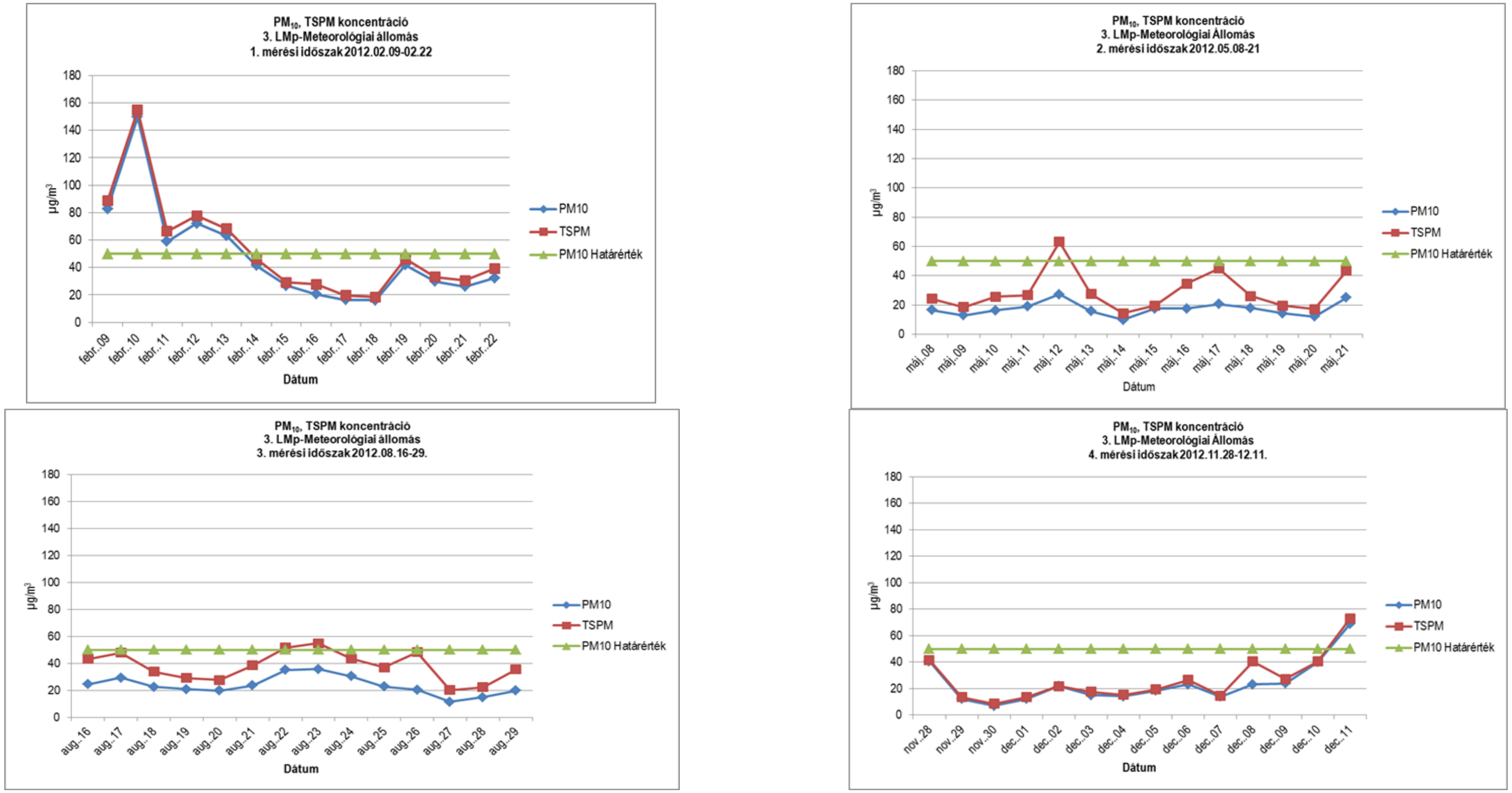
Bi-weekly averages of **CO** measurements/tests were: **744 µg/m³**, **519 µg/m³**, **441 µg/m³**, **569 µg/m³**.

PM_{10}, TSPM 24-hour concentration

Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM
	µg/m³			µg/m³			µg/m³			µg/m³	
Febr.09	83	89	May 08	16	24	Aug.16	25	43	Nov.28	41	42
Febr.10	150	155	May 09	13	19	Aug.17	29	48	Nov.29	12	14
Febr.11	59	66	May 10	16	26	Aug.18	23	34	Nov.30	7	9
Febr.12	72	78	May 11	19	27	Aug.19	21	29	Dec.01	12	13
Febr.13	63	68	May 12	27	63	Aug.20	20	28	Dec.02	22	22
Febr.14	41	46	May 13	16	27	Aug.21	24	39	Dec.03	15	17
Febr.15	27	29	May 14	10	14	Aug.22	35	52	Dec.04	14	15
Febr.16	21	28	May 15	18	19	Aug.23	36	55	Dec.05	18	19
Febr.17	16	20	May 16	17	35	Aug.24	30	44	Dec.06	23	26
Febr.18	16	19	May 17	21	45	Aug.25	23	37	Dec.07	14	15
Febr.19	42	46	May 18	18	26	Aug.26	21	48	Dec.08	23	41
Febr.20	30	33	May 19	14	20	Aug.27	12	20	Dec.09	24	27
Febr.21	26	30	May 20	12	17	Aug.28	15	23	Dec.10	40	41
Febr.22	32	39	May 21	25	43	Aug.29	20	36	Dec.11	69	73
min	**16**	**19**		**10**	**14**		**12**	**20**		**7**	**9**
max	**150**	**155**		**27**	**63**		**36**	**55**		**69**	**73**
Average	**48**	**53**		**17**	**29**		**24**	**38**		**24**	**27**

Table 16.2.2-31: 3. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The following figures present the PM_{10} and a TSPM daily concentration values.



koncentráció - concentration, Meteorológiai állomás - meterorogical station, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-34: 3. LMp - PM_{10} and a TSPM daily run-off curves at 3 LMp meteorological station

PM_{10} 24-hour average values were 18-300 % higher than the limit for 5 days during the 1st measuring period between February 9-13. Having analysed the results of the measuring point of the national measuring stations we can state that the values measured also at the nearby measuring points were also similarly higher than the limit for several days starting from February 7. In the 2nd and 3rd measuring periods the 24-hour average and maximum PM_{10}values were lower than the limit. The 24-hour average PM_{10}value during the 4th measuring period was higher than the limit on December 11, the value was 69 µg/m^3.

The presently effective Decree 4/2011.(I.14.) VM defines no limit for the **TSPM**. Thus we used the limit defined in the former Decree 14/2001.(V.9.) KöM-EüM-FVM for our measurement results. As the measurement curves can well demonstrate, the limit was exceeded only in the 1st measuring period, on February 10, 2012 among the 4 measuring periods, when the measured value was 155% of the “former” limit.

Settling dust

Settling dust concentration		
First days	**Last days**	**g/m^{2}x30nap**
2012.01.23	2012.02.23	0,7
2012.02.23	2012.03.28	1,2
2012.03.28	2012.04.26	2
2012.04.26	2012.05.22	4,6
2012.05.22	2012.06.25	2,5
2012.06.25	2012.07.31	2,0
2012.07.31	2012.08.30	3,1
2012.09.11	2012.10.12	2,1
2012.10.12	2012.11.12	0,5
2012.11.12	2012.12.12	0,7
2012.12.12	2013.01.11	0,4
2013.01.11	2013.02.12	1,0
2013.02.25	2013.03.29	1,3

Table 16.2.2-32: 3. LMp on-the-spot measurements/tests – settling dust

As there is no limit defined for **settling dust**, if we compare the measured values with the former limit (16 g/m^2 x 30 days) we can find out that these measurement results did not exceed the limit, as the highest measured value was only 29 % of the limit.

16.2.2.5.4 Csámpa, Kis street - 4. LMp

mérés - measurements/tests

source : Google Earth

Figure 16.2.2-35: 4. LMp location

1. Test

2. Test

3. Test
(measuring point re-located by 20m)

4. Test

Settling dust sampling units

Figure 16.2.2-36: Location of testing truck and settling dust sampling units at 4 LMp site

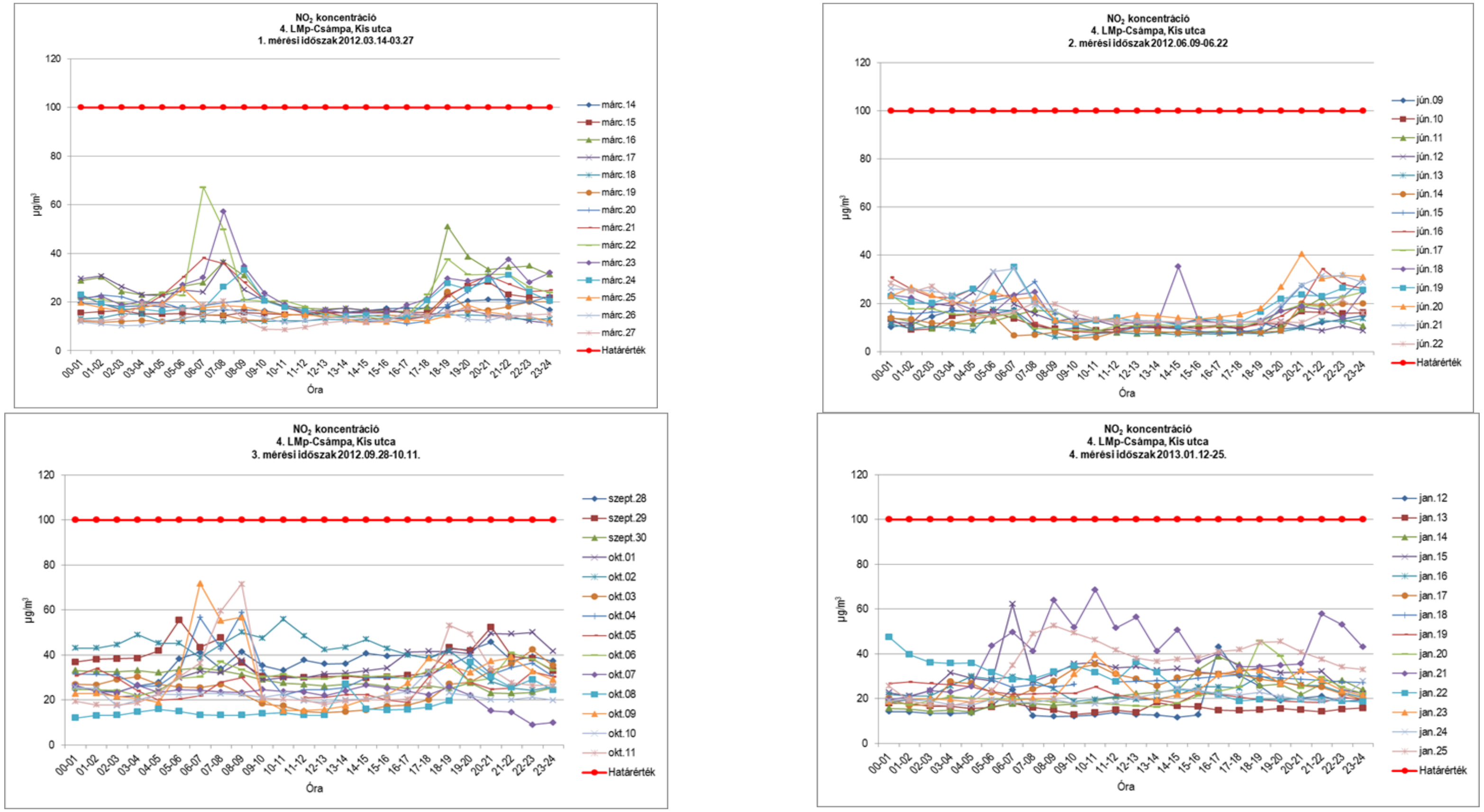
NO_2 immission

NO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
March14	18	15	21	21	June 09	12	9	17	17	Sept.28	36	24	46	44	Jan.12	18	12	43	37
March15	18	14	28	28	June 10	12	9	17	17	Sept.29	38	30	56	54	Jan.13	16	13	18	18
March16	26	16	51	45	June 11	12	7	23	20	Sept.30	29	23	34	34	Jan.14	22	14	39	37
March17	20	11	36	34	June 12	14	7	33	29	Oct.01	34	22	50	50	Jan.15	31	21	62	50
March18	13	12	15	15	June 13	10	6	18	17	Oct.02	41	24	56	53	Jan.16	24	19	30	30
March19	15	12	24	22	June 14	11	6	20	20	Oct.03	25	14	42	39	Jan.17	26	17	35	35
March20	19	11	32	29	June 15	16	8	30	30	Oct.04	33	22	59	58	Jan.18	26	19	31	30
March21	22	13	38	37	June 16	17	8	34	33	Oct.05	26	19	38	36	Jan.19	22	18	27	27
March22	25	13	67	59	June 17	14	9	25	24	Oct.06	30	22	41	40	Jan.20	22	16	46	43
March23	25	16	57	48	June 18	17	12	35	31	Oct.07	22	9	27	27	Jan.21	42	20	69	66
March24	20	14	33	32	June 19	19	11	35	31	Oct.08	18	12	37	34	Jan.22	28	19	48	44
March25	16	12	26	23	June 20	21	12	41	37	Oct.09	30	15	72	65	Jan.23	25	19	39	36
March26	13	10	17	17	June 21	20	12	34	34	Oct.10	22	17	33	29	Jan.24	20	17	28	26
March27	14	9	21	20	June 22	16	12	28	28	Oct.11	29	18	72	66	Jan.25	36	17	53	51
Average	**19**	**13**	**33**	**31**		**15**	**9**	**28**	**26**		**30**	**19**	**47**	**45**		**26**	**17**	**41**	**38**

Comment:
The measurement was suspended on March 20, 2012 between 10.00 – 11.00 hours due to calibration, and between 12.00 – 13.00 hours due to maintenance.
The measurement was suspended on June 15, 2012. between 9.00 – 10.00 hours due to calibration.
The measurement was suspended on October 5, 2012 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on January 18, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-33: 4. LMp on-the-spot measurements/tests – NO_2

The following figures present the NO_2 concentration hourly values:

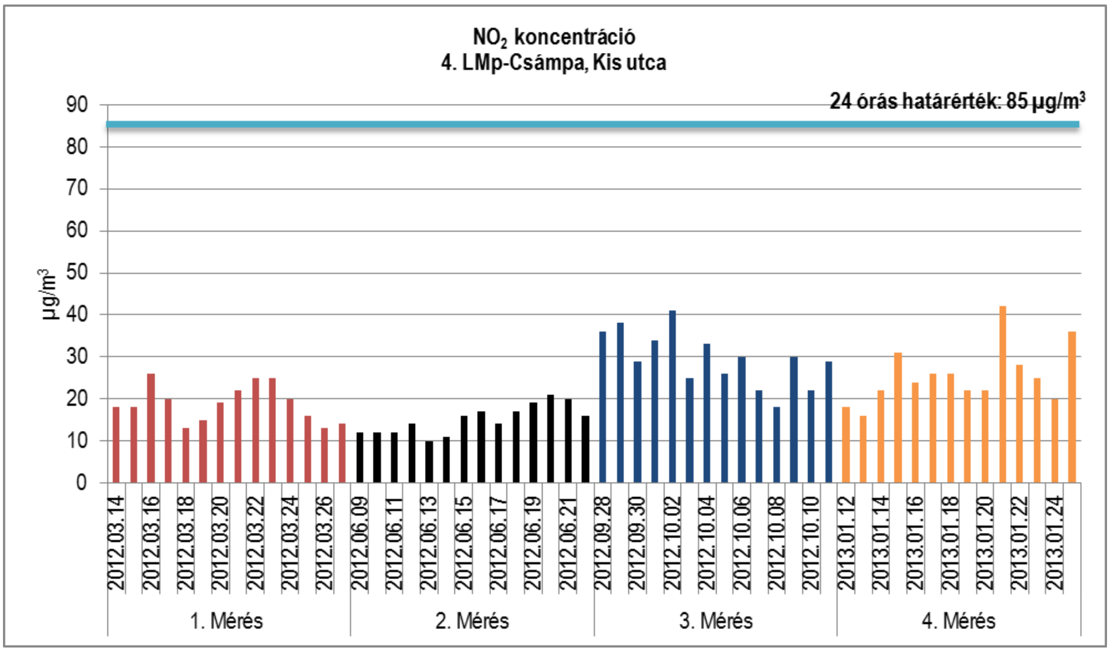


koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-37: 4. LMp - NO_2 hourly run-off curves

NO_2 concentration Based on hourly measurement values **(µg/m^3)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 03. 14-03.27.)	19	13	33	31
2. TEST (2012. 06. 09-22.)	15	9	28	26
3. TEST (2012. 09. 27-10.11.)	30	19	47	45
4. TEST (2013.01.12-01.25.)	26	17	41	38

Table 16.2.2-34: 4. LMp NO_2 measurements/tests results



koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-38: 4. LMp - NO_2 daily average concentration

The NO_2 hourly values measured at the 4. LMp Paks-Csámpa, Kis street measuring point were not higher than the 100 µg/m^3 hourly limit.

The highest hourly NO_2 value was measured during the 3rd measuring period, on October 9, 2012 between 06.00-07.00 a.m., and this value was 72 µg/m^3.

The NO_2 hourly run-off curves can well characterise the daily volatilities during the 1st and 2nd measuring periods, and this characteristic cannot be detected during the 3rd and 4th measuring periods.

During the measurements the 24-hour limit was never exceeded.

Bi-weekly average values of the **NO_2** tests during the four periods were: **19 µg/m^3**, **15 µg/m^3**, **30 µg/m^3**, **26 µg/m^3**.

NO_2 measurement results during the non-heating season were slightly lower than during the heating season, thus values measured in this measuring point can reflect the volatility in line with the heating-non-heating seasons.

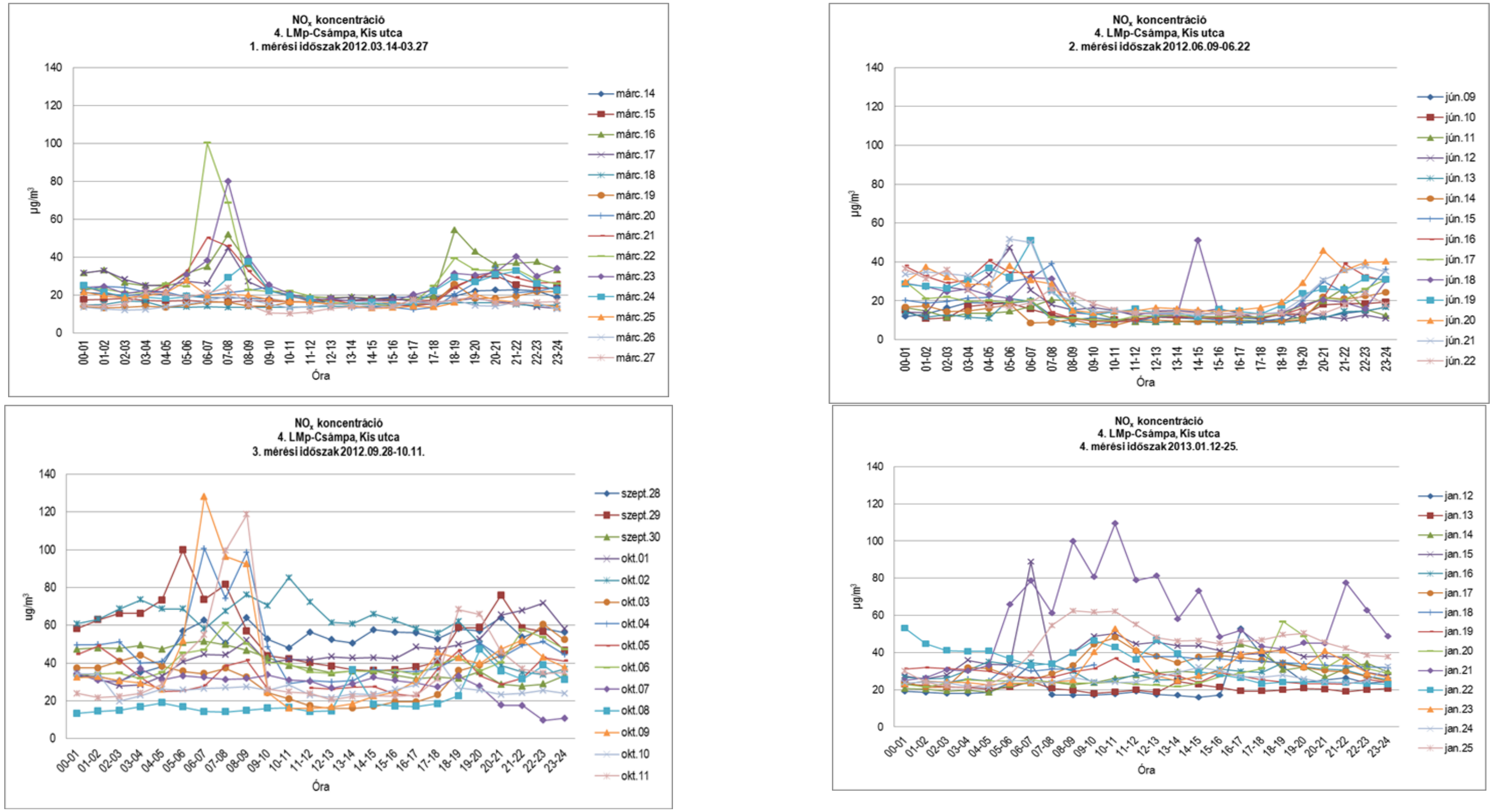
NO_x immission

NO_x concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Avera ge	Min	Max	98% percentile	Measuring period	Avera ge	Min	Max	98% percentile	Measurin g period	Averag e	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
March14	19,4	16,3	22,7	22,7	June 09	13,4	10,2	20,1	19,7	Sept.28	51,3	30,4	63,9	63,9	Jan.12	23,0	15,8	52,7	46,2
March15	19,5	16,4	30,2	29,7	June 10	13,8	10,2	19,3	19,1	Sept.29	56,0	35,9	99,8	91,4	Jan.13	20,7	18,0	24,4	24,4
March16	29,6	17,7	54,4	53,3	June 11	13,7	8,9	26,8	23,9	Sept.30	39,4	27,8	51,5	51,1	Jan.14	27,8	18,5	44,4	43,0
March17	22,0	13,0	44,7	39,3	June 12	17,4	9,0	47,2	40,9	Oct.01	45,6	27,9	71,7	69,9	Jan.15	39,8	25,7	88,7	71,1
March18	14,7	13,5	17,0	16,8	June 13	11,5	7,8	21,0	20,4	Oct.02	60,6	33,8	85,2	81,0	Jan.16	29,2	23,6	35,1	34,9
March19	16,5	13,3	25,7	24,0	June 14	13,2	7,6	24,3	23,4	Oct.03	33,1	15,9	60,5	56,7	Jan.17	32,4	21,3	48,0	46,3
March20	20,8	12,4	34,3	31,1	June 15	19,5	9,1	39,0	37,7	Oct.04	48,1	29,3	100,6	99,7	Jan.18	32,1	23,0	37,9	37,9
March21	24,6	14,3	50,2	48,3	June 16	21,5	9,2	40,8	40,0	Oct.05	33,3	22,5	49,0	47,9	Jan.19	27,9	23,1	36,9	34,6
March22	28,8	13,9	100,2	85,7	June 17	17,0	9,9	30,9	30,4	Oct.06	40,8	31,7	60,9	59,4	Jan.20	28,2	21,5	56,6	53,0
March23	28,2	17,0	80,0	61,8	June 18	21,0	13,0	51,1	42,3	Oct.07	28,3	9,6	36,9	35,7	Jan.21	58,2	25,0	109,3	104,9
March24	22,3	15,0	37,8	35,5	June 19	23,1	11,6	50,9	44,5	Oct.08	21,4	13,3	47,1	43,2	Jan.22	34,4	22,9	53,1	50,2
March25	17,7	13,1	27,7	24,9	June 20	25,6	13,7	45,7	43,1	Oct.09	41,6	16,1	128,2	113,6	Jan.23	31,0	22,8	52,7	47,6
March26	14,9	12,0	19,4	18,5	June 21	25,2	12,7	51,8	50,9	Oct.10	26,5	19,7	42,5	38,7	Jan.24	25,7	21,1	32,5	32,3
March27	16,1	10,3	24,0	22,8	June 22	19,2	13,2	36,4	36,2	Oct.11	39,2	20,6	118,7	109,8	Jan.25	42,7	21,2	62,4	62,3
Average	**21**	**14**	**41**	**37**		**18**	**10**	**36**	**34**		**40**	**24**	**73**	**69**		**32**	**22**	**52**	**49**

Comment:
The measurement was suspended on March 20, 2012 between 10.00 – 11.00 hours due to calibration, between 12.00 – 13.00 hours due to maintenance.
The measurement was suspended on June 15, 2012 between 9.00 – 10.00 hours due to calibration.
The measurement was suspended on October 5, 2012 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on January 18, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-35: 4. LMp on-the-spot measurements/tests – NO_x

The following figures present the NO_x concentration hourly values:

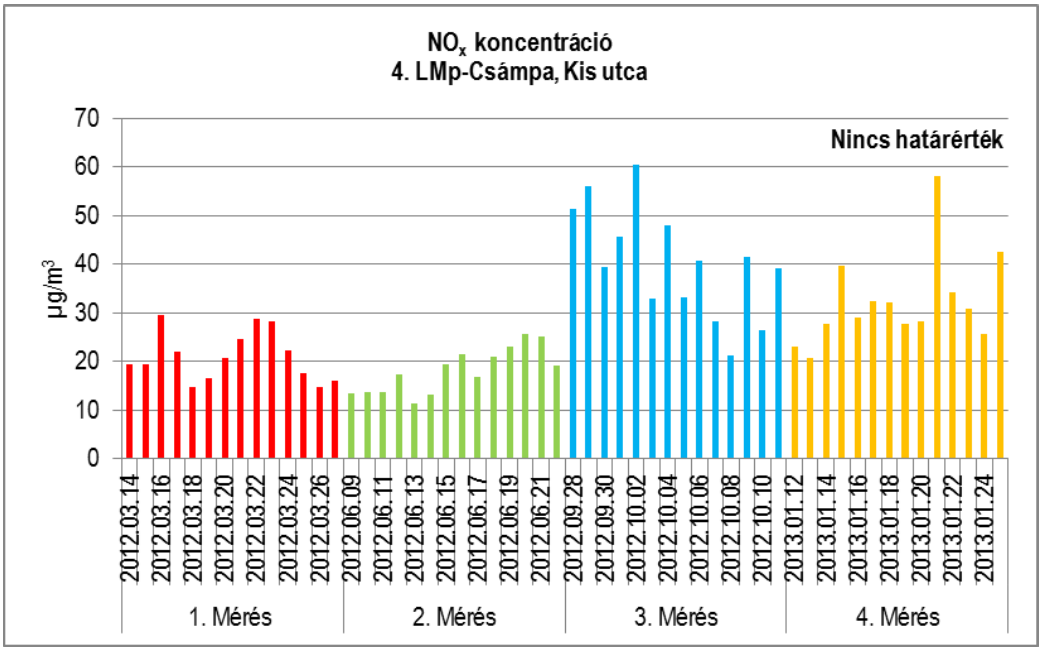


koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, mérési időszak - measurement period, óra - hour

Figure 16.2.2-39: 4. LMp - NO_x hourly run-off curves

NO_x concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 03. 14-03.27.)	21	14	41	37
2. TEST (2012. 06. 09-22.)	18	10	36	34
3. TEST (2012. 09. 27-10.11.)	40	24	73	69
4. TEST (2013.01.12-01.25.)	32	22	52	49

Table 16.2.2-36: 4. LMp NO_x measurements/tests results



koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, nincs határérték - no limit, mérés - measurement/test

Figure 16.2.2-40: 4. LMp - NO_x daily average concentration

Decree 4/2011. (I. 14.) VM defines no immission limit for NO_x. The former decree defined 200 µg/m³ hourly, 150 µg/m³ 24-hour, 70 µg/m³ annual limit for NO_x. The measured hourly NO_x was never during the measuring period higher than the formerly defined limit.

The hourly run-off curves can well characterise the daily volatility in the 1st and 2nd measuring periods, but during the 3rd and 4th measuring periods this volatility was not so characteristic.

The highest hourly NO_x value was measured in the 3rd measuring period, on October 9, 2012 between 06.00-07.00 a.m., this value was 128 µg/m³.

Bi-weekly average values of the **NO_x** measurements were: **21,1 µg/m³**, **18,2 µg/m³**, **40,4 µg/m³**, **32,4 µg/m³**.

NO_x measurement results – similarly to the NO_2 measurement results – were lower during the non-heating season than during the heating season, thus the values reflect the volatility in line with the heating-non-heating seasons.

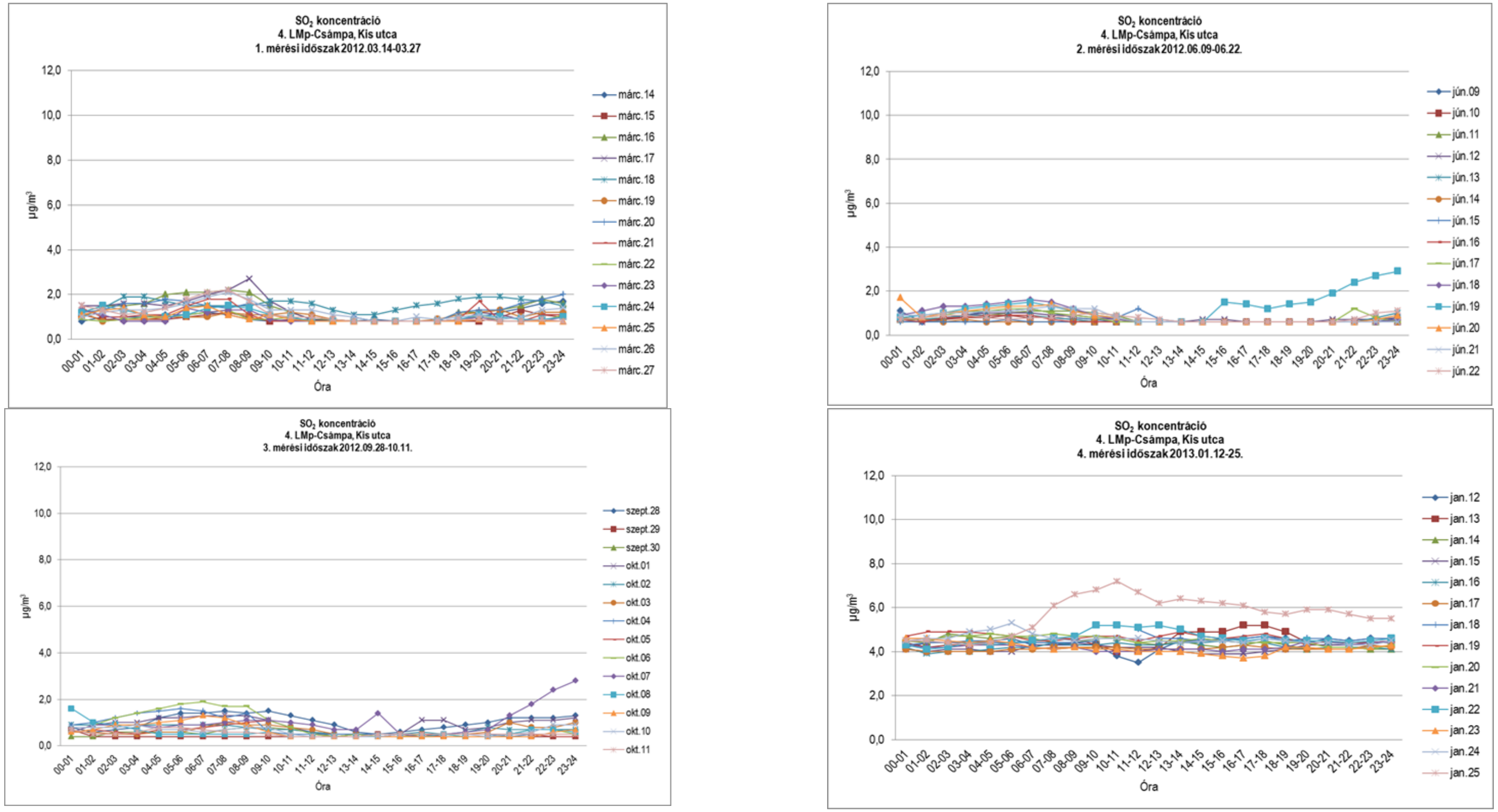
SO_2 immission

SO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Avera ge	Min	Max	98% percentile	Measuring period	Avera ge	Min	Max	98% percentile	Measuring period	Averag e	Min	Max	98% percentile	Measuring period	Avera ge	Min	Max	98% percentile
	µg/m³					µg/m³					µg/m³					µg/m³			
March14	1,0	0,8	1,7	1,7	June 09	0,7	0,6	1,2	1,2	Sept.28	1,0	0,5	1,5	1,5	Jan.12	4,4	3,5	4,7	4,7
March15	0,9	0,8	1,3	1,3	June 10	0,7	0,6	0,9	0,9	Sept.29	0,4	0,4	0,7	0,6	Jan.13	4,5	4,0	5,2	5,2
March16	1,4	0,8	2,2	2,2	June 11	0,8	0,6	1,1	1,1	Sept.30	0,5	0,4	0,8	0,8	Jan.14	4,4	4,1	4,8	4,8
March17	1,3	0,8	2,7	2,5	June 12	0,7	0,6	1,0	1,0	Oct.01	0,9	0,5	1,3	1,3	Jan.15	4,2	3,9	4,4	4,4
March18	1,6	1,0	1,9	1,9	June 13	0,7	0,6	1,0	1,0	Oct.02	0,7	0,5	0,9	0,9	Jan.16	4,2	3,9	4,5	4,5
March19	1,0	0,8	1,3	1,3	June 14	0,6	0,6	0,8	0,8	Oct.03	0,7	0,4	1,0	1,0	Jan.17	4,1	4,0	4,3	4,3
March20	1,4	0,8	2,0	1,9	June 15	0,6	0,6	1,2	1,0	Oct.04	0,8	0,4	1,6	1,6	Jan.18	4,5	4,3	5,0	4,9
March21	1,1	0,8	1,8	1,8	June 16	0,7	0,6	0,9	0,9	Oct.05	0,6	0,4	1,1	1,1	Jan.19	4,6	4,3	4,9	4,9
March22	0,9	0,8	1,3	1,3	June 17	0,8	0,6	1,2	1,2	Oct.06	0,9	0,4	1,9	1,9	Jan.20	4,5	4,1	4,8	4,8
March23	0,9	0,8	1,4	1,4	June 18	0,9	0,6	1,6	1,6	Oct.07	1,0	0,4	2,8	2,6	Jan.21	4,2	4,0	4,5	4,5
March24	1,0	0,8	1,5	1,5	June 19	1,3	0,6	2,9	2,8	Oct.08	0,6	0,4	1,6	1,3	Jan.22	4,6	4,1	5,2	5,2
March25	1,0	0,8	1,5	1,5	June 20	0,9	0,6	1,7	1,6	Oct.09	0,6	0,4	1,3	1,3	Jan.23	4,2	3,7	4,6	4,6
March26	1,2	0,8	2,1	2,0	June 21	0,8	0,6	1,3	1,3	Oct.10	0,6	0,4	0,9	0,9	Jan.24	4,6	4,3	5,3	5,2
March27	1,1	0,8	2,2	2,2	June 22	0,8	0,6	1,1	1,1	Oct.11	0,5	0,4	0,8	0,8	Jan.25	5,7	4,3	7,2	7,0
Average	**1**	**1**	**2**	**2**		**1**	**1**	**1**	**1**		**1**	**0**	**1**	**1**		**4**	**4**	**5**	**5**

Comment:
The measurement was suspended on March 20, 2012 between 10.00 – 11.00 hours due to calibration, between 12.00 – 13.00 hours due to maintenance.
The measurement was suspended on June 15, 2012 between 9.00 – 10.00 hours due to calibration.
The measurement was suspended on October 5, 2012 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on January 18, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-37: 4. LMp on-the-spot measurements/tests – SO_2.

The following figures present the SO_2 concentration hourly test values:

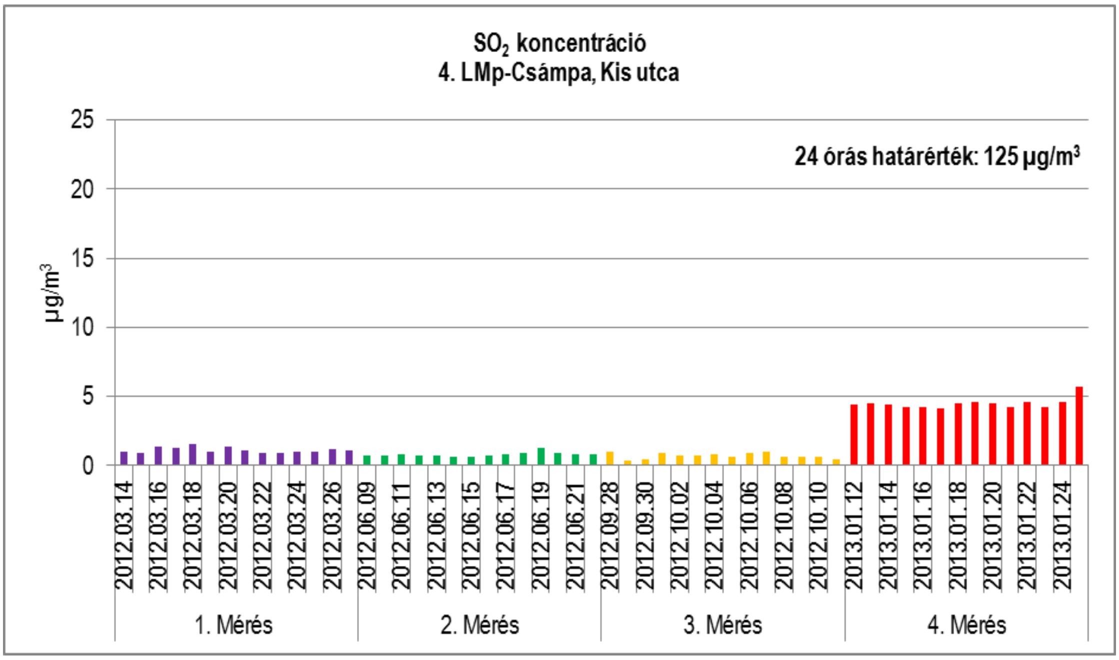


koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, mérési időszak - measurement period, óra - hour

Figure 16.2.2-41: 4. LMp - SO_2 hourly run-off curves

SO_2 concentration Based on hourly measurement values (µg/m³)				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 03. 14-03.27.)	1	1	2	2
2. Test (2012. 06. 09-22.)	1	1	1	1
3. Test (2012. 09. 27-10.11.)	1	0	1	1
4. Test (2013.01.12-01.25.)	4	4	5	5

Table 16.2.2-38: 4. LMp SO_2 measurements/tests results



koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-42: 4. LMp – SO_2 daily average concentration

The measured hourly SO_2 values were well below the 250 µg/m³ hourly limit.

The highest concentration during the 4th measurement period was measured on January 25, 2013 between 10.00-11.00 a.m., this value was 7,2 µg/m³, 3% of the hourly limit.

The 24-hour average concentration values were also well below the 125 µg/m³ daily limit.

Bi-weekly average values of the **SO_2** measurements were: **1 µg/m³**, **1 µg/m³**, **1 µg/m³, 4 µg/m³**.

