



## Audit Conclusion

18/04

### Funds earmarked for supporting air quality improvements

The audit was included in the audit plan of the Supreme Audit Office (hereinafter the “SAO”) for 2018 under number 18/04. The audit was managed and the Audit Conclusion drawn up by SAO member Mr Petr Neuvirt.

The objective of the audit was to examine the provision and use of funds spent on promoting air quality improvements and to examine whether these funds contributed to improving air quality in the Czech Republic.

The audit was conducted with the audited entities between February 2018 and September 2018.

The period under review was 2015-2017; both the previous and subsequent periods were also considered for contextual reasons.

Audited entities:

Ministry of the Environment (“MoE”); State Environmental Fund of the Czech Republic, Prague (“SEF”); Czech Hydrometeorological Institute, Prague (“CHMI”); South Bohemian Region, České Budějovice; Moravian-Silesian Region, Ostrava; Central Bohemian Region, Praha; Ústí Region, Ústí nad Labem; ADM Olomouc s.r.o., Olomouc; BPS Pacov s.r.o., Pacov; Cement Hranice, akciová společnost, Hranice; Elektrárny Opatovice, a.s., Opatovice nad Labem-Pardubice; METAZ Týnec a.s., Prague; PRECIOSA ORNELA, a.s., Zásada; Severočeské doly a.s., Chomutov; Wotan Forest, a.s., České Budějovice.

At its meeting no. XVI held on 10 December 2018, the **Board of the SAO** **approved**, by Resolution No. 6/X/2018, the **Audit Conclusion** as follows:

## KEY FACTS

*Report on the Environment of the Czech Republic 2017*

A total of **39 smog situations**, with a total duration of **3,757 hours**, were declared in 2017.

The **deaths** of approximately **5,700 people** could be attributed to polluted air in 2017.

## LARGEST EMISSION SOURCES

### THE TRANSPORT SECTOR PRODUCES

**32%** of the total NOx emissions

**8%** of the total gross particulate matter emissions

### THE ENERGY AND HEAT GENERATION SECTOR PRODUCES

**51%** of the total sulphur dioxide emissions

**27%** of the total NOx emissions

### THE HOUSEHOLD SECTOR PRODUCES

**98%** of the total benzo(a)pyrene emissions

**74%** of the total fine particulate matter emissions

**47%** of the total volatile organic compound emissions

(Source: CHMI - conclusions from the emission data for 2005-2016.)

## ALLOCATION FROM THE EU FUNDS FOR AIR QUALITY IMPROVEMENTS IN 2015-2017

CZK **6.4** billion  
FOR HOUSEHOLDS

CZK **3** billion  
FOR THE INDUSTRY

Minimum number of boiler replacements in the first two calls regarding "boiler subsidies"

**57,225**

=>

**10% non-compliant**  
boilers in emission classes 1 and 2!

## I. Summary and evaluation

The SAO performed an interim audit of the air quality improvement measures in the Czech Republic. The sources of funding of the measures include, without limitation, the Operational Programme *Environment* (“OPE”), priority axis 2: *Improving air quality in human settlements* (“PA2”) and the *National Programme Environment* (“NPE”). The SAO verified whether the measures specified in the programming documents and the resources used under PA2 of the OPE and the NPE contributed to the improvement of air quality in the Czech Republic.

**The data for the period 2015 to 2017 indicates that air quality does not improve in the Czech Republic. For certain priority pollutants,<sup>1</sup> the air pollution limits<sup>2</sup> specified by the law<sup>3</sup> continue to be exceeded in the long term. On the basis of the evaluation of the fulfilment of the individual measures, the interim evaluations, and the development in the emissions,<sup>4</sup> the SAO has concluded that certain measures specified in the strategic documents aimed at promoting air quality were not fulfilled and, for certain other measures, the specified deadlines were not met.**

**The system of funding under the OPE priority axis *Improving air quality in human settlements*” is set up to primarily support the replacement of obsolete and inadequate local heating sources in households, which represent a major source of air pollution in the Czech Republic. The replacement of the obsolete boilers<sup>5</sup> for low-emission sources leads to accelerating the decrease in emissions in this sector. The financial allocation under the first two calls covers the replacement of only 10% of the obsolete boilers. A significant improvement in the household heating sector can be expected only after 2022<sup>5</sup> after the operation of the obsolete boilers is generally banned by law. However, the resulting effect will largely depend on the level of compliance with the ban and its enforceability.**

**As regards the substantively completed projects aimed at reducing industrial emissions, the specified indicators have been met. The funds thus spent contribute to reducing the pollutant emissions into the air<sup>6</sup>.**

**On the basis of the audit conducted, the SAO identified significant risks of the failure to meet the objective specified in the area of air quality even by 2020<sup>7</sup>:**

---

<sup>1</sup> This concerns, in particular, suspended particles PM (depending on particle size, PM is divided into gross particulate matter (PM<sub>10</sub>) and fine particulate matter (PM<sub>2.5</sub>)); benzo(a)pyrene (BaP), and nitrogen dioxide (NO<sub>2</sub>). The overview of the main pollutants is provided in Annex 3 to this Audit Conclusion.

<sup>2</sup> The air pollution limit (ambient air quality standard) is the highest permissible air pollution level, expressed in mass concentration units. The selected applicable air pollution limits are specified in Annex 1 to this Audit Conclusion.

<sup>3</sup> Act No. 201/2012 Coll. on air protection (hereinafter also referred to as the “Act”).

<sup>4</sup> Emission means the introduction of substances into the ambient air, expressed in units of mass. The development of national emissions is specified in Annex 2 to this Audit Conclusion.

<sup>5</sup> Emission class 1 and 2 boilers according to ČSN EN 305-1, which will be illegal to operate after 1 September 2022 in the Czech Republic in accordance with Act No. 201/2012 Coll.

<sup>6</sup> Annex 5 to this Audit Conclusion lists all the audited projects aimed at reducing the emissions from local heating and from the industry as supported from PA2 of the OPE or from the NPE.

- 1. The strict national unexceedable emission limits of 2020 will be difficult to meet.** In the *National Emission Reduction Programme of the Czech Republic*, the Czech Republic set its own emission reduction objectives, the so-called *unexceedable national emission ceilings of 2020*. As regards the reduction of the emissions of fine particulate matter, there was a decrease by 12% from 2005 to 2016; in order to meet the national commitment, there would have to be a further decrease in the reduction of fine particulate matter by 42% between 2016 and 2020. However, the pace and level of reduction in the emissions of air pollutants is decelerating or fading in recent years.
- 2. The measures set for air quality improvement are not performed sufficiently and in time:**
  - A total of 7 out of the 23 priority measures of the *National Emission Reduction Programme of the Czech Republic* (“NERP”) were not fulfilled before the required deadline or before the completion of this audit<sup>8</sup>.
  - Another 6 of the 23 priority measures of the NERP are fulfilled on a continuous basis but there are significant risks of the failure to implement these measures in time and to the required extent<sup>9</sup>.
  - According to the interim evaluation<sup>10</sup> of the fulfilment of the programme measures to improve air quality, it is particularly the measures in the sector of transport that are not being fulfilled adequately. Their implementation is still only very limited, mainly as regards the transport infrastructure.
  - The MoE cannot evaluate the fulfilment of the measures under the AQIPs sufficiently and conclusively as it has no effective system in place for the timely collection of data and information.
- 3. The AQIP deficiencies found by the courts will not be rectified before 2020<sup>11</sup>** because the MoE plans to issue new and updated AQIPs during 2019. Within 12 months of issue, the municipalities and regions will be required to prepare their schedules for the

---

<sup>7</sup> The Czech Republic has repeatedly set for itself the goal of achieving compliance with the air pollution limits set by the Act, this time by 2020, through measures set at the national level in the *National Emission Reduction Programme of the Czech Republic* (“NERP”), approved at the end of 2015, and, at the regional level, in the Air Quality Improvement Programmes (“AQIPs”) issued by the MoE in the first half of 2016.

<sup>8</sup> They include, for example, measures to promote the acceleration of the replacement of passenger vehicles (responsibility of the MoE) and to stimulate the use of alternative fuel vehicles in road freight transport by reducing the road tax rate or by reducing the share of solid fossil fuels in stationary combustion sources that do not fall under the EU ETS system (e.g. household heating).

<sup>9</sup> They are, for example, the shift of freight transport from roads to railways, the implementation of measures to reduce energy consumption and increase energy efficiency, the construction of the backbone network of high-capacity routes for motor transport, or the priority construction of bypass roads around towns and municipalities and the associated possibility of introducing low-emission zones in urban areas.

<sup>10</sup> In 2018 the MoE presented the first interim evaluation of AQIPs for 2016.