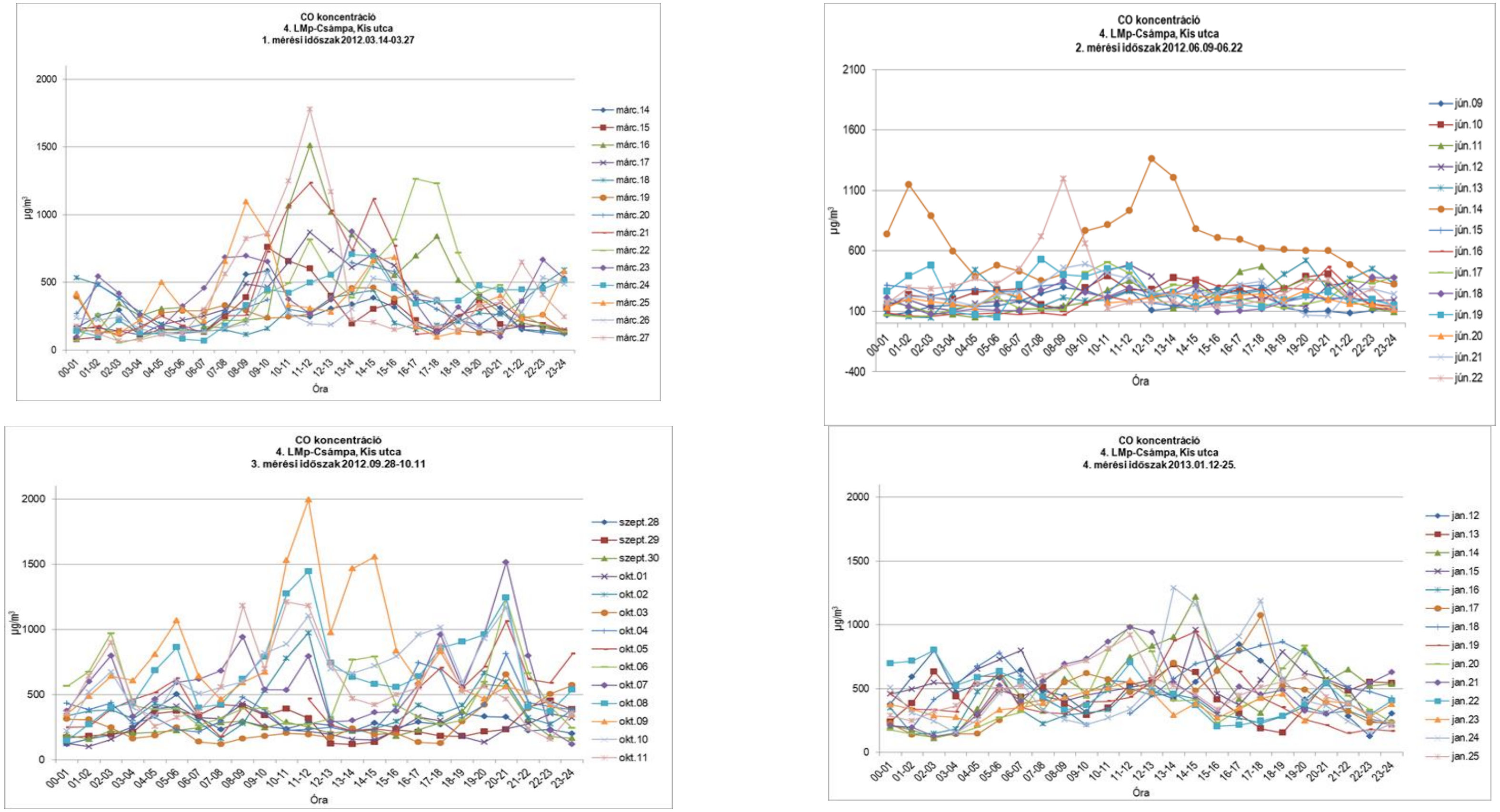
CO immission

CO concentration																				
Based on daily assessment hourly concentration values *																				
1. TEST					2. TEST					3. TEST					4. TEST					
Measuring period	Average	Min	Max	98% per cent	Measuring period	Average	Min	Max	98% per cent	Measuring period	Average	Min	Max	98% per cent	Measuring period	Average	Min	Max	98% per cent
	μg/m³					μg/m³					μg/m³					μg/m³			
March14	256,9	114,0	585,0	572,6	June 09	176,2	70,0	298,0	293,4	Sept.28	271,0	120,0	502,0	449,6	Jan.12	516,8	126,0	848,0	827,3
March15	270,9	80,0	761,0	713,6	June 10	255,8	118,0	408,0	400,6	Sept.29	275,0	118,0	453,0	439,2	Jan.13	434,0	155,0	691,0	664,8
March16	465,9	130,0	1510,0	1304,8	June 11	202,9	49,0	472,0	451,3	Sept.30	264,2	160,0	578,0	572,0	Jan.14	529,1	111,0	1220,0	1075,1
March17	352,5	113,0	871,0	809,4	June 12	216,6	109,0	485,0	462,5	Oct.01	256,6	101,0	431,0	421,3	Jan.15	532,8	218,0	960,0	886,4
March18	297,5	115,0	590,0	564,2	June 13	255,2	48,0	520,0	488,3	Oct.02	406,0	164,0	974,0	884,8	Jan.16	325,6	143,0	628,0	570,5
March19	273,1	127,0	460,0	459,5	June 14	679,4	323,0	1361,0	1290,6	Oct.03	265,9	121,0	655,0	617,3	Jan.17	435,6	119,0	1073,0	947,9
March20	306,0	117,0	644,0	632,0	June 15	245,8	116,0	419,0	379,0	Oct.04	385,6	213,0	813,0	781,3	Jan.18	541,9	194,0	866,0	853,7
March21	419,7	104,0	1233,0	1178,3	June 16	192,1	60,0	465,0	424,1	Oct.05	463,7	177,0	1062,0	952,4	Jan.19	431,7	149,0	946,0	913,3
March22	422,8	53,0	1264,0	1247,9	June 17	224,3	54,0	506,0	466,4	Oct.06	485,8	243,0	1233,0	1111,6	Jan.20	437,7	116,0	992,0	919,3
March23	418,1	99,0	878,0	811,3	June 18	207,4	73,0	381,0	378,2	Oct.07	596,9	120,0	1515,0	1260,6	Jan.21	484,6	125,0	982,0	962,2
March24	356,6	69,0	707,0	701,0	June 19	259,3	50,0	530,0	507,0	Oct.08	674,6	148,0	1446,0	1366,4	Jan.22	463,7	205,0	803,0	763,0
March25	395,0	98,0	1095,0	986,0	June 20	196,9	116,0	276,0	269,6	Oct.09	790,8	346,0	1994,0	1792,5	Jan.23	370,5	224,0	564,0	536,9
March26	283,6	126,0	575,0	556,1	June 21	261,0	63,0	491,0	475,8	Oct.10	669,0	222,0	1169,0	1138,2	Jan.24	488,3	154,0	1290,0	1242,2
March27	437,6	67,0	1777,0	1534,1	June 22	317,5	122,0	1196,0	977,0	Oct.11	582,8	158,0	1210,0	1196,7	Jan.25	493,1	206,0	920,0	871,2
Average	**354**	**101**	**925**	**862**		**264**	**98**	**558**	**519**		**456**	**172**	**1002**	**927**		**463**	**160**	**913**	**860**

Comment:
* Maximum of daily 8-hour moving average concentrations. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. . The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on March 20, 2012 between 10.00 – 11.00 hours due to calibration, and between 12.00 – 13.00 hours due to maintenance.
The measurement was suspended on June 15, 2012 between 9.00 – 10.00 hours due to calibration.
The measurement was suspended on October 5, 2012 between 10.00 – 11.00 hours due to calibration.
The measurement was suspended on January 18, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-39: 4. LMp on-the-spot measurements/tests – CO

The following figures present the CO concentration hourly test values:

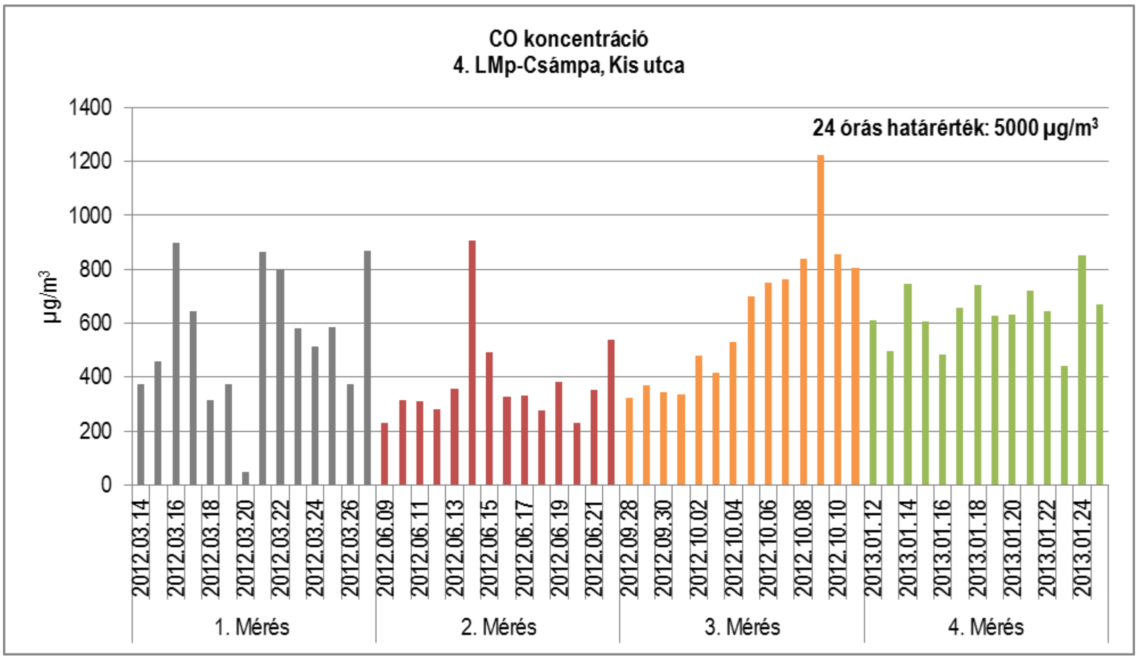


koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, mérési időszak - measurement period, óra - hour

Figure 16.2.2-43: 4. LMp - CO hourly run-off curves

CO concentration Based on hourly measurement values (µg/m³)				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 03. 14-03.27.)	550	48	899	891
2. TEST (2012. 06. 09-22.)	380	230	908	812
3. TEST (2012. 09. 27-10.11.)	624	323	1223	1127
4. TEST (2013.01.12-01.25.)	638	439	854	825

Table 16.2.2-40: 4. LMp CO measurements/tests results



koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-44: 4. LMp – CO daily average concentration

The hourly CO immission values were always below the 10 000 µg/m³ hourly limit.

The highest concentration was measured during the 3rd measurement period on October 9, between 11.00-12.00 a.m., its value was 1994 µg/m³, 20% of the hourly limit.

The maximum of the 8-hour moving average values did not reach even 20% of the 24-hour limit (5 000 µg/m³) 20 %

Bi-weekly average values of the **CO** measurements were: **550 µg/m³**, **380 µg/m³**, **624 µg/m³, 638 µg/m³**.

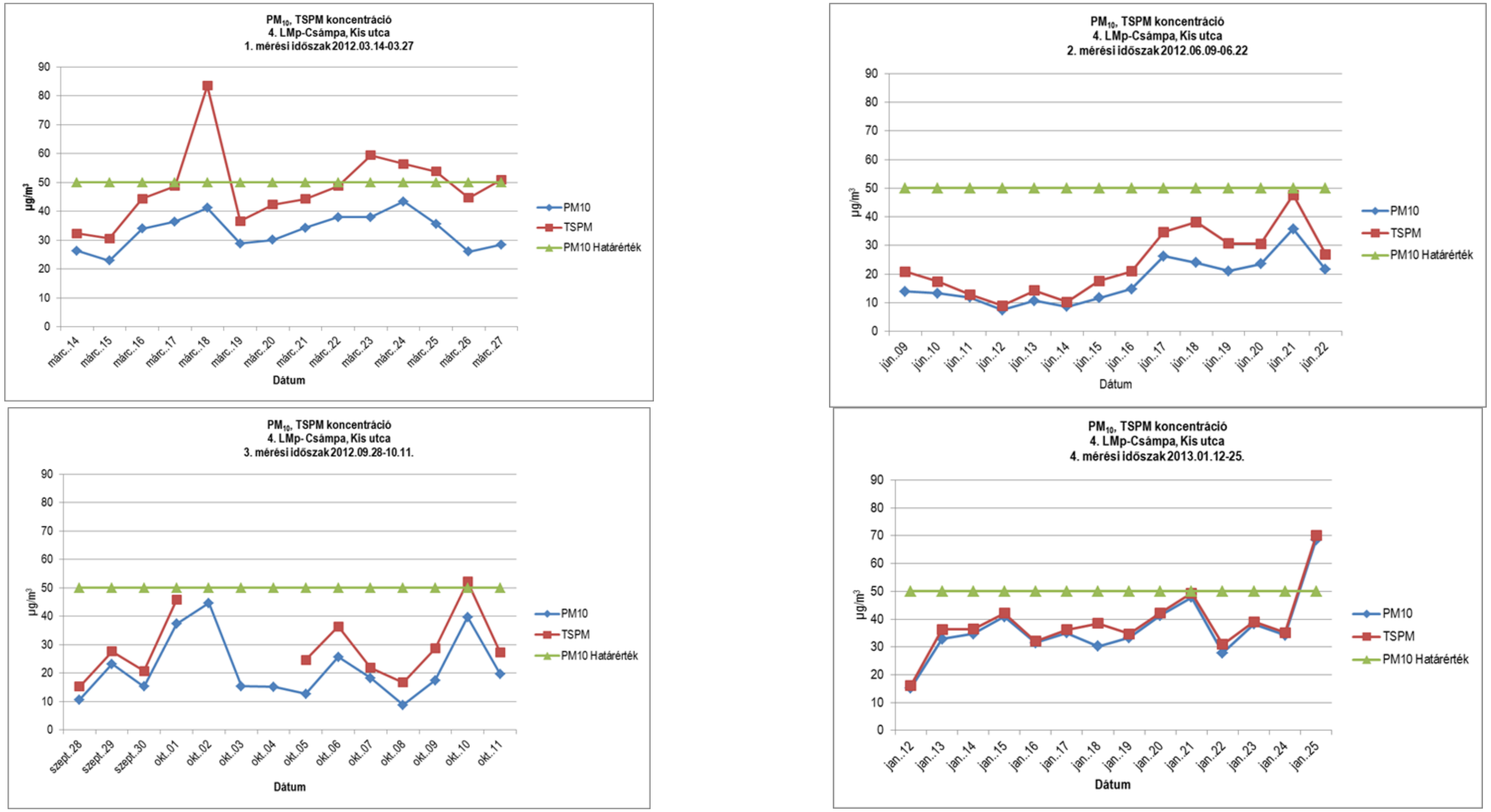
PM_{10}, TSPM 24-hour concentration

Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM
	µg/m³			µg/m³			µg/m³			µg/m³	
March14	26	32	June 09	14	21	Sept.28	11	15	Jan.12	15	16
March15	23	31	June 10	13	17	Sept.29	23	28	Jan.13	33	36
March16	34	44	June 11	12	13	Sept.30	15	21	Jan.14	35	36
March17	36	49	June 12	7	9	Oct.01	37	46	Jan.15	41	42
March18	41	84	June 13	11	14	Oct.02	45	-	Jan.16	31	32
March19	29	37	June 14	9	10	Oct.03	15	-	Jan.17	35	36
March20	30	42	June 15	12	18	Oct.04	15	-	Jan.18	30	38
March21	34	44	June 16	15	21	Oct.05	13	25	Jan.19	33	35
March22	38	49	June 17	26	35	Oct.06	26	36	Jan.20	41	42
March23	38	59	June 18	24	38	Oct.07	18	22	Jan.21	48	49
March24	43	56	June 19	21	31	Oct.08	9	17	Jan.22	28	31
March25	36	54	June 20	24	31	Oct.09	17	29	Jan.23	38	39
March26	26	45	June 21	36	48	Oct.10	40	52	Jan.24	34	35
March27	28	51	June 22	22	27	Oct.11	20	27	Jan.25	69	70
min	**23**	**31**		**7**	**9**		**9**	**15**		**15**	**16**
max	**43**	**84**		**36**	**48**		**45**	**52**		**69**	**70**
Average	**33**	**48**		**17**	**24**		**22**	**29**		**37**	**39**

Comment:
TSPM test was suspended between October 2-4 due to technical reasons.

Table 16.2.2-41: 4. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The following figure the PM_{10} and TSPM daily concentration values:



koncentráció - concentration, Csámpa, Kis utca - Csámpa, Kis street, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-45: 4. LMp - PM_{10} and a TSPM daily run-off curves

The 24-hour average and maximum **PM_{10}** values measured during the 1st and 2nd measuring periods were lower than the limit. The total particulate matter samples taken during the 3rd measuring period between October 2 and 4 could not be analysed and assessed due to technical problems. The 24-hour average and maximum M_{10} values taken during the measuring period were lower than the limit. The 24-hour 69 μg/m³ average PM_{10} value measured during the 4th measuring period on January 25, 2013 was higher than the limit. The automatic measuring stations also measured values higher than the limit on the same day in the southern part of the country, these values were between 51-105 μg/m³.

The presently effective Decree 4/2011.(I.14.) VM defines no limit for **TSPM**. The formerly valid Decree 14/2001.(V.9.) KöM-EüM-FVM defined 200 μg/m³ hourly and 100 μg/m³ 24-hour limit. The measurement results did not exceed the former 24-hour limit.

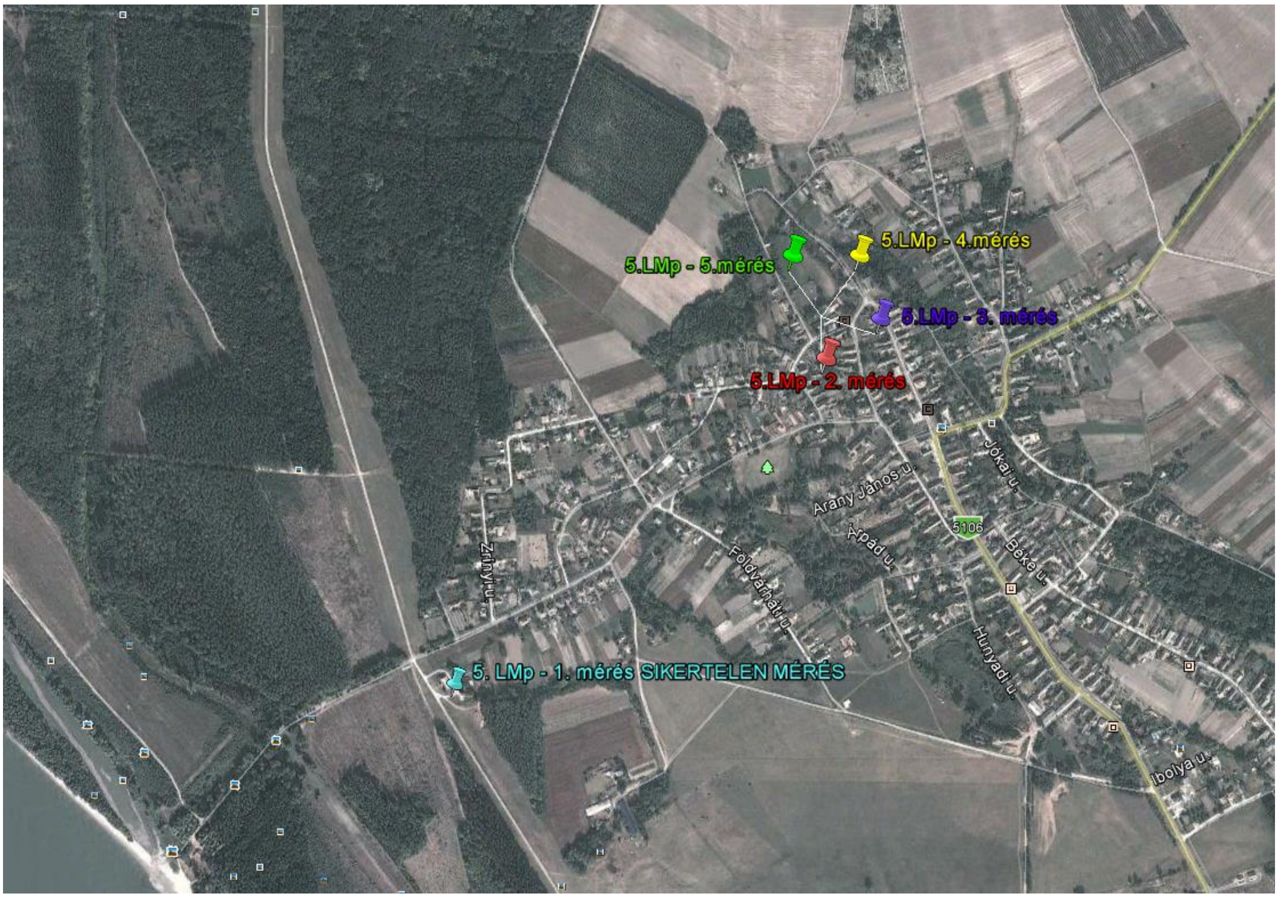
Settling dust

Settling dust concentration		
First days	**Last days**	**g/m²x30nap**
2012.01.23	2012.02.23	0,4
2012.02.23	2012.03.28	1,9
2012.03.28	2012.04.26	5,8
2012.04.26	2012.05.22	8,0
2012.05.22	2012.06.25	10,3
2012.06.25	2012.07.31	4,0
2012.07.31	2012.08.30	6,4
2012.09.11	2012.10.12	5,1
2012.10.12	2012.11.12	3,5
2012.11.12	2012.12.12	1,1
2012.12.12	2013.01.11	0,6
2013.01.11	2013.02.12	0,8
2013.02.25	2013.03.29	2,7

Table 16.2.2-42: 4. LMp on-the-spot measurements/tests – settling dust

Decree 4/2011. (I. 14.) VM defines no limit for the **settling dust**. The former decree defined 16 g/m² x 30-day limit. The measured settling dust concentrations did not exceed the former limit, and the highest measured value was 64% of the limit.

16.2.2.5.5 Dunaszentbenedek - 5. LMp



mérés - measurement/test, sikertelen mérés – unsuccessful measurement/test

source : Google Earth

Figure 16.2.2-46: 5. LMp location

Test 1. planned at 5. LMp (as selected in advance) at *Dam keeper house* encountered unforeseeable technical difficulties. During the days after commencing the measurements significant voltage volatility (between 170 V - 220 V) emerged. The measuring instruments would need minimum 200 V voltage level for their ordinary operation. Efforts were made to perform the test a couple of streets further from the originally planned measuring station, at *Dunakert street 2*., but similar voltage volatility prevented the test again. We tried to find a measuring point that can secure acceptable technical conditions involving the Mayor, but it took quite a long time and at the end of the day the 5. LMp 1. test had to be suspended.

As the test at Dunaszentbenedek had to be suspended, the measurement plan had to be re-scheduled, and the test series continued at Paks, and the suspended test was scheduled after the completion of the total measurement series, for 2013 first quarter.

The site for 5. LMp new measurement was selected on July 4, 2012 involving the representative of OKI and ERBE. The new **measuring point** is located ***in the area of the elementary school at the corner of Rózsa and Kölcsei street***s.

The 1st measuring period started at the Dam keeper house in accordance with the original plan for the settling dust measurements. A new settling dust measurement series was launched (simultaneously with the other measuring points) on July 17, 2012. The measurements were trouble-freely performed on the selected new measuring station.

Thus there was no professional reason for performing parallel settling dust measurements on the old and new points, and the original task requires holding the settling dust measurements on the same location as the other air pollution measurements, so no further settling dust measurements were performed after the 3rd test at the Dam keeper house.

1. TEST **2. TEST** **3. TEST** **4. TEST** **5. TEST**

Point of the unsuccessful test: Dam keeper house

New measurement point: Rózsa street

Dunaszentbenedek, Dam keeper house

Dunaszentbenedek, Rózsa street

SETTLING DUST SAMPLING UNITS

Figure 16.2.2-47: Location of testing truck and settling dust sampling units at 5 LMp sites

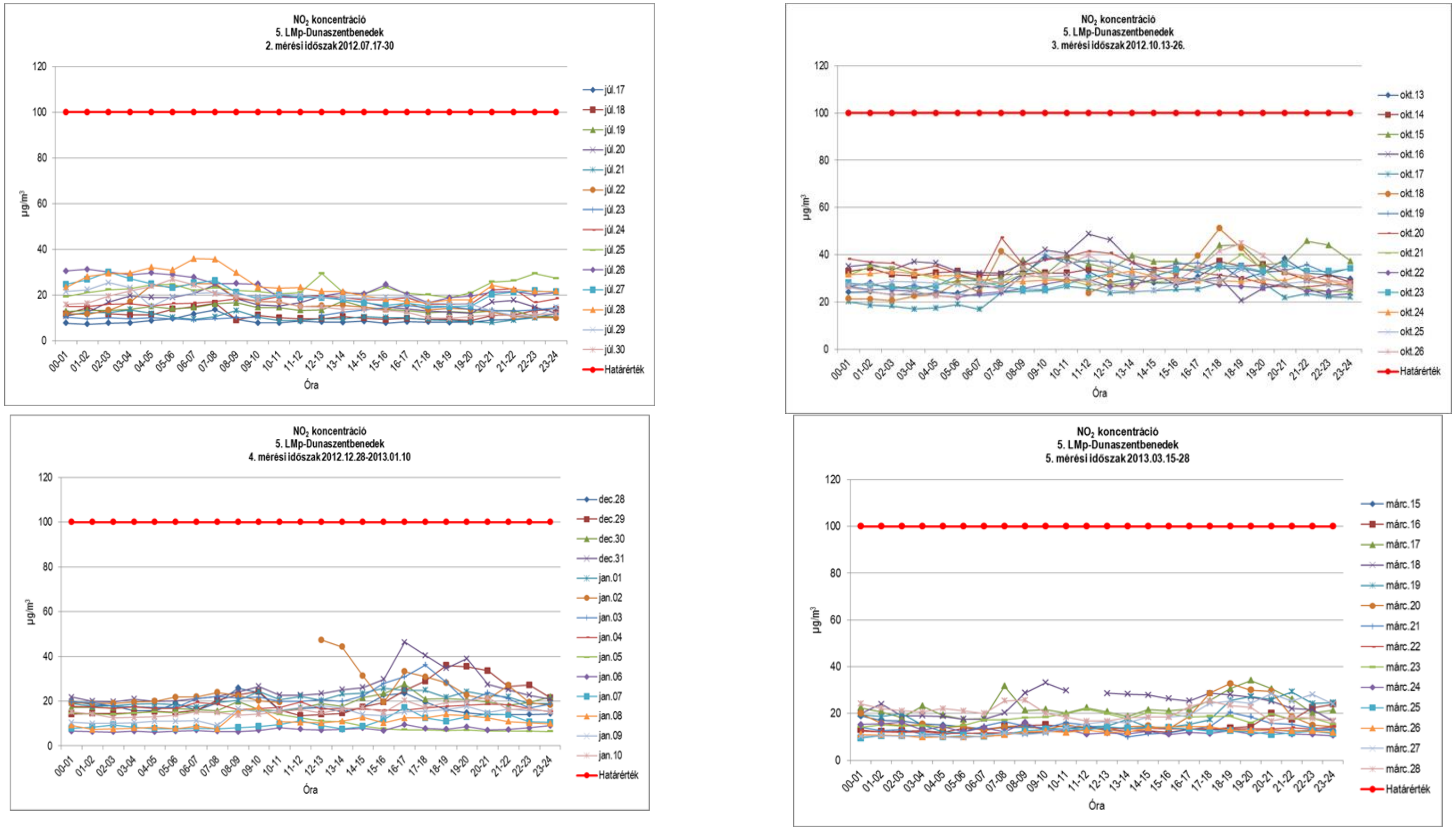
NO_2 immission

NO_2 concentration																			
Based on daily assessment hourly concentration values																			
2. TEST					3. TEST					4. TEST					5. TEST				
Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
July17	9	7	14	13	Oct.13	30	23	38	38	Dec.28	18	14	26	25	March15	14	13	19	18
July18	11	9	16	16	Oct.14	32	28	37	36	Dec.29	21	14	36	36	March16	15	12	24	23
July19	14	11	18	17	Oct.15	35	26	46	45	Dec.30	19	16	28	26	March17	23	18	34	33
July20	16	11	25	23	Oct.16	33	21	49	48	Dec.31	26	20	46	44	March18	24	17	33	32
July21	10	8	14	13	Oct.17	23	17	35	32	Jan.01	21	17	26	25	March19	18	11	29	28
July22	16	10	25	25	Oct.18	30	21	51	47	Jan.02	25	18	47	46	March20	18	13	33	32
July23	12	9	16	15	Oct.19	32	23	40	39	Jan.03	22	17	36	34	March21	14	10	21	20
July24	18	15	23	23	Oct.20	34	26	47	45	Jan.04	17	15	20	20	March22	13	11	14	14
July25	23	19	29	29	Oct.21	30	24	40	38	Jan.05	11	6	16	16	March23	18	14	22	21
July26	24	17	31	31	Oct.22	26	22	30	30	Jan.06	7	6	10	9	March24	13	11	16	16
July27	21	15	30	29	Oct.23	30	25	36	36	Jan.07	10	8	17	16	March25	12	10	14	14
July28	24	17	36	36	Oct.24	30	27	33	33	Jan.08	11	7	17	16	March26	12	10	15	15
July29	18	11	25	24	Oct.25	28	25	34	34	Jan.09	14	9	18	18	March27	17	10	28	28
July30	16	10	27	26	Oct.26	31	22	45	43	Jan.10	16	12	22	21	March28	21	17	26	26
Avr.	**17**	**12**	**23**	**23**		**30**	**23**	**40**	**39**		**17**	**13**	**26**	**25**		**16**	**12**	**23**	**23**

Comment:
The measurement was suspended on July 23, 2012 between 10.00 – 12.00 hours due to calibration.
The measurement was suspended on October 18, 2012 between 10.00-11.00 hours due to calibration.
The measurement was suspended on January 2, 2013 between 11.00-12.00 hours due to calibration.
The measurement was suspended on March 18, 2013 between 11.00-12.00 hours due to calibration.

Table 16.2.2-43: 5. LMp on-the-spot measurements/tests – NO_2

The following figure presents the NO_2 concentration hourly values:

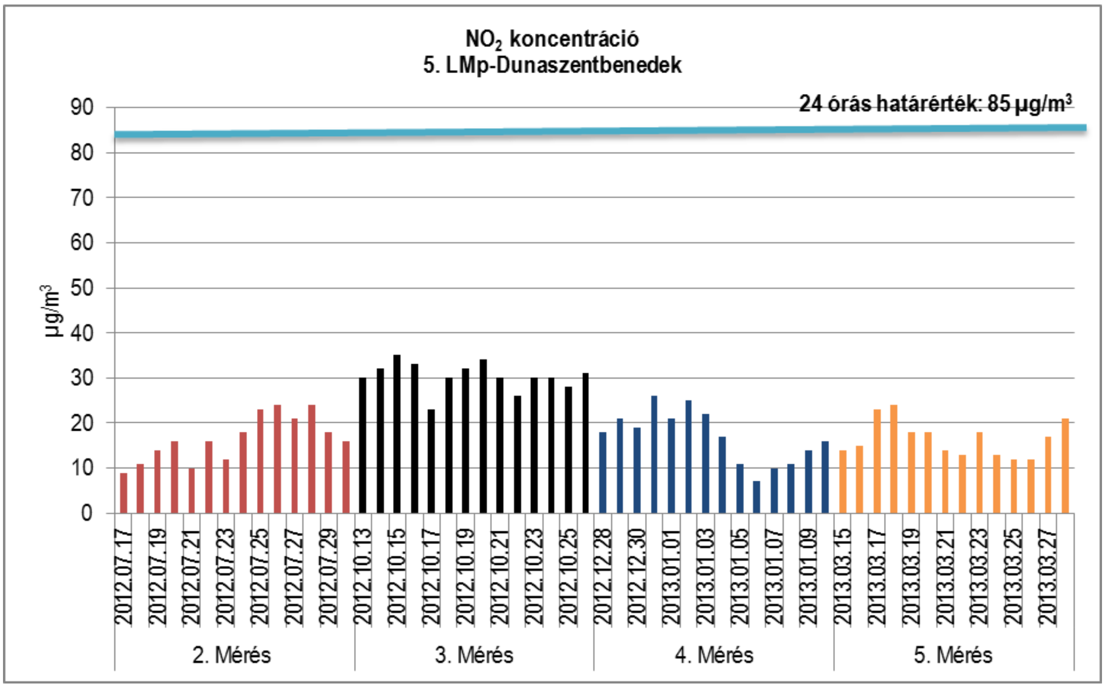


koncentráció - concentration, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-48: 5. LMp - NO_2 hourly run-off curves

NO_2 concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
2. TEST (2012. 07.17-30.)	17	12	23	23
3. TEST (2012. 10.12-26.)	30	23	40	39
4. TEST (2012. 12. 28-2013.01.10.)	17	13	26	25
5. TEST (2013. 03.14-28.)	16	12	23	23

Table 16.2.2-44: 5. LMp NO_2 measurements/tests results



koncentráció - concentration, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-49: 5. LMp - NO_2 daily average concentration

The measured NO_2 hourly values did not exceed the 100 µg/m³ hourly limit at the measuring point during the 2-week measurement process.

The highest NO_2 value was measured during the 3rd measuring period, on October 18, 2012 between 17.00-18.00 hours, the value was 51 µg/m³.

The 24-hour limit was never exceeded during the measurements.

Bi-weekly average values of the **NO_2** measurements were: **17 µg/m³**, **30 µg/m³**, **17 µg/m³**, **16 µg/m³**.

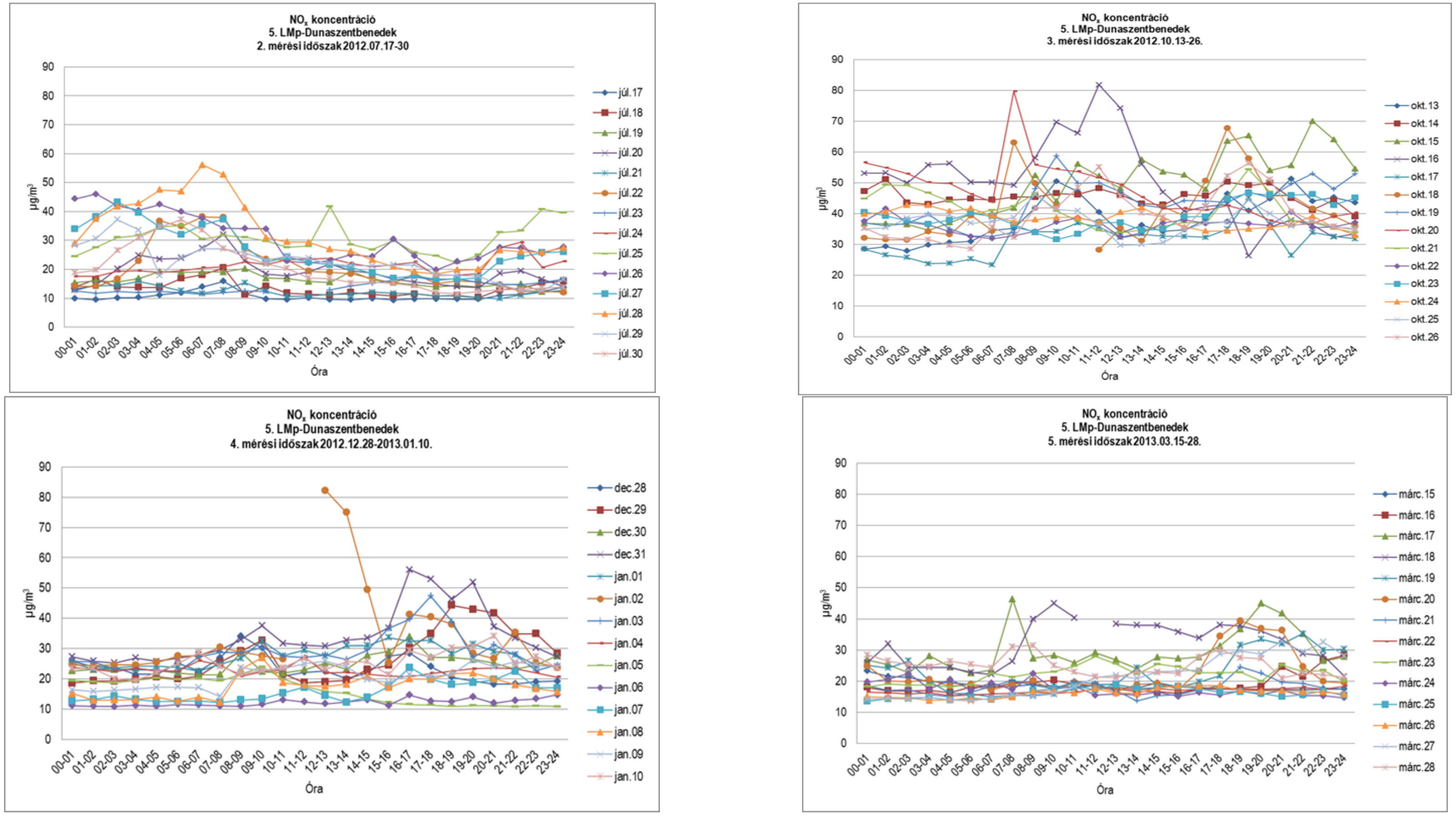
NO_x immission

NO_x concentration																			
Based on daily assessment hourly concentration values																			
2. TEST					3. TEST					4. TEST					5. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	µg/m^3					µg/m^3					µg/m^3					µg/m^3			
July17	10,8	9,3	15,9	15,0	Oct.13	38,4	27,9	51,3	51,0	Dec.28	23,2	18,2	34,2	32,3	March15	18,7	17,0	23,3	22,5
July18	13,4	10,3	20,5	19,4	Oct.14	45,6	39,1	51,2	50,8	Dec.29	26,8	18,6	44,3	43,7	March16	19,1	16,1	28,3	27,6
July19	16,2	12,2	20,2	19,8	Oct.15	49,8	34,6	70,0	67,9	Dec.30	24,8	21,3	33,9	31,7	March17	29,5	22,6	46,3	45,7
July20	19,2	12,8	32,0	29,9	Oct.16	49,9	26,3	81,8	78,2	Dec.31	34,1	25,2	56,1	54,6	March18	32,0	21,6	44,9	42,9
July21	12,2	9,8	15,9	15,6	Oct.17	31,6	23,3	45,1	41,4	Jan.01	27,6	22,5	33,7	33,2	March19	22,5	14,9	35,3	34,4
July22	20,6	12,1	38,1	38,1	Oct.18	41,4	28,3	67,8	65,7	Jan.02	34,0	23,7	82,3	79,1	March20	22,5	16,7	39,4	38,2
July23	14,0	11,4	17,4	17,1	Oct.19	43,8	32,7	58,7	56,1	Jan.03	28,8	22,3	47,4	43,8	March21	18,0	13,7	24,5	23,6
July24	21,3	17,6	29,3	28,5	Oct.20	47,6	36,3	79,7	69,1	Jan.04	22,8	20,5	27,3	26,7	March22	16,9	15,4	18,4	18,3
July25	30,6	22,1	41,7	41,2	Oct.21	41,1	33,9	54,4	52,1	Jan.05	16,0	10,8	24,0	22,8	March23	22,1	18,1	27,9	26,8
July26	30,9	19,8	46,0	45,3	Oct.22	36,2	31,9	41,7	41,2	Jan.06	12,1	10,8	14,7	14,6	March24	17,4	14,6	22,4	22,4
July27	26,5	16,6	43,3	41,6	Oct.23	39,4	31,6	46,7	46,5	Jan.07	15,7	12,2	23,7	23,1	March25	16,2	13,5	18,9	18,6
July28	31,9	18,3	56,1	54,6	Oct.24	38,3	32,9	42,8	42,8	Jan.08	17,5	12,3	27,0	25,2	March26	16,2	13,8	18,6	18,6
July29	22,5	12,5	37,2	35,6	Oct.25	37,3	29,7	46,3	45,4	Jan.09	20,9	14,2	26,2	26,0	March27	21,2	13,6	32,8	32,7
July30	19,9	11,5	37,2	36,0	Oct.26	39,8	28,6	56,3	55,8	Jan.10	25,2	19,4	34,2	32,6	March28	25,1	21,0	31,5	31,3
Average	**21**	**14**	**32**	**31**		**41**	**31**	**57**	**55**		**23**	**18**	**36**	**35**		**21**	**17**	**29**	**29**

Comment:
The measurement was suspended on July 23, 2012 between 10.00 – 12.00 hours due to calibration.
The measurement was suspended on October 18, 2012 between 10.00-11.00 hours due to calibration.
The measurement was suspended on January 2, 2013 between 11.00-12.00 hours due to calibration.
The measurement was suspended on March 18, 2013 between 11.00-12.00 hours due to calibration.

Table 16.2.2-45: 5. LMp on-the-spot measurements/tests – NO_x

The following figure presents the NO_x concentration hourly values:

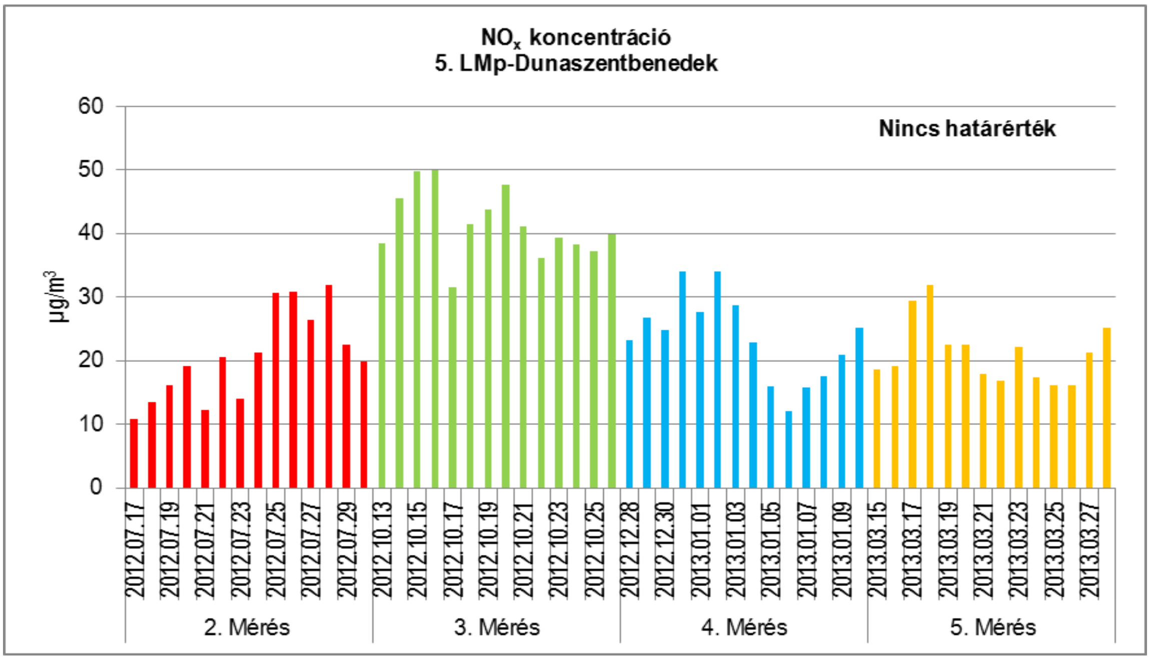


koncentráció - concentration, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-50: 5. LMp - NO_x hourly run-off curves

NO_x concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
2. Test (2012. 07.17-30.)	21	14	32	31
3. Test (2012. 10.12-26.)	41	31	57	55
4. Test (2012. 12. 28-2013.01.10.)	23	18	36	35
5. Test (2013. 03.14-28.)	21	17	29	29

Table 16.2.2-46: 5. LMp NO_x measurements/tests results



koncentráció - concentration, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-51: 5. LMp - NO_x daily average concentration

Decree 4/2011. (I. 14.) VM defines no immission limit for NO_x. The former decree defined for NO_x a 200 µg/m³ hourly limit, and 150 µg/m³ 24-hour limit but these limits were never exceeded during the 4-times two-week measurement process based on the hourly measurement values.

The highest NO_x value was measured during the 4th measuring period after the calibration on January 2, 2013 between 12.00-13.00 hours, and on October 16, 2012, between 11.00-12.00 a.m., the value was in both days 82 µg/m³.

Bi-weekly average values of the **NO_x** measurements were: **20,7 µg/m³**, **41,4 µg/m³**, **23,5 µg/m³**, **21,2 µg/m³**.

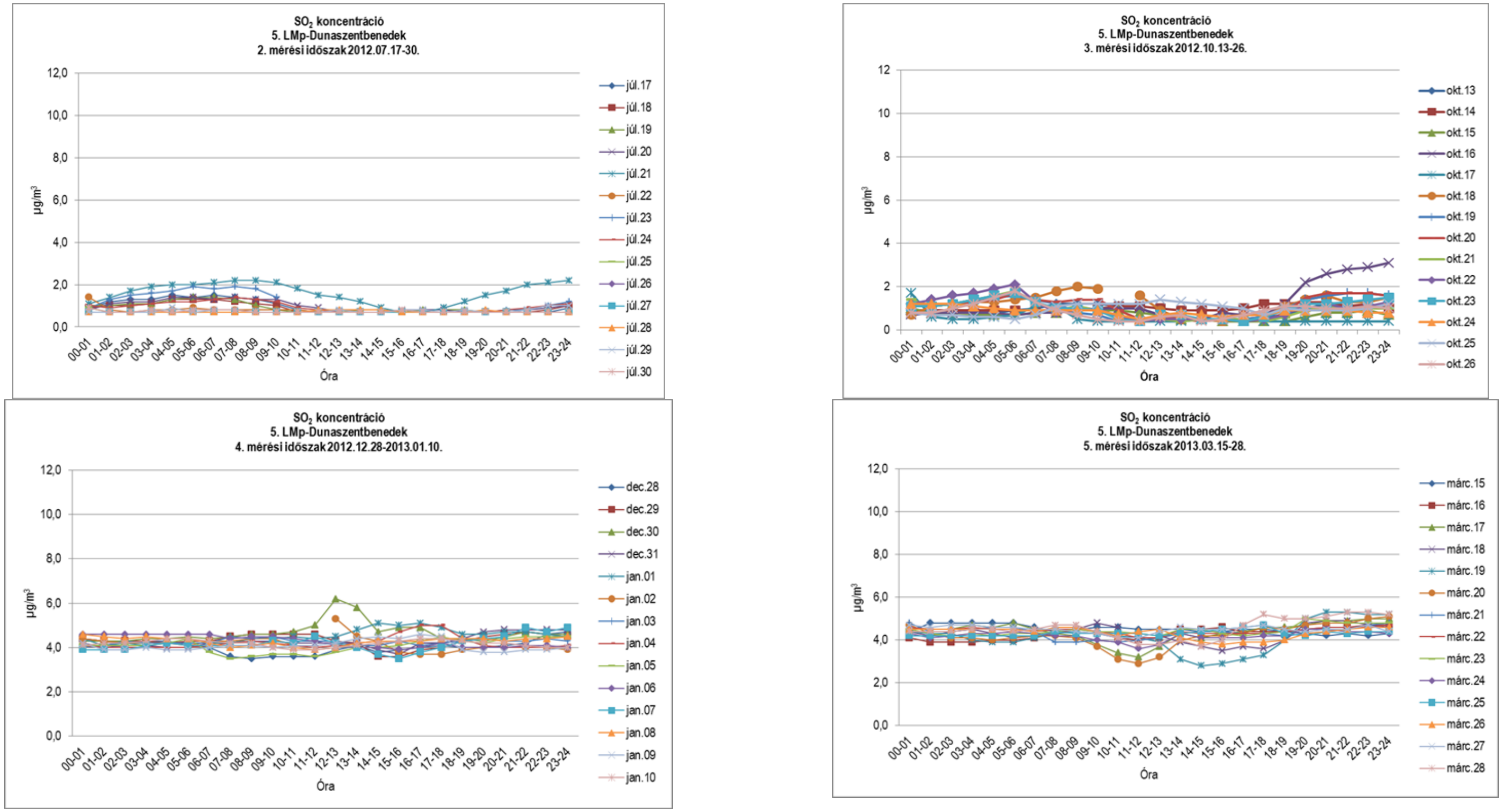
SO_2 immission

SO_2 concentration																				
Based on daily assessment hourly concentration values																				
2. TEST					3. TEST					4. TEST					5. TEST					
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
July17	1,0	0,7	1,5	1,5	Oct.13	0,9	0,5	1,2	1,2	Dec.28	4,0	3,5	4,7	4,7	March15	4,5	4,2	4,8	4,8
July18	0,9	0,7	1,3	1,3	Oct.14	1,0	0,9	1,3	1,3	Dec.29	4,3	3,6	4,7	4,7	March16	4,3	3,9	4,7	4,7
July19	0,9	0,7	1,4	1,4	Oct.15	0,7	0,4	1,0	1,0	Dec.30	4,7	4,3	6,2	6,0	March17	4,4	3,2	5,0	5,0
July20	1,0	0,7	1,4	1,4	Oct.16	1,2	0,5	3,1	3,0	Dec.31	4,3	3,7	4,8	4,8	March18	4,3	3,5	4,9	4,9
July21	1,6	0,7	2,2	2,2	Oct.17	0,6	0,4	1,7	1,4	Jan.01	4,5	4,1	5,1	5,1	March19	4,1	2,8	5,3	5,3
July22	0,8	0,7	1,4	1,2	Oct.18	1,2	0,4	2,0	2,0	Jan.02	4,2	3,7	5,3	4,9	March20	4,2	2,9	5,1	5,1
July23	1,1	0,7	1,9	1,9	Oct.19	1,0	0,4	1,7	1,7	Jan.03	4,3	4,0	4,5	4,5	March21	4,3	3,9	4,8	4,8
July24	0,9	0,7	1,4	1,4	Oct.20	1,1	0,4	1,7	1,7	Jan.04	4,2	4,0	5,0	5,0	March22	4,4	4,1	4,7	4,7
July25	0,7	0,7	0,9	0,8	Oct.21	0,9	0,4	1,8	1,7	Jan.05	4,1	3,5	4,5	4,5	March23	4,5	4,2	5,0	5,0
July26	0,7	0,7	0,7	0,7	Oct.22	1,0	0,4	2,1	2,0	Jan.06	4,3	3,9	4,6	4,6	March24	4,2	3,6	4,5	4,5
July27	0,7	0,7	0,7	0,7	Oct.23	1,0	0,4	1,7	1,7	Jan.07	4,2	3,5	4,9	4,9	March25	4,3	4,2	4,7	4,7
July28	0,7	0,7	0,8	0,8	Oct.24	0,9	0,5	1,2	1,2	Jan.08	4,3	3,9	4,6	4,6	March26	4,3	3,8	4,6	4,6
July29	0,8	0,7	1,0	1,0	Oct.25	1,0	0,5	1,4	1,4	Jan.09	4,1	3,8	4,6	4,6	March27	4,5	4,1	4,7	4,7
July30	0,7	0,7	0,9	0,9	Oct.26	0,9	0,4	1,8	1,7	Jan.10	4,2	3,9	4,4	4,4	March28	4,5	3,7	5,3	5,3
Average	**1**	**1**	**1**	**1**		**1**	**0**	**2**	**2**		**4**	**4**	**5**	**5**		**4**	**4**	**5**	**5**

Comment:
The measurement was suspended on July 23, 2012 between 10.00 – 12.00 hours due to calibration.
The measurement was suspended on October 18, 2012 between 10.00-11.00 hours due to calibration.
The measurement was suspended on January 2, 2013 between 11.00-12.00 hours due to calibration.
The measurement was suspended on March 18, 2013 between 11.00-12.00 hours due to calibration.

Table 16.2.2-47: 5. LMp on-the-spot measurements/tests – SO_2

The following figure presents the SO_2 concentration hourly test values:

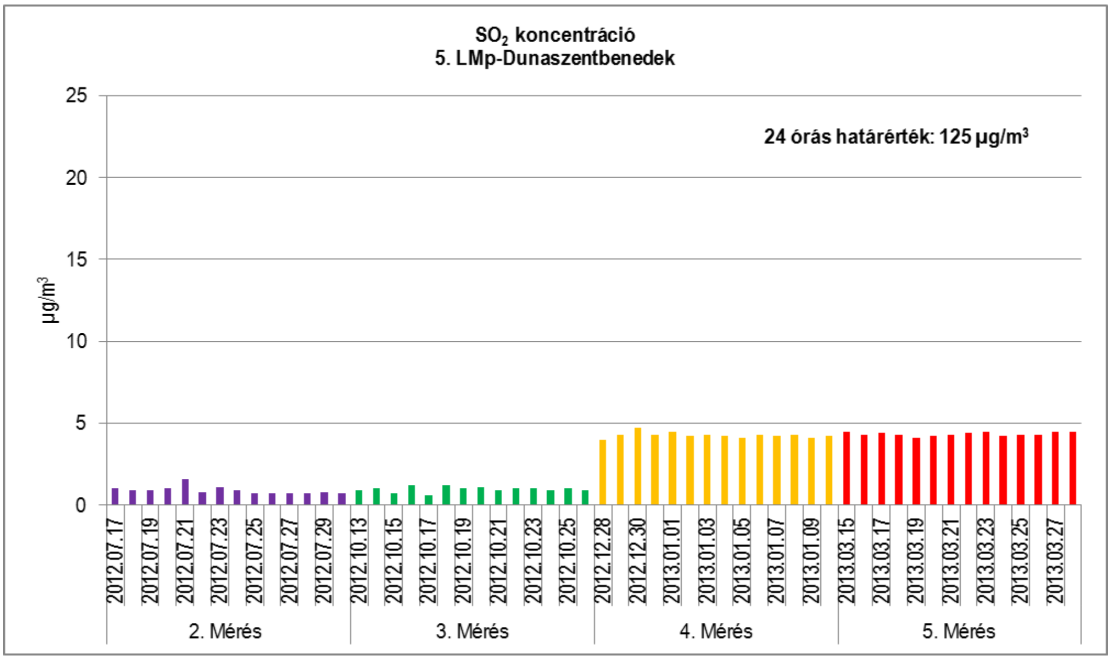


koncentráció - concentration, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-52: 5. LMp - SO_2 hourly run-off curves

SO_2 concentration Based on hourly measurement values **(μg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
2. Test (2012. 07.17-30.)	1	1	1	1
3. Test (2012. 10.12-26.)	1	0	2	2
4. Test (2012. 12. 28-2013.01.10.)	4	4	5	5
5. Test (2013. 03.14-28.)	4	4	5	5

Table 16.2.2-48: 5. LMp SO_2 measurements/tests results



koncentráció - concentration, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-53: 5. LMp – SO_2 daily average concentration

The measured hourly SO_2 values were well below the 250 μg/m³ hourly limit.

The highest concentration was measured during the 4th measurement period on December 30, 2012 between 12.00-13.00 hours, the value 6,2 was μg/m³, 2,%% of the hourly limit.

The 24-hour average concentration values were also well below the 125 μg/m³ daily limit.

Bi-weekly average values of the **SO_2** measurements were: **1 μg/m³**, **1 μg/m³**, **4 μg/m³, 4 μg/m³**.

CO immission

CO concentration

Based on daily assessment hourly concentration values *

2. Test				
Measuring period	Average	Min	Max	98% percent
	µg/m³			
July17	185,9	63,0	469,0	426,2
July18	334,3	258,0	424,0	423,5
July19	229,5	117,0	519,0	502,0
July20	219,4	117,0	356,0	338,1
July21	163,5	96,0	251,0	239,5
July22	232,2	128,0	398,0	380,5
July23	181,3	73,0	319,0	297,6
July24	276,6	172,0	458,0	439,6
July25	266,2	107,0	754,0	704,8
July26	222,6	107,0	484,0	415,5
July27	185,6	72,0	605,0	515,8
July28	256,8	129,0	525,0	472,1
July29	170,9	67,0	396,0	349,1
July30	222,0	105,0	556,0	527,9

3. Test				
Measuring period	Average	Min	Max	98% percentile
	µg/m³			
Oct.13	663,5	369,0	1142,0	1020,6
Oct.14	623,6	361,0	802,0	800,2
Oct.15	434,9	217,0	671,0	627,3
Oct.16	386,0	188,0	625,0	617,1
Oct.17	374,2	126,0	692,0	679,6
Oct.18	406,3	128,0	1127,0	1028,9
Oct.19	433,5	145,0	806,0	770,1
Oct.20	342,6	115,0	663,0	654,3
Oct.21	360,8	135,0	669,0	653,4
Oct.22	273,3	80,0	800,0	753,1
Oct.23	292,2	115,0	695,0	665,6
Oct.24	385,6	118,0	726,0	695,6
Oct.25	335,1	145,0	590,0	542,2
Oct.26	431,1	173,0	991,0	943,6
				746

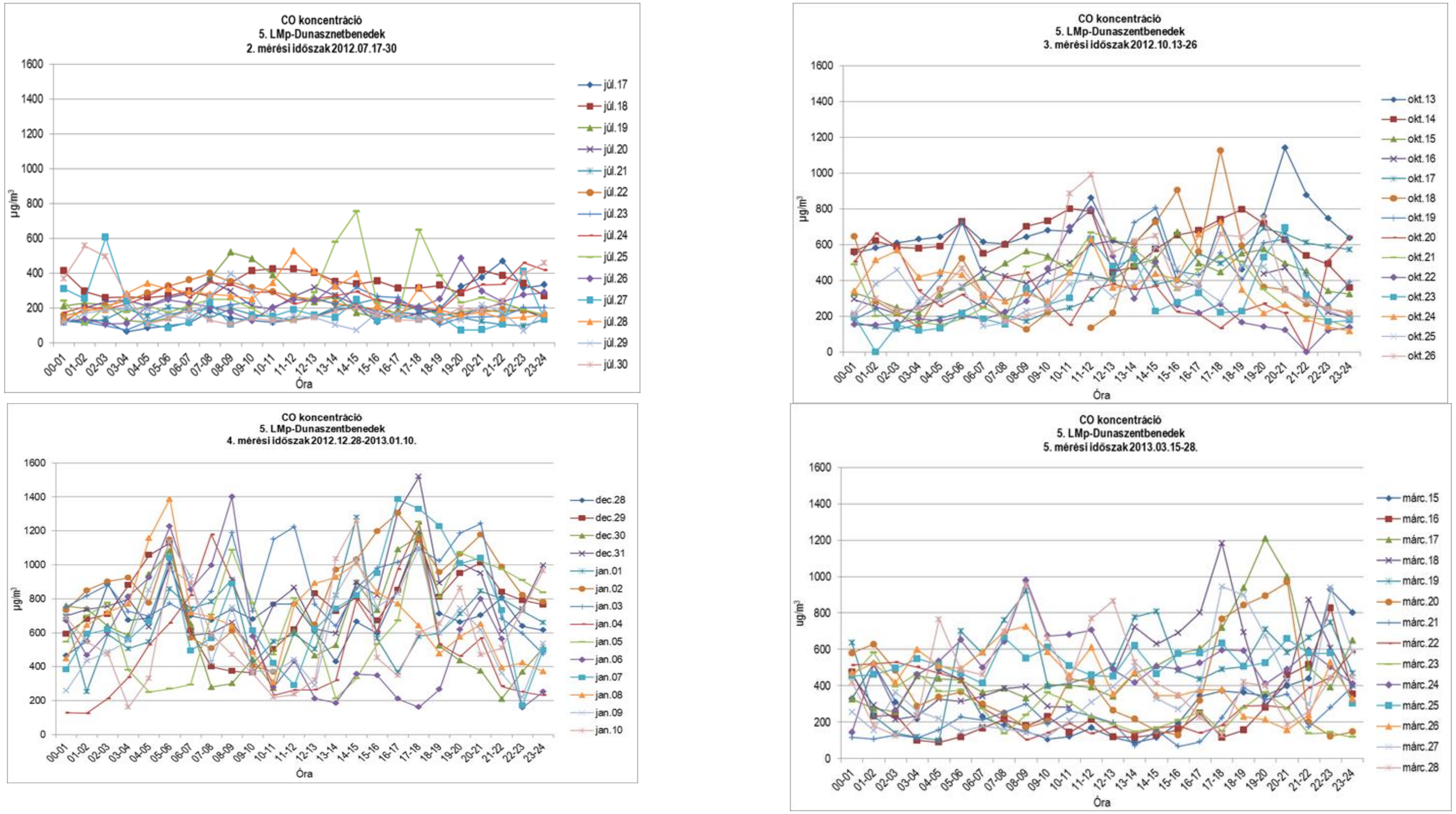
4. Test				
Measuring period	Average	Min	Max	98% percent
	µg/m³			
Dec.28	711,0	429,0	1184,0	1096,6
Dec.29	755,7	365,0	1147,0	1138,7
Dec.30	608,9	210,0	1171,0	1133,7
Dec.31	815,5	495,0	1520,0	1423,4
Jan.01	662,6	254,0	1279,0	1110,6
Jan.02	864,6	369,0	1305,0	1258,4
Jan.03	877,0	474,0	1244,0	1234,8
Jan.04	521,9	125,0	1242,0	1212,6
Jan.05	678,8	212,0	1253,0	1176,6
Jan.06	557,7	159,0	1400,0	1320,0
Jan.07	736,3	170,0	1386,0	1359,8
Jan.08	696,6	307,0	1387,0	1280,7
Jan.09	621,6	220,0	1138,0	1118,7
Jan.10	590,7	162,0	1261,0	1157,0

5. Test				
Measuring period	Average	Min	Max	98% percentile
	µg/m³			
March15	324,0	90,0	928,0	870,0
March16	245,8	90,0	828,0	684,5
March17	515,4	257,0	1208,0	1111,9
March18	491,3	215,0	1183,0	1046,6
March19	526,5	101,0	922,0	869,6
March20	395,5	123,0	969,0	934,5
March21	209,9	68,0	398,0	393,9
March22	304,1	102,0	587,0	560,3
March23	276,4	118,0	584,0	531,1
March24	532,8	144,0	978,0	852,4
March25	526,0	304,0	667,0	662,9
March26	443,8	158,0	726,0	713,1
March27	382,8	123,0	946,0	941,9
March28	452,3	126,0	954,0	913,5
		144		**792**

Comment:
* Maximum of daily 8-hour moving average concentrations. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. . The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on July 23, 2012 between 10.00 – 12.00 hours due to calibration.
The measurement was suspended on October 16, 2012 between 14.00-19.00 hours due to instrument breakdown, and on October 18 between 10.00-11.00 hours due to calibration.
The measurement was suspended on January 2, 2013 between 11.00-12.00 hours due to calibration.
The measurement was suspended on March 18, 2013 between 11.00-12.00 hours due to calibration.

Table 16.2.2-49: 5. LMp on-the-spot measurements/tests – CO

The following figure presents the CO concentration hourly test values:

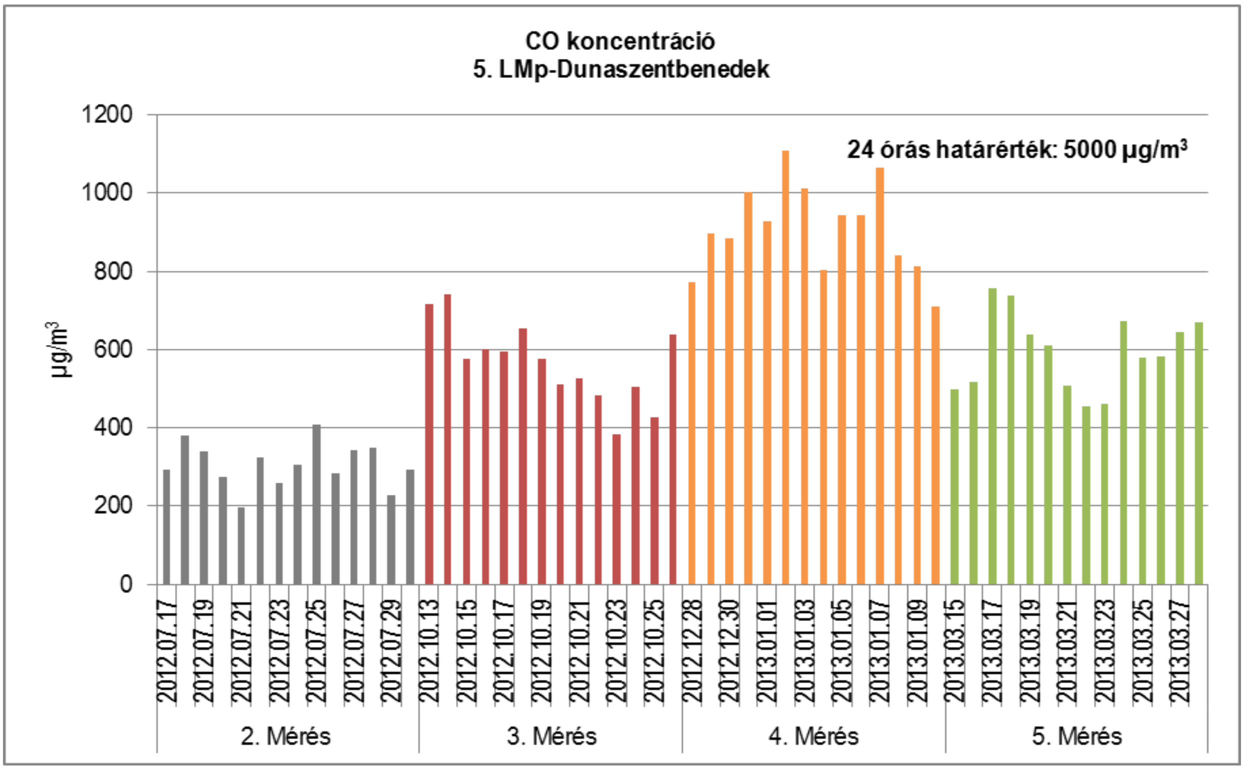


koncentráció - concentration, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-54: 5. LMp - CO hourly run-off curves

CO concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
2. TEST (2012. 07.17-30.)	306	196	409	402
3. TEST (2012. 10.12-26.)	567	383	742	735
4. TEST (2012. 12. 28-2013.01.10.)	909	710	1109	1097
5. TEST (2013. 03.14-28.)	595	456	757	753

Table 16.2.2-50: 5. LMp CO measurements/tests results



koncentráció - concentration, 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-55: 5. LMp – CO daily average concentration

The hourly CO immission values were below the 10 000 µg/m³ hourly limit.

During the 4 times 2-2-week test series the highest concentration was measured during the 4th test on December 31, 2012 between 17.00-18.00 hours. The concentration value was 1520 µg/m³, as 15% of the hourly limit.

The maximum of the 8-hour moving average values was lower than 20% of the 24-hour limit (5 000 µg/m³).

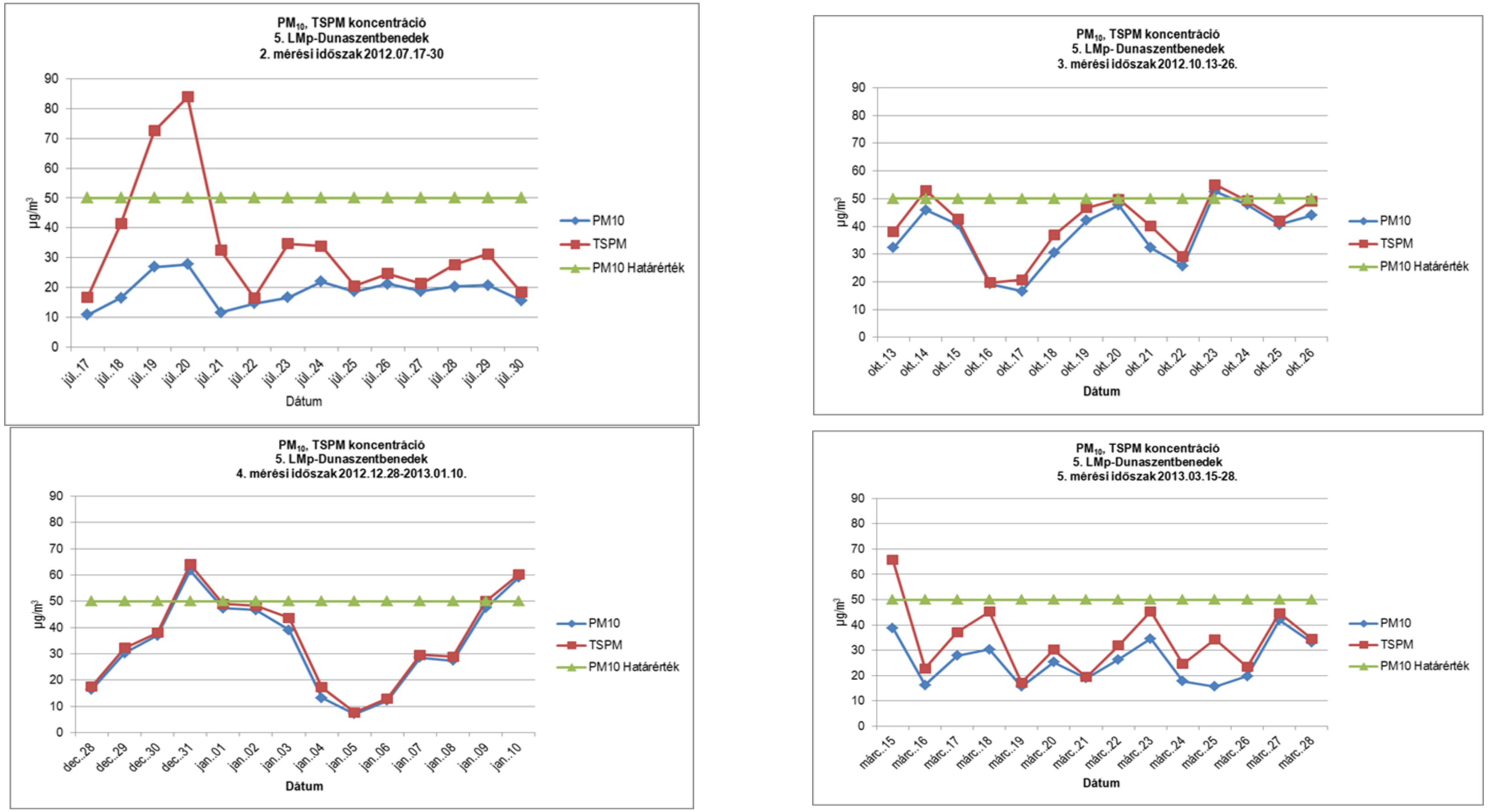
Bi-weekly average values of the **CO** measurements were: **306 µg/m³**, **567 µg/m³**, **909 µg/m³**, **595 µg/m³**.

PM_{10}, TSPM 24-hour concentration

Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM
	μg/m³			μg/m³			μg/m³			μg/m³	
July17	11	17	Oct.13	32	38	Dec.28	16	18	March15	39	66
July18	17	42	Oct.14	46	53	Dec.29	30	32	March16	16	23
July19	27	73	Oct.15	41	43	Dec.30	37	38	March17	28	37
July20	28	84	Oct.16	19	20	Dec.31	62	64	March18	30	45
July21	12	32	Oct.17	17	21	Jan.01	47	49	March19	16	17
July22	15	17	Oct.18	30	37	Jan.02	47	48	March20	25	30
July23	17	35	Oct.19	42	47	Jan.03	39	44	March21	19	19
July24	22	34	Oct.20	48	50	Jan.04	13	17	March22	26	32
July25	19	21	Oct.21	32	40	Jan.05	7	8	March23	35	45
July26	21	25	Oct.22	26	29	Jan.06	12	13	March24	18	25
July27	19	21	Oct.23	53	55	Jan.07	29	30	March25	16	34
July28	20	28	Oct.24	48	49	Jan.08	27	29	March26	20	23
July29	21	31	Oct.25	41	42	Jan.09	48	50	March27	42	45
July30	16	18	Oct.26	44	49	Jan.10	59	60	March28	33	35
min	**11**	**17**		**17**	**20**		**7**	**8**		**16**	**17**
max	**28**	**84**		**53**	**55**		**62**	**64**		**42**	**66**
Average	**19**	**34**		**37**	**41**		**34**	**36**		**26**	**34**

Table 16.2.2-51: 5. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The following figure presents the PM_{10} and TSPM daily concentration values:



koncentráció - concentration, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-56: 5. LMp - PM_{10} and a TSPM daily run-off curves

The 24-hour average and maximum **PM_{10}** values measured during the 1st and 4th measuring period did not exceed the 24-hour limit. The PM_{10} value measured during the 2nd measuring period was on 1 day higher than the 24-hour limit. The value exceeded the limit on October 23 and it was 53 µg/m^3, 6% of the 24-hour limit. The PM_{10} value measured during the 3rd measuring period was on 2 days higher than the 24-hour limit. The value was higher than the limit on December 31 and January 10, with values 62 µg/m^3 and 59 µg/m^3, representing 24 % and 18 % of the 24-hour limit, respectively. Automatic measuring stations operating in the he southern regions of the country also measured values higher than the limit during this period.

Based on the **TSPM** measurement results we can state that (as there is no valid limit at present) the measured values were not higher than the 24-hour limit (100 µg/m^3) defined by the formerly effective Decree 14/2001.(V.9.) KöM-EüM-FVM.

Settling dust

Settling dust concentration		
First days	**Last days**	**g/m^{2}x30nap**
2012.01.23	2012.02.23	0,5
2012.02.23	2012.03.28	1,3
2012.03.28	2012.04.26	3,2
2012.04.26	2012.05.22	5,1
2012.05.22	2012.06.25	3,3
2012.06.25	2012.07.31	4,3
2012.07.31	2012.08.30	4,8 2,1*
2012.09.11	2012.10.12	2,8 4,7*
2012.10.12	2012.11.12	1,5*
2012.11.12	2012.12.12	1,3*
2012.12.12	2013.01.11	1,2*
2013.01.11	2013.02.12	3,5*
2013.02.25	2013.03.29	1,2*

*Dunaszentbenedek, Rózsa street

Table 16.2.2-52: 5. LMp on-the-spot measurements/tests – settling dust

Measurements/tests were held at both measuring points at Dunaszentbenedek, at the Dam keeper house and in Rózsa street between July 31 and October 12, 2012. As during the parallel tests the settling dust load was low at both measuring points, and the original task required that the settling dust test is performed at the same point as the other air pollution measurements/tests are held, there was no professional reason for continuing the settling dust test at Dam keeper house.

Settling dust measurement results were not higher than the 16 g/m^2 x 30-day limit defined by Decree 14/2001.(V.9.) KöM-EüM-FVM (the presently effective Decree defines no limit), and the highest value measured was 32 % of the limit.

16.2.2.5.6 Paks, Dankó Pista street 1. OVIT site - 6. LMp

mérés- measurement/test

source : Google Earth

Figure 16.2.2-57: 6. LMp locatione

1. TEST

2. TEST

3. TEST

4. TEST

SETTLING DUST SAMPLING UNITS

Figure 16.2.2-58: Location of testing truck and settling dust sampling units at 6 LMp site

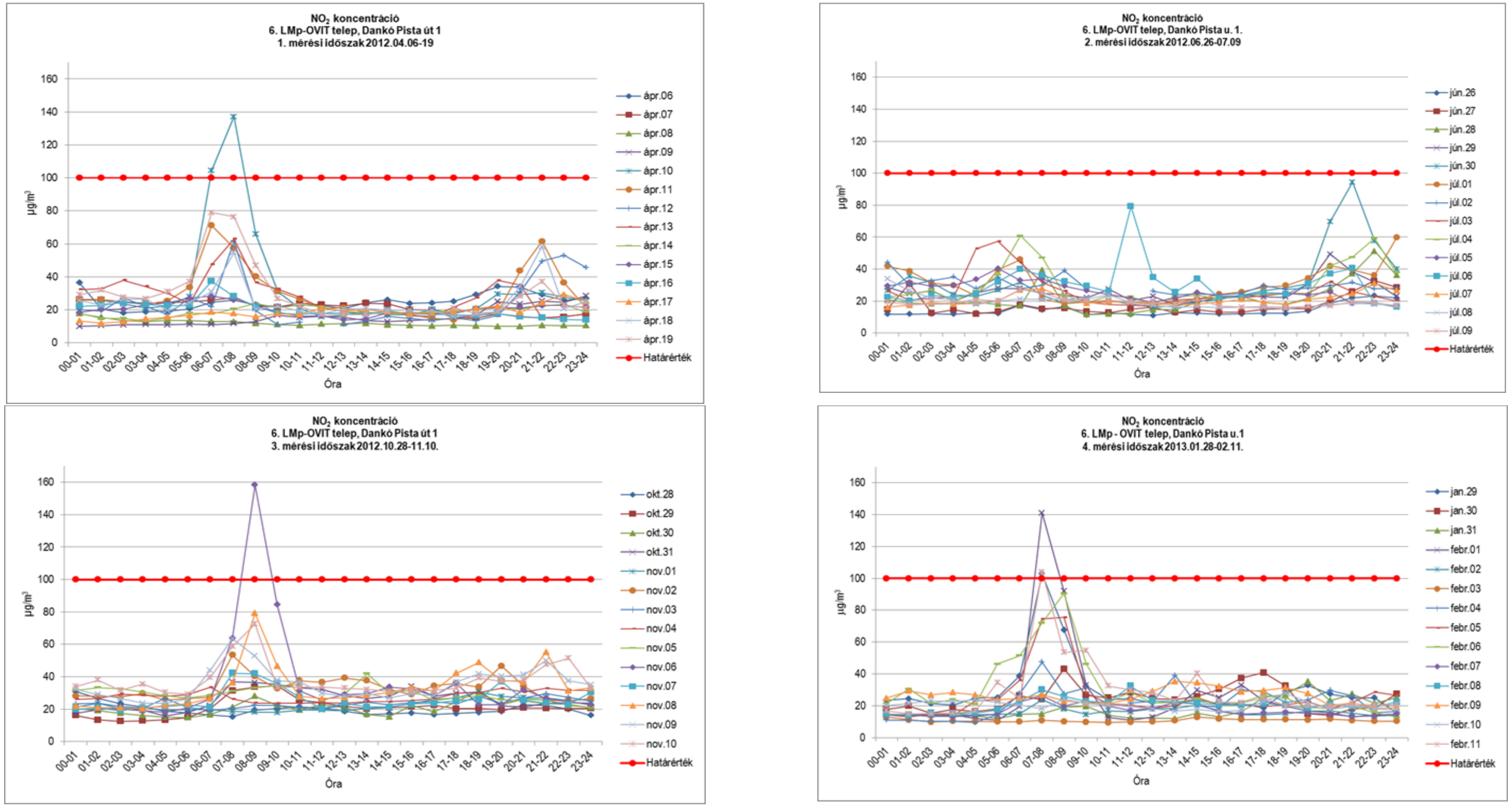
NO_2 immission

NO2 concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Apr.06	25	18	36	35	June 26	14	11	23	23	Oct.28	20	15	31	29	Jan.29	30	16	103	87
Apr.07	22	15	27	27	June 27	17	12	33	32	Oct.29	21	13	34	34	Jan.30	24	14	43	42
Apr.08	12	10	18	17	June 28	22	12	51	46	Oct.30	21	15	31	30	Jan.31	18	12	35	32
Apr.09	16	10	28	27	June 29	26	18	49	44	Oct.31	26	16	37	37	Febr.01	26	11	141	119
Apr.10	33	16	137	122	June 30	31	16	94	83	Nov.01	23	18	31	29	Febr.02	16	14	24	22
Apr.11	29	14	71	67	July01	30	19	60	53	Nov.02	33	25	54	50	Febr.03	11	9	13	13
Apr.12	24	11	62	58	July02	30	24	44	42	Nov.03	24	20	30	29	Febr.04	22	10	47	44
Apr.13	28	15	63	56	July03	27	17	57	55	Nov.04	28	24	34	33	Febr.05	26	13	76	75
Apr.14	19	13	24	24	July04	30	19	61	60	Nov.05	29	21	42	39	Febr.06	30	13	90	82
Apr.15	20	14	28	28	July05	26	17	41	37	Nov.06	35	18	158	124	Febr.07	17	13	26	25
Apr.16	20	14	37	33	July06	30	16	79	61	Nov.07	26	19	42	42	Febr.08	21	14	33	31
Apr.17	19	12	29	27	July07	21	16	31	30	Nov.08	34	20	79	68	Febr.09	26	19	35	35
Apr.18	25	16	58	57	July08	20	15	34	31	Nov.09	35	24	64	59	Febr.10	20	16	28	26
Apr.19	31	17	79	78	July09	19	16	27	26	Nov.10	38	29	73	66	Febr.11	29	15	104	81
Average	**23**	**14**	**50**	**47**		**25**	**16**	**49**	**45**		**28**	**20**	**53**	**48**		**23**	**13**	**57**	**51**

Comment:
The measurement was suspended on April 12, 2012 between 11.00 – 12.00 a.m. due to calibration, and on April 19, 2012 between 15.00 – 16.00 and 16.00 – 17.00 p.m. due to maintenance.
The measurement was suspended on July 2, 2012 between 10.00-12.00 a.m. due to calibration.
The measurement was suspended on November 5, 2012 between 11.00-12.00 a.m. due to calibration.
The measurement was suspended on February 4, 2013 between 10.00-11.00 a.m. due to calibration.