<sup>11</sup> At the end of 2017 and in the first half of 2018 the Supreme Administrative Court and the Municipal Court in Prague ruled on four contested AQIPs; see Judgments of the Supreme Administrative Court Ref. Nos.: 6 As 288/2016-146, 4 As 250/2016-156, 9 As 17/2017-98, and Judgment of the Municipal Court in Prague Ref. No.: 10A 173/2016-119.

implementation of the measures. The first detailed AQIP implementation schedules will thus have no impact on the fulfilment of the strategic milestone of 2020.

- 4. There is a risk of the Czech Republic failing to meet the goal of reducing exposure for fine particulate matter<sup>12</sup>.** The wording of the EU directive is not clear as to what urban background stations<sup>13</sup> the data evaluated should come from. The selected methodology affects the resulting value of the indicator for the Czech Republic in the individual years, including the target year 2015.
- 5. The CHMI does not have a current policy for the state network for air pollution monitoring.** While the state network for pollution monitoring does meet the requirements for the number of measuring stations in accordance with the European and national legislation, the non-systematic approach to the development of the state network for pollution monitoring brings about the risk of failure to meet the specific programme indicator of the OPE 2014–2020, i.e. reducing the “level of uncertainty of spatial interpretation of pollution data” from 35% in 2011 to 30% in 2023.
- 6. The SEF does not monitor and evaluate the economy, efficiency and effectiveness of the funds used from the NPE for supporting air quality improvements.** The SEF has not even set any quantifiable and measurable objectives in its fundamental objectives as the basic prerequisites for the evaluation of the projects implemented and of the programme as such. The SEF thus does not evaluate the actual benefits, impacts and results of the individual priority areas or of the individual calls regarding air quality improvement in the Czech Republic. Deficiencies related to public procurement have been found by audits of the selected projects funded from the NPE.
- 7. Between 2014 and 2016, no Czech Entity submitted a project application for assistance under the LIFE Programme, which is coordinated by the European Commission, with a focus on air quality and emissions.**

**With regard to the significant impact of cross-border transmission on the level of air pollution between the Czech Republic and Poland,<sup>14</sup> the MoE should hold transboundary consultations with Poland in the preparation of the national air pollution control programme.<sup>15</sup>**

---

<sup>12</sup> PM<sub>2.5</sub> particles. As of 2015 the same objective of 20 µg/m<sup>3</sup> was set for all the Member States.

<sup>13</sup> Urban background stations are placed in urban areas, where the levels are representative of the exposure of the urban population in general. The urban background stations should be placed so that their pollution level is influenced by the integrated contribution from all sources upwind of the station.

<sup>14</sup> A significant impact of cross-border transmission on air pollution between the Czech Republic and Poland was confirmed, among others, by the Air Silesia (2010–2013) project entitled *Information System for Air Quality in the Silesian and Moravian-Silesian Region along the Czech-Polish Border (CZ.3.22/1.2.00/09.01610)*, conducted from 1 July 2010 to 30 June 2013. The full results of the projects are available at [www.air-silesia.eu](http://www.air-silesia.eu).

<sup>15</sup> According to Article 6 (2) of EU Directive No 2016/2284, when drawing up, adopting and implementing the national air pollution control programmes, Member States shall assess to what extent national emission sources are likely to have an impact on air quality in their territories and neighbouring Member States and, where appropriate, transboundary consultations shall be conducted.

## II. Information on the audited area

At the national level, air quality is governed by the Air Protection Act<sup>2</sup> and its implementing regulations. The Act specifies, among others, the permissible air pollution levels and limits, the air pollution assessment and evaluation methods, air pollution control tools, the rights and obligations of persons, and the competences of public authorities in the area of air protection. The Act lists the authorities responsible for public administration in the area of air protection. They are the Ministry of the Environment, the Czech Environmental Inspectorate, the regional authorities, municipal authorities of municipalities with extended competences, municipal authorities, customs authorities, the Czech Trade Inspection Authority, the Ministry of Agriculture, and the Ministry of Health.

The umbrella strategic document in the environmental protection is the *State Environmental Policy of the Czech Republic 2012–2020* (“SEP”). The SEP was approved by Government Resolution No. 6 of 9 January 2013 and its updated version was approved by Government Resolution No. 1026 of 23 November 2016. In the area of air quality improvement, the SEP sets the strategic objective of reducing the level of air pollution, which is further broken down into three specific objectives:

- 1) improving air quality in areas where air pollution limits are exceeded;
- 2) implementing the national emission ceilings for sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (NMVOC), ammonia (NH<sub>3</sub>), and fine suspended particulate matter (PM<sub>2.5</sub>);
- 3) reducing the emissions of heavy metals and persistent organic substances (e.g. benzo[a]pyrene).

The SEP also sets out the detailed strategic framework of the OPE 2014–2020. Air quality protection policy is also based the *Medium-term Air Quality Improvement Strategy of the Czech Republic (until 2020)* (“Strategy”), the NERP, and the AQIPs.

### *Medium-term Air Quality Improvement Strategy of the Czech Republic (until 2020)*

The requirement from the European Commission (“Commission”) to prepare a comprehensive air quality management policy for the Czech Republic resulted in the preparation of the *Medium-term Air Quality Improvement Strategy of the Czech Republic (until 2020)*. This requirement was also worded as the prerequisite for the approval of priority axis 2: *Improving air quality in human settlements in the OPE 2014–2020*. The Strategy was approved by Government Resolution No. 979 of 2 December 2015.

The Strategy forms the strategic framework for the *National Emission Reduction Programme of the Czech Republic* and for the programmes aimed at air quality improvements in zones and agglomerations in the Czech Republic, which must be prepared in accordance with the national and EU legislation.

### *National Emission Reduction Programme of the Czech Republic*

The NERP for the period until 2020 and looking ahead to 2030 was prepared in accordance with Section 8 of the Act and with regard to the international commitments of the Czech Republic, the expected changes in the legal framework of the EU, and the failure to meet the

air pollution limits set for certain pollutants. The strategic objective of the NERP is to decrease the health risks arising from air pollution and the negative impacts on ecosystems and vegetation and on materials as soon as possible by upholding the international emission control commitments and by observance of the applicable air pollution limits. For this purpose, a new scenario is set out in the NERP, including additional measures (NERP-WAM), including the implementation schedule and the authorities responsible for the implementation. The NERP was approved by Government Resolution No. 978 of 2 December 2015.

#### *Air quality assessment*

Air pollution level is assessed and evaluated by the CHMI under authorisation from the MoE for designated territories (zones) or for zones which represent an urban agglomeration with a population of over 250,000 (agglomeration). The Act defines seven zones for the Czech Republic (Central Bohemia, Southwest, Northwest, Northeast, Southeast, Central Moravia, and Moravia-Silesia) and three agglomerations (Prague, Brno, and Ostrava/Karviná/Frýdek-Místek).

**Figure 1: Zones and agglomerations for air pollution assessment and evaluation**



**Source:** the Strategy.

In order to ensure a minimum air quality level, the law specifies the air pollution limits (ambient air quality standards) for selected pollutants with regard to human health protection. The air pollution limits are also set in accordance with the requirements of EU legislation with regard to air quality in Europe. For stationary measurement, the CHMI manages and operates a state network for air pollution monitoring.

#### *Air Quality Improvement Programmes*

The AQIPs were prepared under Section 9 of the Act where the air pollution limit set by the Act has been exceeded in the zone or agglomeration or where the air pollution limit set by the Act has been exceeded in the zone or agglomeration more times than permitted by the Act. Due to the level of air pollution in the Czech Republic, the preparation of the AQIPs was relevant to all the zones and agglomerations in the country. The AQIPs were prepared by the MoE in cooperation with the relevant regional and/or municipal authorities. Being the

regional air quality management strategies, the AQIPs contain emission and air pollution analyses, pollution causes and findings of the previous AQIPs, measures in the form of emission ceilings, and new competences regarding the listed major pollution sources. The reference year used for the analytical parts of the AQIPs was 2011. The proposal section specifies measures regarding the pollutants in question (objectives). Among others, they are based on dispersion studies and their purpose is to help achieve the air pollution limits set by the Act in the relevant zone or agglomeration by 2020, which year represents a strategic milestone. The AQIPs for the individual zones and agglomerations were approved in the course of 2016 and were issued by the MoE in the form of generally applicable measures.

### **III. Scope of audit**

The audit focused on the funding of measures aimed at supporting air quality improvements in the Czech Republic under OPE PA2: *Improving air quality in human settlements* and under the NPE as the complementary source. The objective of the audit was to verify whether the measures specified in the programming documents and the resources used under the OPE and the NPE contributed to the improvement of air quality in the Czech Republic, i.e. whether they were effective. Examination was also performed of the possibilities of funding from the *LIFE Programme* – the Community programme concerning the environment and climate, coordinated by the European Commission.