Table 16.2.2-53: 6. LMp on-the-spot measurements/tests – NO_2

The following figures present the NO_2 concentration hourly values:

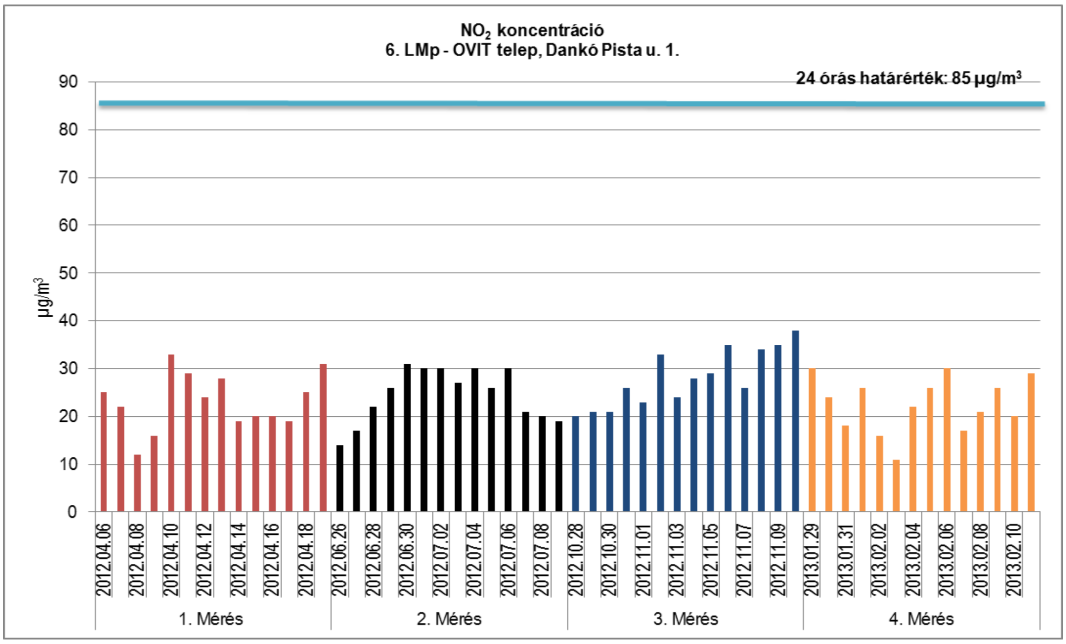


koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-59: 6. LMp - NO_2 hourly run-off curves

NO_2 concentration Based on hourly measurement values (µg/m³)				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 04. 06-04.19.)	23	14	50	47
2. TEST (2012. 06. 26-07.09.)	25	16	49	45
3. TEST (2012. 10. 28-11.10.)	28	20	53	48
4. TEST (2013. 01.29. – 02.11.)	23	13	57	51

Table 16.2.2-54: 6. LMp NO_2 measurements/tests results



koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site , 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-60: 6. LMp - NO_2 daily average concentration

Hourly values measured at 6. LMp were 4 times, and during the 2-week period total 6 times higher than the 100 µg/m³ hourly limit, and during the 1st measuring period twice, the 3rd once and 4th three times.

Diagrams of the measured NO_2 values can well characterise the daily volatility. In the morning between 05.00-10.00 hours significant NO_2 concentration increase could be seen, and values exceeding the limit also emerged during this period. In the evening between 20.00-24.00 hours slight increase was detected in concentration. The cause of repeated increase in air pollution was the traffic.

The limit exceeding values were 3-58% higher than the permitted level.

The highest hourly NO_2 value was measured during the 3rd measuring period, on November 6, 2012 between 08.00-09.00 a.m., its value was 158 µg/m³.

The 24-hour limit was never exceeded.

Bi-weekly average values of the 2-week **NO_2** measurements were: **23 µg/m³**, **25 µg/m³**, **28 µg/m³**, **23 µg/m**.

Based on the run-off curves of the NO_2 measurement results we can state that the volatility does not follow in line with the heating-non-heating seasons, and changes can presumably reflect the impacts of local and target-based traffic.

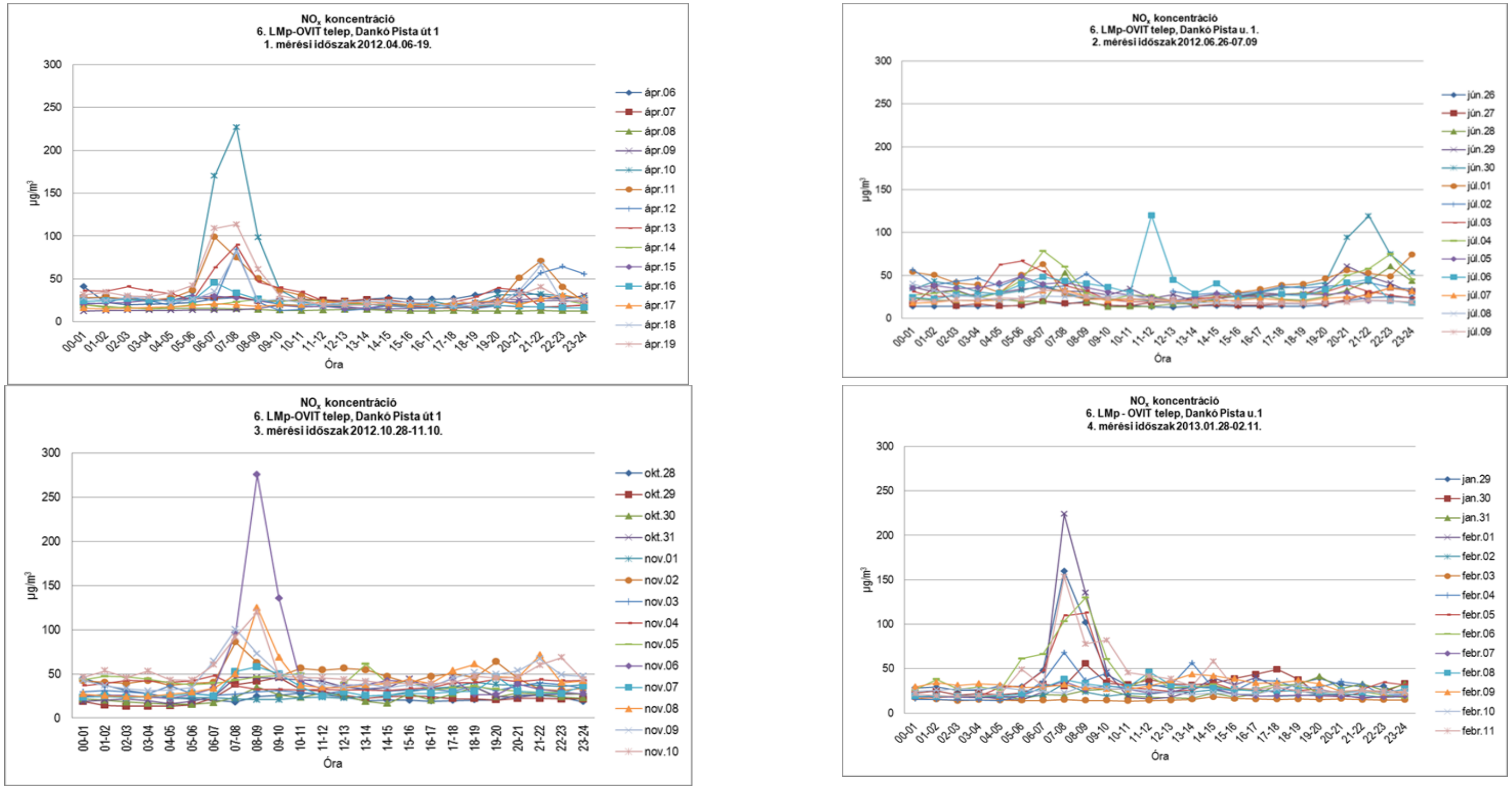
NO_x *immission*

NO_x concentration																			
Based on daily assessment hourly concentration values																			
1. Test					2. Test					3. Test					4. Test				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Apr.06	27,1	20,1	40,8	38,6	June 26	16,1	12,6	25,0	24,5	Oct.28	24,5	18,1	45,2	41,6	Jan.29	38,9	20,3	159,8	133,3
Apr.07	23,6	16,9	30,3	29,3	June 27	19,4	13,9	36,4	36,0	Oct.29	23,9	13,4	46,2	43,9	Jan.30	30,9	18,6	55,7	52,7
Apr.08	14,2	12,3	19,9	19,0	June 28	25,8	13,0	60,3	56,9	Oct.30	23,2	15,4	35,2	35,1	Jan.31	23,3	16,1	41,3	37,4
Apr.09	17,9	12,3	30,7	29,4	June 29	32,0	20,0	60,6	55,3	Oct.31	30,9	16,2	45,9	45,8	Febr.01	36,3	15,0	223,7	183,0
Apr.10	43,0	17,8	227,0	200,8	June 30	39,0	17,8	119,2	107,7	Nov.01	28,1	20,7	40,9	39,6	Febr.02	20,9	17,6	32,6	29,6
Apr.11	34,5	15,7	99,0	88,0	July01	38,7	20,5	74,1	68,9	Nov.02	47,2	31,1	86,0	75,7	Febr.03	15,1	13,5	18,3	17,8
Apr.12	28,1	13,1	84,3	75,5	July02	38,0	27,6	56,3	54,4	Nov.03	31,6	25,9	39,9	38,9	Febr.04	30,0	13,8	68,1	63,0
Apr.13	32,9	17,0	89,4	77,3	July03	31,2	18,6	66,7	64,7	Nov.04	38,0	31,4	47,9	46,2	Febr.05	34,4	17,3	112,8	111,3
Apr.14	21,2	15,1	26,4	25,9	July04	36,0	20,4	78,4	76,7	Nov.05	39,9	26,6	60,9	56,4	Febr.06	39,6	17,1	129,8	117,6
Apr.15	22,3	15,5	30,0	29,5	July05	30,3	18,3	48,6	45,4	Nov.06	49,4	22,1	275,5	211,2	Febr.07	22,3	17,3	35,4	33,4
Apr.16	22,6	16,3	45,6	40,1	July06	35,8	17,7	119,8	86,8	Nov.07	31,6	23,1	58,0	55,5	Febr.08	26,4	18,4	46,1	42,3
Apr.17	20,9	14,7	31,2	29,3	July07	23,4	17,6	35,8	34,4	Nov.08	44,2	24,2	125,1	100,4	Febr.09	31,5	22,8	43,7	42,9
Apr.18	28,9	17,8	81,8	74,7	July08	22,2	16,4	40,0	36,5	Nov.09	47,1	31,0	100,6	87,8	Febr.10	25,1	21,0	32,0	31,7
Apr.19	36,9	19,2	113,6	111,6	July09	21,5	17,4	32,8	31,7	Nov.10	52,0	39,0	119,9	106,9	Febr.11	39,2	19,2	153,4	120,5
Average	**27**	**16**	**68**	**62**		**29**	**18**	**61**	**56**		**36**	**24**	**80**	**70**		**30**	**18**	**82**	**73**

Comment:
The measurement was suspended on April 12, 2012 between 11.00 – 12.00 hours due to calibration, on April 19, 2012 between 15.00 – 16.00 and 16.00 – 17.00 hours due to maintenance.
The measurement was suspended on July 2, 2012 between 10.00-12.00 hours due to calibration.
The measurement was suspended on November 5, 2012 between 11.00-12.00 hours due to calibration.
The measurement was suspended on February 4, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-55: 6. LMp on-the-spot measurements/tests – NO_x.

The following figures present the NO_x concentration hourly values:

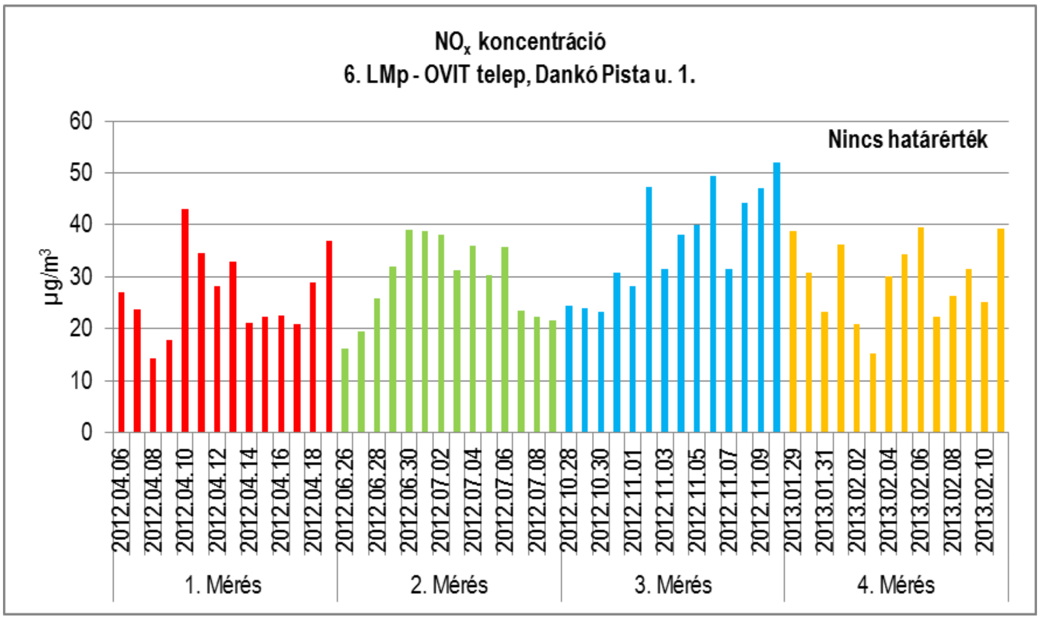


koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-61: 6. LMp - NO_x hourly run-off curves

NO_x concentration Hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. TEST (2012. 04. 06-04.19.)	27	16	68	62
2. TEST (2012. 06. 26-07.09.)	29	18	61	56
3. TEST (2012. 10. 28-11.10.)	36	24	80	70
4. TEST (2013. 01.29. – 02.11.)	30	18	82	73

Table 16.2.2-56: 6. LMp NO_x measurements/tests results



koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site , 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-62: 6. LMp - NO_x daily average concentration

Decree 4/2011. (I. 14.) VM defines no immission limit for NO_x.

Compared to the hourly NO_x limit defined by the former decree (200 µg/m³), the measured values higher than the hourly limit were once-once during the 1st, the 3rd and the 4th measuring period. The values were 12-38 % higher than the limit.

The former decree defined 150 µg/m³, as the 24-hour limit, and this was never exceeded during the measurement periods.

The hourly run-off curves can well characterise the daily volatility. NO_x concentration increased during the morning between 05.00-11.00 hours, and in the evening from 20.00 hours. The hourly and daily NO_x values showed similar run-off curves as NO.

The highest measured hourly NO_x concentration value was 276 µg/m³, it was during the 3rd measuring period, on November 6, 2012 between 08.00-09.00 a.m.

The average values of the **NO_x** measurements were: **26,7 µg/m³**, **29,2 µg/m³**, **36,5 µg/m³, 29,6 µg/m³**.

Based on the NO_x measurement results we can state that the volatility reflects the impacts of the local, target-based morning traffic.

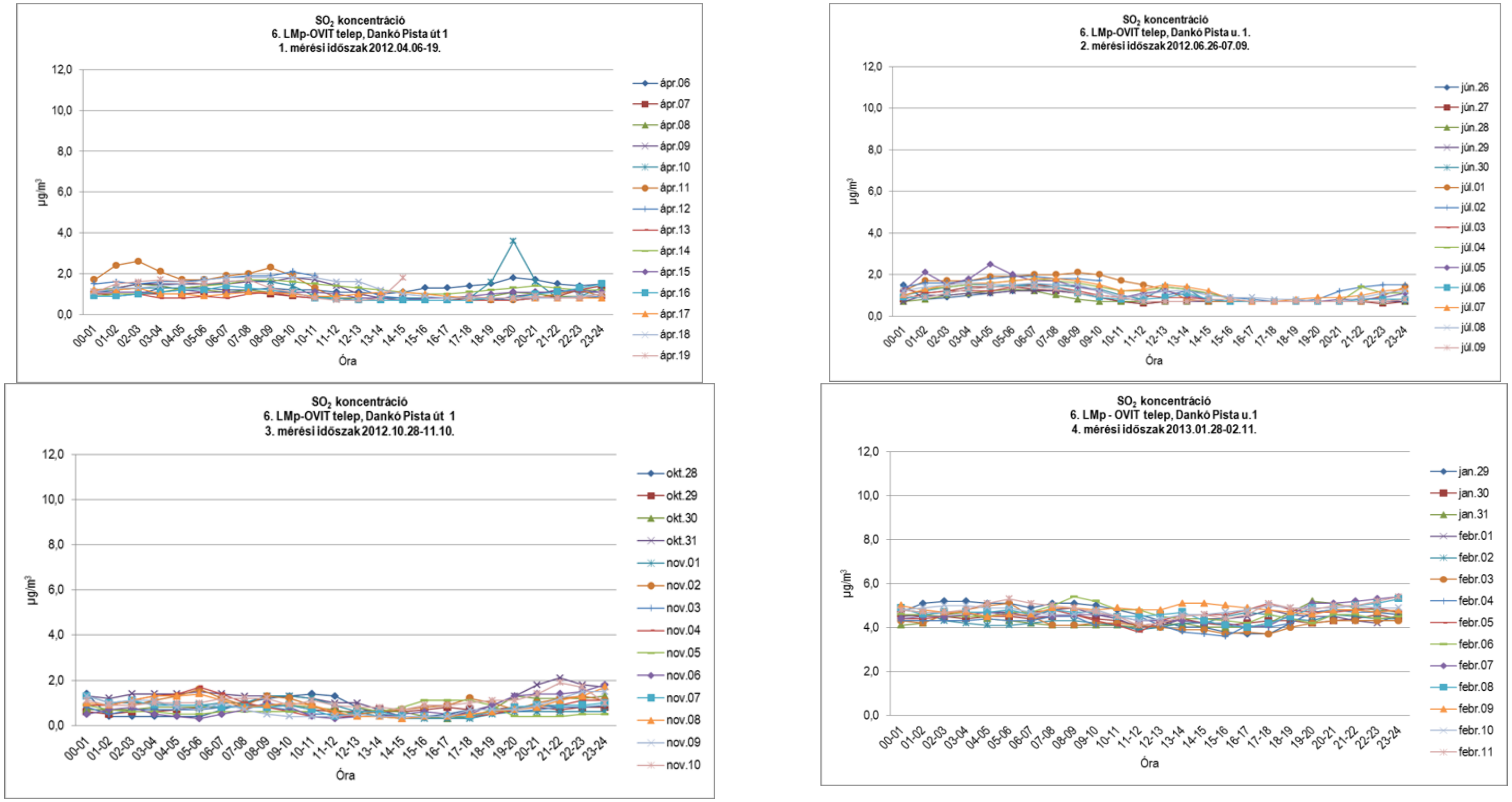
SO_2 immission

SO_2 concentration																			
Based on daily assessment hourly concentration values																			
1. TEST					2. TEST					3. TEST					4. TEST				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Aver-age	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Apr.06	1,3	0,9	1,8	1,8	June 26	0,9	0,6	1,5	1,4	Oct.28	0,8	0,4	1,4	1,4	Jan.29	4,6	3,7	5,2	5,2
Apr.07	0,9	0,7	1,4	1,3	June 27	0,9	0,6	1,4	1,4	Oct.29	0,7	0,5	0,9	0,9	Jan.30	4,4	4,1	4,6	4,6
Apr.08	1,0	0,7	1,5	1,5	June 28	0,8	0,7	1,3	1,3	Oct.30	0,8	0,3	1,3	1,3	Jan.31	4,4	4,0	5,2	5,2
Apr.09	1,2	0,7	1,8	1,8	June 29	0,9	0,7	1,2	1,2	Oct.31	1,2	0,4	2,1	2,0	Febr.01	4,5	4,0	4,9	4,9
Apr.10	1,3	0,7	3,6	2,7	June 30	1,1	0,7	1,5	1,5	Nov.01	0,8	0,3	1,3	1,3	Febr.02	4,3	3,9	4,8	4,8
Apr.11	1,3	0,7	2,6	2,5	July01	1,3	0,7	2,1	2,1	Nov.02	1,0	0,5	1,6	1,5	Febr.03	4,2	3,7	5,1	5,1
Apr.12	1,3	0,7	2,1	2,0	July02	1,4	0,7	1,9	1,9	Nov.03	0,6	0,4	0,9	0,9	Febr.04	4,3	3,6	4,8	4,8
Apr.13	0,8	0,7	1,1	1,1	July03	1,0	0,7	1,5	1,5	Nov.04	0,8	0,4	1,7	1,6	Febr.05	4,6	3,8	5,1	5,0
Apr.14	1,3	0,9	1,7	1,7	July04	1,2	0,7	1,8	1,8	Nov.05	0,7	0,4	1,1	1,1	Febr.06	4,6	4,2	5,4	5,3
Apr.15	1,0	0,7	1,2	1,2	July05	1,2	0,7	2,5	2,3	Nov.06	0,8	0,3	1,8	1,7	Febr.07	4,6	4,0	5,4	5,4
Apr.16	1,0	0,7	1,5	1,5	July06	1,0	0,7	1,5	1,5	Nov.07	0,8	0,4	1,3	1,2	Febr.08	4,7	4,0	5,3	5,2
Apr.17	1,0	0,8	1,3	1,3	July07	1,3	0,7	1,8	1,8	Nov.08	0,9	0,3	1,7	1,6	Febr.09	4,8	4,5	5,1	5,1
Apr.18	1,3	0,8	1,8	1,8	July08	1,2	0,7	1,6	1,6	Nov.09	0,8	0,4	1,5	1,5	Febr.10	4,8	4,3	5,0	5,0
Apr.19	1,2	0,7	1,8	1,8	July09	0,9	0,7	1,4	1,4	Nov.10	1,1	0,7	1,9	1,8	Febr.11	4,8	4,1	5,4	5,4
Average	**1**	**1**	**2**	**2**		**1**	**1**	**2**	**2**		**1**	**0**	**1**	**1**		**5**	**4**	**5**	**5**

Comment:
The measurement was suspended on April 12, 2012 between 11.00 – 12.00 hours due to calibration, and on April 19, 2012 between 15.00 – 16.00 and 16.00 – 17.00 hours due to maintenance.
The measurement was suspended on July 2, 2012 between 10.00-12.00 hours due to calibration.
The measurement was suspended on November 5, 2012 between 11.00-12.00 hours due to calibration.
The measurement was suspended on February 4, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-57: 6. LMp on-the-spot measurements/tests – SO_2

The following figures present the SO_2 concentration hourly tests:

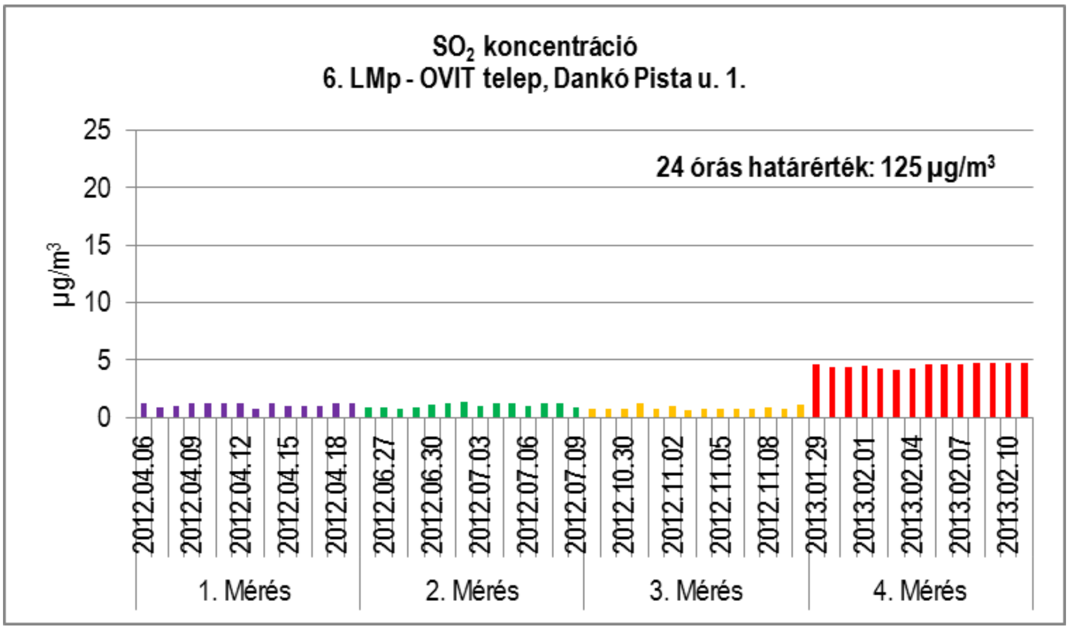


koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-63: 6. LMp - SO_2 hourly run-off curves

SO_2 concentration Based on hourly measurement values **(μg/m^3)**				
	Average	**Min**	**Max**	**98% percentile**
1. **TEST** (2012. 04. 06-04.19.)	1	1	2	2
2. **TEST** (2012. 06. 26-07.09.)	1	1	2	2
3. **TEST** (2012. 10. 28-11.10.)	1	0	1	1
4. **TEST** (2013. 01.29. – 02.11.)	5	4	5	5

Table 16.2.2-58: 6. LMp SO_2 measurements/tests results



koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site , 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-64: 6. LMp – SO_2 daily average concentration

The measured hourly SO_2 immission values were well below the 250 μg/m^3 hourly limit.

The highest hourly value was measured during the 4th measurement period on February 6 between 08.00-09.00 a.m., its value was 5,4 μg/m^3, 2% of the hourly limit.

The 24-hour average concentration values did not exceed even 10% of the 125 μg/m^3 daily limit.

Average values of the **SO_2** measurements were: **1 μg/m^3**, **1 μg/m^3**, **1 μg/m^3, 5 μg/m^3**.

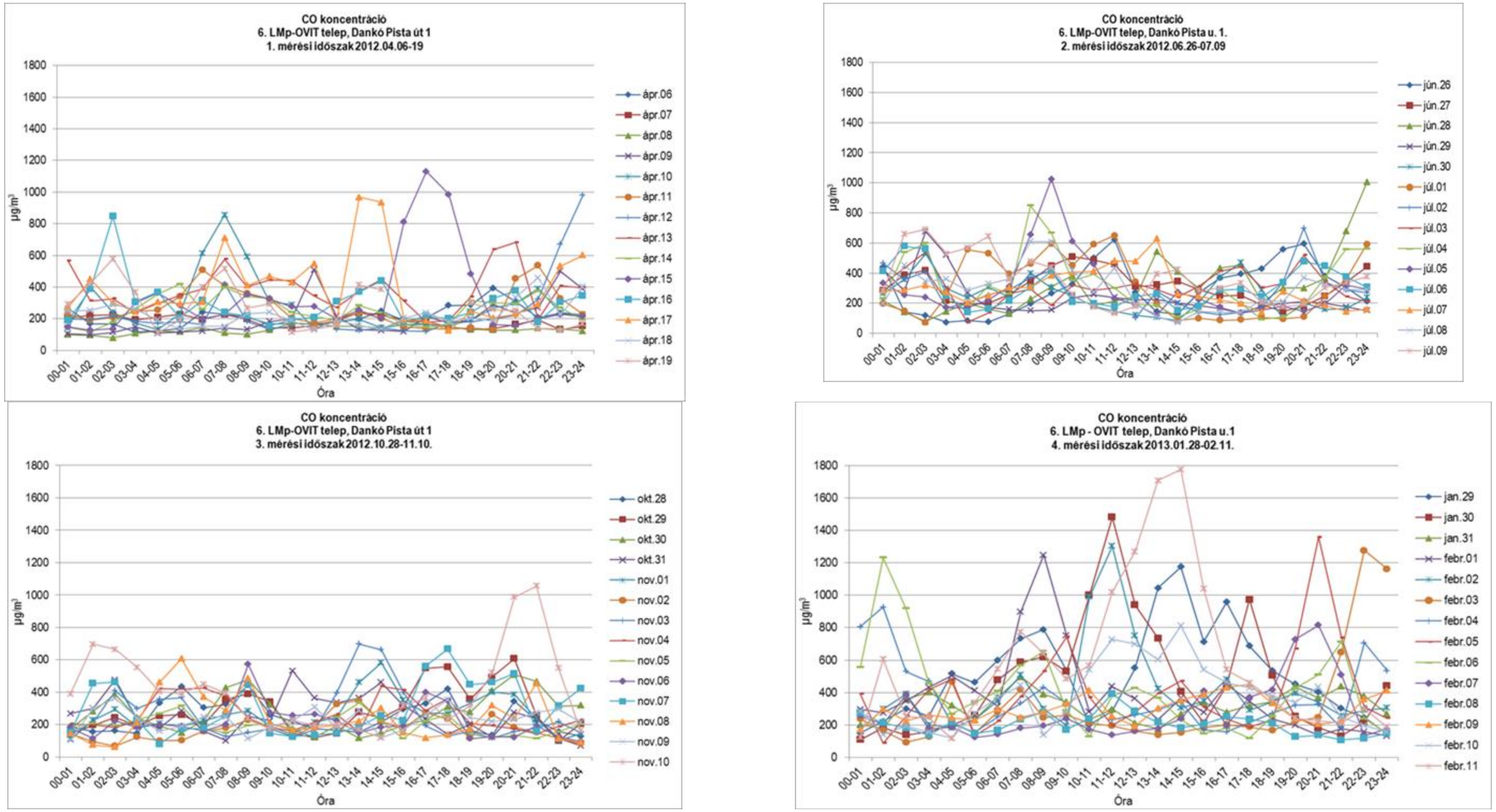
CO immission

CO concentration																			
Based on daily assessment hourly concentration values *																			
1. TEST					**2. TEST.**					**3. TEST**					**4. TEST**				
Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile	Measuring period	Average	Min	Max	98% percentile
	μg/m³					μg/m³					μg/m³					μg/m³			
Apr.06	212,8	117,0	393,0	354,4	June 26	293,3	73,0	622,0	609,1	Oct.28	246,0	130,0	445,0	440,4	Jan.29	510,8	145,0	1174,0	1114,7
Apr.07	183,9	131,0	238,0	233,4	June 27	313,5	146,0	509,0	498,4	Oct.29	289,5	100,0	607,0	584,0	Jan.30	465,9	110,0	1481,0	1260,2
Apr.08	132,5	79,0	186,0	180,9	June 28	317,9	78,0	1003,0	853,5	Oct.30	277,9	118,0	508,0	494,2	Jan.31	318,6	176,0	496,0	469,3
Apr.09	201,5	97,0	509,0	504,9	June 29	241,3	135,0	676,0	603,8	Oct.31	260,5	71,0	532,0	507,2	Febr.01	386,3	133,0	1248,0	1087,5
Apr.10	281,0	132,0	856,0	744,2	June 30	250,8	84,0	530,0	501,9	Nov.01	263,2	101,0	583,0	527,3	Febr.02	402,3	173,0	1303,0	1158,6
Apr.11	264,0	132,0	537,0	524,6	July01	304,3	71,0	649,0	624,6	Nov.02	175,3	68,0	349,0	338,9	Febr.03	317,0	94,0	1277,0	1224,6
Apr.12	243,1	119,0	981,0	844,6	July02	284,6	104,0	698,0	600,1	Nov.03	257,9	118,0	698,0	682,4	Febr.04	367,8	154,0	927,0	873,8
Apr.13	379,9	177,0	683,0	662,3	July03	309,9	73,0	541,0	530,4	Nov.04	263,2	145,0	437,0	431,9	Febr.05	401,4	88,0	1359,0	1076,1
Apr.14	258,0	121,0	419,0	408,9	July04	327,7	93,0	849,0	764,8	Nov.05	198,7	113,0	336,0	326,8	Febr.06	415,1	119,0	1231,0	1087,5
Apr.15	335,3	129,0	1130,0	1063,8	July05	295,9	121,0	1024,0	854,3	Nov.06	212,6	97,0	572,0	492,9	Febr.07	280,4	124,0	815,0	774,5
Apr.16	297,5	156,0	847,0	660,2	July06	301,4	140,0	579,0	570,7	Nov.07	300,9	81,0	666,0	617,7	Febr.08	203,3	107,0	392,0	342,3
Apr.17	393,1	124,0	968,0	952,8	July07	294,5	142,0	629,0	560,5	Nov.08	241,3	62,0	608,0	552,8	Febr.09	297,6	169,0	451,0	441,8
Apr.18	224,6	129,0	459,0	432,8	July08	299,0	72,0	610,0	609,1	Nov.09	231,0	105,0	362,0	357,9	Febr.10	373,6	119,0	812,0	772,9
Apr.19	280,1	111,0	577,0	552,6	July09	363,0	132,0	691,0	675,8	Nov.10	407,5	121,0	1056,0	1024,3	Febr.11	584,3	116,0	1776,0	1744,7
Average	**263**	**125**	**627**	**580**		**300**	**105**	**686**	**633**		**259**	**102**	**554**	**527**		**380**	**130**	**1053**	**959**

Comment:
* Maximum of daily 8-hour moving average concentrations. The maximum value shall be selected among the 8-hour moving average values calculated on the basis of the hourly averages. . The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.
The measurement was suspended on April 12, 2012 between 11.00 – 12.00 hours due to calibration, on April 19, 2012 between 15.00 – 16.00 and 16.00 – 17.00 hours due to maintenance.
The measurement was suspended on July 2, 2012 between 10.00-12.00 due to calibration.
The measurement was suspended on November 5, 2012 between 11.00-12.00 hours due to calibration.
The measurement was suspended on February 4, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-59: 6. LMp on-the-spot measurements/tests – CO

The following figures present the CO concentration hourly test results:

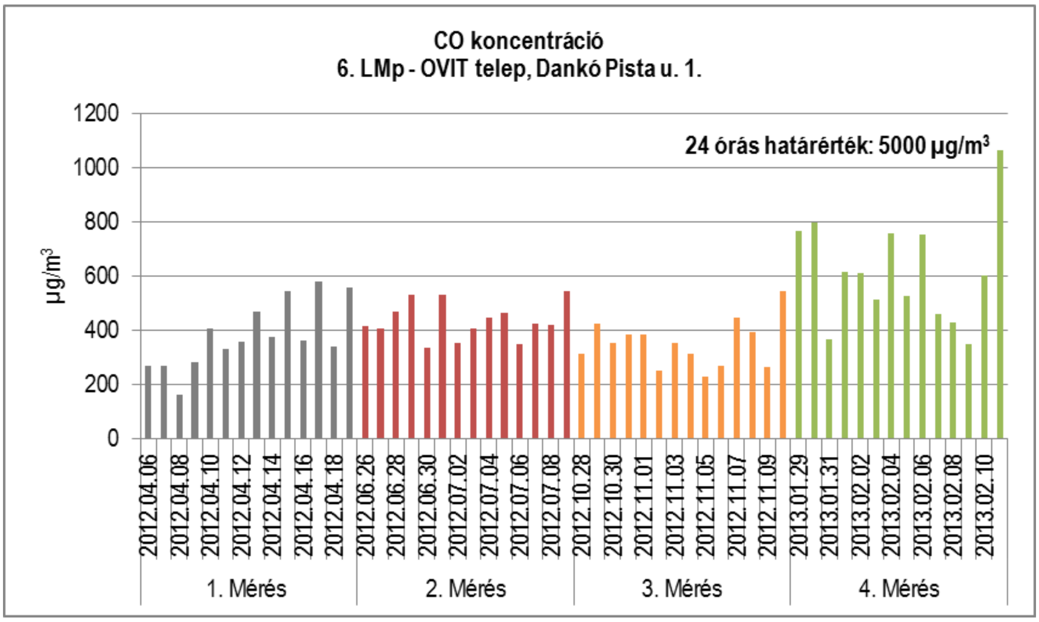


koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, óra - hour, határérték - limit

Figure 16.2.2-65: 6. LMp - CO hourly run-off curves

CO concentration Based on hourly measurement values **(µg/m³)**				
	Average	**Min**	**Max**	**98% percentile**
1. Test (2012. 04. 06-04.19.)	378	160	581	575
2. Test (2012. 06. 26-07.09.)	434	334	545	542
3. Test (2012. 10. 28-11.10.)	351	227	543	517
4. Test (2013. 01.28. – 02.11.)	614	348	1068	994

Table 16.2.2-60: 6. LMp CO measurements/tests results



koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site , 24 órás határérték - 24-hour limit, mérés - measurement/test

Figure 16.2.2-66: 6. LMp – CO daily average concentration

The measured hourly CO immission values were always well below the 10 000 µg/m³ hourly limit.

The highest concentration was measured during the 4th measurement period on February 11, between 14.00-15.00 hours, its value was 1776 µg/m³, 18% of the relevant limit.

The maximum of the 8-hour moving average values was lower than 22% of the 24-hour limit (5 000 µg/m³).

Bi-weekly average values of the **CO** measurements were: **263,4 µg/m³**, **299,8 µg/m³**, **259 µg/m³**, **380,0 µg/m³**.

PM_{10}, TSPM 24-hour concentration

Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM	Measuring period	PM_{10}	TSPM
	µg/m³			µg/m³			µg/m³			µg/m³	
Apr.06	36	44	June 26	12	17	Oct.28	10	11	Dec.29	44	45
Apr.07	26	30	June 27	14	24	Oct.29	14	17	Dec.30	19	21
Apr.08	23	48	June 28	21	42	Oct.30	20	24	Dec.31	13	17
Apr.09	24	28	June 29	25	46	Oct.31	30	32	Jan.01	22	32
Apr.10	37	54	June 30	34	50	Nov.01	18	19	Jan.02	16	16
Apr.11	38	61	July01	41	63	Nov.02	17	18	Jan.03	9	14
Apr.12	24	34	July02	45	76	Nov.03	15	17	Jan.04	26	30
Apr.13	27	46	July03	38	69	Nov.04	22	24	Jan.05	28	31
Apr.14	26	28	July04	57	68	Nov.05	13	18	Jan.06	26	26
Apr.15	26	28	July05	40	59	Nov.06	11	18	Jan.07	15	17
Apr.16	19	29	July06	40	53	Nov.07	15	21	Jan.08	27	29
Apr.17	23	33	July07	33	42	Nov.08	16	22	Jan.09	40	40
Apr.18	23	37	July08	23	35	Nov.09	21	25	Jan.10	34	34
Apr.19	28	44	July09	20	35	Nov.10	43	45	Jan.11	41	43
min	**19**	**28**		**12**	**17**		**10**	**11**		**9**	**14**
max	**38**	**61**		**57**	**76**		**43**	**45**		**44**	**45**
Average	**27**	**39**		**32**	**49**		**19**	**22**		**26**	**28**

Table 16.2.2-61: 6. LMp on-the-spot measurements/tests – PM_{10}, TSPM

The analysed 24-hour average and maximum **PM_{10}** values were not higher than the 24-hour limit on any day during the 1st, the 3rd and the 4th measuring period.

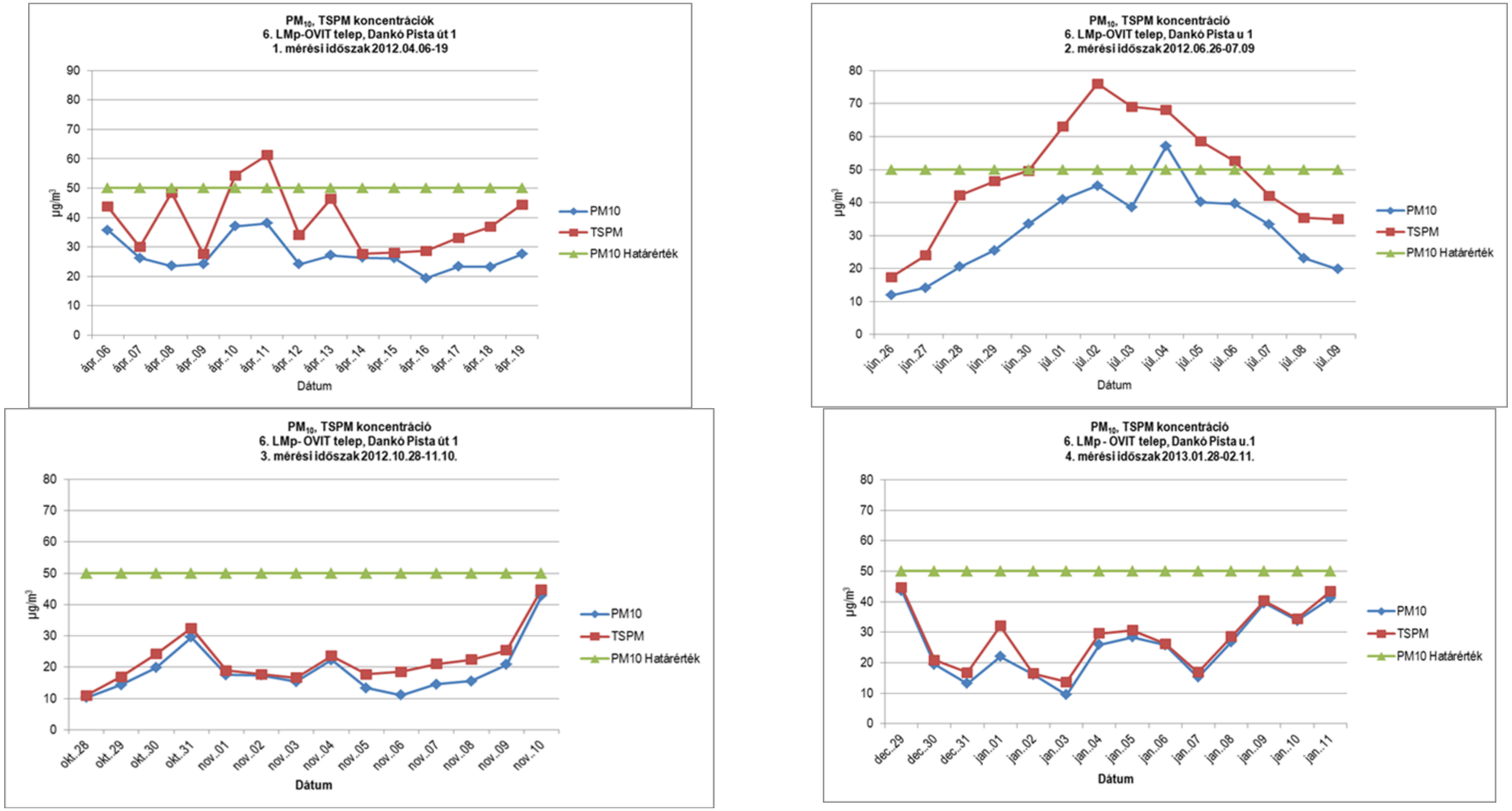
The analysed 24-hour average PM_{10} value was lower than the 24-hour limit on July 4 during the 2nd measuring period, and the measured 24-hour value was 57 µg/m³.

Decree 4/2011. (I. 14.) VM defines no limit for the **TSPM.**

The formerly valid Decree 14/2001.(V.9.) KöM-EüM-FVM defined 100 µg/m³ as the 24-hour limit.

The measurement results did not exceed the previous 24-hour limit.

The following figures present the PM_{10} and TSPM daily concentration values:



koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-67: 6. LMp - PM_{10} and a TSPM daily run-off curves

Settling dust

Settling dust concentration		
First days	**Last days**	**g/m²x30nap**
2012.01.23	2012.02.23	0,6
2012.02.23	2012.03.28	1,8
2012.03.28	2012.04.26	4,2
2012.04.26	2012.05.22	7,7
2012.05.22	2012.06.25	3,8
2012.06.25	2012.07.31	4,3
2012.07.31	2012.08.30	1,9
2012.09.11	2012.10.12	2,3
2012.10.12	2012.11.12	0,9
2012.11.12	2012.12.12	1,2
2012.12.12	2013.01.11	0,8
2013.01.11	2013.02.12	1,6
2013.02.25	2013.03.29	0,5

Table 16.2.2-62: 6. LMp on-the-spot measurements/tests – settling dust

Decree 4/2011. (I. 14.) VM defines no limit for the **settling dust**. The former decree defined 16 g/m² x 30-day limit. The measured settling dust concentration values never exceeded the former limit, the highest measured value was 48 % of the limit.

O_3 immission

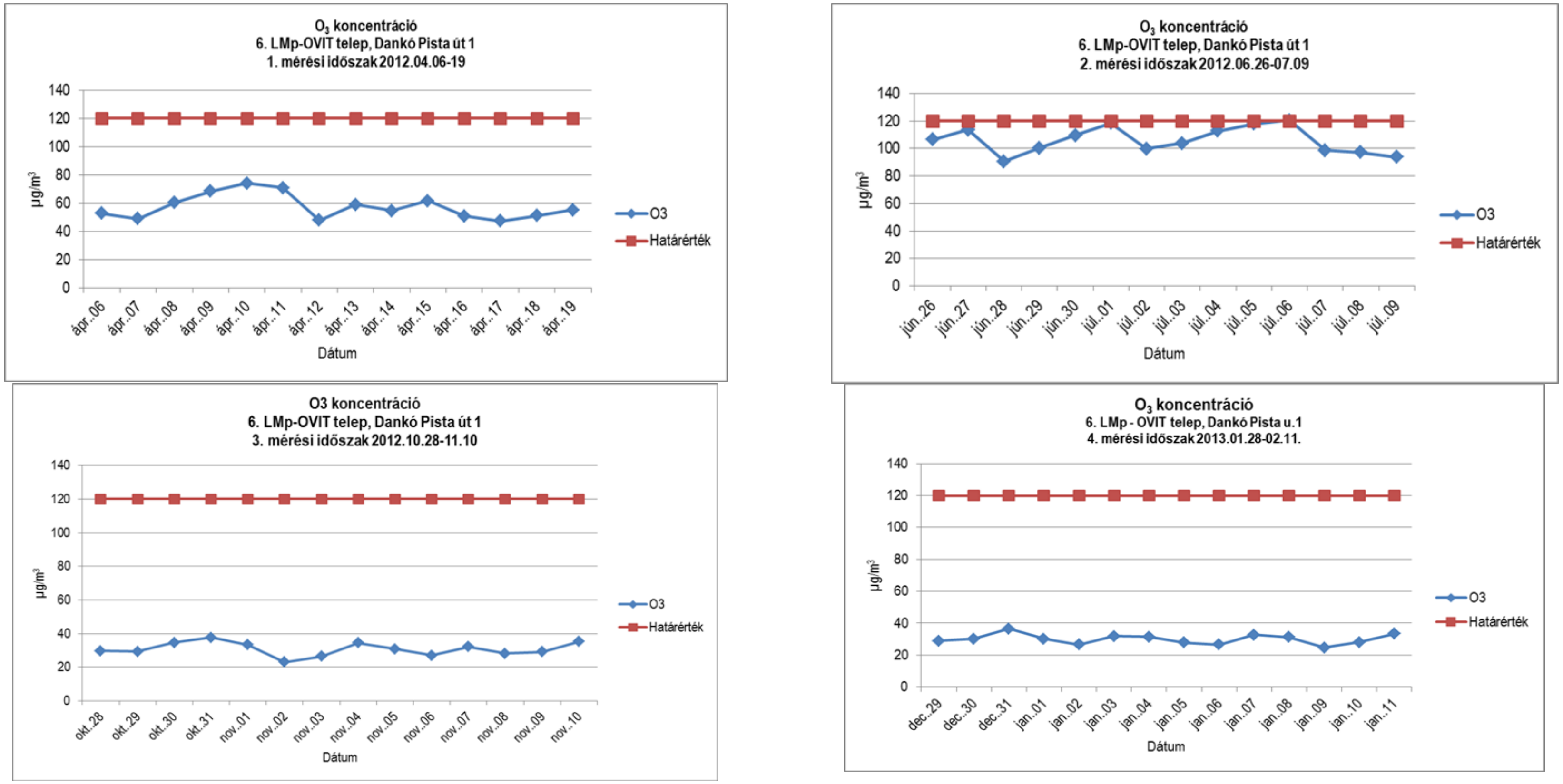
Measuring period	O_3 µg/m³	Measuring period	O_3 µg/m³	Measuring period	O_3 µg/m³	Measuring period	O_3 µg/m³
Apr.06	53	June 26	106	Oct.28	30	Dec.29	29
Apr.07	49	June 27	114	Oct.29	29	Dec.30	30
Apr.08	60	June 28	91	Oct.30	35	Dec.31	37
Apr.09	68	June 29	100	Oct.31	38	Jan.01	30
Apr.10	74	June 30	110	Nov.01	33	Jan.02	27
Apr.11	71	July01	118	Nov.02	23	Jan.03	32
Apr.12	48	July02	100	Nov.03	26	Jan.04	31
Apr.13	59	July03	104	Nov.04	35	Jan.05	28
Apr.14	55	July04	113	Nov.05	31	Jan.06	27
Apr.15	62	July05	118	Nov.06	27	Jan.07	33
Apr.16	51	July06	121	Nov.07	32	Jan.08	31
Apr.17	47	July07	99	Nov.08	28	Jan.09	25
Apr.18	51	July08	97	Nov.09	29	Jan.10	28
Apr.19	55	July09	94	Nov.10	35	Jan.11	33
min	**47**		**91**		**23**		**25**
max	**74**		**121**		**38**		**37**
Average	**57**		**106**		**31**		**30**

* Maximum of daily 8-hour moving average concentration values. The maximum value shall be selected among the 8-hour moving average values generated on the basis of hourly averages. The 8-hour average values that were so calculated shall refer to those days , on which the 8-hour period ends, thus the first test period of any day will last from 17 hours of the previous day until 01 hour of the given day. The last test on any day will last from 16 to 24 hours within the given day.

The measurement was suspended on April 12, 2012 between 11.00 – 12.00 hours due to calibration, on April 19, 2012 between 15.00 – 16.00 and 16.00 – 17.00 hours due to maintenance, on July 2 2012 between 10.00-12.00 hours, on November 5, 2012 between 11.00-12.00 hours, on February 4, 2013 between 10.00-11.00 hours due to calibration.

Table 16.2.2-63: 6. LMp on-the-spot measurements/tests – O_3

The following figures present the O_3 daily concentration values:



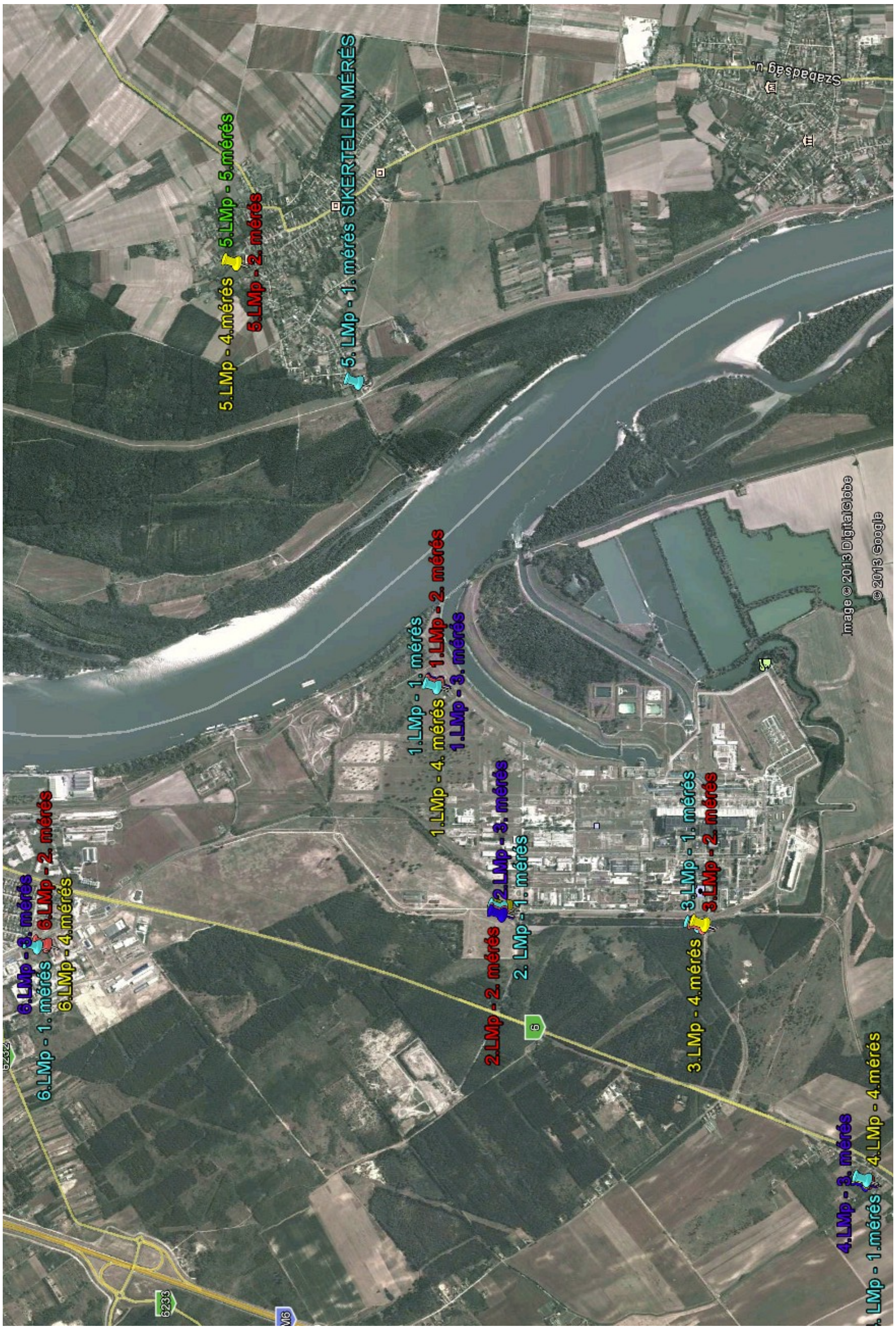
koncentráció - concentration, OVIT telep, Dankó Pista út 1. - Paks, Dankó Pista street 1. OVIT site, mérési időszak - measurement period, dátum - date, határérték - limit

Figure 16.2.2-68: O_3 daily run-off curves

The daily maximum 8-hour moving average O_3 concentration values did not reach the limit either during the 1st, the 3rd or the 4th measuring periods. The maximum value of the O_3 daily 8-hour moving average concentration during the 2nd measuring period (on July 6) was higher than the limit, the value was 121 μg/m^3, less than 1 % of the limit.

16.2.2.6 Aggregated assessment of on-the-spot measurement results in 2012/2013

Measurement sites



mérés - measurement/test

Figure 16.2.2-69: location of air pollution measuring points during various measuring periods

Measurement points parameters

The following table presents the GPS coordinates for the measuring points (1-6 LMp), and the dates of nitrogen dioxide (NO_2), nitrogen oxides (NO_X), sulphur-dioxide (SO_2), carbon monoxide (CO) and ozone (O_3), particulate matter (PM_{10}), total particulate matter (TSPM) measurements/tests for the relevant measuring periods.

	1. measuring period			
	Coordinate		**Height***	**Measurement date**
1. LMp	N46°35'11,22"	E18°51'42,66"	92,29 m	2012.01.24.-02.06.
2. LMp	N46°34'59,16"	E18°50'47,51"	99,68 m	2012.02.24.-03.08.
3. LMp	N46°34'25,32"	E18°50'43,8"	99,92 m	2012.02.09.-02.22.
4. LMp	N46°33'55,66"	E18°49'40,84"	94,17 m	2012.03.14.-03.27.
5. LMp	N46°35'25,15" **Unsuccessful!*** **	E18°52'58,15" **Unsuccessful!*** **	94,98 m **Unsuccessful!*** **	2012. 03. 29-03.30. 03. 29-04.04. **Unsuccessful!*** **
6. LMp	N46°35'11,22"	E18°51'42,66"	101,02 m	2012.04.06.-04.19.
	2. measuring period			
1. LMp	N46°35'10,72"	E18°51'43,16"	105,47 m	2012.04.21.-05.04.
2. LMp	N46°34'59,12"	E18°50'46,36"	102,95 m	2012.05.23.-06.07.
3. LMp	N46°34'24,56"	E18°50'43,51"	105,3 m	2012.05.08.-05.21.
4. LMp	N46°33'55,33"	E18°49'40,37"	100,25 m	2012.06.09.-06.22.
5. LMp	N46°35'46,46"	E18°53'27,67"	96,76 m	2012.07.17.-07.31.
6. LMp	N46°36'17,68"	E18°50'36,82"	109,29 m	2012.06.26.-07.09.
	3. measuring period			
1. LMp	N46°35'10,59"	E18°51'43,48"	105,47 m	2012.08.01.-08.14.
2. LMp	N46°34'59,2"	E18°50'45,85"	102,95 m	2012.09.13-09.26.
3. LMp	N46°34'24,61"	E18°50'43,8"	105,3 m	2012.08.16.-08.29.
4. LMp	N46°33'55,44"	**E18°49'49,24"	100,25 m	2012.09.28.-10.11.
5. LMp	N46°35'46,46"	E18°53'27,67"	97,79 m	2012.10.13.-10.25.****
6. LMp	N46°36'17,68"	E18°50'36,82"	109,29 m	2012.10.28.-11.10.
	4. measuring period			
1. LMp	N46°35'10,59"	E18°51'43,05"	92,84 m	2012.11.13.-11.26.
2. LMp	N46°34'58,33"	E18°50'47,87"	94,80 m	2012.12.13.-12.26.
3. LMp	N46°34'24,24"	E18°50'44,09"	105,52 m	2012.11.28.-12.11.
4. LMp	N46°33'55,656"	E18°49'40,62"	102,87 m	2013.01.12.-01.25.*****
5. LMp	N46°35'46,46"	E18°53'27,67"	97,79 m	2012.12.28.-2013.01.10.
6. LMp	N46°36'17,68"	E18°50'36,82"	109,29 m	2013.01.29.-02.11.
	5. measuring period			
5. LMp	N46°35'46,46"	E18°53'27,67"	97,79 m	2013.03.15.-03.28.

Comments:
* Height above sea level
** The measuring point was relocated at Csámpa – at the request of landowner who provided power supply – with 20 m.
*** The tests were cancelled due to 170 V - 220 V voltage volatility. Tests were later held during the 5th measuring period.
***** Tests at Dunaszentbenedek – OVIT, and *****Csámpa - Dunaszentbenedek were inter-changed to ensure more even distribution of tests at at Dunaszentbenedek.*

Table 16.2.2-64: GPS coordinates of the measurement points

In Dunaszerdahely at the 5. LMp site at Dam keeper house after measurements started on March 29 significant voltage volatility (170V-220V) emerged, and it prevented the measurements/tests. The measuring instruments need minimum 200V voltage for their acceptable operation. (Dunakert street 2.). We encountered with similar voltage volatility a couple of streets further. As the problem could not be resolved within a few days, we continued the measurements/tests at Paks. We could find an acceptable site for the next measuring period, thus subsequent measurements were performed on such sites. The tests suspended in the 1st period were performed in 2013 first quarter.

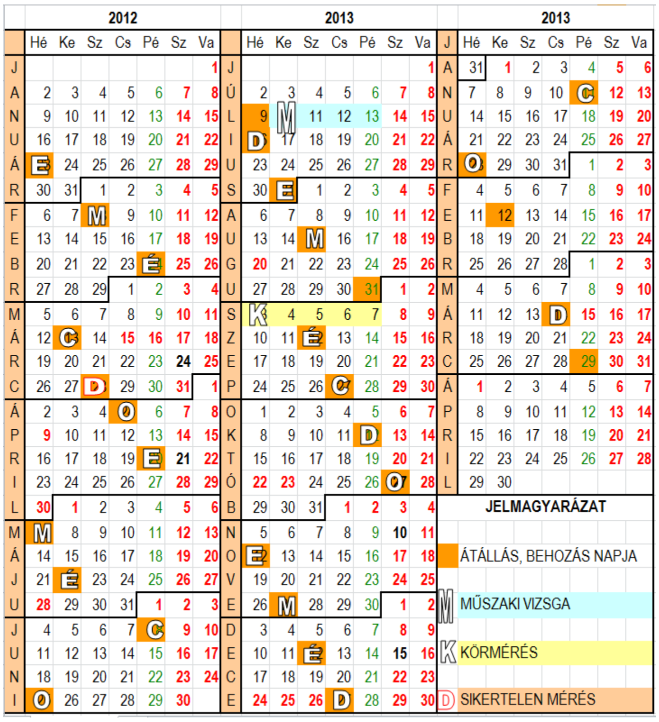
Periods of settling dust tests in all measuring points:

Test first days	Test last days
2012.01.23.	2012.02.23.
2012.02.23.	2012.03.28.
2012.03.28.	2012.04.26.
2012.04.26.	2012.05.22.
2012.05.22.	2012.06.25.
2012.06.25.	2012.07.31.
2012.07.31.	2012.08.30.
2012.09.11.	2012.10.12.
2012.10.12.	2012.11.12.
2012.11.12.	2012.12.12.
2012.12.12.	2013.01.11.
2013.01.11.	2013.02.12.
2013.02.25*	2013.03.29

Comment:
*test starting date: 2013.02.25 (parallel with the tests at Dunaszentbenedek)

Table 16.2.2-65: Dates of the performed settling dust measurements/tests

Time schedule of the performed on-the-spot measurements/tests:



Legend:

E – Plan
M – Meteorological station
É – Northern gate
C – Csámpa
D – Dunaszentbenedek
O – OVIT site
átállás, behozás napja – date of change-over
Műszaki vizsga - Technical inspection
Körmérés - Circular measurement
Sikertelen mérés - Unsuccessful measurement

Table 16.2.2-66: Time schedule of the performed on-the-spot measurements/tests

16.2.2.6.1 NO_2 summary of measurement results

2-week average concentrations (µg/m³) Limit: Hourly 100 µg/m³, 24-hour 85 µg/m³						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	18	31	18	33	-	25
Value exceeding the limit	0 pcs					
2. LMp – Next to the northern access road	27	13	35	25		25
Value exceeding the limit	8 pcs	0 pcs	8 pcs	5 pcs		
3. LMp - Meteorological Station	32	16	27	23		25
Value exceeding the limit	2 pcs	0 pcs	2 pcs	2 pcs		
4. LMp - Csámpa, Kis street	19	15	30	26		23
Value exceeding the limit	0 pcs					
5. LMp - (Dunaszentbenedek, Dam keeper house) Dunaszentbenedek, Rózsa street	-	17	30	17	16	20
Value exceeding the limit		0 pcs				
6. LMp - OVIT telep, Dankó Pista u. 1.	23	25	28	23	-	25
Value exceeding the limit	2 pcs	0 pcs	1 pcs	3 pcs		
Baseline NO_2 pollution of the area						24

Table 16.2.2-67: NO_2 immission measurement results

Based on test results and the environment of measuring points we can state that the hourly NO_2 values exceeding the limit and higher concentration values measured at 2.LMp, 3.LMp and 6.LMp points are due to traffic. The highest measured hourly NO_2 values dominantly occurred in the morning hours with values between 72 µg/m³ and 231 µg/m³. NO_2 measurement results at 1.LMp, 4.LMp and 5.LMp present the immission values characteristic for the given area. NO_2 measurement results during the non-heating season were lower than during the heating season, as volatility in values were in line with the heating-non-heating seasons. The 24-hour limit was never exceeded during any measurement period.

The baseline NO_2 pollution of the area is *24* µg/m*³.*

16.2.2.6.2 NO_x summary of measurement results

2-week average concentrations (µg/m³) Limit: -						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	23	36	20	47	-	32
2. LMp – Next to the northern access road	33	16	48	21		30
3. LMp - Meteorological Station	37	20	33	32		31
4. LMp - Csámpa, Kis street	21	18	40	32		28
5. LMp - (Dunaszentbenedek, Dam keeper house) Dunaszentbenedek, Rózsa street	-	21	41	23	21	27
6. LMp - OVIT telep, Dankó Pista u. 1.	27	29	36	30	-	31
Baseline NO_x pollution of the area						30

Table 16.2.2-68: NO_x immission measurement results

Decree 4/2011. (I. 14.) VM on air load limits and emission limits for stationary air polluting point sources defines no immission limit for NO_x. The former (annulled) Decree 14/2001.(V.9.) KöM-EüM-FVM defined for NO_x 200 µg/m³ hourly, 150 µg/m³ 24-hour and 70 µg/m³ annual limits. based on the above we may state that the measured NO_x values were not higher than the hourly or the 24-hour limits either. Measurement results of 4.LMp, 1.LMp and 5.LMp measuring points were in line with the volatility of heating-non-heating cycles, where the NO_x measurement results during the non-heating season were – similarly to the NO_2 measurement results – lower than during the heating season. In case of 2.LMp, 3.LMp and 6.LMp the NO_x measurement results can also reflect the impacts of traffic. The

NO_x hourly and daily values show an almost identical run-off profile as in case of NO_2, and they can well characterise the daily volatility. Similarly to NO_2 , NO_x concentration values were higher in the morning between 04.00-09.00 hours and in the evening between 17.00-24.00 hours. The highest measured hourly NO_x values dominantly occurred during the morning hours and the relevant values were between 128 μg/m^3 and 401 μg/m^3. There was no value exceeding the 24-hour limit, and the daily average values were not higher than 32% of the 24-hour limit.

The baseline NO_x pollution of the area is *30* μg/m^3.

16.2.2.6.3 SO_2 summary of measurement results

2-week average concentrations (μg/m^3) Limit: Hourly 250 μg/m3, 24-hour 125 μg/m3						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	3	1	1	1	-	1,5
2. LMp – Next to the northern access road	1	1	1	5		2
3. LMp - Meteorological Station	1	1	1	2		1,3
4. LMp - Csámpa, Kis street	1	1	1	4		1,8
5. LMp - (Dunaszentbenedek, Dam keeper house) Dunaszentbenedek, Rózsa street	-	1	1	4	4	2,5
6. LMp - OVIT telep, Dankó Pista u. 1.	1	1	1	5	-	2
The baseline SO_2 pollution of the area						2

Table 16.2.2-69: SO_2 immission measurement results

The measured hourly SO_2 immission values were well below the 250 μg/m3 hourly limit. The highest hourly values represented only 4% of the hourly limit. 24-hour average concentration was also below 10% of 125 μg/m^3 daily limit.

The baseline SO_2 pollution of the area is *2* μg/m^3.

16.2.2.6.4 CO summary of measurement results

2-week average concentrations (μg/m^3) Limit: Hourly 10 000 μg/m^3, 24-hour 5 000 μg/m^3						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	564	396	348	564	-	468
Value exceeding limit	0 pcs					
2. LMp - Next to the northern access road	563	356	446	733		525
Value exceeding limit	0 pcs					
3. LMp - Meteorological Station	744	519	441	569		568
Value exceeding limit	0 pcs					
4. LMp - Csámpa, Kis street	550	380	624	638		548
Value exceeding limit	0 pcs					
5. LMp - (Dunaszentbenedek, Dam keeper house) Dunaszentbenedek, Rózsa street	-	306	567	909	595	594
Value exceeding limit		0 pcs				
6. LMp - OVIT telep, Dankó Pista u. 1.	378	434	351	614	-	444
Value exceeding limit	0 pcs					
The baseline CO pollution of the area						525

Table 16.2.2-70: CO immission measurement results

The measured hourly CO immission values were always well below the 10 000 μg/m^3 hourly limit. The highest measured hourly concentration value was 1994 μg/m^3, which corresponds to 20% of the limit. Average concentration values calculated from the 8-hour moving maximum values remained below 22% of the 24-hour limit (5 000 μg/m^3). CO measurement results showed a volatility in line with the heating-non-heating seasons.

The baseline CO pollution of the area is *525* μg/m^3.

16.2.2.6.5 PM_{10} summary of measurement results

2-week average concentrations ($\mu g/m^3$) Limit: 24-hour 50 $\mu g/m^3$						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	45	20	20	38	-	31
Value exceeding limit	5 days	0 days		2 days		
2. LMp - Next to the northern access road	21	16	18	33		22
Value exceeding limit	0 days			1 days		
3. LMp - Meteorological Station	48	17	24	24		29
Value exceeding limit	5 days	0 days		1 days		
4. LMp - Csámpa, Kis street	33	17	22	37		27
Value exceeding limit	0 days			1 days		
5. LMp - (Dunaszentbenedek, Dam keeper house) Dunaszentbenedek, Rózsa street	-	19	37	34	26	29
Value exceeding limit		0 days	1 days	2 days	0 days	
6. LMp - OVIT telep, Dankó Pista u. 1.	27	32	19	26	-	26
Value exceeding limit	0 days	1 days	0 days			
Baseline PM_{10} pollution of the area						27

Table 16.2.2-71: PM_{10} immission measurement results

The PM_{10} measurements/tests results measured between January 24, 2012 and March 28, 2013 were higher than the limit for 19 days. As prescribed by Appendix 1 of Decree 4/2011. (I. 14.) VM on air load limits and emission limits for stationary air polluting point sources the 50 $\mu g/m^3$ 24-hour limit may be exceeded not more than 35 times during one calendar year. The number of vases when the limit was exceeded was lower than permitted during the PM_{10} measurements/tests performed during the 336-day period at 6 measuring stations. Having analysed the results for measurements held in the region and other points of the country we can state that the measured high values are almost identical with the results of national measurements/tests.

The baseline PM_{10} pollution of the area is *27* $\mu g/m^3$.

16.2.2.6.6 TSPM summary of measurement results

2-week average concentrations ($\mu g/m^3$) Limit: -						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Avrg**
1. LMp - Plant area	54	28	33	42	-	39
2. LMp - Next to the northern access road	25	24	27	35		28
3. LMp - Meteorological Station	53	29	38	27		37
4. LMp - Csámpa, Kis street	48	24	29	39		35
5. LMp - Dunaszentbenedek, (Dam keeper house); Rózsa street	-	34	41	36	34	36
6. LMp - OVIT telep, Dankó Pista u. 1.	39	49	22	28	-	35
Baseline TSPM pollution of the area						35

Table 16.2.2-72: TSPM immission measurement results

The effective Decree 4/2011. (I. 14.) VM defines no limit for TSPM. The former (annulled) Decree 14/2001.(V.9.) KöM-EüM-FVM defines for TSPM 200 $\mu g/m^3$ hourly, 100 $\mu g/m^3$ 24-hour, and 50 $\mu g/m^3$ annual limit. Thus we compared the measurement results with the limit defined by the former Decree. The limit was exceeded only once, where the value was 155% of the „former limit". The 24-hour TSPM concentration values were below 54% of the former limit.

The baseline TSPM pollution of the area is *35* $\mu g/m^3$.

16.2.2.6.7 Settling dust summary of measurement results

(μg/m^3) Limit: -							
Measurements/tests	**1. LMp**	**2. LMp**	**3. LMp**	**4. LMp**	**5. LMp**	**6. LMp**	**Average**
1.	1,0	1,2	0,7	0,4	0,5	0,6	0,7
2.	1,8	1,6	1,2	1,9	1,3	1,8	1,6
3.	2,2	2,2	2,0	5,8	3,2	4,2	3,3
4.	6,6	2,6	4,6	8,0	5,1	7,7	5,8
5.	3,7	3,7	2,5	10,3	3,3	3,8	4,6
6.	3,5	2,3	2,0	4,0	4,3	4,3	3,4
7.	5,2	1,6	3,1	6,4	4,8 (2,1*)	1,9	3,8
8.	2,3	3,7	2,1	5,1	2,8 (4,7*)	2,3	3,1
9.	0,6	0,9	0,5	3,5	1,5*	0,9	1,3
10.	0,5	0,8	0,7	1,1	1,3*	1,2	0,9
11.	0,3	0,8	0,4	0,6	1,2*	0,8	0,7
12.	0,9	1,6	1,0	0,8	3,5*	1,6	1,6
13.	0,9	1,3	1,3	2,7	1,2*	0,5	1,3
Baseline settling dust pollution of the area							2,5

*Dunaszentbenedek, Rózsa street

Table 16.2.2-73: Settling dust measurement results

Decree 4/2011. (I. 14.) VM defines no limit for settling dust. The former (annulled) Decree 14/2001.(V.9.) KöM-EüM-FVM defines 16 g/m^2 x 30 day and 120 t/km^2 x year limit. The measured settling dust concentration values never exceeded the former limit, and the highest measured value was 65% of the limit.

Between July 31, and October 12, 2012 we held measurements/tests at both measuring points at Dunaszentbenedek, at the dam keeper house and in Rózsa street. As the settling dust load values were low at both measuring points during this parallel test series and the original task required that the settling dust test are held at the same point as other air pollution measurements/tests, there was no professional reason for continuing the settling dust test at Dam keeper house.

The baseline settling dust pollution of the area is 2,5 μg/m^3.

16.2.2.6.8 O_3 summary of measurement results

2-week average concentrations (μg/m^3) Limit: 24-hour 120 μg/m^3						
Measuring points	**1. test**	**2. test**	**3. test**	**4. test**	**5. test**	**Average**
6. LMp - Paks, Dankó Pista street 1. OVIT site	57	106	31	30	-	56
Value exceeding limit	0 pcs	1 pcs	0 pcs			

Table 16.2.2-74: O_3 measurement results

The maximum value of the O_3 daily 8-hour moving average concentrations was once higher than the limit, and this value was 121 μg/m^3. The referred value was less than 1% higher than the limit.

The baseline O_3 pollution of the area is 56 μg/m^3.

NO_2, NO_x, SO_2, CO, PM_{10}, TSPM, settling dust, and O_3 concentration values measured between January 24, 2012 and March 28, 2013 were lower, and remained below the limits permitted for PM_{10}. Based on these measurement results we may state that the ambient air quality was excellent in respect of SO_2, CO air pollutants, and fair regarding NO_2, PM_{10} and O_3 pollutants.

16.2.3 AIR LOADABILITY

Based on the assessment of measurement results we determined the loadability values of the area in accordance with Article 2. § 40 of Government Decree 306/2010. on air protection measurements.

The air loadability level is the difference between the air pollution limit and the baseline air load as it follows.

Air pollutant	Baseline air load	Hourly air pollution limit	Loadability
	(µg/m^3)		
Sulphur-dioxide (SO_2)	2	250	248
Nitrogen dioxide (NO_2)	24	100	76
Nitrogen oxides (NO_x)	30	-	-
Carbon monoxide (CO)	525	10 000	9 475
Particulate matter (PM_{10})	27	-	-
Particulate matter TSPM	35	200	165

Table 16.2.3-1: Summary assessment of 2012 baseline measurements/tests and air loadability

16.3 MODELLING OF PROPAGATION OF NON-RADIOACTIVE AIR POLLUTANTS

Modelling of propagation of non-radioactive air pollutants emitted by the new nuclear plant units planned at Paks site, and the relevant impact zones were defined for the following cases:

I. Analysis of emission of the planned nuclear plant

Propagation simulations for the area with 30 km radius

II. Analysis of emission related to the planned nuclear plant

Modelling of air pollutants caused by traffic for the area with 25 radius, as prescribed by the Decree

During the modelling works we determined the additional load caused by conventional air pollutants emitted during both the construction and operation periods, and then, based on the results and in conformity with the requirements of the Decree, we also delineated the direct and indirect and cross-border impact areas of the planned development.

16.3.1 THE APPLIED MODEL

We calculated the impacts of nuclear plant units to be constructed during the planned project onto air quality with models simulating various atmospheric propagations. We estimated the distribution of non-radioactive polluting materials arising from implementation and operation of Paks II., prepared the air quality prognosis and defined the impact zones using the Gauss-type model of the TREX model family.
The Gauss-type models are based on the so-called Gauss equation:

$$c(x,y,z) = \frac{Q}{2\pi\sigma_y\sigma_z u} exp\left(\frac{-y^2}{2\sigma_y^2}\right)\left[exp\left(\frac{-(z-z_p)^2}{2\sigma_z^2}\right) + exp\left(\frac{-(z+z_p)^2}{2\sigma_z^2}\right)\right]$$

where:

c (x, y, z) – the value of concentration in (x, y, z) coordinate [mass unit/volume],
Q – the quality of the emitted material [mass unit / unit of time],
σy – deviation parameter in y direction [m],
σz – deviation parameter in z direction [m],
u – wind speed at height at the time of emission [m/unit of time],
zp – the height of emission [m].

We define the σ_y and σ_z deviation parameters based on the stability and using the Monin–Obukhov similarity equation, and performing additional calculations in accordance with MSZ 21457-4:2002 and MSZ 21457-7:2002 standards.

Thermal energy related to the atmosphere is also required for describing the turbulent processes and thermal turbulence. The thermal energy of soil (*G*) is the sensible thermal quantity crossing the soil surface, transported by the water vapour content of the vortex and the latent thermal flow (*LE*), and absorbed and released during the phase transformation process (*H*). The product of the equilibrium of the global radiation (*S*) and radiation (*R*) is required for quantifying the thermal turbulence. The global radiation defines the total short wave radiation quantity arriving from the higher air layers onto one unit of surface, and its value can be calculated with the following formulae:

$$S = (a_1 \sin\phi + a_2)(1 + b_1\, N^{b^2}),$$

where

a_1 and a_2 empiric constants,
b_1 and b_2 cloud constants,
N degree of cloud cover
Φ solar height.