In order to fulfil the objective, the audit was conducted at two levels:

1. Audit of the set-up of the system of air quality improvement measures in the programming document, their implementation, and evaluation. This audit was conducted at the MoE. The main areas under examination included the strategic and conceptual activities of the MoE as the main body responsible for air protection in the Czech Republic; the level of fulfilment of the specified measures and objectives at the national level, in particular, in the NERP, and the method of the interim evaluation of the implementation of the measures specified in the AQIPs for the regional level;
2. Audit of the funding of air quality improvements from the European or national sources. The audit was conducted with the MoE as the managing authority of the OPE, with the SEF as the intermediate body of the OPE and the provider of the funds from the NPE, and with selected beneficiaries (CHMI, regions, other beneficiaries). The effectiveness of the funds spent on air quality improvements was verified on the basis of the specified indicators and objectives of the individual projects and the level of their fulfilment as of the completion date of the audit. The audited entities are listed and the evaluation of the project indicators is provided in Annex 5 to this Audit Conclusion.

At the system level, funds in the total amount of CZK 10.6 billion were audited, of which funding under PA2 of the OPE accounted for CZK 9.9 billion. The amount audited at the system level was based on the allocation of funds under the calls that were announced between 2015 and 2018 with a focus on air quality improvements under PA2 of the OPE, the



NPE, and the *LIFE Programme*. In particular, the audit focused on the preparation and evaluation of the individual calls.

At the SEF level, the SAO examined evaluation system and the method of selecting the successful projects aimed at air quality improvements. The audit examined the administration of 14 projects involving the total subsidy of CZK 496.6 million, of which PA2 of the OPE accounted for CZK 487 million, representing approximately 5% of the funds allocated under the calls announced under PA2 of the OPE.

Audits were also conducted with the beneficiaries, with a particular focus on adherence to the terms and conditions of receiving and using the aid. The audit was conducted with four regions as the beneficiaries of subsidies under PA2 of the OPE for reallocation of the resources to individuals to promote the replacement of obsolete boilers. In addition, the CHMI was also audited, being a major beneficiary under PA2 of the OPE with a particular focus on the improvement of the system for the monitoring, evaluation and forecasting of air quality and the related weather aspects. In addition, four beneficiaries of aid granted under PA2 of the OPE for reducing emissions from stationary sources and four beneficiaries of aid under the NPE were audited. Overall, the audit checked the implementation of 21 projects with a total subsidy of CZK 3.82 billion, of which PA2 of the OPE accounted for CZK 3.8 billion, representing 38% of the funds allocated so far under PA2 of the OPE. The audit examined public contracts in the total amount of CZK 541.9 million excl. VAT.

The audit thus examined the air quality improvement support system as a whole: system set-up and management by the Ministry of the Environment (being the competent air protection body and the managing authority of the OPE), the activities of the SEF (being the intermediary body for the aid), and the use of the financial aid by the main beneficiaries. The output of this audit is the evaluation of the set-up and functioning of the system of support for air quality improvements in the Czech Republic and the identification of its weak points.

## **IV. Detailed facts ascertained by the audit**

### **A. Funding of air quality improvement measures**

The ESIF are the main source of funding for air quality improvement measures<sup>16</sup>. The NPE is a complementary source of funding. LIFE, a financial instrument of the EU for the environment and climate, administered by the European Commission, is another identified source of funding.

#### **a) Operational Programme Environment 2014–2020**

The issue of air quality improvements is addressed by priority axis 2: *Improving air quality in human settlements*. The managing authority of the OPE is the MoE and the intermediate

---

<sup>16</sup> The sources identified under the ESIF included the OPE, the Operational Programme Transport (“OPT”), Operational Programme Enterprise and Innovation for Competitiveness (“OPEIC”), Integrated Regional Programme (“IROP”), Operational Programme Prague - Growth Pole of the Czech Republic, and Rural Development Programme (“RDP”).

body for PA2 is the SEF. PA2 is fully co-financed from the Cohesion Fund. The current amount of allocation to PA2 for the programming period 2014 – 2020 is EUR 490,700,000, i.e. about CZK 13 billion.

PA2 of the OPE 2014–2020 has three specific objectives (“SOs”): 2.1: *Reduce emissions from local household heating*; 2.2: *Reduce emissions from stationary sources and improve their monitoring system*; 2.3: *Improve the system of monitoring, evaluation and forecasting of the air quality trends and of the related weather aspects*.

The table below provides an overview of all the calls issued under PA2 of the OPE to date, including the amount of aid paid to the beneficiaries. The information regarding the ongoing and closed calls under PA2 is provided as of 7 August 2018.

**Table 1: An overview of the ongoing and closed calls under PA2 of the OPE 2014–2020 (as of 7 August 2018)**

Specific objective	Call title	Application deadline	Amount of EU contribution allocated to the call (CZK)	Applications submitted under individual calls		Applications approved by the managing authority		Amounts paid to beneficiaries (CZK)
				Quantity	EU contribution (CZK)	Quantity	EU contribution (CZK)	
<b>Total</b>	<b>Priority axis 2</b>		<b>9,921,980,000</b>	<b>525</b>	<b>17,264,291,670</b>	<b>190</b>	<b>10,760,864,500</b>	<b>5,836,802,952</b>
SO 2.1	MoE_Call 16, rolling	24 October 2015	3,000,000,000	14	3,283,670,000	14	3,283,670,000	3,260,530,114
	MoE_Call 67, rolling	28 April 2017	3,421,980,000	14	3,421,980,000	14	3,421,980,000	1,877,820,613
<b>Total</b>	<b>SO 2.1</b>		<b>6,421,980,000</b>	<b>28</b>	<b>6,705,650,000</b>	<b>28</b>	<b>6,705,650,000</b>	<b>5,138,350,726</b>
SO 2.2	MoE_Call 8, single-round	16 December 2015	2,500,000,000	240	5,195,394,267	126	2,620,902,085	580,876,412
	MoE_Call 89, single-round	31 January 2018	500,000,000	220	4,845,795,315	10	1,037,353,159	0
<b>Total</b>	<b>SO 2.2</b>		<b>3,000,000,000</b>	<b>460</b>	<b>10,041,189,582</b>	<b>136</b>	<b>3,658,255,244</b>	<b>580,876,412</b>
SO 2.3	MoE_Call 17, rolling	15 October 2016	200,000,000	18	264,181,173	14	208,173,769	116,695,418
	MoE_Call 79, rolling	20 December 2017	200,000,000	11	139,507,371	9	138,173,311	880,396
	MoE_Call 98, rolling	20 December 2018	100,000,000	8	113,763,544	3	50,612,176	0
<b>Total</b>	<b>SO 2.3</b>		<b>500,000,000</b>	<b>37</b>	<b>517,452,088</b>	<b>26</b>	<b>396,959,256</b>	<b>117,575,814</b>

**Sources:** Prepared by the SAO on the basis of data from the MoE.

#### *Specific objective 2.1 Reduce emissions from local household heating*

The OPE places priority emphasis of reducing emissions from private furnaces, which, at the time of the formulation of the OPE,<sup>17</sup> accounted for about 41% of all the PM<sub>10</sub> emissions, over 59% of PM<sub>2.5</sub> emissions, and nearly 90% of BaP emissions in the respiratory zone, which is most significant in terms of the impact of air pollution on human health. 75% of the funds allocated to the PA2 was thus intended for SO 2.1, which addresses reducing emissions from households. The resources were distributed among the regions under the individual calls

<sup>17</sup> Data for 2012.

according to the assumed number of non-compliant boilers, taking into account air quality in each region.

The goal of the MoE is to replace 80 thousand old boilers with manual stoking, which significantly pollute the air in the Czech Republic, with new, low-emission heating sources. The subsidies are intended for the replacement of the old emission class 1 and 2 environmentally unfriendly boilers with new, low-emission boilers firing biomass, coal or a combination thereof, a heat pump, gas boiler, or solar system. Data from the *2011 Population and Housing Census* indicate that there were 587 thousand private homes using boilers firing solid fuels with an output of less than 50 kW that are classified as emission classes 1 or 2 according to ČNS EN 305-1.. The above-mentioned facts mean that the objective of the MoE is to replace about 14% of the non-compliant obsolete boilers.

As at conclusion of this audit, the first two calls of the so-called “boiler subsidies” (Nos. 16 and 67) had been announced and under implementation, with the specified minimum number of implemented project of 57,225. The interim evaluation of 26,080 projects had been performed as at the end of 2017. The highest numbers of boilers were replaced in the Central Bohemian Region (4,652) and the Moravian-Silesian Region (4,330). The interim evaluation data regarding the boiler subsidies as monitored by the SEF suggest the following composition of the new boilers: 33% - combined coals and biomass boilers; 25% - heat pumps; 18% - biomass boilers; 14% - gas boilers; and 10% - coal-firing boilers.