The value of global radiation is defined in W/m^{-2}. We calculate the balance of radiation – as the quantity of radiation of radiation arriving at one unit of horizontal surface and emitted from this surface during one unit of time – with the following equation:

$$R = \frac{S(1-A) + c_1 T^6 - \sigma_{SB} T^4 + c_2 N}{1 + c_3},$$

where:

A – the albedo,
T – surface temperature [K], and we approach this value using the temperature determined in practice next to the relevant surface (typically at 2 m height),
N – the quantity of cloudiness (nebulosity),
σ_{SB} – Stefan–Boltzmann constant, value: 5,67 10^{-8} [Wm^{-2}K^{-4}]
c_1 – long wave radiation constant, value: 5,31 10^{-13} [Wm^{-2}K^{-6}]
c_2 – nebulosity constant, value: 60 [Wm^{-2}]
c_3 – surface warming constant, value: 0,12 (-)

Based on the measured (and derivative) meteorological data and the values calculated with the above parametrics we calculate the close-to-surface dynamic parameter values applying the iteration process described in MSZ 21457-4:2002-ben.

We performed simulations using the Gauss-type model for artificially conservative meteorological conditions and real meteorological conditions. In the latter case we prepared the calculations for 1 full year using the hourly and 3-hour meteorological database.

Gauss-type models are based on point-like meteorological data, thus the meteorological conditions present a stationary constant state at the emission point, thus the direction of propagation dominantly depends upon the wind direction measured at the emission point; and the concentration field has a Gauss distribution perpendicular along wind direction from the source. We assumed that the emission was constant and continuous in time during the simulations; thus the result we got was a geometric tail, where the theory of mass conservation will apply. We can determine the distribution width based on the relevant atmosphere conditions and the time elapsed since the emission.

This type of concentration calculation has the advantage that the mathematical calculations can be extremely quickly prepared, thus simulations can run almost simultaneously, moreover, it can manage the chemical processes, sedimentation, and reflection from the planetary boundary layer. It can be successfully applied for local pollution modelling, as it provides prompt results for the propagation direction of the tail. If we perform a large-quantity simulation with the Gauss-type model we can also prepare statistical analyses for longer time horizon. There is a disadvantage, namely that it cannot manage special volatility of meteorological fields, and thus it is not applicable for simulating polluting material propagation on longer distances.

16.3.2 DATA CHARACTERISTIC FOR SOURCE ENVIRONMENT

We need the quantities and the relevant functions that describe the relevant characteristics for the atmosphere in order that we can prepare the propagation calculations.

The characteristic data for source environment regarding air pollution propagation calculation are as it follows:

- *land roughness height.*
- *most frequent meteorological conditions (wind direction, wind speed, stability)*

16.3.2.1 Land roughness-height

We determined the land roughness height based on the type and articulation of the land.

The baseline data for this calculation was the categories of land cover determined for the environment of the area with 30 and 3 km radius based on the aerial photography in 2013.

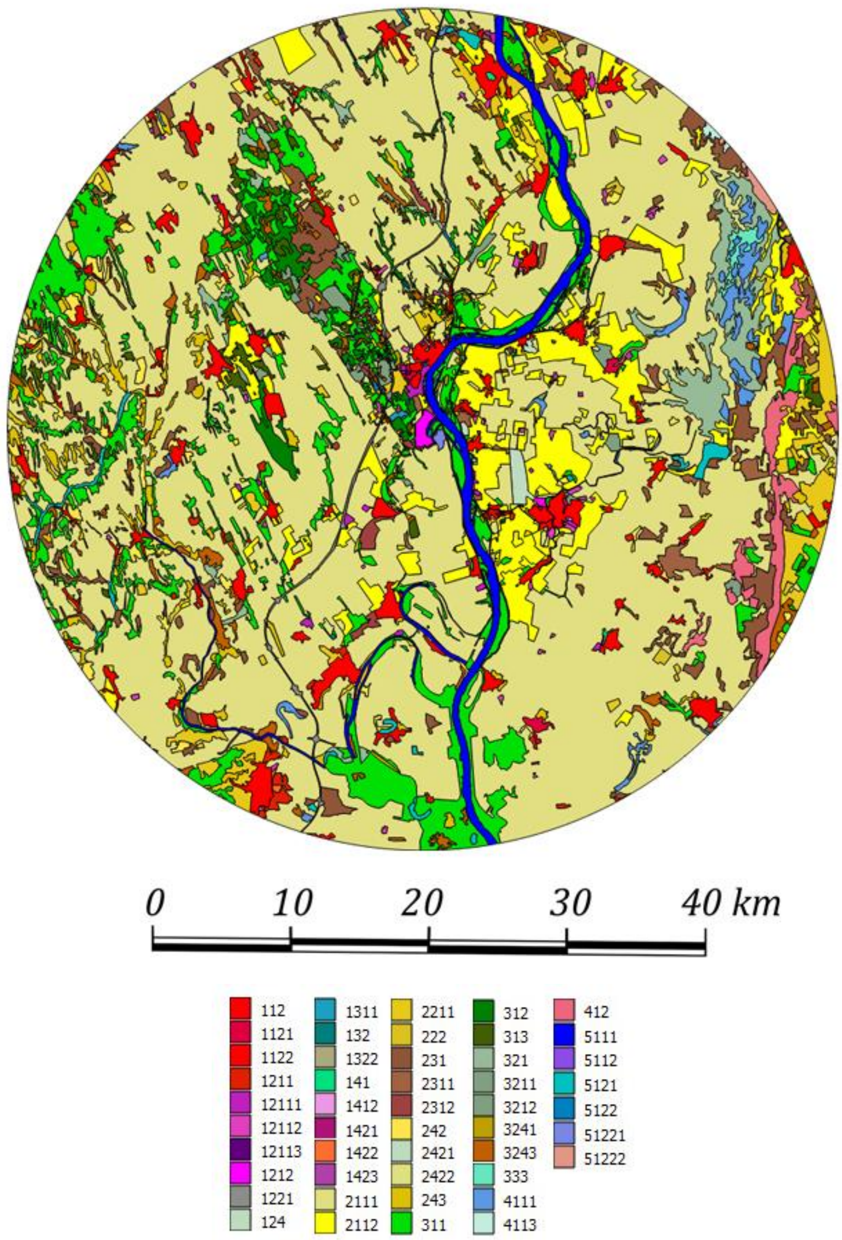


Figure 16.3.2-1: Map of surface cover and land use in 30 km radius area in 2013 – with colour codes

Statistics of surface cover categories in 30 km radius area in 2013

Surface cover category	Name of surface cover	Category propagation	
		(km^2)	(%)
112	Non-coherent settlement structure	52,90	1,87
1121	Non-coherent settlement structure, with multi-story houses without garden	3,30	0,12
1122	Non-coherent area with detached houses and gardens	51,78	1,83
1211	Industrial and commercial units	8,88	0,31
12111	Industrial and commercial facilities	4,34	0,15
12112	Agrarian facilities	8,71	0,31
12113	Education and healthcare facilities	0,28	0,01
1212	Special technical facilities	3,92	0,14
1221	Road network and connecting areas	9,16	0,32
124	Airfields with solid surface runway	4,43	0,16
1311	Open-cast mines	1,03	0,04
132	Depositories, refuse pit heaps	0,58	0,02
1322	Depositories for fluid wastes	0,08	<0,01
141	Green areas within cities	0,69	0,02
1412	Cemeteries	0,34	0,01
1421	Sport facilities	0,48	0,02
1422	Recreational areas	0,67	0,02
1423	Resort settlements	0,25	0,01
2111	***Large-scale arable lands without irrigation***	***1595,65***	***56,44***
2112	***Small-scale arable lands without irrigation***	***211,31***	***7,47***
2211	Vineyards	63,14	2,23
222	Orchards, berries	5,98	0,21
231	***Intensive pastures and very degraded lawn areas***	***110,88***	***3,92***
2311	Intensive pastures and very degraded lawn areas without bushes and trees	19,02	0,67
2312	Intensive pastures and very degraded lawn areas with bushes and trees	9,37	0,33
242	Complex cultivation structure	36,93	1,31
2421	Complex cultivation structure without buildings	2,85	0,10
2422	Complex cultivation structure with scattered buildings	6,75	0,24
243	Primarily agricultural	49,38	1,75
311	***Broadleaf forests***	***257,91***	***9,12***
312	Coniferous forests	24,95	0,88
313	Mixed forests	24,99	0,88
321	Natural lawns, near-nature meadows	58,02	2,05
3211	Natural lawn without trees and shrubs	7,29	0,26
3212	Natural lawn with trees and shrubs	12,11	0,43
3241	Young forests and cutting zones	2,82	0,10
3243	Spontaneous areas with shrubs, bushes and trees	45,34	1,60
333	Thin vegetation	3,99	0,14
4111	Freshwater swamps	26,69	0,94
4113	Saline swamps	1,09	0,04
412	Peat swamps	29,88	1,06
5111	Running waters	49,68	1,76
5112	Channels	1,33	0,05
5121	Natural lakes	13,12	0,46
5122	Artificial lakes, water reservoirs, fishponds	0,98	0,03
51221	Artificial lakes, water reservoirs	0,84	0,03
51222	Fishponds	3,23	0,11
	Total	2827,31	100

Table 16.3.2-1: Surface cover and land use in 30 km radius test area – statistics for 2013.

Land usage on the **area within 30 km radius area in** 2013 can be characterised by the following:

- the land use form with the highest share in the region (56%) is large scale, not irrigated arable land cultivation
- 9 % deciduous forest area
- small scale arable land, small scale agricultural cultivation area 7,5 %
- intensive pasture and highly degraded grazing land representing ~4% in the region can be also regarded as somewhat characteristic land use
- Other forms of area usage cannot be regarded as substantial.

The following table presents the characteristic **roughness values** relevant to various surface types in accordance with the effective MSZ 21457:2002 standard, where the category characteristic for the studied area are shown with bold.

Surface type a	z_0 **, m**
water surface [511–523]	0,0003
flat soil without vegetation [331]	0,003
low vegetation, grassland [321, 333]	0,005
medium vegetation on flat area [322]	0,02
vegetation on flat area with grass, shrubs, bushes, trees [323–324]	0,05
agricultural area (active) [211–213, 221–223, 231, 241–244]	***0,15***
high vegetation (without trees) [323]	0,25
thin forest (~9 m) with low trees [311, 312]	***0,8***
medium density forest, with medium-size (~17 m) trees [311, 312]	1,7
dense forest, with high (~25 m) trees [311, 312]	2,5
small settlement, scattered low buildings [111]	0,85
village, small town [112]	0,75
city (medium size) [111]	1,0
larger city (1–6 story buildings) [111]	1,5
large city, high buildings, tower blocks [111]	2,0
Industrial area with low buildings [121–124, 131–133]	1,2

Table 16.3.2-2: Values of roughness-heigth parameter for various type surfaces

Land usage on the **area within 3 km radius area in** 2013 can be characterised by the following:

- „large scale, not irrigated arable land cultivation" represent the highest share (31%)
- „deciduous forest areas" cover 15% (rounded-up)
- „rivers and channels" represent 11 %
- „special technical facilities" represent 10 %
- „coniferous forest" represents 8 %
- „intensive pastures and degraded grazing lands" represent 6 %
- the other forms of land use represent ignorable share.

The following table presents the characteristic roughness values relevant to various surface types in accordance with the effective MSZ 21457:2002 standard

Surface type a	z_0 **, m**
water surface [511–523]	***0,0003***
low vegetation, grassland puszta [321, 333]	0,005
agricultural area (active) [211–213, 221–223, 231, 241–244]	***0,15***
thin forest with low (~9 m) trees [311, 312]	***0,8***
larger city (1–6 story buildings) [111]	1,5

Table 16.3.2-3: Values of roughness-heigth parameter for various type surfaces

Based on the above we used during the calculations z0= 0,25 m land roughness height value.

16.3.2.2 „Most frequent meteorological condition"

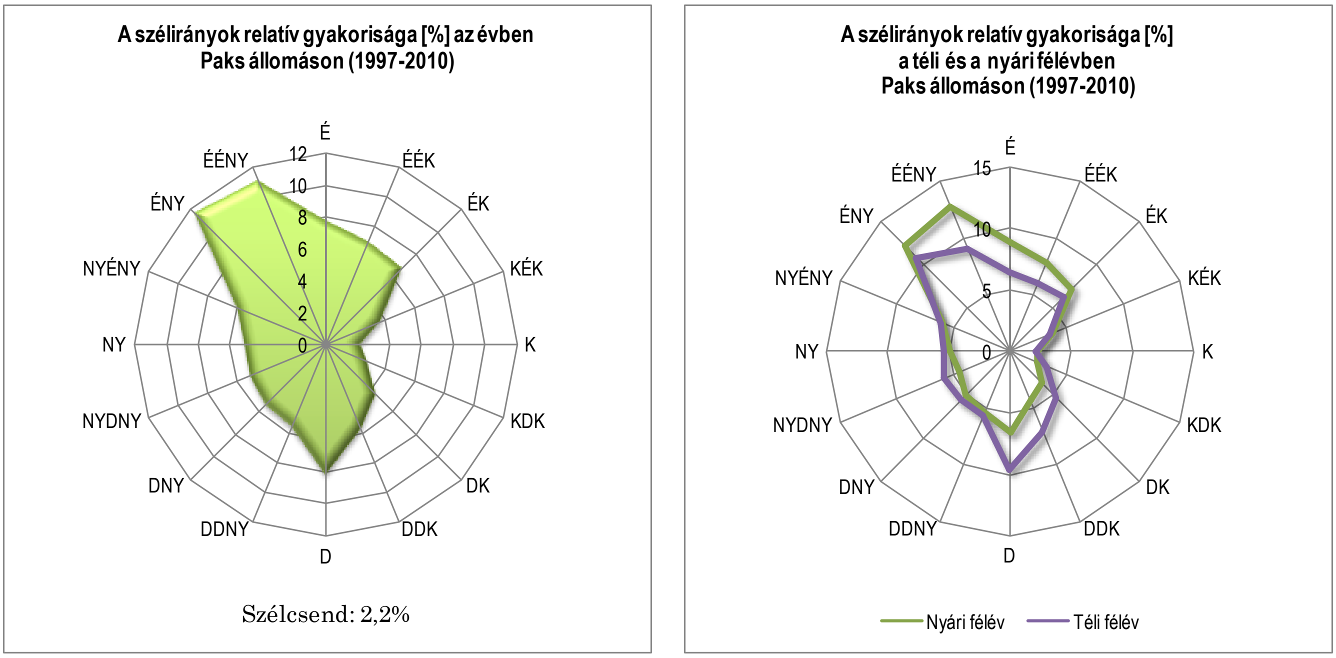
Definition of the *most frequent meteorological condition* can be characterised with the following.

16.3.2.2.1 Wind direction, average wind speed

Wind has been measured at **OMSz Paks station** since 1997 using an automatic VAISALA WAA type wind measuring instrument installed at a height 9.8 m above ground level. The time that has elapsed since then is long enough for performing climate surveys, thus wind data measured long ago using other methods (mechanical) were not used for the analysis, only results of measurements/tests held between 1997-2010.

The **wind direction** is the direction from where the wind is blowing. The wind direction that has the highest frequency of occurrence is called the ruling wind direction.

First we analysed the relative frequency of wind directions on annual level, and then we displayed the results of summer and winter seasons on a common diagram for better comparison (Figure 16.3.2-2).

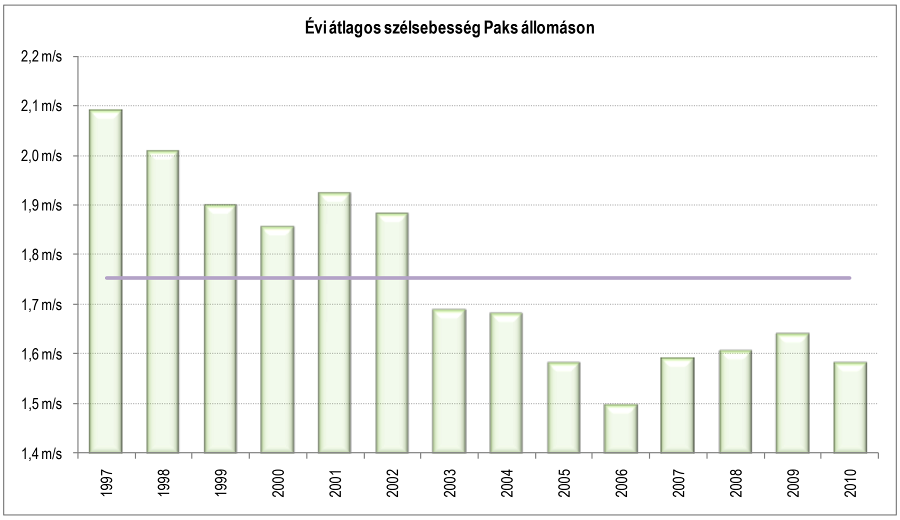


A szélirányok relatív gyakorisága [%] az évben Paks állomáson - Wind directions relative frequency on annual level [%] based on tests held in Paks station
A szélirányok relatív gyakorisága [%] a téli és a nyári félévben Paks állomáson - Wind directions relative frequency during the summer-winter season [%] based on tests held in Paks station
szélcsend - calm, nyári félév - summer semester, téli félév - winter semester
É-N, K-E, D-S, NY-W

Figure 16.3.2-2: Wind directions relative frequency on annual level [%], and during the summer-winter season [%] based on tests held in Paks station between 1997-2010

It can be seen that at Paks region the most frequent wind comes from NW (11,6%) and NNW (11%) on annual level, followed by S direction (8,1%). During summer season NNW is the dominant direction (12,7%), then NW (12,2%) and N (8,9%), so S direction was the fourth (6,7%). During winter season the ruling wind direction is NW (10,8%), and second is S (9,6%), and the third is NNW (9,1%).

The following diagram presents the **average wind speed values** at Paks station starting from 1997. At the beginning of the 1997-2010 we could measure 1,9-2 m/s, and in recent years 1,6-1,7 m/s average values, thus we can see a reducing trend in the annual average wind speed. The reason for decreasing wind speed is most probably the natural volatility in the climate. This phenomenon can be also observed in the time scale measured at Baja, and partly at Tevel and Soltvadkert.



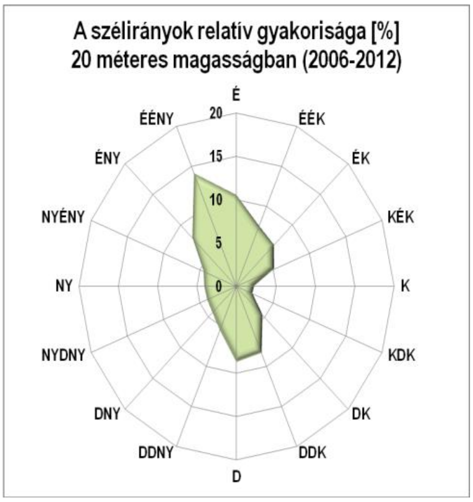
Évi átlagos szélsebesség Paks állomáson - Annual average wind speed at Paks station

Figure 16.3.2-3: Annual average wind speed [m/s] between 1997-2010, and multi-year average (1997-2010) at Paks station

In case of stronger air movement, when the average wind speed is higher than 3 m/s, wind are dominantly blowing from northwest, north-northwest.

Data with 10-minute resolution and recorded by the **Paks measuring tower** were available from 2006 November. PA Zrt. owns the measurement/test results obtained at three levels (20, 50 and 120 metres), so they do not form part of the OMSZ meteorological database, thus contrary to the above presented wind data they did not go through the standard multi-level data control and replacement processes. As the first level of data procession we converted the obtained data in format that allows procession, and then we tried to filter out the erroneous data. We could process only the wind data due to shortage and format of data series and due to defaults and missing data in certain data series, but we wish to emphasise that the presented results are of informative nature due to the quality of the available data.

The measuring tower is 20 metre high (Figure 16.3.2-4) where based on data of the seven years of study the NNW wind direction was the ruling direction (14%), and N was also the second most frequent direction. S (8,7%) and SSE (8,3%) were also quite frequent directions.

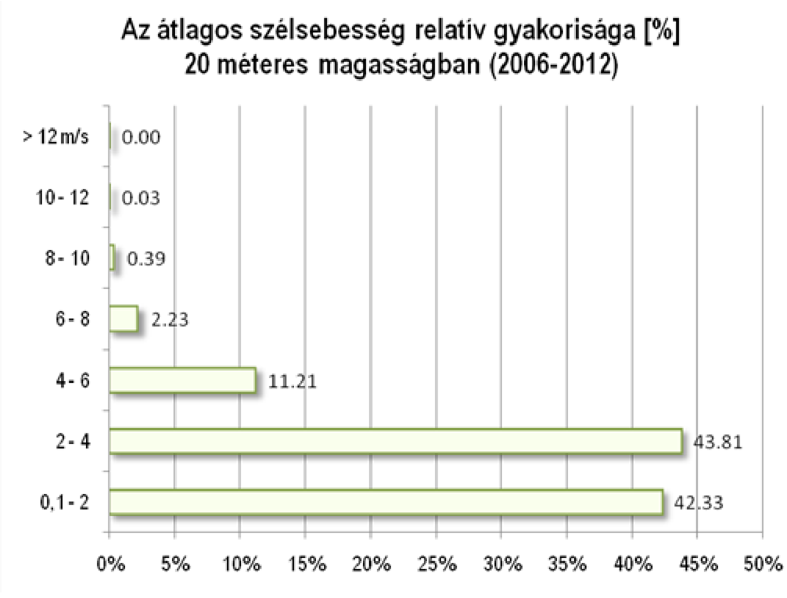


A szélirányok relatív gyakorisága [%] 20 méteres magasságban - Wind directions relative frequency [%] at 20 m height
É-N, K-E, D-S, NY-W

Figure 16.3.2-4: Wind direction relative frequency [%] at Paks measuring tower at 20 m height

Average wind speed

The wind speed increases in the troposphere in line with height, and this is well reflected on the figures that process the 10-minute average wind speed values measured at various levels figures. At 20 metre height the frequency of the 2-4 m/s range is hardly higher than in the lower range.



Az átlagos szélsebesség relatív gyakorisága [%] 20 méteres magasságban - Average wind speed relative frequency [%] at 20 m height

Figure 16.3.2-5: Average wind speed relative frequency [%] at Paks measuring tower at 20 m height

16.3.2.2.2 Atmospheric stability conditions

The following table presents the synoptic wind speed and relative frequency of wind direction according to the Pasquil index for Paks station on annual level (1997-2010).

Synoptic wind speed and wind direction - Relative frequency based on Pasquil-index																			
	Pasquil-index	**No wind/ variable**	**N**	**NNE**	**NE**	**ENE**	**E**	**ESE**	**SE**	**SSE**	**S**	**SSW**	**SW**	**WSW**	**W**	**WNW**	**NWY**	**NNW**	**Total**
[0,0 - 0,1)	A – very unstable	0,0																	0,0
	B – moderately unstable	0,1																	0,1
	C – slightly unstable	0,1																	0,1
	D – neutral	0,6																	0,6
	E – slightly stable	0,6																	0,6
	F – very stable	3,7																	3,7
[0,1 – 1,1)	A		0,1	0,0	0,1	0,1	0,0	0,1	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9
	B		0,1	0,0	0,1	0,1	0,2	0,1	0,2	0,0	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	1,5
	C		0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,0	0,1	0,1	1,3
	D		0,7	0,3	0,3	0,2	0,2	0,3	0,3	0,4	0,3	0,3	0,3	0,4	0,6	0,7	0,7	0,6	6,8
	E		0,5	0,5	0,2	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,1	0,2	0,2	0,2	0,2	0,4	3,6
	F		1,3	1,1	0,5	0,2	0,2	0,1	0,5	0,7	0,7	0,6	0,8	0,8	0,6	1,0	1,1	1,4	11,5
[1,1 – 2,1)	A		0,2	0,3	0,5	0,5	0,3	0,3	0,4	0,3	0,2	0,2	0,2	0,1	0,2	0,1	0,1	0,1	4,0
	B		0,3	0,3	0,6	0,5	0,3	0,4	0,5	0,4	0,3	0,3	0,2	0,2	0,3	0,3	0,3	0,3	5,6
	C		0,2	0,3	0,2	0,3	0,2	0,3	0,4	0,2	0,4	0,2	0,2	0,2	0,2	0,2	0,4	0,3	4,1
	D	0,0	0,7	0,5	0,5	0,4	0,3	0,3	0,5	0,6	0,6	0,3	0,2	0,6	0,7	0,9	1,1	1,1	9,3
	E		0,2	0,2	0,2	0,0	0,0	0,1	0,2	0,3	0,4	0,1	0,1	0,1	0,1	0,1	0,2	0,3	2,8
	F		0,3	0,4	0,2	0,1	0,0	0,0	0,1	0,3	0,4	0,2	0,2	0,2	0,2	0,2	0,2	0,3	3,3
[2,1 – 3,1)	A		0,2	0,3	0,3	0,2	0,0	0,0	0,1	0,2	0,4	0,2	0,1	0,1	0,2	0,1	0,1	0,1	2,7
	B		0,4	0,3	0,6	0,2	0,1	0,1	0,3	0,4	0,5	0,4	0,4	0,2	0,4	0,2	0,5	0,4	5,4
	C		0,3	0,3	0,3	0,1	0,1	0,1	0,2	0,2	0,3	0,2	0,2	0,2	0,2	0,3	0,5	0,5	4,1
	D		0,6	0,4	0,7	0,2	0,1	0,1	0,2	0,2	0,5	0,3	0,3	0,4	0,3	0,5	1,1	0,9	6,7
	E		0,0	0,1	0,1	0,0			0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,7
	F		0,0	0,0	0,1	0,0	0,0		0,0	0,0	0,2	0,1	0,1	0,0	0,0		0,0	0,0	0,7
[3,1 – 5,1)	A		0,0	0,2	0,0				0,0	0,0	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,9
	B		0,3	0,4	0,3	0,1		0,0	0,1	0,2	0,8	0,6	0,5	0,3	0,1	0,1	0,3	0,4	4,6

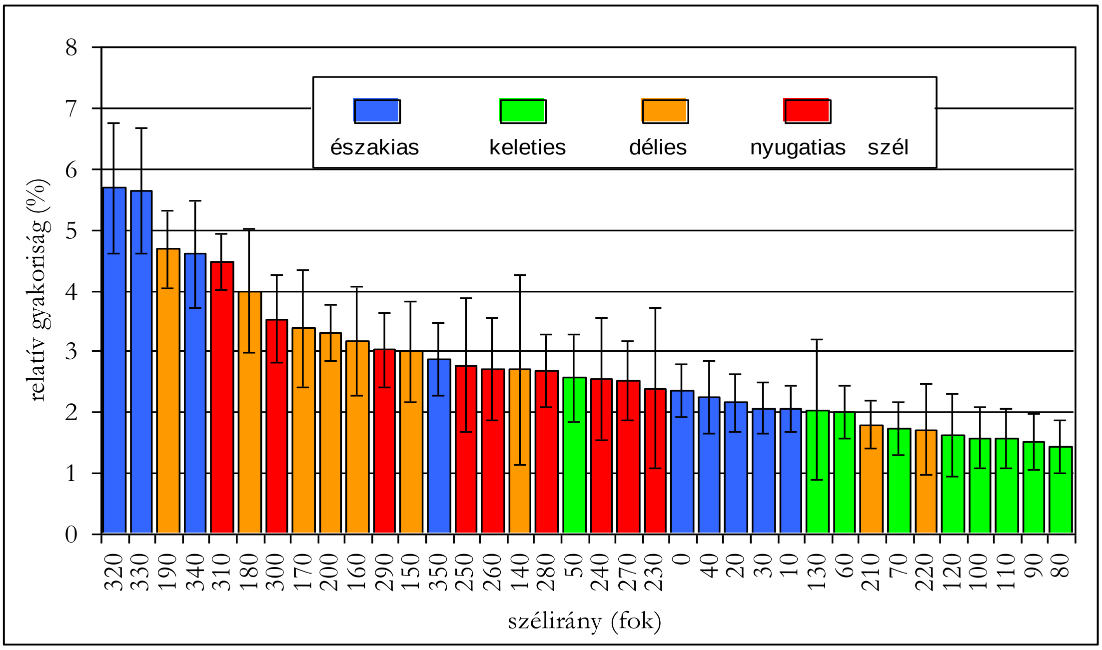
Synoptic wind speed and wind direction - Relative frequency based on Pasquil-index																			
	Pasquil-index	**No wind/ variable**	**N**	**NNE**	**NE**	**ENE**	**E**	**ESE**	**SE**	**SSE**	**S**	**SSW**	**SW**	**WSW**	**W**	**WNW**	**NWY**	**NNW**	**Total**
	C		0,5	0,3	0,2	0,1		0,1	0,3	0,1	0,4	0,2	0,2	0,2	0,1	0,3	0,7	0,6	4,0
	D		0,5	0,4	0,2	0,1	0,0	0,0	0,2	0,2	0,4	0,5	0,2	0,3	0,2	0,5	1,7	1,4	6,9
	E			0,0	0,0					0,0	0,0	0,0	0,0	0,0	0,0		0,0		0,2
	F		0,0	0,0	0,0						0,0	0,0	0,0	0,0	0,0				0,1
[5,1 – 7,1)	A			0,0								0,0							0,0
	B		0,0	0,0	0,0						0,0	0,1	0,1	0,0				0,0	0,3
	C		0,0	0,0	0,0	0,0	0,0		0,0		0,0	0,1	0,2	0,1		0,0	0,1	0,1	0,7
	D		0,0	0,1	0,0				0,0	0,0	0,0	0,1	0,1	0,2	0,1	0,1	0,7	0,4	1,8
	E												0,0						0,0
	F												0,0						0,0
[7,1 – 10,1)	A												0,0						0,0
	B												0,0	0,0					0,0
	C											0,0	0,0	0,0					0,0
	D		0,0	0,0		0,0						0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,3
	E																		
	F																		
[10,1 – 13,1)	A																		
	B																		
	C																		
	D												0,0				0,0	0,0	0,0
	E																		
	F																		
Total		5,1	7,5	6,8	6,3	3,6	2,2	2,6	4,9	5,0	7,5	5,5	4,9	5,1	4,8	5,9	10,3	9,9	100,0

Table 16.3.2-4: Synoptic wind speed and relative frequency of wind direction according to Pasquill index [%] at Paks station on annual level (1997-2010)

16.3.3 METEOROLOGICAL DATABASES APPLIED FOR PROPAGATION SIMULATIONS

16.3.3.1 Average meteorological data for conservative estimate

We prepared conservative estimates based on climate data, average and values that are the most characteristic for the area.
The ruling wind direction characteristic to the area is north-western, and we defined it based on the annual average wind direction values measured at the Paks meteorological measuring tower at 120 m height above the surface in 10 degree resolution in order of size sequence for the period between 2000 and 2011 (Figure 16.3.3-1). The figure presents the northern wind between 320–40°, the eastern wind between 50–130°, the southern wind between 140–220°, and the western wind between 230–310° values. During the conservative estimate process we prepared estimates irrespective of direction, and the 10 degree frequency of every wind direction can provide sufficient information regarding the level of probability of occurrence of such wind directions in the given area. For the conservative estimate we used the climatic data, average and most characteristic values for the area.



északias - northern, keleties - eastern, délies - southern, nyugatias - western, szél – wind
relatív gyakoriság (%) - relative frequency (%), szélirány (fok) - wind direction (degree)

Figure *16.3.3-1: Wind direction frequency measured at Paks measuring tower and its deviation in 10 degree resolution*

We defined the **wind speed** values at Paks measuring tower at 20 and 120 metre levels based on the average values of measurements performed between 2002 and 2011, and the relevant average wind speed values at 20 m high was 2,52 m/s, and at 120 m it was 5,47 m/s.

Temperature data from measurements performed in the tower were not available, thus we used the average climatic temperature, which is 10,7° C for the area of the study. Assuming dry adiabatic temperature layering assuming that the temperature at 925 hPa pressure rate is 4,7 C, and on 850 hPa pressure rate –3,3°C.

The geo-potential height for 925 hPa pressure level was taken as 700 m, while for 850 hPa level as 1 500 m.

We set the boundary layer height limit for the lowest value characteristic to the daytime hours (300 m), which is the most unfavourable for propagation of polluting materials.

We set nebulosity at 4 octas (50 % nebulosity rate), and the value of sensible thermal power as 100 W/m^2.

16.3.3.2 Simulations using real meteorological database

Using real meteorological database we prepared the model simulations for one full year, based on hourly emission values.

Data of the meteorological measuring tower (120 m high) located at the site of Paks Nuclear Plant provided partly the meteorological data for the stimulation. The measurements were performed at 20, 50 and 120 m height with 10 minute average measuring time. Wind direction and wind speed values were available from the Paks measuring tower.
We generated all other meteorological data that were required for the stimulations (as they were not available from the measurements held in the tower) from the output fields of the freely accessible American Global Forecast System (GFS) numeric forecasting model (http://www.emc.ncep.noaa.gov/GFS/doc.php [16-9]). GFS provides the meteorological database which is most widely used in the world and available free-of-charge, offering both archive data and forecasts alike.

The hydrostatic GFS model output fields are available in 0,5 × 0,5 degree spatial and 3 hour time resolution

The National Centres for Environmental Prediction (NCEP) developed the GFS, and it is at present running on the super computer of US National Weather Service (NWS). The assimilation of results from surface and remote sensor-operated measurements arriving from all parts of the world provide the initial conditions of the model (Global Data Assimilation System, GDAS). The latest measurement data are collected and model runs are held four times per day in every 6 hour. GFS is a hydrostatic, spectral-type model. In addition to the resolution of atmospheric flows, thermal and humidity transport controlling equations it is using enhanced parametrics for calculating impacts onto cloud formation, turbulence and surface atmosphere.

The model will provide the following data on 25 pressure rates between 10 and 1000 hPa:

- wind direction,
- wind speed,
- temperature,
- relative humidity,
- geo-potential height.

Through parametrics we also deleted from the GFS the surface parameters required for our calculations:

- ground level temperature,
- air temperature at 2 m height,
- relative humidity at 2 m height,
- nebulosity,
- wind direction at 10 m reference height,
- wind speed at 10 m reference height,
- boundary layer height,
- surface thermal energy (sensible, latent thermal energy),
- intensity of precipitation,
- state of precipitation.

Simulation results can be reached in 0.5 degree horizontal and 3-hour time resolution covering the entire globe. The archive (http://nomads.ncdc.noaa.gov/ [16-10]) is carefully maintained by the National Climatic Data Center (NCDC) and it works free-of-charge, where reliable results of models developed in the past years are available.

Using data from the archive we developed a 3-hour continuous database for 2011 and we used first and second output time steps in the runs launched in every 6 hours, thus every run can provide data for the 3rd and 6th hour after the launch.

Quality of analysis prepared for 0 hour and generated directly from the data assimilation and the maximum 6-hour short term forecasts showed no significant difference. However, using short term forecasts may have several benefits versus analysis: firstly they allow the development of 3-hour data series versus the 6-hour cycle of data collection. Secondly surface data that are not shown in the critical, measurements for propagation modelling can be directly derived from the enhanced parametrics of the forward looking model, e.g. boundary layer height. Moreover, in case of any eventual data shortage the missing data can be replaced with subsequent forecasting steps of the previous model run, thus we can secure the data series continuity.

We used meteorological data of 2011 for the simulation. This selection was primarily based on the fact that during 2011 there were several weather conditions unfavourable for air pollution aspects. 2011 had an extremely dry summer with 1–3-week heat waves that are favourable for enriching the air pollutants. There was a long cold cushion situation prevailing in the country between mid-November and early December in 2011, when serious smog situations emerged at several points in the country. Based on the above procession of the total time series of 2011 can provide information regarding the load evolving in the most unfavourable climatic conditions.

Data of this year when the weather was very unfavourable for air quality aspects present conservative estimate regarding meteorological conditions that have impacts onto air pollution in Hungary.

16.4 IMPACTS OF EMITTED NON-RADIOACTIVE AIR POLLUTANTS ONTO AMBIENT AIR QUALITY DURING PAKS II CONSTRUCTION

We calculated the limits required for the survey in accordance with Appendix 1 of Decree 4/2011. (I.14.) VM on air load limits and emission limits for stationary air polluting point sources:

Air pollutant	Limit ($\mu g/m^3$)	Reference period
Nitrogen dioxide (NO_2)	100	hourly average
Carbon monoxide (CO)	10 000	hourly average
Particulate matter (PM_{10})	50	24-hour average
Hydrocarbons (C_xH_y) *	10	24-hour average

* the limit refers to benzene, hourly limit is not defined

Table 16.3.3-1: Limit of the studied air polluting materials

Parameters estimates could be only partially matched using a conservative approach for the sake of security:

- We assumed the total quantity of nitrogen oxides (NO_x) as NO_2, and the real NO_2-quantity – subject to the relevant atmospheric parameters - could be significantly less than this quantity.
- We assumed the total quantity of hydrocarbons (C_xH_y) as benzene. The real quantity of benzene could be significantly less than this quantity.

16.4.1 LEGAL BASIS FOR THE IMPACT ZONE DETERMINATION

We determined the impact zone of the studied air pollution in accordance with Article 2. § 14. of the Government Decree 306/2010. Accordingly, the impact zone of the stationary point source:

Around the studies point sources we can delineate the largest area, where the air pollutants emitted by this point source at maximum capacity utilisation the change in the ground-level air load calculated for the reference period and expected below the axis of the torch due to propagation and under the most frequent meteorological conditions emerging in the vicinity of the air polluting point source

- *is higher than 10% of the air pollution limit defined for one hour (in case of PM_{10} it is 24-hour), or*
- *the loadability is higher than 20%.*

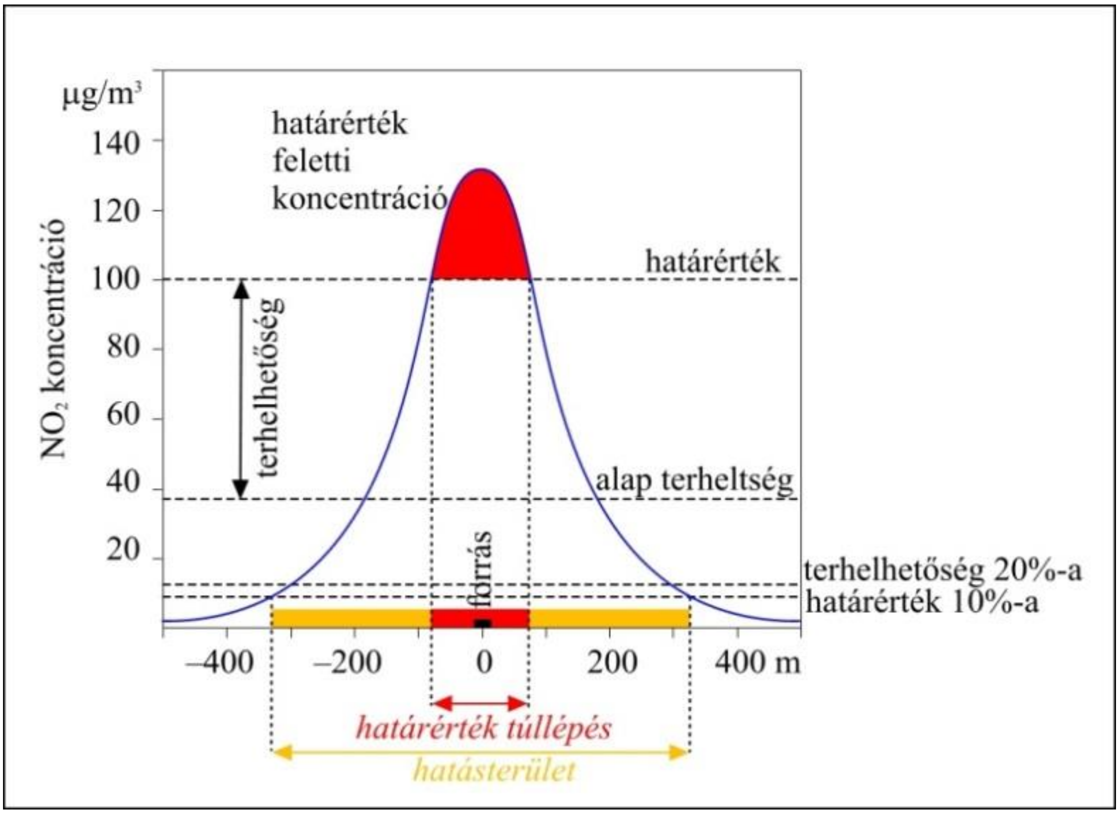
Loadability is the difference between air pollution limit and baseline air load. Baseline air load estimates used the average values of immission measurements performed at the six measuring stations established around Paks II. area.