The use of the funds under Call 16 (1st round of the boiler subsidies) will be completed on 31 December 2018; under Call 67 (2nd round of the boiler subsidies) the funds will be used by the final beneficiaries until 31 December 2019. Because of the incomplete implementation of the projects submitted under the 1st round of the boiler subsidy scheme, it is impossible to evaluate the overall contribution of the funds provided for reducing the emissions generated by local household heating. Even though this contribution cannot be evaluated at present, it is possible to state that the focus of PA2 on the replacement of old boilers with boilers with lower emissions of pollutants is positive and leads to reducing the level of air pollution and thus to air quality improvements. The current fulfilment of the indicators and objectives of the programme suggests that these objectives and indicators will be significantly exceeded after all the projects under SO 2.1 are completed.

*Specific objective 2.2: Reduce emissions from stationary sources<sup>18</sup>*

PA2 is used to support, for example, the implementation of measures to reduce resuspension<sup>19</sup> and the emissions of pollutants from stationary sources, which are a significant contributor to the high level of air pollution. The most typical projects concern the full or partial replacement or reconstruction of the existing stationary pollution sources, or the acquisition of additional technologies to reduce the emissions of pollutants or to reduce the level of pollution.

---

<sup>18</sup> The support is aimed at reducing the emissions of pollutants from the industry or from agriculture.

<sup>19</sup> The primary particles are emitted into the air directly from the sources; the secondary particles may also enter the air by resuspension, i.e. when raised by human activity (transport) or by weather factors (wind).

The audit of the administration of the selected projects by the intermediate body found that the SEF did not require the submission of supporting documents by the beneficiaries within the specified deadlines for the final evaluation of the projects. In doing so, the SEF failed to proceed in accordance with Section 25(1) of Act No. 320/2001 Coll.<sup>20</sup> in that it failed to introduce and maintain an internal control system to enable the timely notification of any failure by the beneficiaries to comply with their obligations.

*Specific objective 2.3: Improve the system of monitoring, evaluation and forecasting of the air quality trends and of the related weather aspects*

The third area of support under PA2 concerns projects aimed at improving the system of monitoring, evaluation and forecasting of the air quality and weather trends, which is also used to evaluate the current situation, forecast the future development in the short term as well as the long term, and evaluate the air quality improvement measures. In terms of the volume of funding, the Czech Hydrometeorological Institute is the most significant beneficiary within the framework of this specific objective.

During the period under review, Calls Nos. 17, 79 and 98 were issued under SO 2.3 (see Table 1). Under Call No. 17, a total of 14 projects were supported with the EU contribution of CZK 208 million. The CHMI was the applicant for five projects with the EU contribution of CZK 135 million. Under Call No. 79, a total of 9 projects were supported with the EU contribution of CZK 138 million. The CHMI was the applicant for two projects with the EU contribution of CZK 67 million. The amount of support allocated to the CHMI under Calls Nos. 17 and 79 represents 58% of the total allocation of these Calls, in the amount of CZK 346 million.

Call No. 98, with the submission deadline of 20 December 2018, was issued on 8 March 2018. It is the last call regarding the resources available under SO 2.3. As of 21 August 2018, there were 8 applications submitted, requesting an EU contribution of CZK 114 million. The CHMI was the applicant for six projects involving the EU contribution of CZK 110 million.

The CHMI thus uses aid from PA2 of the OPE to implement 13 projects involving the total EU contribution of CZK 312 million. However, the audit found that seven of these projects, accounting for an EU contribution of CZK 147 million (46% of the total EU contribution to the CHMI), primarily focused on the related weather aspects rather than on air quality monitoring and evaluation; this, nevertheless, is permitted under specific objective 2.3.

The facts which have been established by the audit and which identify the risk of failure to meet the specific programme indicator for SO 2.3 are discussed in detail in Part B (5) of this Audit Conclusion.

#### ***b) National Programme Environment***

The NPE is a programme of the MoE, with the SEF acting as the intermediate body, with the resources (in particular, income from environmental fees) being provided through the NPE

---

<sup>20</sup> Act No. 320/2001 Coll., on financial control in public administration and on amendments to certain acts (Financial Control Act).

as project funding. The NPE is a complementary programme for projects which are not supported under other subsidy frameworks such as the OPE or the *New Green Savings* programme.

Since 2015, funds from the SEF are provided through the NPE on the basis of MoE Directive No. 4/2015<sup>21</sup>. The aid from the NPE is provided in the form of a subsidy, a loan, or a combination thereof. The form and purpose of aid are set in the individual calls for proposals.

The area of air protection and air quality improvement is mainly addressed by priority area 2: *Air*. In addition, air protection and quality improvement projects are also supported in priority area 5: *Environment in municipalities*. Air quality improvement projects are also marginally supported in priority area 6: *Environmental prevention* and 7: *Innovative and demonstration projects*).

In 2015–2017 the MoE issued 12 calls involving a total allocation of CZK 526 million aimed at air protection and emission control. As of 31 December 2017, a total of 191 effective Decisions of the Minister concerning a subsidy of CZK 137 million were issued; the aid paid as of that date amounted to CZK 17 million.

The audit found that the SEF did not monitor and evaluate the economy, efficiency and effectiveness of the funds used from the NPE for supporting air quality improvements. The details regarding this deficiency are provided in Part B (6) of this Audit Conclusion.

### **c) The LIFE Programme**

The *LIFE Programme* is a Community instrument for the environment and climate action for the period from 1 January 2014 to 31 December 2020, established by Regulation (EC) No 1293/2013<sup>22</sup>. The project objectives include contributing to the shift towards a low-carbon economy and supporting better environmental and climate governance. The total amount of EUR 3,456,655,000 euros was allocated to the implementation of the LIFE Programme for the period 2014–2020, of which the financial envelope set for the period 2014–2017 was set at 1,796,242,000 euros. The priority types of projects to be supported in the period from 2014 to 2017 were also set for the thematic priority of *Air quality and emissions*.

In 2015 and 2017 the MoE issued the national call for requests for national co-financing from the *LIFE Programme*; since 2016 it also includes the call for the requests for support for the preparation of project documents to motivate Czech applicants to submit project proposals and to increase the use of the *LIFE Programme* by beneficiaries from the Czech Republic. The applicants that succeed in the national *LIFE* call may obtain a contribution from the MoE equal to 15% of the total budget, with the maximum being CZK 10 million. The national resources for the co-financing of the projects supported from the *LIFE Programme* are

---

<sup>21</sup> MoE Directive No. 4/2015 *on the provision of financial resources from the State Environmental Fund of the Czech Republic through the National Programme Environment*.

<sup>22</sup> Regulation (EU) No 1293/2013 of 11 December 2013 *on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007*.

provided under MoE Directive No. 4/2016.<sup>23</sup> The details regarding the established facts are provided in Part B (7) of this Audit Conclusion.

## B. Risk of the failure to meet air quality objectives even by 2020

### 1. The strict national unexceedable emission limits of 2020 will be difficult to meet.

In order to progressively reduce air pollution by reducing emissions, to protect human health and the environment, Directive EU 2016/2284<sup>24</sup> was adopted, laying down new commitments for Member States, which commitments are identical with those set out in the revised *Gothenburg Protocol*<sup>25</sup>. The commitments to reduce SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub> and PM<sub>2.5</sub> emissions are set out for the period from 2020 onwards, taking the year 2005 as a base year (the “international emission reduction commitment”).

At the same time, the Czech Republic used the NERP to set its own, more ambitious emission reduction objectives, the so-called *unexceedable national emission values of 2020*, which are stricter than the international commitments applicable in 2020, and the *emission ceilings for the individual groups of stationary and mobile sources*. The MoE set all the emission reduction objectives (commitments) as absolute values, which makes them difficult to evaluate because of the changes in the calculation of the emission balance. The MoE chose a different method of setting out the commitments for 2020 in comparison with the international commitments, expressing the emission reduction requirement as a fixed percentage decrease compared to the total emissions in 2005. The commitments set out for the Czech Republic according to Directive EU 2016/2284 or the Gothenburg Protocol and the unexceedable national emission values for 2020 as set out in the NERP and their percentage with regard to the total national emissions from 2005 are provided in the table below.

**Table 2: Czech Republic’s emission reduction commitments**

Row	Emissions/commitments	SO <sub>2</sub>	NO <sub>x</sub>	NMVOC	NH <sub>3</sub>	PM <sub>2.5</sub>
1	Emissions in 2005 - emission balance used for the preparation of the NERP (in kilotons per year)	211	281	203	82	37
<b>Directive (EU) 2016/2284 (Gothenburg Protocol)</b>						
2	Commitment to reduce emissions by 2020 (as a percentage of the 2005 value)	45	35	18	7	17
3	Commitment to reduce emissions by 2030 (as a percentage of the 2005 value)	66	64	50	22	60
<b>Unexceedable national emission values in 2020</b>						
4	Unexceedable national emission values in 2020 (kilotons per year)	92	143	129	64	19
5	Maximum emissions – commitment expressed * (%)	56	49	36	22	49

**Source:** Prepared by the SAO according to Directive (EU) 2016/2284 and the *National Emission Reduction Programme of the Czech Republic*.

\* A percentage difference between the values of the emissions of 2005 (row 1) and the unexceedable national emission values for 2020 (row 4).

<sup>23</sup> MoE Directive No. 4/2016 on the provision of funding from the MoE Budget Chapter 315 in support of projects implemented within the framework of the LIFE Community Programme in the period 2014–2020.

<sup>24</sup> Directive (EU) 2016/2284 of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC.

<sup>25</sup> Gothenburg Protocol = Protocol to Abate Acidification, Eutrophication and Ground-level Ozone of 1999, further revised in 2012.

The conversion of the unexceedable national emission values into a percentage representation of the commitment to reduce the emissions of 2005 shows that the unexceedable national emission values for 2020 set by the MoE are stricter than the international commitment by the Czech Republic.

The emission balance guidelines may be updated, the emission calculations are subject to modifications and refinement. On the basis of these changes in the calculation methodology, the emission balance values are recalculated in order to keep them comparable within a time series (the follow-up retrospective conversion of the emission time series). For example, a major change in the emission calculation method took place in the local heating sector in 2015 and an in-depth revision of the emission inventory with a view to its alignment with the requirements of Directive (EU) 2016/2284 was performed in 2017. The following table shows the current status of compliance with the emission reduction commitments of the Czech Republic for 2020 on the basis of the latest available emission balance reported in 2018 for the year 2016<sup>26</sup>.

---

<sup>26</sup> Reporting\_2018\_v\_1-2\_1990-2016 (the reporting is available at: [http://webdab1.umweltbundesamt.at/download/submissions2018/CZ\\_NFR2018.zip?cgiproxy\\_skip=1](http://webdab1.umweltbundesamt.at/download/submissions2018/CZ_NFR2018.zip?cgiproxy_skip=1)).

**Table 3: Compliance with the emission commitments for 2020<sup>27</sup>**

Row	Emissions/Czech commitments	SO <sub>2</sub>	NO <sub>x</sub>	NMVOC	NH <sub>3</sub>	PM <sub>2.5</sub>
1	Emissions in 2005 - latest emission balance* (kilotons per year)	208	281	267	78	45
2	Emissions in 2016 - latest emission balance* (kilotons per year)	115	165	213	73	39
3	Emission reduction between 2005 and 2016 (%)	45	41	20	7	12
<b>Directive (EU) 2016/2284 (Gothenburg Protocol)</b>						
4	Emission reduction commitment (as a percentage of the 2005 value)	45	35	18	7	17
5	<b>2020 emission ceiling for 2020 calculated from current data</b> (kilotons per year)	<b>115</b>	<b>183</b>	<b>219</b>	<b>73</b>	<b>37</b>
<b>Unexceedable national emission values in 2020</b>						
6	Emission reduction commitment** (as a percentage of the 2005 value)	56	49	36	22	49
7	<b>2020 emission ceiling for 2020 calculated from current data***</b> (kilotons per year)	<b>91</b>	<b>143</b>	<b>170</b>	<b>61</b>	<b>23</b>
8	<b>Emission reduction required by 2020</b> (as a percentage of the 2016 value)	<b>21</b>	<b>13</b>	<b>20</b>	<b>16</b>	<b>42</b>

**Zdroj:** Prepared by the SAO based on the NERP, emission balance (Reporting\_2018\_v\_1-2\_1990-2016).

\* The latest available emission balance is from 2018 for the year 2016 (including recalculation of the time series from 1990).

\*\* The commitment expressed as a percentage of the 2005 value was calculated from the national emission values for 2005 used for the preparation of the NERP and from the unexceedable national emission values set out in the NERP.

\*\*\* Unexceedable national emission values recalculated by the SAO to reflect the changes in the calculation of the emission balance.

As early as 2016 the Czech Republic met the international emission reduction commitment for 2020 for SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, and NH<sub>3</sub>. As regards the PM<sub>2.5</sub> fraction of suspended particulate matter, the Czech Republic is approaching its international commitment. As regards compliance with the unexceedable national emission values for 2020, the attainment of which is the common objective of the SEP, the Strategy, and the NERP, the situation is quite to the contrary and no emission ceiling for 2020 has been met.

The MoE set highly ambitious targets for 2020. Considering that the total emissions values for 2020 will only be available in the first quarter of 2022, the attainment of the target unexceedable value of PM<sub>2.5</sub> emissions for 2020 appears unrealistic as a result of the changes in the calculation methodology of the national emissions and the analysis of the performance of the individual measures of the NERP. Between 2005 and 2016, i.e. over a period of 11 years, the PM<sub>2.5</sub> emissions decreased by 12%. In order to meet the national target, there would have to be a further decrease in the PM<sub>2.5</sub> emissions by 42% between 2016 and 2020, i.e. over a period of 4 years.

<sup>27</sup> Rows 1 and 2 in the table show the total national emissions of pollutants for which the commitments for 2020, the base year 2005, and the latest available year 2016 are specified. Using the current data for 2005, the emission ceilings for 2020 are calculated in rows 5 and 7 on the basis of the percentage representation of the emission reduction commitments compared to 2005 (as shown in rows 4 and 6). The emission ceilings which have not yet been achieved are shown in red. Row 8 shows the need for an additional reduction in emissions in order to meet the unexceedable national emission values for 2020 when compared to 2016.



As a result of changes in the calculation methodologies of the national emissions and given the current performance status of the individual measures of the NERP, there is also the risk of the failure to meet the target values for other pollutants for which the unexceedable emission values were set in the NERP, i.e. SO<sub>2</sub>, NO<sub>x</sub>, NMVOC and NH<sub>3</sub>. Between 2005 and 2016 there was a decrease in the emissions of SO<sub>2</sub> by 45%, of NO<sub>x</sub> by 41%, of NMVOC by 20%, and of NH<sub>3</sub> by 7%. In order to meet the national target, there would have to be a further emission decrease by 21% for SO<sub>2</sub>, by 13% for NO<sub>x</sub>, by 20% for NMVOC, and by 16% for NH<sub>3</sub> from 2016 to 2020.

The MoE should evaluate approaching the national emission values for 2020 annually in the regular report on the environment (“Environment Report”), which is submitted to the Czech government for approval. The “distance to target”, i.e. the difference between the current national emission in the given year and the target value for 2020, should be evaluated. However, in its *Report on the Environment 2016*, the MoE did not evaluate the “distance to target” for the PM<sub>2.5</sub> fraction of suspended particulate matter even though the attainment of the unexceedable national emission value for PM<sub>2.5</sub> for 2020 carries the highest risk of failure. In addition, Directive (EU) 2016/2284 sets a very strict PM<sub>2.5</sub> emission reduction commitment for the Czech Republic for 2030, i.e. a decrease in the PM<sub>2.5</sub> emissions by 60% compared to 2005.

## **2. The measures set for air quality improvement are not performed sufficiently and in time:**

### *Performance status of the priority measures of the NERP*

The new scenario NERP-WAM includes 23 priority measures. The implementation is to be evaluated annually on the basis of specified indicators and the outcome of the evaluation is submitted to the government by the MoE as a part of the regular Report on the Environment. The audit examined the performance status and the evaluation of the implementation by the MoE. The list of all the priority measures, including the comparison of the evaluation of the implementation by the MoE and the evaluation of the performance status of the priority actions by the SAO, is provided in Annex 4 to this Audit Conclusion.

The performance analysis of the priority measures shows differences in comparison with the evaluation conducted by the MoE. While the differences do result from the different points in time of the evaluation, the main cause lies in the fact that the evaluation by the MoE fails to consider the result achieved or the level of fulfilment of the individual measures with regard to their desired target<sup>28</sup>. The indicators listed in the *Statistical Environmental*

---

<sup>28</sup> This can be exemplified by transport measure AB2, focusing on the priority construction of city and municipality bypasses (AB2), which includes 427 investment schemes. The monitoring of the construction of city and municipality bypasses is limited to municipalities with a population of over 10 thousand. Published in the *Statistical Environmental Yearbook for 2016*, this indicator shows the same number (3) for 2015 and 2016. However, the MoE still sees this performance positively because it is “fulfilled on a continuous basis”. The MoE evaluates the fulfilment status of certain measures funded from the ESIF similarly even though there are risks associated with the use of the funds, which implies the risks of the failure to fulfil the indicator and of a delayed implementation of these measures.