Air pollutant	Baseline load of the air based on 2012 tests	Loadability	Limit 10%-a	Loadability 20%-a
	($\mu g/m^3$)			
Carbon monoxide (CO)	525	9 475	1 000	1 895
Nitrogen oxides (NO_x)	30	70	10	14
Hydrocarbons (C_xH_y)	n.a.	n.a.	1	n.a.
Particulate matter (PM_{10})	27	23	5	4,6

Table 16.4.1-1: Data on the studied air polluting materials

When we determined the impact zone we used the stricter among the two criteria defined in the Government Decree, and these values were 10% of baseline pollution of carbon monoxide, nitrogen oxides and hydrocarbons, and 20% of the loadability limit in case of particulate matter.

Figure 16.4.1-1 presents a specific example for data used for air pollution, and these data were applied for both direct and indirect sources.



határérték feletti koncentráció - concentration higher than limit, határérték - limit, terhelhetőség - loadability, alap terhelhetőség - base loadability terhelhetőség 20%-a - 20% of loadability, határéték 10%-a - 10% of limit, határérték túllépés - excessing limit, hatásterület - impact zone
NO_2 koncentráció – NO_2 concentration

Figure 16.4.1-1: Definition of value higher than the limit and the impact zone

We present the concentration values received for the given material as average calculated for the limit of the relevant reference time. The concentration values defined for hourly period refer to part of the day with maximum emission rate.

We calculated the expected atmospheric concentration distributions and impact zones using the real meteorological database and conservative meteorological data.

- using real meteorological database (for 2011 with hourly resolution), simulating average concentration fields,
- assuming conservative meteorological conditions, simulating the theoretically possible most unfavourable conditions.

16.4.2 IMPACT FACTORS OF PAKS II IMPLEMENTATION

Mobilisation area

Removal / relocation of vegetation from the mobilisation area
Topsoil removal and deposition

Plant area

Demolishing facilities located on the Plant operation area
Removal / relocation of vegetation form the area of implementation, topsoil removal and deposition
Establishment of foundations, including work ditches / trenches and eater separation
Construction and technological assembly of buildings, structures and engineering objects on water

Route of the 400 kV block transmission line and 120 kV transmission line up to the new sub-station

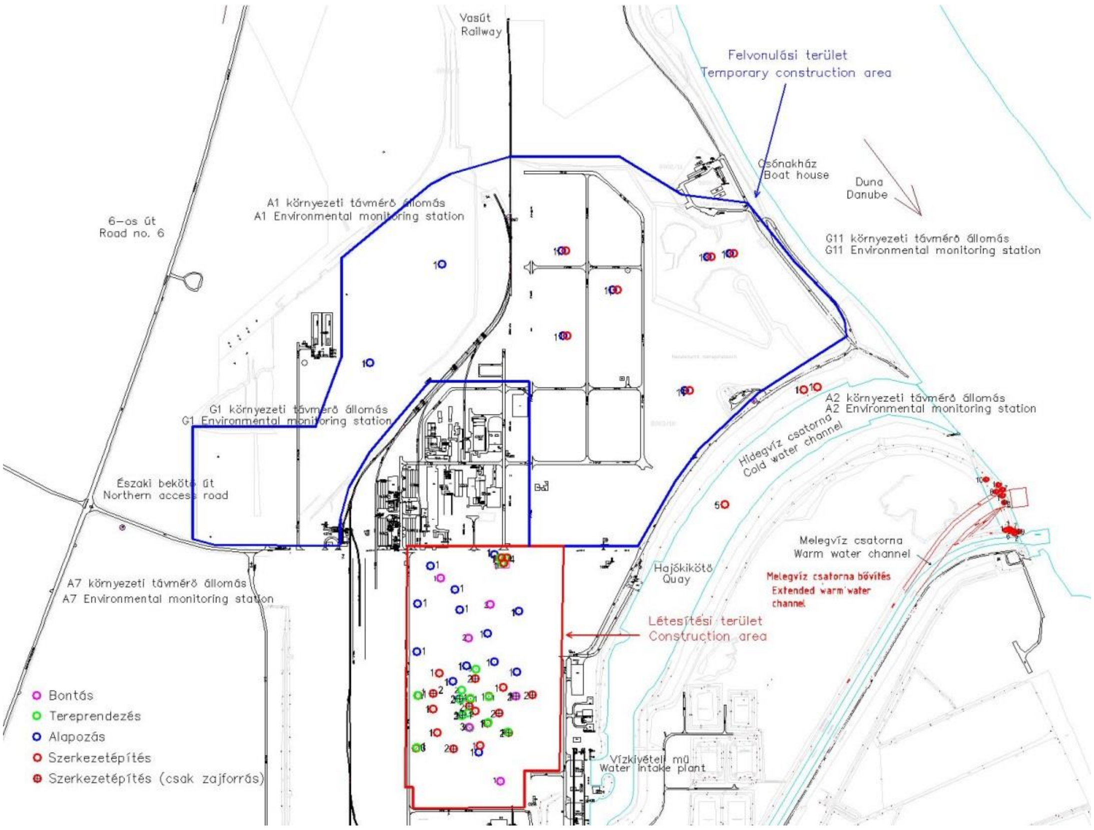
Landscaping on areas of transmission line poles
Topsoil removal and deposition
Foundation of transmission line poles
Pole assembly – erection
Pulling and assembly of transmission line

Transportation

Construction materials transportation into the plant
Human resource transportation into the plant

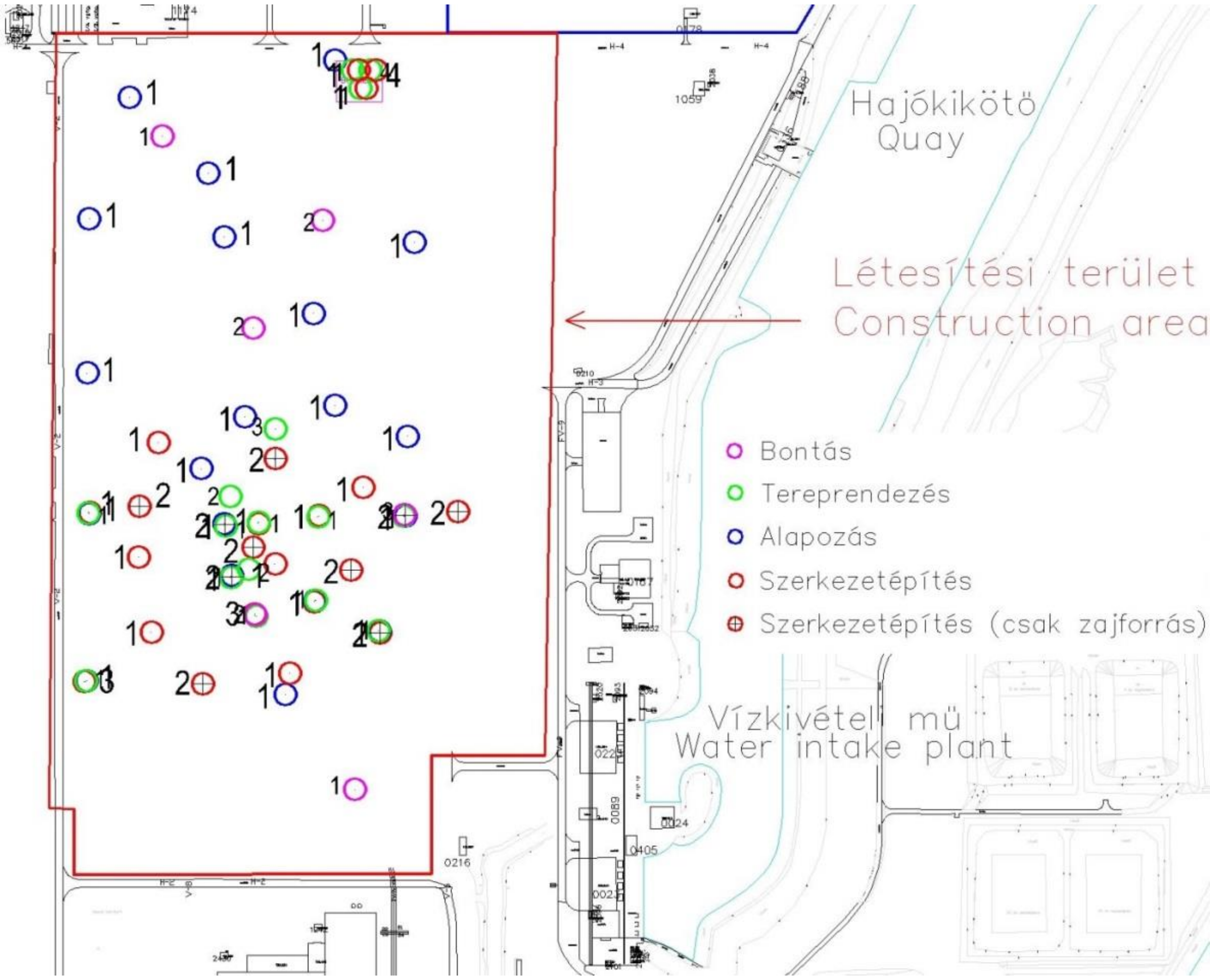
16.4.2.1 Air polluting sources and characteristics of Paks II implementation

16.4.2.1.1 Air polluting sources and characteristics of Paks II implementation



bontás - demolishing, tereprendezés - terrain arrangement, alapozás – foundation
szerekezetépítés - structure construction, szerekzetépítés (cask zajforrás) - structure construction (only noise source)

Figure 16.4.2-1: Air polluting sources during implementation phase – overview site plan



bontás - demolishing, tereprendezés - terrain arrangement, alapozás – foundation
szerekezetépítés - structure construction, szerekzetépítés (cask zajforrás) - structure construction (only noise source)

Figure 16.4.2-2: Air polluting sources during implementation phase on the plant area

Dusting source during the implementation phase

Description	Area	topsoil /humus	Quantity of removed / moved soil
	m^2	m	m^3
Removal and deposition of topsoil			
On operation area	270 330	0,2 m topsoil	54 066
On mobilisation area	300 000	0,2 m topsoil	60 000
On the island	22 521	0,2 m topsoil	4 504
On areas of block transmission line and transmission line poles	4 031	0,2 m topsoil	806
Foundation			
Quantity of moved soil (calculating with average depth of certain building foundation)			821 260

Table 16.4.2-1: Air polluting sources and their characteristics during the construction phase on the construction area

	Description	Motor fuel consumption	Operation time	Consumed gasoil		Emission/unit			Total emission (1 vehicle)			Pieces	Total emission		
		[litre/h]	[h/day]	[litre/ day]	[kg/day]	[kg/kg]			[kg/day]			pcs	[kg/day]		
						CO	NO_x	C_xH_y	CO	NO_x	C_xH_y		CO	NO_x	C_xH_y
Demolishing	Heavy-duty machines (rotating excavator, dumpers)	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	2,0	223,1	31,9	8,0
	Dredger equipped with hydraulic crushing head	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	3,0	502,0	71,7	17,9
	Crusher (with jaws or centrifuge crusher)	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	1,0	167,3	23,9	6,0
T	Heavy-duty machines (rotating excavator, dumper, etc.)	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	20+8 (mobilis . area.)	3123,5	446,2	111,6
Foundation	Heavy-duty machines (dumper truck, etc.)	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	12,0	1338,6	191,2	47,8
	Concrete mixer	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	2,0	334,7	47,8	12,0
	Pump	2	24	48	39,8	0,28	0,04	0,01	11,2	1,6	0,4	1,0	11,2	1,6	0,4
	Mobile crane	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	1,0	111,6	15,9	4,0
Assembly work	Heavy-duty machines (rotating excavator, dumper, etc.)	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	24,0	2677,2	382,5	95,6
	Electric tower crane	-	24	-	-							10,0			
	Diesel tower crane	40	24	960	796,8	0,28	0,04	0,01	223,1	31,9	8,0	2,0	446,2	63,7	15,9
	Mobile crane	20	24	480	398,4	0,28	0,04	0,01	111,6	15,9	4,0	1,0	111,6	15,9	4,0
	Dredger ship	40	24	960	796,8	0,28	0,04	0,01	223,1	31,9	8,0	1,0	223,1	31,9	8,0
	Gap masonry machine	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	1,0	167,3	23,9	6,0
	Concrete mixer	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	2,0	334,7	47,8	12,0
	Platform vibrator	5	24	120	99,6	0,28	0,04	0,01	27,9	4,0	1,0	2,0	55,8	8,0	2,0
	Rod vibrator	-	24	-	-							2,0			
	Crane truck	30	24	720	597,6	0,28	0,04	0,01	167,3	23,9	6,0	1,0	167,3	23,9	6,0

Comment:
Gasoil density [kg/dm^3] (MSZ EN ISO 3675) 0,83
T – landscaping

Table 16.4.2-2: Characteristics of air polluting sources during plant construction

16.4.2.1.2 Air polluting sources and their characteristics along 400 kV block transmission line and 120 kV transmission line up to the new sub-station

Landscaping on area for transmission line poles
Topsoil removal and deposition, foundation of transmission line poles
Pole assembly and erection, transmission line pulling and assembly

The construction leadtime will be nearly 8-10 months, but works may take even longer than 1 year. Though the construction phase is broken down to several phases, we apply the limits onto the total construction process. During the construction process heavy-duty earth machines, heavy-duty construction machines and transportation vehicles will be the predominant sources for air polluting materials. Construction operations will be performed daytime. Based on experiences acquired on construction works similar to the planned project we use data presented in the following table for calculating the air polluting impacts of the construction:

	Description	**Motor fuel consumption**	**Operation time**	**Consumed gasoil**		**Specific emissions**			**Total emission (1 vehicle)**			**Pieces**	**Total emission**		
		[litre/h]	[h/day]	[litre/day]	[kg/day]	[kg/kg]			[kg/day]			pcs	[kg/day]		
						CO	**NO_x**	**C_xH_y**	**CO**	**NO_x**	**C_xH_y**		**CO**	**NO_x**	**C_xH_y**
Landscaping	Heavy-duty machines (truck, bulldozer)	20	16	200	166	0,28	0,04	0,01	74,4	10,6	2,7	2	148,7	21,2	5,3
Foundation	Heavy-duty machines (hydraulic dredger with deep digging unit, bulldozer and excavator, piling machine with internal combustion engine or comprised air)	20	16	200	166	0,28	0,04	0,01	74,4	10,6	2,7	6	446,2	63,7	15,9
Assembly	Heavy-duty machines (truck, jeep, agricultural heavy-duty machine, transmission line pulling machine line)	20	16	200	166	0,28	0,04	0,01	74,4	10,6	2,7	9	669,3	95,6	23,9

Comment:
Gasoil density [kg/dm^3] (MSZ EN ISO 3675) 0,83

Table 16.4.2-3: Characteristics of pollution sosurces of block transmission lines and a transmission line construction

16.4.2.1.3 Transportation

Transportation operations will be carried out on road, railway and water (barges). Road transportation will be operated daytime. This operation will also cause higher traffic of passenger transporting vehicles.

Alternatives of road traffic with identical level of probability:

- *M6 motorway towards north and south,*
- *Main road no. 6 towards north and south.*

Description	**Motor fuel consumption**	**Motor capacity**	**Duration of stay**	**Motor energy need**	**Specific emission (EURO 5)**			**Emission (1 vehicle)**			**Pieces**	**Total emission**		
	[litre/100 km]	[kW]	[h/day]	[kWh]	[g/kWh]			[kg/day]			pcs/day	[kg/day]		
					CO	NO_x	C_xH_y	CO	NO_x	C_xH_y		CO	NO_x	C_xH_y
Truck (3-4 axle dumper truck, etc.)	17	200	2	400	1,5	2	0,46	0,6	0,8	0,184	130	78	104	23,92
Passenger transportation (bus, mini bus)	17	200	2	400	1,5	2	0,46	0,6	0,8	0,184	84	50,4	67,2	15,456
	Motor fuel consumption	**Distance covered**	**Consumed gasoil**	**Consumed gasoil**	**Specific emissions (EURO 5)**			**Emission (1 vehicle)**			**Pieces**	**Total emission**		
	[litre/100 km]	[km]	[litre/day]	[kg/day]	[g/km]			[kg/day]			pcs/day	[kg/day]		
					CO	NO_x	C_xH_y	CO	NO_x	C_xH_y		CO	NO_x	C_xH_y
Passenger car	8	100	8	6,64	0,5	0,18	0,05	0,05	0,018	0,005	350	17,5	6,3	1,75

Table 16.4.2-4: Air polluting sources and their characteristics of transportaion during the construction phase

16.4.3 IMPACTS AND IMPACT ZONES OF CONSTRUCTION

Emission of non-radioactive polluting material related to the implementation of Paks II can be connected to the construction works and the related traffic emissions.

16.4.3.1 Construction works impacts

We calculated the propagation for the following four periods of the implementation process:

- demolishing,
- landscaping,
- foundation,
- structure construction.

Emission data for stationary sources (point, and local sources in the area) related to construction works and for various periods were available. We prepared the propagation simulations for air polluting materials where we had the relevant emission data, like carbon monoxide (CO), nitrogen oxides (NO_x) and hydrocarbons (C_xH_y).

During the impacts survey we used data presented in Table 16.4.2-1- Table 16.4.2-3.

During landscaping when the cultivated soil / topsoil is removed, we estimated the dust quantity emitted into the atmosphere as 0,029 kg/ton in line with the reference given in the relevant professional literature [16-11]. based also on references form professional literature [16-11]; [16-12] we defined the PM_{10} content of dust quantity emitted into the atmosphere as 7 g / m^3, as a fairly conservative estimate. This value means that if we move 1 m^3 soil, then this PM_{10} quantity would be emitted into the atmosphere (in case of wet soil the quality would be lower) under this pessimistic estimate. We calculated the volume and quantity of the moved soil using the available data (i.e. size of the working area and depth of the removed soil – and the moved soil quantity moved during landscaping was taken as 119 376 m^3, and during foundation it was total 821 260 m^3). The assumed duration of the emission was takes as 3 months. We selected high number of points in the source area and allocated the total emitted quantity onto each point for the relevant emission period. Thus and based on the locations of the source points we could estimate also the quantity and impact zone of particulate matter (PM_{10}) emitted into the atmosphere due to dusting

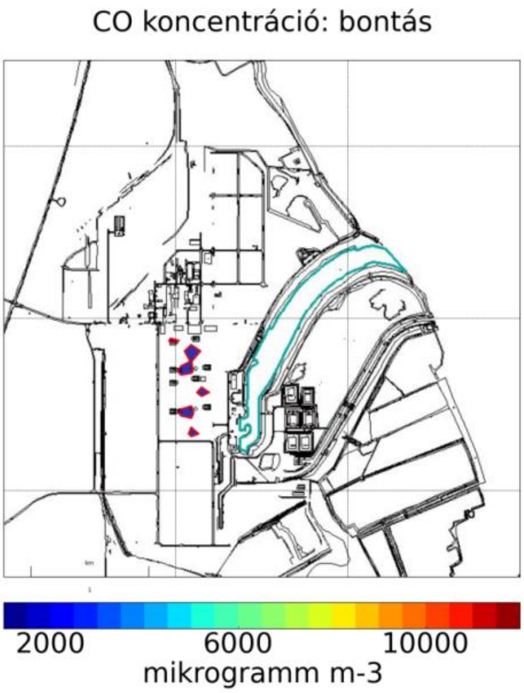
16.4.3.1.1 Demolishing period

Regarding the demolishing period we calculated the concentration fields and impact zones of polluting materials based on emission data defined in Table 16.4.2-2.

	CO	NO_x	C_xH_y
	μg/m^3		
max. concentration	1 450	117	29
Value exceeding limit	none	on operation area	on operation area
limit 10%-a	1 000	10	1
impact zone (if applicable)	yes	yes	yes
impact zone	on operation area	within 500 m radius from the operation area	within 500 m radius from the operation area

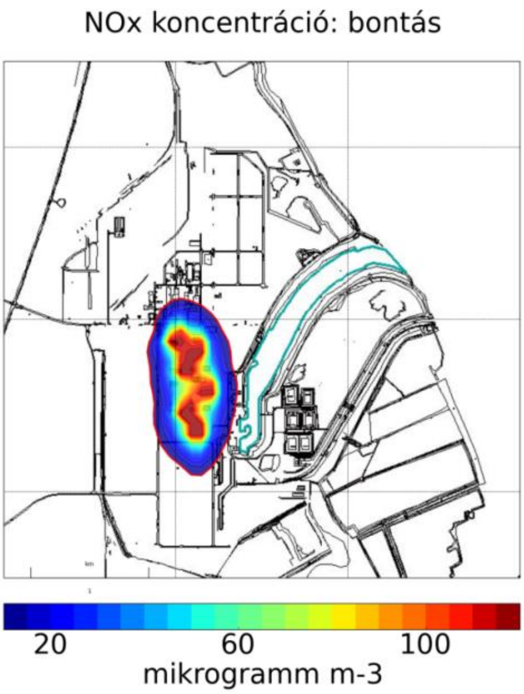
Table 16.4.3-1: Maximum concentration and impact zones calculated for the demolishing phase

The following figures present the immission values concentration for each pollutant calculated with real meteorological data and the borderlines of the impact zone marked with red contour lines, for the nitrogen oxides (NO_x) in Figure 16.4.3-2, and for carbon-monoxide (CO) in Figure 16.4.3-1, and for hydrocarbons (C_xH_y) in Figure 16.4.3-3.



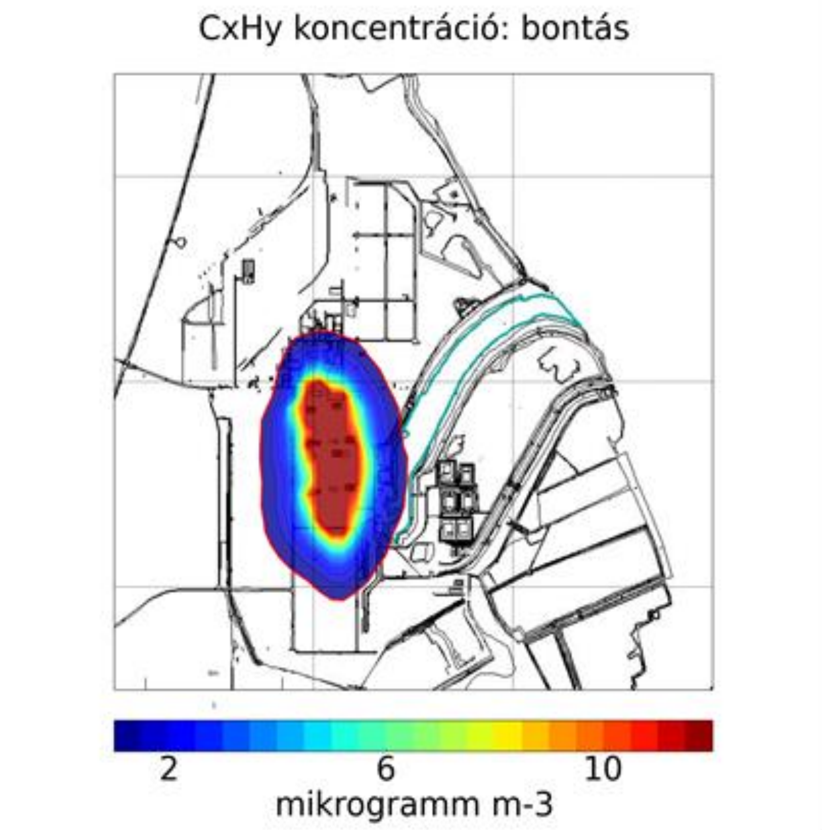
CO koncentráció: bontás - CO concentration during the demolishing period

Figure 16.4.3-1: CO impact zone during the demolishing period



NO_x koncentráció: bontás - NO_x concentration during the demolishing period

Figure 16.4.3-2: NO_X impact zone during the demolishing period



CxHy koncentráció: bontás - CxHy concentration during the demolishing period

Figure 16.4.3-3: C_xH_y impact zone during the demolishing period

We can make the following conclusions on non-radioactive air polluting impacts emitted during the demolishing works and the relevant impact zones:

- Carbon-monoxide (CO):

  Calculating with real meteorological conditions, no value was higher than the limit, and the impact zone is located within the operation area.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only in the direct vicinity of source points, and the impact zone is located within the operation area.

- Nitrogen oxides (NO_x):

  Calculating with real meteorological conditions, NO_x value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

  Calculating with conservative meteorological conditions value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

- Hydrocarbons (C_xH_y):

  Calculating with real meteorological conditions, C_xH_y value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

- Calculating with conservative meteorological conditions, value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

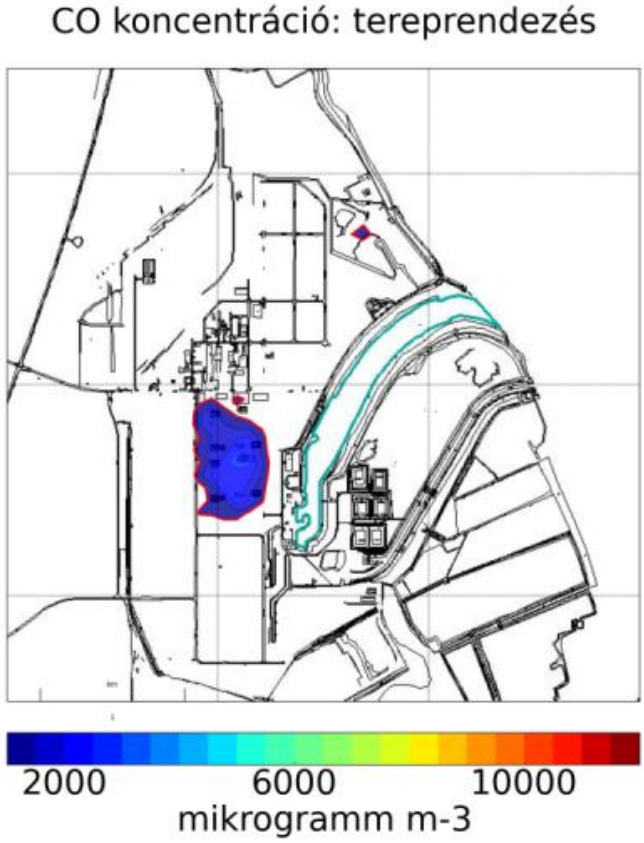
16.4.3.1.2 Landscaping period

Regarding the landscaping period, we calculated the concentration fields and impact zones of polluting materials based on emission data defined for earthworks in Table 16.4.2-1 and in Table 16.4.2-2.

	CO	**NO_x**	**C_xH_y**	**PM_{10}**
	µg/m^3			
max. concentration	1 840	263	66	11
Value exceeding the limit	none	within the operation and mobilisation area	within the operation and mobilisation area	none
limit 10%-a	1 000	10	1	4,6
impact zone (if applicable)	yes	yes	yes	yes
impact zone	within the operation and mobilisation area	within 500 m radius from the operation and mobilisation area	within 1000 m radius from the operation and mobilisation area l	within the operation and mobilisation area

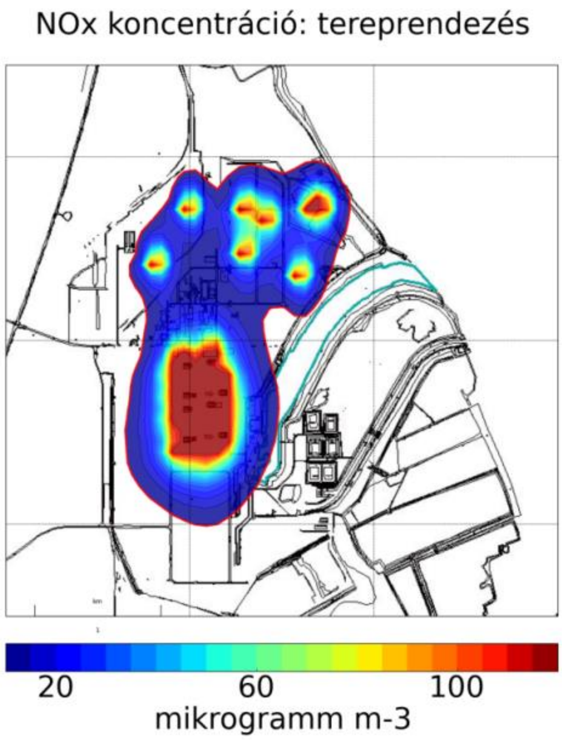
Table 16.4.3-2: Maximum concentrations and impact zones calculated for the landscaping period

The following figures present the impact zones, carbon monoxide (CO) - Figure 16.4.3-4, nitrogen oxides (NO_x) - Figure 16.4.3-5, hydrocarbons (C_xH_y) - Figure 16.4.3-6, particulate matter (PM_{10}) - Figure 16.4.3-7



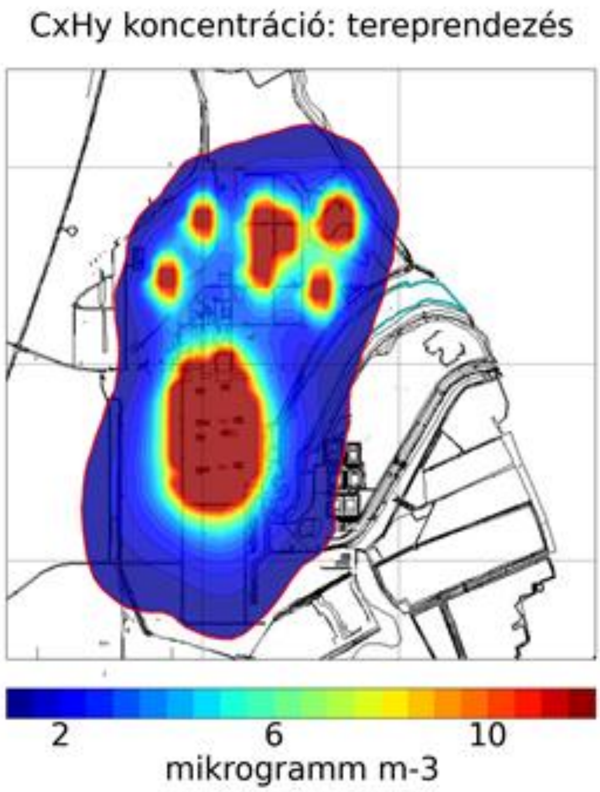
CO koncentráció: tereprendezés - CO concentration during the landscaping period

Figure 16.4.3-4: CO impact zone during the landscaping period



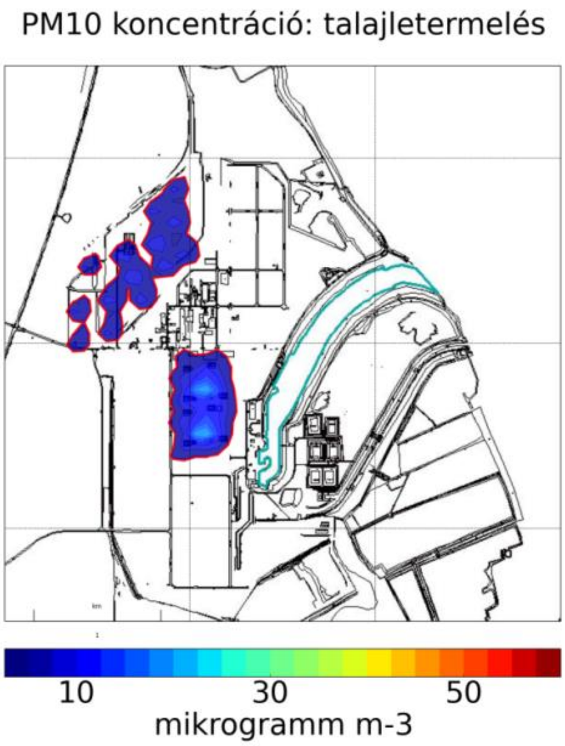
NO_x koncentráció: tereprendezés - NO_x concentration during the landscaping period

Figure 16.4.3-5: NO_X impact zone during the landscaping period



CxHy koncentráció: tereprendezés - CxHy concentration during the landscaping period

Figure 16.4.3-6: C_xH_y impact zone during the landscaping period



PM_{10} koncentráció: talajtermelés - PM_{10} concentration during the soil removal

Figure 16.4.3-7: PM_{10} impact zone during the soil removal

We can make the following conclusions on radioactive emissions impacts and impact zones related to landscaping works

- Carbon monoxide (CO):

  Calculating with real meteorological conditions, there was no CO value higher than the limit, and the impact zone is located within the operation and mobilisation areas.

  Calculating with conservative meteorological conditions value higher than the limit occurred only in the direct vicinity of the source points, and the impact zone is located within the operation and mobilisation areas
- Nitrogen oxides (NO_x):

  Calculating with real meteorological conditions, NO_x value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

  Calculating with conservative meteorological conditions value higher than the limit can emerge within the operation and mobilisation areas, and the impact zone is located within 500 m radius of the operation and mobilisation areas
- Hydrocarbons (C_xH_y):

  Calculating with real meteorological conditions, C_xH_y value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation and mobilisation area.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only within and mobilisation areas, and the impact zone is located within 1000 m radius of the operation and mobilisation area.
- Particulate matter (PM_{10}):

  Calculating with real meteorological conditions, there was no PM_{10}value higher than the limit, and the impact zone is located within the operation and mobilisation areas.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only in the direct vicinity of source points, and the impact zone is located within the operation and mobilisation areas.

We prepared the calculations also for the earthworks related to the block and transmission lines using data from Table 16.4.2-1, and emission data in Table 16.4.2-4. As the results can demonstrate, there no impact zone could be identified.

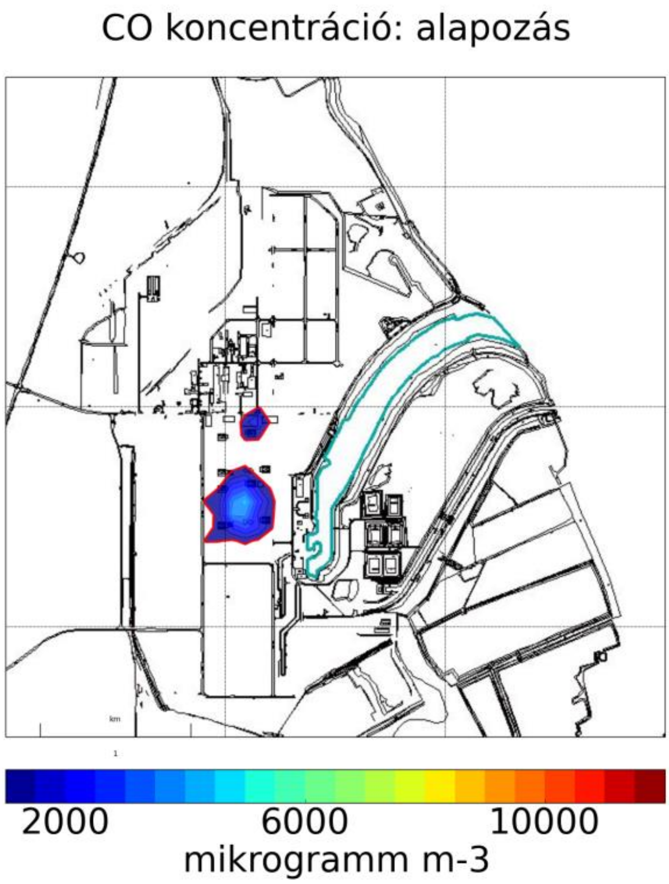
16.4.3.1.3 Foundation period

Regarding the foundation period, we calculated the concentration fields and impact zones of polluting materials based on emission data defined for earthworks in Table 16.4.2-1 and Table 16.4.2-2.

	CO	**NO_x**	**C_xH_y**	**PM_{10}**
	μg/m³			
max. concentration	1 562	223	56	190
Value exceeding limit	none	on operation area	on operation area	on operation area
Limit 10%-a	1 000	10	1	4,6
Impact zone (if applicable)	yes	yes	yes	yes
impact zone	on operation area	within 1000 m radius from operation are	within 1000 m radius from operation are	within 1000 m radius from operation are

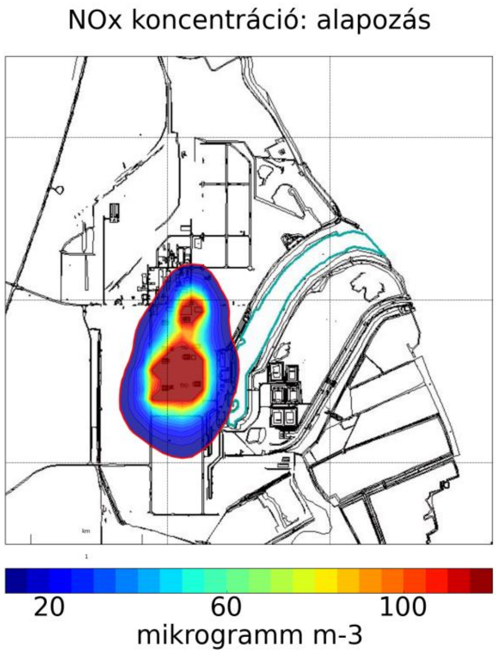
Table 16.4.3-3: Maximum concentration and impact zones calculated for foundations

The following figures present the impact zones for carbon monoxide (CO) - Figure 16.4.3-8, nitrogen oxides (NO_x) - Figure 16.4.3-9, hydrocarbons (C_xH_y) - Figure 16.4.3-10, particulate matter (PM_{10}) - Figure 16.4.3-11.