*Yearbook for 2016* are incomplete and no detailed verbal evaluation is provided. The evaluation by the MoE does not allow for an objective assessment of whether or not the NERP is consistently being fulfilled even though it is one of the most important air quality improvement instruments at the national level.

The audit found that seven out of the 23 priority measures of the NERP failed to be completed within the required deadline or even before the completion of this audit. They include, for example, measures to promote the acceleration of the replacement of passenger vehicles (responsibility of the MoE) and to stimulate the use of alternative fuel vehicles in road freight transport by reducing the road tax rate or by reducing the share of solid fossil fuels in stationary combustion sources that do not fall under the EU ETS system (e.g. local household heating). Another six of the 23 priority measures of the NERP are being fulfilled on a continuous basis but there are significant risks of the failure to implement these measures in time and to the required extent. They are, for example, the shift of freight transport from roads to railways, the implementation of measures to reduce energy consumption and increase energy efficiency, the construction of the backbone network of high-capacity routes for motor transport, or the priority construction of bypass roads around towns and municipalities and the associated possibility of introducing low-emission zones in urban areas.

The audit also established that neither MoE, being the proposer of the NERP, nor the other parties responsible for the measures proceeded in accordance with the approval of the draft policy, having failed to prioritise the measure aimed at promoting and accelerating the renewal of the passenger vehicle fleet (AA3), the measure aimed at stimulating the use of alternative fuel vehicles in road freight transport (AA5), and the measure to ensure the shift of freight transport from roads to railways (AB23). Measures AA3 and AA5 have not yet been fulfilled. While measure AB23 is implemented on a continuous basis, the indicators monitored suggest a high risk of failure to meet the set objective.

#### *Evaluation of AQIP implementation*

The current *Air Quality Improvement Programmes*, being the regional air quality management strategies prepared for the individual zones and agglomerations, were approved in the course of 2016 and were issued by the MoE in the form of generally applicable measure.

The MoE presented the initial interim evaluations of the AQIPs for all the zones and agglomerations for 2016. The evaluation was performed in late 2017 and early 2018 and the individual evaluations were published at the end of the first quarter of 2018. The first evaluations do not provide any conclusive data regarding the impact of the current AQIPs on environmental components because the indicators monitored include mainly air quality data from before the AQIPs were issued and, as such, they are not very informative in terms of the evaluation of their impact.

The AQIP evaluation method suggests that the MoE has no effective system in place for the timely collection of data and information in the required quality from the individual sponsors of the measures, i.e. the municipalities and the regions. The data and information collected

are suboptimal, incomplete and incomparable. Therefore, the MoE cannot conduct a satisfactory and conclusive evaluation of the implementation of the measures set out in the AQIPs. The fulfilment of the measures is thus impossible to evaluate because the AQIPs lack any quantification of the expected contribution of the individual measures to air quality improvements and the schedule of the implementation of the individual measures.

### **3. The deficiencies in the AQIPs found by the courts will not be rectified before 2020.**

As regards the AQIPs issued by the MoE for the agglomerations of Prague, Brno, and Ostrava/Karviná/Frýdek-Místek and for the Northwest zone, petitioners filed motions for the cancellation of the generally applicable measures with the competent Czech courts. The Supreme Administrative Court and the Municipal Court in Prague proceeded to rebuke the MoE for the absence of specific schedules for the individual measures in the AQIPs and for the fact that the AQIPs failed to quantify the contribution of the measures to air quality improvement, which makes it impossible to focus on the measures having the strongest impact in case of time or financial constraints. The courts also noted that it was currently impossible to impose upon any self-government bodies any measures and to enforce the same because the competences of such bodies might only be regulated by the law. These deficiencies established by the courts represent a risk for the fulfilment of the objectives of the AQIPs for 2020. While the courts did not cancel the contested generally applicable measure in full, they did, in particular, cancel the provisions regarding the emission ceilings for road transport and those listing the individual measures aimed at air quality improvements.

Act No. 172/2018 Coll.<sup>29</sup>, effective from 1 September 2018, sets out the obligation of municipalities and regions to draw up the implementation schedules for the measures imposed upon them by the AQIPs. The MoE intends to announce new or updated AQIPs in the course of 2019. Thereafter, the municipalities and regions implementing the measures will be required to draw up their own implementation schedule (within 12 months of the publication of the relevant AQIP in the *MoE Bulletin*). The first detailed AQIP implementation schedules will thus have no impact on the fulfilment of the strategic milestone of 2020.

### **4. There is a risk of the Czech Republic failing to meet the goal of reducing exposure for fine particulate matter (PM<sub>2.5</sub>)**

One of the objectives of the NERP was to meet the national exposure reduction target for the PM<sub>2.5</sub> fraction of suspended particulate matter as set for the Czech Republic by Directive 2008/50/EC<sup>30</sup>. The fulfilment of this objective is monitored using the “Average Exposure Indicator” for the PM<sub>2.5</sub> fraction of suspended particulate matter, which is drawn up on the basis of measurements at urban background locations. The urban background locations should be placed so that the pollution level at the site is influenced by the integrated

---

<sup>29</sup> Act No. 172/2018 Coll. amending Act No. 201/2012 Coll. on air protection, as amended, effective from 1 September 2018.

<sup>30</sup> Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 *on ambient air quality and cleaner air for Europe*.

contribution from all pollution sources. The Average Exposure Indicator for the given year (y) is calculated as the three-year running average concentration calculated from all the sampling points for the years y, y-1 and y-2. As of 2015 the same objective of 20 µg/m<sup>3</sup> was set for all the Member States of the EU. The national exposure reduction target to be achieved by 2020 was set at 18 µg/m<sup>3</sup> for the Czech Republic.

The wording of the EU directive is not clear as to whether the calculation should include all the urban background stations measuring PM<sub>2.5</sub> concentrations or whether the indicator is constructed using only the values obtained from agglomerations and other urban areas with a population of over 100 thousand (in the Czech Republic in 2015: Prague, Brno, Ostrava, Pilsen, and Liberec). In the construction of this indicator, the MoE originally relied on the interpretation that the indicator is to include only the urban background stations located in agglomerations or urban areas with a population of over 100,000. It is for these values and for these locations that the Czech Republic's target for 2020, as specified in the Strategy and the NERP, was set.

The audit examined whether the Czech Republic had met the target for 2015. The SAO audit found that the Average Exposure Indicator for PM<sub>2.5</sub> had not been reported for the Czech Republic for 2015<sup>31</sup>. The MoE presented its own evaluation of the PM<sub>2.5</sub> Average Exposure Indicator for 2015, in which the indicator had been calculated using also the urban areas with a population of under 100 thousand and, in fact, using all the urban background stations where PM<sub>2.5</sub> concentration had been measured between 2013 and 2015. The following table shows the comparison of the two Average Exposure Indicator calculation methods.

**Table 4: Comparison of the PM<sub>2.5</sub> Average Exposure Indicator calculation methods (µg/m<sup>3</sup>)**

Exposure Indicator for PM <sub>2.5</sub>	All urban background stations*	Urban background stations: cities with population > 100 thousand**	Target
2015	19.64	20.14	20

**Source:** Data provided by MoE and CHMI; processed internally.

\* "All urban background stations" – includes all the urban background stations where concentrations of the PM<sub>2.5</sub> fraction of suspended particulate matter were measured in the given years.

\*\* "Urban background stations: cities with population > 100 thousand" includes the values from all the urban background stations where concentrations of the PM<sub>2.5</sub> fraction of suspended particulate matter were measured in the given years only from cities with a population of over 100 thousand (Prague, Brno, Ostrava, Pilsen, Liberec).

The selected methodology thus affects the resulting value of the Average Exposure Indicator for PM<sub>2.5</sub> for the Czech Republic in the individual years, including the target year 2015. If the construction of the indicator included only cities with a population of over 100 thousand, the Czech Republic would not have to meet the exposure concentration obligation set by Section C of Annex XIV to Directive 2008/50/EC. However, it will only be possible to say whether or

<sup>31</sup> The data are reported through the European Environment Agency ("EEA"); according to the statement of the CHMI, there was a technical error when uploading the data for this indicator and the item was not defined as a required item in the system, which allowed the dataset to be uploaded without this item.

not the Czech Republic met this target after the European Commission evaluates compliance with the requirements of Directive 2008/50/EC by the Member States.

The selected methodology both affects the fulfilment of the target value and changes the interpretation of the indicator. In its original design, the indicator takes into account the exposure of the population to the PM<sub>2.5</sub> fraction of particulate matter in densely populated areas, where the concentration of multiple pollution sources can be expected. In the other case, the aspect of covering the entire territory of the Member State prevails, without defining the minimum population of the urban area, which, in the extreme case, may reduce the weight of areas with higher PM<sub>2.5</sub> exposure values in the indicator.

Only an opinion of an EEA representative, obtained in the course of the audit, is currently available. The opinion leans towards selecting locations in agglomerations or urban areas with a population of over 100 thousand. Before changing the construction of the indicator, the MoE had not prepared an analysis or opinion regarding the interpretation of Directive 2008/50/EC.

#### **5. The CHMI has no current policy for the establishment and location of the monitoring stations**

The state network for air pollution monitoring includes both automated and manual air pollution monitoring. The establishment and distribution of the monitoring stations is governed by Decree No. 330/2012 Coll<sup>32</sup>. The results of the assessment and evaluation of the pollution levels are kept by the CHMI in the air quality information system (“AQIS”). The monitoring network operated by the CHMI consists of the backbone network of monitoring stations aided by monitoring stations which are owned or operated by other organisations and which must meet the data quality requirements specified for the AQIS. According to MoE Measure No. 17/17<sup>33</sup> and Decree No. 330/2012 Coll., the CHMI should have a policy in place regarding the distribution of the monitoring stations.

The CHMI currently has no policy in place regarding the establishment and modifications of the state network for air pollution monitoring. While the network does currently meet the requirements for the number of measuring stations in accordance with the European and national legislation, the non-systematic approach to the development of the state network for pollution monitoring brings about the risk of failure to meet the specific programme indicator of the OPE 2014–2020, i.e. reducing the *“level of uncertainty of spatial interpretation of pollution data”* from 35% in 2011 to 30% in 2023.

The level of uncertainty of the spatial interpretation of the air pollution data is calculated using the arithmetic mean of the spatial interpretation uncertainties calculated by the CHMI separately for the individual pollutants monitored with a view to protecting the health of the population. In the selected calculation method, a higher weight is assigned to pollutants for

---

<sup>32</sup> Decree No. 330/2012 Coll. on the method of assessment and evaluation of the pollution level, the extent of informing the public about the pollution level and in smog situations.

<sup>33</sup> Measure No. 17/17 of the Ministry of the Environment on the publication of the full text of the charter of the Czech Hydrometeorological Institute, a public-benefit corporation.

which the spatial interpretation uncertainty is high (e.g. benzo[a]pyrene; in 2014 to 2016 it was an identical 60%) or extremely high (e.g. cadmium with up to 92% in 2015).

Even though the air pollution monitoring network was renewed and complemented between 2011 and 2016, which, to a certain degree, improved the information for spatial interpolation, the territorial coverage by the air pollution monitoring stations remains the lowest for benzo[a]pyrene as one of the priority pollutants, and its interpolation is still subject to the highest degree of uncertainty. In addition, the benzo[a]pyrene content in PM<sub>10</sub> particulate matter needs to be analysed manually in laboratories. From 2014 to 2017 there was no significant extension of the network to include new, in particular, rural stations measuring benzo[a]pyrene. The number of measuring stations owned by the CHMI and providing valid data increase by three, from 22 to 25. The spatial interpretation uncertainty did not improve and was always at 60% from 2014 to 2016 (the indicator value for 2017 has not yet been published by the CHMI).

The CHMI is not considering a further increase in the number of measuring stations benzo[a]pyrene, which does not comply with the support objective of the NERP (PA3). According to the CHMI, a further increase in the number of stations may only occur after 2020 after the capacity of the laboratories increase in terms of manual analyses. These findings confirm the need for a long-term policy, which is not available at present.

#### **6. The SEF does not monitor and evaluate the economy, efficiency and effectiveness of the funds used from the NPE for supporting air quality improvements**

In the basic documents of the NPE, the SEF, in cooperation with the MoE, failed to specify the quantifiable and measurable objectives of the *National Programme Environment*, which would be the basic prerequisite for the evaluation of the projects implemented and of the *National Programme Environment* as a whole. Programme objectives must be defined clearly; they should rely on measurable indicators, showing the initial figure and the realistically expected target so as to enable the evaluation of the contributions of the NPE.

The SEF failed to proceed in accordance with Article 2(8) of MoE Directive 4/2015, on the provision of financial resources from the State Environmental Fund of the Czech Republic through the *National Programme Environment* because it did not evaluate the programme using monitoring reports between 2015 and 2017.

The audit found that the SEF had performed no evaluation of the actual benefits, impacts and results of the individual priority areas of the *NPE* or of the individual calls announced in the area of air quality improvement in the Czech Republic. The objectives of the priority areas, subareas and calls were set only in the form of a general description, which does not enable the evaluation of the economy, effectiveness and efficiency of the funds spent under the *NPE* or the evaluation of their impact on the degree of air quality improvement in the Czech Republic.

Even though the MoE set the allocations for the calls under the *NPE* on the basis of its own expert estimated following consultations with the SEF, less than 40% of the allocation was used in 5 out of the 9 calls.

Among others, the audit examined the award of four public contracts to selected beneficiaries, in the total amount of CZK 11.5 million excl. VAT. In one case, the contracting authority was found to have breached Section 6(1) of Act No. 134/2016 Coll.<sup>34</sup> by failing to observe the transparency principle because the call for proposals and the procurement documents had not been published in accordance with the law. In another case, the contracting authority was found to have breached Section 6(1) of Act No. 134/2016 Coll. by failing to observe the transparency and non-discrimination principle, having selected a contractor who should have been excluded from the procurement procedure because it failed to meet the requirements of the public contract. In yet another case, the contracting authority failed to meet the statutory deadline for the publication of the result of the procurement procedure by publishing it only 7 months after contracting even though the statutory deadline is 30 days.

Two of the four audited beneficiaries failed to submit to the SEF the monitoring reports on the progress of the implementation of the project for every 3 months for the entire project implementation period, thus breaching the terms and conditions of the call and of the contract concerning aid from the SEF.

**7. Between 2014 and 2016, no Czech Entity submitted a project application for assistance under the *LIFE Programme*, which is coordinated by the European Commission, with a focus on air quality and emissions**

The *LIFE Programme* enables the implementation of the so-called “integrated” projects promoting the implementation and monitoring of local and regional air quality plans with a view to contributing to the air pollution reduction programmes at the national level. Working with six regions, eight cities and five other partners, the MoE was preparing the *AirCzechia* project, aimed at the implementation of the measures of the AQIPs. Although the project was successfully submitted in the first round of the call under the *LIFE Programme* in 2017, the MoE discontinued the project early in the course of the preparation for the full project proposal in March 2018. According to the MoE, the main reason for the early discontinuation of the project was the fact that even though the MoE, being the main project partner, had full financial and factual responsibility for the project, prohibitive risks were identified in connection with the reluctance of the partners to offer adequate staffing for the project, their inability to perform the key activities using themselves as well as their preference of complementary measures with only a low impact on the overall implementation of the AQIPs, e.g. above-the-threshold road cleaning.

In the period 2014–2016<sup>35</sup>, no project was submitted under the *LIFE Programme* with the thematic priority of *Air quality and emissions*, including urban environment, with an entity from the Czech Republic being the coordinating beneficiary even though the programme focus and conditions enabled that. The information from the project database and the

---

<sup>34</sup> Act No. 134/2016 Coll. on public procurement.

<sup>35</sup> A multi-annual work programme was set for the period 2014–2017 with an allocation of EUR 1,796,242,000. The data for 2017 were not available as of the conclusion of the audit.

information published by the Commission also shows that the *LIFE Programme* was used between 2014 and 2016 to support:

- a total of 10 projects where the coordinating beneficiary was an entity in the Czech Republic (no project focused on the thematic priority of *Air quality and emission*);
- 25 integrated projects from 14 Member States. The highest number of integrated projects (3) were allotted to Germany, Belgium and Spain. No integrated project was assigned to the Czech Republic in the period 2014–2016. The territory of the Czech Republic was concerned with one integrated project - that dealing with the AQIP implementation in the Lesser Poland Voivodeship<sup>36</sup>.

**With regard to the significant impact of cross-border transmission on the level of air pollution in the Czech Republic and in Poland, the MoE should hold transboundary consultations with Poland in the preparation of the national air pollution control programme.**

The analyses carried out by the MoE in connection with the preparation of the Strategy, the NERP and the AQIPs as well as the analysis performed under the *Air Silesia* project (2010–2013) confirm a significant impact of cross-border transmission on the level of air pollution in the Czech Republic, in particular, in the Moravian-Silesian Region. The conclusions of the *Air Silesia* project read, for example:

- The level of air pollution by sulphur dioxide (SO<sub>2</sub>) is about double in the Silesian Voivodeship compared to the Moravian-Silesian Region; at the same time, the analyses of the samples taken during the project point to higher concentrations of PM<sub>10</sub> and benzo[a]pyrene on the Polish side of the border.
- The largest area with the highest air pollution levels in the entire region is located roughly between the Czech-Polish border and the surroundings of Rybnik; the pollution that originates from this area also significantly influences the border region of the Czech Republic.
- More frequently than not the winds blow from the Czech Republic into Poland; however, the Polish sources produce more PM<sub>10</sub> emissions, large concentrations of which are transmitted into the Czech Republic under adverse dispersion conditions.