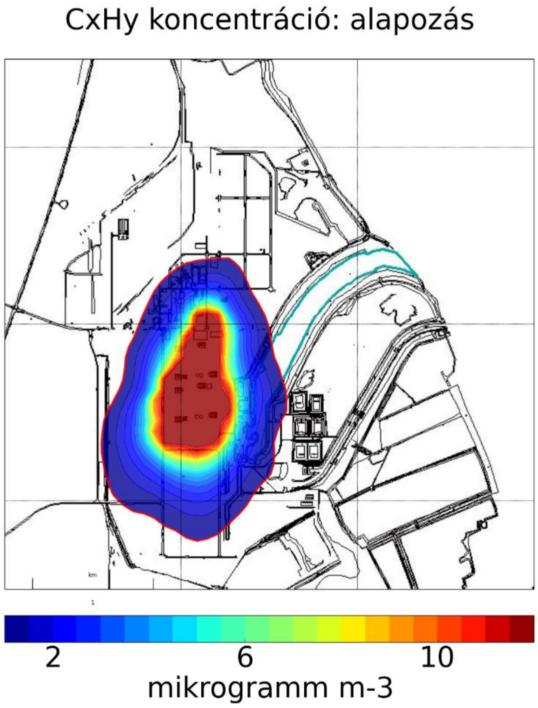
CO koncentráció: alapozás - CO concentration during the foundation period

Figure 16.4.3-8: CO impact zone during the foundation period



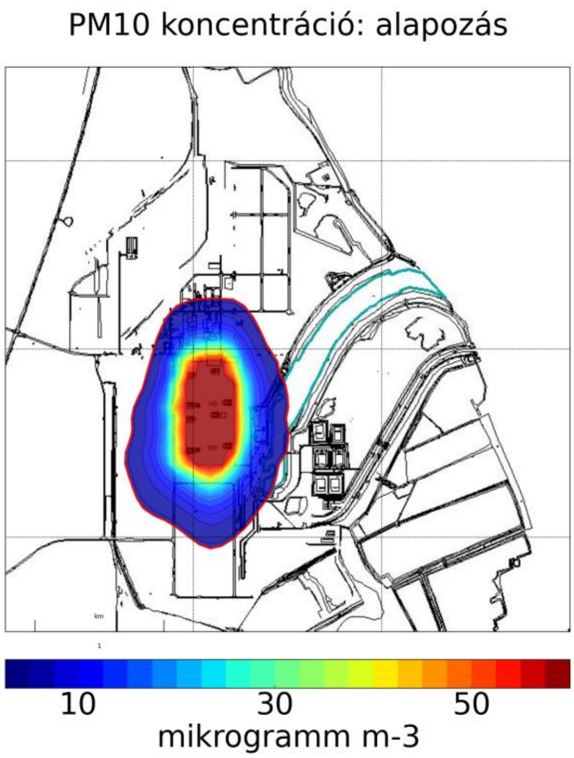
NO_x koncentráció: alapozás - NO_x concentration during the foundation period

Figure 16.4.3-9: NO_X impact zone during the foundation period



CxHy koncentráció: alapozás - CxHy concentration during the foundation period

Figure 16.4.3-10: C_xH_y impact zone during the foundation period



PM_{10} koncentráció: alapozás - PM_{10} concentration during the foundation period

Figure 16.4.3-11: PM_{10} impact zone during the foundation period

We can make the following conclusions on radioactive emissions impacts and impact zones related to foundation works:

- Carbon monoxide (CO):

  Calculating with real meteorological conditions, there was no CO value higher than the limit, and the impact zone is located within the operation area.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only in the direct vicinity of source points, and the impact zone is located within the operation area.

- Nitrogen oxides (NO_x):

  Calculating with real meteorological conditions, NO_x value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

  Calculating with conservative meteorological conditions value higher than the limit can emerge only within the operation area, the impact zone is located within 1000 m radius of the operation area.

- Hydrocarbons (C_xH_y):

  Calculating with real meteorological conditions, C_xH_y value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

  Calculating with conservative meteorological conditions value higher than the limit can emerge only within the operation area, the impact zone is located within 1000 m radius of the operation area

- Particulate matter (PM_{10}):

  Calculating with real meteorological conditions, PM_{10} value higher than the limit can emerge only within the operation area, the impact zone is located within 500 m radius of the operation area.

  Calculating with conservative meteorological conditions value higher than the limit can emerge only within the operation area, the impact zone is located within 1000 m radius of the operation area.

We prepared the calculations also for the earthworks related to the block and transmission lines using data from Table 16.4.2-1, and emission data in Table 16.4.2-4. As the results can demonstrate, there no impact zone could be identified.

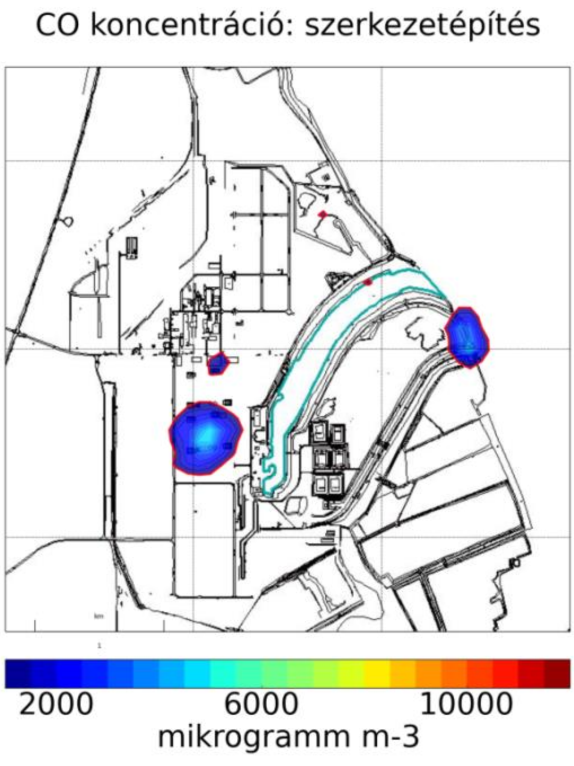
16.4.3.1.1 Structure construction period

Regarding the structure construction period, we calculated the concentration fields and impact zones of polluting materials based on emission data defined in Table 16.4.2-2.

	CO	**NO_x**	**C_xH_y**
	μg/m³		
max. concentration	2 570	367	92
Value exceeding limit	none	within the operation and mobilisation area and island	within the operation and mobilisation area and island
limit 10%-a	1 000	10	1
impact zone (if applicable)	yes	yes	yes
impact zone	within the operation and mobilisation area and island	within 1000 m radius from the emission	within 1000 m radius from the emission

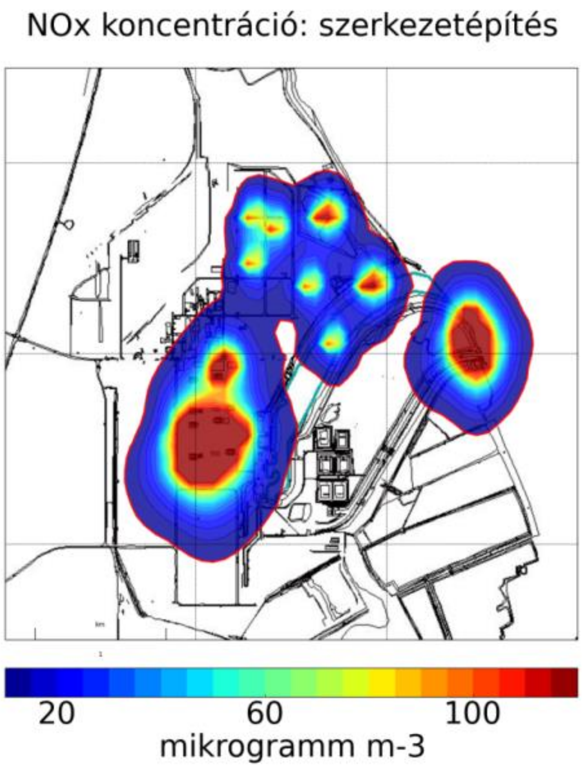
Table 16.4.3-4: Maximum concentration and a impact zones calculated for the structure construction period

The following figures present the impact zones for carbon monoxide (CO) - Figure 16.4.3-12, nitrogen oxides (NO_x) - Figure 16.4.3-13, hydrocarbons (C_xH_y) - Figure 16.4.3-14.



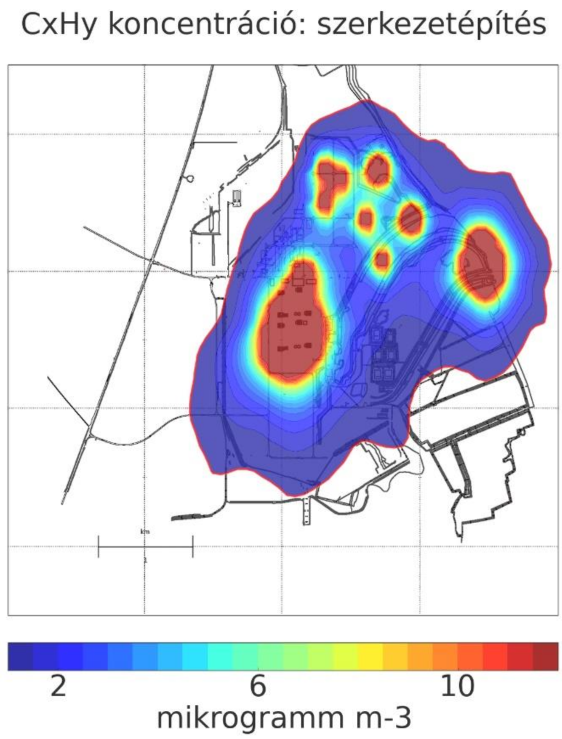
CO koncentráció: szerekzetépítés - CO concentration during the construction period

Figure 16.4.3-12: CO impact zone during the structure construction period



NO_x koncentráció: szerekzetépítés - NO_x concentration during the construction period

Figure 16.4.3-13: NO_x impact zone during the structure construction period



CxHy koncentráció: szerekzetépítés - CxHy concentration during the construction period

Figure 16.4.3-14: CxHy impact zone during the structure construction period

We can make the following conclusions on radioactive emissions impacts and impact zones related to structure construction works:

- Carbon-monoxide (CO):

  Calculating with real meteorological conditions, there was no CO value higher than the limit, and the impact zone is located within the operation and mobilisation areas and on the island.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only in direct vicinity of source points, but the impact zone is located within the operation/mobilisation area and the island.
- Nitrogen oxides (NO_x):

  Calculating with real meteorological conditions, NO_x value higher than the limit can emerge only within the operation and mobilisation areas and within the island, and the impact zone within 1000 m radius of the emission.

  Calculating with conservative meteorological conditions, value higher than the limit can emerge only within the operation area, the impact zone is located within 1000 m radius of the source points
- Hydrocarbons (C_xH_y):

  Calculating with real meteorological conditions, C_xH_y value higher than the limit can emerge only within the operation and mobilisation area and within the island, and the impact zone is located within 500 m radius of the emissions.

  Calculating with conservative meteorological conditions value higher than the limit can emerge only within the operation area, the impact zone is located within 1000 m radius of the operation area.

We wish to note that during the above calculations we estimated the impacts for NO_x and C_xH_y using a conservative approach, thus the expected actual impacts are restricted to a smaller area. However, assuming the long term existence of the most unfavourable meteorological conditions for the eventual dilution of the atmospheric polluting materials values higher than the limit may emerge also in larger area, and thus the impact zone may extend the boundaries of the operation area. If we can predict that unfavourable weather conditions remain in place for a longer period of time the works can be suspended and as a result higher concentration values and evolution of larger impact zones may be prevented.

16.4.3.1.2 Summary: impacts during the implementation phase

Under real meteorological conditions

	CO	NO_x	C_xH_y	PM_{10}
Demolishing				
max. conc. (μg/m^3):	1 450	117	29	
value exceeding limit:	none	on the operation area	on the operation area	-
impact zone:	on the operation area	within 500 m radius from the operation area	within 500 m radius from the operation area	-
Landscaping				
max. conc. (μg/m^3):	1 840	263	66	11
Value exceeding limit:	none	within the operation and mobilisation area	within the operation and mobilisation area	none
impact zone:	within the operation and mobilisation area	within 500 m radius from operation/mobilisation area	within 500 m radius from operation/mobilisation area	within the operation and mobilisation area
Foundation				
max. conc. (μg/m^3):	1 562	223	56	190
Value exceeding limit:	none	on the operation area	on the operation area	on the operation area
impact zone:	on the operation area	within 500 m radius from the operation area	within 500 m radius from the operation area	within 500 m radius from the operation area
Structure construction				
max. conc. (μg/m^3):	2 570	367	92	
Value exceeding limit:	none	within the operation and mobilisation area and island	within the operation and mobilisation area and island	-
impact zone:	within the operation and mobilisation area and island	within 500 m radius from the operation area	within 500 m radius from the operation area	-

Table 16.4.3-5: Impacts of Paks II implementation onto the air quality under real meteorological conditions

Under conservative meteorological conditions

	CO	NO_x	C_xH_y	PM_{10}
Demolishing				
Value exceeding limit:	in direct vicinity of source points	on the operation area	on the operation area	-
impact zone:	on the operation area	within 500 m from the operation area	within 500 m from operation area	-
Landscaping				
Value exceeding limit:	in direct vicinity of source points	within operation and mobilisation area	within operation and mobilisation area	in direct vicinity of source points
impact zone:	within operation and mobilisation area	within 500 m from operation and mobilisation area	within 1000 m from operation and mobilisation area	within the operation and mobilisation area
Foundation				
Value exceeding limit:	in direct vicinity of source points	within 500 m from the operation area	within 500 m from the operation area	within 500 m from the operation area
impact zone:	on the operation area	within 1000 m from the operation area	within 1000 m from the operation area	within 1000 m from the operation area
Structure construction				
Value exceeding limit:	in direct vicinity of source points	within 500 m from the source points	within 500 m from the source points	-
impact zone:	within operation, mobilisation area and island	within 1000 m from source points	within 1000 m from the source points	-

Table 16.4.3-6: Impacts of Paks II implementation onto the air quality under conservative meteorological conditions

Under ordinary circumstances the aggregated load values arising from the relevant implementation phases will be presumably classified for the residential areas as *tolerable-neutral.*

16.4.3.2 Transportation impacts

Road traffic has alternatives with identical probability: M6 motorway and road no. 6. Traffic data for roads affected by demolishing and construction works are presented in sub-section nr. 15.4.3 of Paks II. KHT Noise and Vibration.

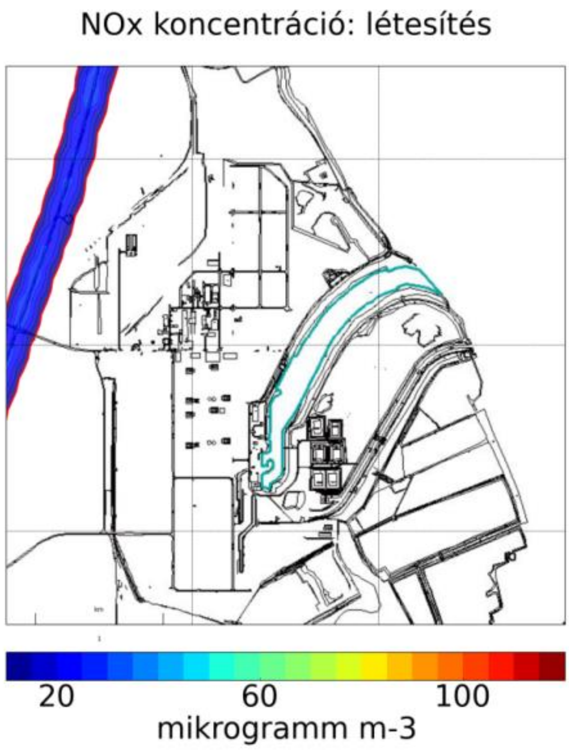
For studying the impacts related to transportation we used emission data shown in Table 16.4.2-4, and we prepared propagation simulations for significant air pollutant materials shown in this table, namely carbon monoxide (CO), a nitrogen oxides (NO_x) and hydrocarbons (C_xH_y).

For calculating the concentration values, the line sources were regarded as the set of point sources recorded next to each other with high-density.

Implementation			
Transportation			
Under real meteorological conditions			
	CO	**NO_x**	**C_xH_y**
max. conc. (μg/m^3):	27	33,1	0,63
Value exceeding limit:	none	none	none
impact zone:	none	within 100 m from transportation routes	none
Under conservative meteorological conditions			
	CO	**NO_x**	**C_xH_y**
Value exceeding limit:	none	none	none
impact zone:	none	within 100 m from transportation routes	none

Table 16.4.3-7: Impacts of transportation during Paks II implementation onto air quality under real and conservative meteorological conditions

The load arising from transportation will under ordinary load conditions be qualified as tolerable-neutral on the residential areas.



NO_x koncentráció: szerekzetépítés - NO_x concentration during the during the implementation

Figure 16.4.3-15: Average NOx impact zone emerging due to impacts of transportation during the implementation

We can make the following conclusions on non-radioactive emissions impacts and impact zones related to transportation:

- Carbon-monoxide (CO):

  Calculating with real meteorological conditions, there was no CO value higher than the limit, and no impact zone can be identified.

  Calculating with conservative meteorological conditions, there was no value higher than the limit, and no impact zone can be identified

- Nitrogen oxides (NO_x):

  Calculating with real meteorological conditions, there was no NOx value higher than the limit, and the impact zone is located within 100 m radius perpendicular to the routes.

  Calculating with conservative meteorological conditions, there was no value higher than the limit, and the impact zone is located within 100 m radius perpendicular to the routes

- Hydrocarbons (C_xH_y):

  Calculating with real meteorological conditions, there was no C_xH_y value higher than the limit, and no impact zone can be identified.

  Calculating with conservative meteorological conditions, there was no value higher than the limit, and no impact zone can be identified.

- Particulate matter (PM_{10}):

  Soil moved during landscaping and foundation works will be transported (if required) in truck with proper cover as prescribed, thus the dust load will most probably not increase along the transportation routes.

We wish to note here also that we over-estimated the impacts due to NO_x and C_xH_y using a conservative approach, thus the impacts expected along the transportation routes will be restricted to a smaller area.

16.4.4 TECHNICAL ACTIONS AIMING AT EMISSION MITIGATION

Emission of air polluting material of diffuse origin can be mitigated with the following technical actions:

Solids moved and dusted during landscaping and foundation works will spread in the ambient air; part of them settles down. Soil parameters (structure, humidity) and then prevailing meteorological conditions can significantly influence the degree of this process. Dusting solids may travel on larger distances only in case of strong wind, and if required it is reasonable to suspend works that can cause intensive dust formation. In case of dry periods dust formation can be mitigated with watering.

16.4.5 MONITORING SYSTEM

Based on detailed modelling results we can state that impacts of the implementation will cover the site and its direct environment even assuming conservative meteorological conditions.

The nearest residential building at Csámpa is located 1 330 m, in Paks 2 960 m. and in Dunaszentbenedek 2 590 m from Paks II. construction area. With regard to these significant distances there is no need and argument for establishing stations for pollution monitoring at the test points.

However, considering the size and extension of the project and ~10 year of the complex implementation process it is reasonable, for the sake of security, to monitor air pollution on residential areas located nearest to the planned site.

The proposed measurement points are the following:

- 1 point on Paks-Csámpa settlement, at the residential areas located along road no. 6.
- 1 point at the left bank of the River Danube
- 1 point in Paks city in the vicinity of Kölesdi road.

The proposed air pollution monitoring is the following:

- Continuous test of concentration of nitrogen dioxide (NO_2), nitrogen oxides (NO_X), and carbon monoxide (CO) integrated onto one hour average time using an analyser installed into a mobile measuring station.
  Duration of measurements for every measuring point: 14 days, twice in each season, total 8 times per annum (8 x 14 days)
- Particulate matter fraction below 10 µm (PM_{10}), total particulate matter (TSPM) pollution test applying 24-hour exposition time and phased active test technique.
  Duration of measurements for every measuring point: 14 days, twice in each season, total 8 times per annum (8 x 14 days).
- Continuous test of concentration of ozone (O_3) integrated onto one hour average time using an analyser installed into a mobile measuring station.
  Duration of measurements for every measuring point: 14 days, twice in each season, total 8 times per annum (8 x 14 days).
- Settling dust pollution test applying passive test technique.
- Duration of measurements for every measuring point: 30 days, once in each season, total 4 times per annum (4 x 30 days).

Parallel with air pollution test we also propose to continuously register the values of meteorological characteristics (temperature, humidity, wind speed, wind direction) integrated for 1 hour interval.

Accredited laboratory may perform the test applying approved instrument types.

It is advisable to launch the tests one year prior to starting the implementation, as thus we can ensure that the baseline pollution of the area is recorded as the reference point. The test program ought to continue throughout the entire implementation phase as thus we can ensure recording and documentation of the actual states.

16.5 IMPACTS OF NON- RADIOACTIVE AIR POLLUTANTS EMITTED DURING PAKS II. OPERATION

16.5.1 IMPACTS OF PAKS II ORDINARY OPERATION

16.5.1.1 Air polluting sources and characteristics of Paks II. ordinary operation

Air polluting point sources – Diesel generators

Four diesel generators each with ~7,5 MW_e capacity will provide power supply for every unit for the safety systems during operational disturbances (outage, the delivered combustion heat will be 18,75 MW_{th} per unit

Any diesel generator shall be able to secure the required power supply in case of an eventual emergency shutdown.

According to plans, these diesel generators will under ordinary operation circumstances operate only in test or pilot operation mode. Emissions are determined on the basis of the following key conditions:

a) *As one diesel generator shall secure power supply if the relevant unit is eventually shut down, every diesel generator will individually perform monthly 8-hour as test run one-by-one, thus approaching real operation conditions for diesel generators,*
b) *each of the 8 diesel generators will operate 8 hours during one month separately, one-by-one and not simultaneously,*
c) each of the 8 diesel generators will operate 12 x 8 hours during one year, separately, one-by-one, thus the annual operation time is 768 hours.

Based on the above, the expected emission of the diesel generators will be as it follows.

Emission			**Operation time**	**Operation time**	**Height**
[kg/h]*	**[kg/month]****	**[kg/year]*****	**[h/month/unit]**	**[h/year/unit]**	**[m]**
CO: 26,7 NO_x: 3,8 C_xH_y: 1	CO: 1709 NO_x: 243,2 C_xH_y: 64	CO: 20506 NO_x: 2918 C_xH_y: 768	8	8 x 12	19 19 19 19

Comment:
* emission of one diesel generator was used for calculating the hourly emission .
** total 8 x 8 = 64 hours operation time
*** total 8 x 8 x 12 = 768 hours operation time

Table 16.5.1-1: Point sources and their characteristics during the operation period

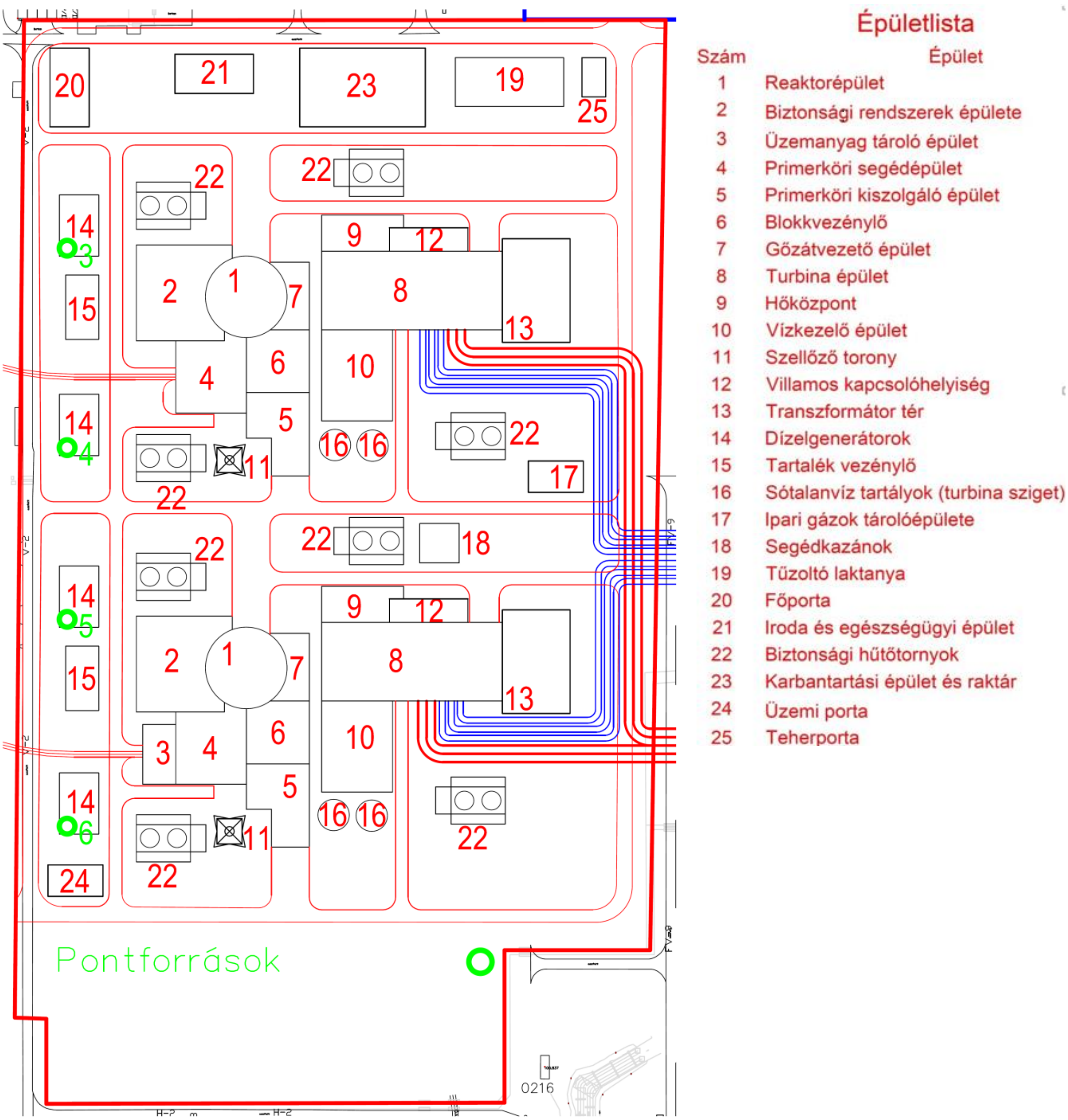
Technological emission limits of stationary diesel internal combustion engines

Appendix 7 of Decree 4/2011. (I. 14.) VM on air load limits and emission limits for stationary air polluting point sources, process-specific technology emission limits and other requirements 2.8.1, emission limits for stationary diesel internal combustion engines with higher than 5 MW_{th} capacity:

	Emission limit [mg/m³] (air pollutant concentration)		
Diesel engines	**Carbon monoxide**	**Nitrogen oxides (expressed in NO_2)**	**Solid material**
In case of capacity higher than 5 MW_{th}	650	2 000 500*	130

Comment:
the emission limits apply on dry tail gas with 5 vol% O_2-content, at 273 K temperature and 101,3 kPa pressure
* in case of new diesel engines with higher than 5 MW_{th} capacity, the 500 mg/m³ limit for nitrogen oxides shall not be applied if the engine operates less than annual 500 hours

Table 16.5.1-2: Emission limits for diesel generators



Épületlista - List of buildings
1 reactor building
2 security system building
3 fuel storage
4 primary line auxiliary building
5 primary line service building
6 block control
7 steam transfer building
8 turbine building
9 heat centre
10 water treatment
11 venting tower
12 electric switchboard
13 transformer unit
14 diesel generators
15 stand-by control
16 desalinated water tanks (turbine island)
17 industrial gas storage
18 auxiliary boilers
19 fire brigade building
20 main entrance gate
21 office and health building
22 safety cooling towers
23 maintenance building and warehouse
24 service gate
25 entry gate for trucks
Pontforrások - Point sources

Figure 16.5.1-1: Location of point sources for the safety (stand-by) diesel generators

EOV coordinates of point sources for the safety (stand-by) diesel generators:

	Sr. nr.	Description	X	Y
1. unit	3	Diesel generator (2 units)	634 927	137 143
	4	Diesel generator (2 units)	634 927	137 275
2. unit	5	Diesel generator (2 units)	634 927	137 384
	6	Diesel generator (2 units)	634 927	137 511

Table 16.5.1-3: EOV coordinates of points sources for the safety (stand-by) diesel generators

Transportation

Vehicles (except the trucks) move on the road daytime not in a steady distribution rate, as 80% of passenger cars arrive in the morning between 6-7 hours and depart in the afternoon between 14-15 hours.

Vehicles have the following alternative routes with identical probability:

- *M6 motorway to north and south,*
- *road no. 6. to north and south.*

Description	Motor fuel consumption	Motor capacity	Duration of stay	Motor energy need	Specific emissions (EURO 5)			Total emission (1 vehicle)			Pieces	Total emission		
	[litre/100 km]	[kW]	[h/day]	[kWh]	[g/kWh]			[kg/day]			pcs/day	[kg/day]		
					CO	NO_x	C_xH_y	CO	NO_x	C_xH_y		CO	NOx	C_xH_y
Freight transportation (3-4 axle dumper truck, etc.)	17	200	2	400	1,5	2	0,46	0,6	0,8	0,184	5	3	4	0,92
Passenger transporta-tion (bus, mini bus)	17	200	2	400	1,5	2	0,46	0,6	0,8	0,184	11	6,6	8,8	2,024
	Motor fuel consumption	**Kilometre covered**	**Consumed gasoil**	**Consumed gasoil**	**Specific emissions (EURO 5) [**			**Total emission (1 vehicle)**			**Pieces**	**Total emission**		
	[litre/100 km]	[km]	[litre/day]	[kg/day]	[g/km]			[kg/day]			pcs/day	kg/day]		
					CO	NO_x	C_xH_y	CO	NO_x	C_xH_y		CO	NO_x	C_xH_y
Passenger car	8	100	8	6,64	0,5	0,18	0,05	0,05	0,018	0,005	45	2,25	0,81	0,225

Table 16.5.1-4: Air polluting sources and their characteristics during the operation period – transportation

16.5.1.2 Impacts and impact zone of Paks II. operation

During Paks II. operation phase and assuming ordinary operation mode, non-radioactive emission may emerge during the planned pilot or test operation of diesel generators that prove power supply for the safety systems in case of any operational disturbance or emergency.

The stationary air polluting point sources will be the chimneys of the diesel generators.

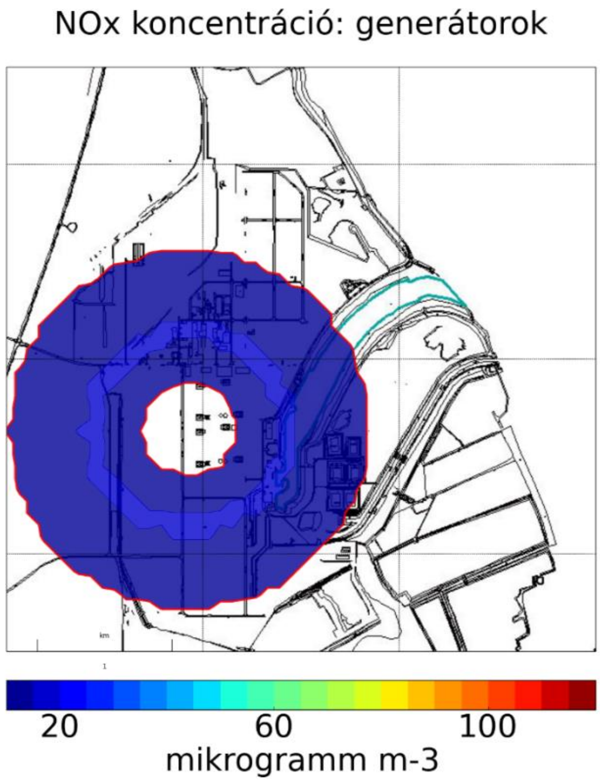
Based on the emission time and the quantity of the emitted polluting materials (Table 16.5.1-1) the limit values will not be exceeded in any of the air polluting materials.

During the modelling process we used the emission values as described above, so the arising modelling values are presented in Table 16.5.1-5.

	CO	**NO_x**	**C_xH_y**
max. conc. ($\mu g/m^3$):	107,2	15,3	3,8
value higher than the limit	none	none	none
impact zone	none	Within 1300 m radius from the source points	Within 2000 m radius from the source points

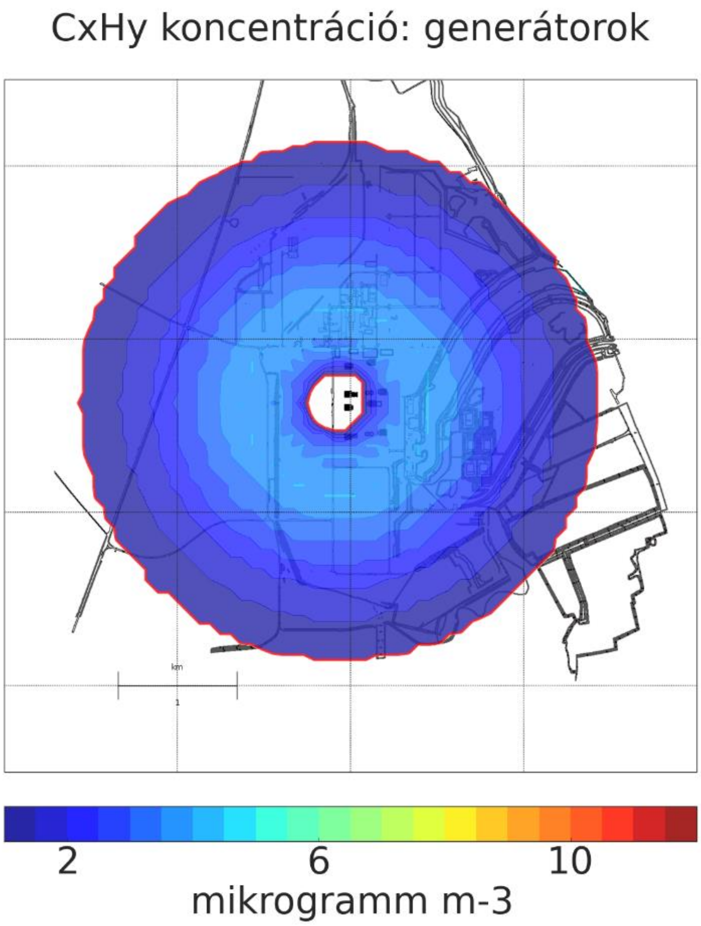
Table 16.5.1-5: Impacts of pilot operations of diesel generators

We defined the impact zone of point sources for the safety (stand-by) diesel generators also in accordance with Article 2 § 14 of the Government Decree 306/2010. Impact zone of diesel generators during pilot/test operation cannot be interpreted using the maximum concentration value of the hourly CO emissions, i.e. there is no impact zone. Regarding NOx and CxHy, the impact zone will be as it follows (Figure 16.5.1-2 and Figure 16.5.1-3).



NO_x koncetráció: generátorok – NO_x concentration: diesel generators durin pilot/test operation

Figure 16.5.1-2: NO_X impact zone of diesel generators during pilot/test operation



CxHy koncetráció: generátorok – CxHy concentration: diesel generators durin pilot/test operation

Figure 16.5.1-3: C_xH_y impact zone of diesel generators during pilot/test operation

16.5.1.3 Impacts and impact zone of transportation

We prepared the propagation simulations for the operation phase and line sources related to transportation only for air pollutants where we had the relevant emission data, like carbon monoxide (CO), nitrogen oxides (NO_x) and hydrocarbons (C_xH_y). The survey of indirect impacts used the emission data presented in Table 16.5.1-4.

We calculated the expected atmospheric concentration distributions using the real meteorological database and conservative meteorological data.

Transportation			
	CO	**NO_x**	**C_xH_y**
max. conc. (µg/m³):	2,2	2,5	0,05
Value higher than the limit	none	none	none
impact zone:	none	none	none

Table 16.5.1-6: Impacts of transportation onto the air quality during Paks II operation

Based on impacts of transportation during the operation phase we can state that no value higher than the limit will occur irrespective whether we use for the calculation real or conservative meteorological conditions, and the emerging atmospheric concentration values are so small that we do not even present them in separate figures.

16.5.1 OPERATIONAL DISTURBANCES, EMERGENCES

Emergency shutdown of the plant

Regarding air quality protection, operational disturbance and event of emergency will be qualified as emission of air pollutants when the units must be shut down through the emergency process and the stand-by diesel generators start working and, of course, emitting.

Only one diesel generator should be able to support such emergency shutdown operation. In this situation one diesel generator will need to operate for 168-hour (uninterrupted) for each unit.

Emission	Quantity
	kg / 168 hour / diesel generator
CO	4485,8
NOx	638,2
CxHy	168

The concentration values and impact zones for the hourly periods regarding the impact zones are identical with the results presented in Section 16.5.1.2.

16.6 *IMPACTS OF PAKS II. ABANDONMENT ONTO THE AIR QUALITY*

Impacts that may emerge during Paks II abandonment can be hardly estimated due to the very long time horizon of this event and unavailability of exact data related to the abandonment. When the plant equipments are de-commissioned and demolished, we may assume that the load would be most probably very similar as during the plant construction phase. This will include works performed on the plant area and road traffic related to the transportation of the demolished materials.

The direct impact zone affected by air pollution during the abandonment phase can be described as the area delineated for the construction works during the structure construction period.

The direct impact zone of the abandonment phase will be within Paks II. area.

Indirect impacts will also emerge during the abandonment period, and the impact zone of traffic can be predicted as similar to the indirect impact zone of the implementation phase.

16.7 *IMPACTS AND IMPACT ZONES OF SIMULTANEOUS OPERATIONS IN PAKS II. AND PAKS NUCLEAR PLANT*

The baseline air pollution load measured in the ambient air in 2012-2013 also includes the impacts of non-radioactive emissions of a Paks Nuclear Plan. If we add the results of modelling of Paks II. independent impacts to the baseline measurement results, then we can have the combined impact of simultaneous operation of Paks II. and Paks Nuclear Plant.

Air pollutant	Baseline air load	Max. hourly concentration of test run of Paks II diesel generators	Combined impacts of Paks II. and a Paks Nuclear Plant a	Air pollution limit hourly
	(μg/m^3)			
Nitrogen oxides (NO_x)	30	15	45	100
Carbon monoxide (CO)	525	107	632	10 000

Table 16.5.1-1: Combined impact of Paks II and a Paks Nuclear Plant simultaneous operation onto air quality

As the results can demonstrate, neither will impacts of non-radioactive emissions from Paks II. standalone operation or combined and simultaneous operation of Paks II. and Paks Nuclear Plant substantially modify the existing air pollution conditions, and it will be qualified as *tolerable-neutral* for the residential areas.

Conventional air pollutants emitted during Paks II operation will have no recordable impacts onto air pollution, and they will not in merit modify the existing air pollution conditions. The impact zone will cover only the site and its direct environment, and will be qualified as *tolerable-neutral* for the residential areas.

Under the existing air pollution conditions, emissions from transportation will most presumably increase the air pollution levels only slightly and along the transportation routes, and this impact onto air pollution cannot be presented, and will be qualified as *tolerable-neutral*.

Based on the modelling results we can state that neither will impacts of cross-border air pollution from Paks II. standalone operation or combined and simultaneous operation of Paks II. and Paks Nuclear Plant occur.

16.8 CROSS-BORDER ENVIRONMENTAL IMPACTS

Based on the modelling results we can state that neither will impacts of non-radioactive emissions from Paks II. standalone operation or combined and simultaneous operation of Paks II. and Paks Nuclear Plant may lead to any cross-border pollution.

16.9 REFERENCE

[16-1] Extension of operation time of Paks Nuclear Plant - Environmental Impact Study, ETV-ERŐTERV Rt., 000000K00004ERE/A, 2006. February

[16-2] 2007. recapitulative assessment of Hungary's air quality based on manual measuring network, VITUKI Environmental Protection mi and Water Management Research Institute KHT., 2008. March 31.

[16-3] 2008. recapitulative assessment of Hungary's air quality based on manual measuring network, National Meteorological Service, 2009. March 31.]

[16-4] 2009. recapitulative assessment of Hungary's air quality based on manual measuring network, National Meteorological Service, 2010. March 31

[16-5] 2010. recapitulative assessment of Hungary's air quality based on manual measuring network, National Meteorological Service, 2011. March

[16-6] 2011. recapitulative assessment of Hungary's air quality based on manual measuring network, National Meteorological Service, 2012. March

[16-7] Aerosol filters XRF analysis, Paks, Fadd, AEKI 2010, 2011

[16-8] Preliminary consultation documentation Pöyry Erőterv Zrt. 6F111121/0002/O, 2012. 01.31.

[16-09] http://www.emc.ncep.noaa.gov/GFS/doc.php

[16-10] http://nomads.ncdc.noaa.gov/

[16-11] EPA, 1995, Heavy Construction Operations AP-42 Section 13.2.3 EPA Contract No. 69-D0-0123, Midwest Research Institute, 1995.

[16-12] EPA, 1998, Background Documentation For AP-42, Revision of Emission Factors for AP-42 Section 11.9, EPA Contract No. 69-D0-0159, Midwest Research Institute, 1998.