The national air pollution control programmes are currently being updated in the EU Member States in accordance with Directive (EU) 2016/2284, which, in Article 6(2), sets out that, when drawing up, adopting and implementing these programmes, Member States shall assess to what extent national emission sources are likely to have an impact on air quality in their territories and neighbouring Member States and, where appropriate, the Member States shall conduct transboundary consultations.

---

<sup>36</sup> One of the project objectives was to build a single Czech, Polish and Slovak emission and air pollution database. The MoE appears as a partner in the project by preparing the air quality model for the project area. According to the project proposal, the MoE budget was 50,367 euros, of which the Commission contribution accounted for 20,109 euros.



## List of abbreviations and terms

kT	kiloton
µg/m <sup>3</sup>	microgram per cubic metre (the unit of measure of the concentration of air pollutants in the air)
µm	micrometre
Ng/m <sup>3</sup>	nanogram per cubic metre (the unit of measure of the concentration of an air pollutant in the air)
BaP	benzo[a]pyrene
CLRTAP	<i>The Convention on Long-Range Transboundary Air Pollution</i>
EEA	European Environment Agency
EC	European Commission
EMEP	A cooperation programme regarding the monitoring and evaluation of long-range transmission of pollutants in Europe ( <i>the European Monitoring and Evaluation Programme</i> )
EU ETS	EU Emissions Trading System (trade in emission allowances within the EU)
NH <sub>3</sub>	ammonia
NMVOC	non-methane volatile organic compounds
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NERP	<i>National Emission Reduction Programme of the Czech Republic</i>
NERP-WAM	a newly formulated scenario <i>with additional measures</i>
NPE	<i>National Programme Environment</i>
OPT	<i>Operational Programme Transport</i>
OPEIC	<i>Operational Programme Enterprise and Innovation for Competitiveness</i>
OPE	<i>Operational Programme Environment</i>
PA	priority axis/area
RDP	Rural Development Programme
AQIP(s)	Air Quality Improvement Programme(s)
RoPD (Czech acronym)	decision to provide subsidy (funding)
ŘSD	Road and Motorway Directorate of the Czech Republic (Ředitelství silnic a dálnic ČR)
SO	specific objective (in the OPE)
SO <sub>2</sub>	sulphur dioxide
SEP	<i>State Environmental Policy of the Czech Republic 2012–2020</i>
SSIM (Czech acronym)	state network for air pollution monitoring
Strategy	<i>Medium-term Air Quality Improvement Strategy of the Czech Republic (until 2020)</i>
Environment Report	Report on the Environment of the Czech Republic

## Annex 1

### Selected air pollution limits according to Act No. 201/2012 Coll. and Decree No. 330/2012 Coll.

**Table 5: Air pollution limits for health protection and the maximum number of exceedances**

Pollutant	Averaging period	Assessment threshold ( $\mu\text{g}/\text{m}^3$ )		Air pollution limit ( $\mu\text{g}/\text{m}^3$ )
		LAT	UAT	
SO <sub>2</sub>	1 hour	-	-	350 max. 24 times per year
	24 hours	50 max. 3 times per year	75 max. 3 times per year	125 max. 3 times per year
NO <sub>2</sub>	1 hour	100 max. 18 times per year	140 max. 18 times per year	200 max. 18 times per year
	calendar year	26	32	40
PM <sub>10</sub>	24 hours	25 max. 35 times per year	35 max. 35 times per year	50 max. 35 times per year
	calendar year	20	28	40
PM <sub>2.5</sub>	calendar year	12	17	25

Source: Act No. 201/2012 Coll., Decree No. 330/2012 Coll.

**Table 6: Air pollution limits for health protection – total content in PM<sub>10</sub> particulate matter**

Pollutant	Averaging period	Assessment threshold ( $\text{ng}/\text{m}^3$ )		Air pollution limit ( $\text{ng}/\text{m}^3$ )
		LAT	UAT	
benzo[a]pyrene	calendar year	0.4	0.6	1

Source: Act No. 201/2012 Coll., Decree No. 330/2012 Coll.

At the end of 2015, the Czech Republic has again set for itself the goal of achieving compliance with the air pollution limits set by the Act, this time by 2020<sup>37</sup>, through measures set at the national level in the *National Emission Reduction Programme of the Czech Republic* (“NERP”) and at the regional in the Air Quality Improvement Programmes, which were prepared in connection with the *Medium-term Air Quality Improvement Strategy of the Czech Republic (until 2020)*.

<sup>37</sup> The air pollution limits for PM<sub>10</sub> are effective from 1 January 2005. The air pollution limit NO<sub>2</sub> was supposed to be achieved by 1 January 2010. In 2009 and 2011 the Czech Republic applied to the EU institutions for exemptions from the obligation to achieve the limits values for PM<sub>10</sub> and NO<sub>2</sub>, arguing that they could not be achieved within the required timeframe due to the specific dispersion characteristics in the Czech Republic and the adverse influence of climatic conditions. The exceedances of the limit values are currently the subject of infringement proceedings. The proceedings are still ongoing.

## Air quality in the Czech Republic

The air pollution limits for certain pollutants (PM<sub>10</sub>, PM<sub>2.5</sub>, BaP a NO<sub>2</sub>) were repeatedly exceeded in the period from 2015 to 2017. The tables below show the number of stations where the air pollution limits were exceeded and the share of the population exposed to above-the-threshold concentrations of pollutants from 2015 to 2017.

**Table 7: Number of stations where the limit was exceeded from 2015 to 2017**

Year	Number of stations where the limit was exceeded*				
	NO <sub>2_aa</sub>	PM <sub>10_aa</sub>	PM <sub>10_da</sub>	PM <sub>2.5_aa</sub>	BaP <sub>aa</sub>
2015	2 (93)	3 (131)	29 (131)	6 (49)	21 (34)
2016	4 (96)	1 (152)	23 (152)	10 (81)	31 (44)
2017	4 (93)	2 (148)	50 (148)	10 (79)	31 (47)

Source: CHMI, processed by the SAO

**Explanatory notes:**

aa = average annual concentration; da = average daily (24-hour) concentration

\* The brackets specify the total number of stations with a sufficient amount of data for annual evaluation in accordance with the applicable legislation.

**Table 8: Share of the population exposed to the concentration of pollutants from 2015 to 2017**

Year	Population affected (%)				
	NO <sub>2_aa</sub>	PM <sub>10_aa</sub>	PM <sub>10_da</sub>	PM <sub>2.5_aa</sub>	BaP <sub>aa</sub>
2015	0	0.01	10	5	51
2016	0.3	0	7	3	56
2017	0	0.01	23	5	62
Average for 2013–2017	0	0.2	15	7	51

Sources: Prepared by the SAO on the basis of CHMI data.

**Explanatory notes:**

aa = average annual concentration; da = average daily (24-hour) concentration

In 2017 the air pollution limit for the average daily concentration of PM<sub>10</sub> was exceeded at 50 measuring stations, i.e. about  $\frac{1}{3}$  of all the measuring stations (compared to 23 stations in 2016 and 29 stations in 2015); 23% of the population of the Czech Republic was exposed to above-the-threshold concentrations in 2017 (compared to 7% of the population in 2016 and 10% in 2015). Because of the high concentration of PM<sub>10</sub> fraction of suspended particulate measure, a total of 39 smog situations lasting 3,757 in total were declared in 2017.

In 2017 the air pollution limit for the average annual concentration of BaP, measured as the total content in the PM<sub>10</sub> fraction of particulate matter, was exceeded at 31 measuring stations, i.e. nearly  $\frac{2}{3}$  of the measuring stations (compared to 31 in 2016 and 21 in 2015); 62% of the population of the Czech Republic was exposed to above-the-threshold

concentrations in 2017 (compared to 56% of the population in 2016 and 51% in 2015)<sup>38</sup>, the five-year average for the period from 2013 to 2015 is 51%.

---

<sup>38</sup> The low density of the monitoring network must be taken into consideration when interpolating the BaP data. The estimated average annual concentrations of BaP carry a significantly higher uncertainty than the other substances monitored. The insufficient number of measurements does not allow for a more accurate determination of the BaP concentrations in smaller-sized settlements; however, the composition of the emission sources and the results of certain studies suggest that the concentrations are above the threshold there, too.

## Annex 2

### Evaluation of the pollution level

The level of air pollution by pollutants of anthropogenic origin and greenhouse gases is evaluated by the CHMI under the authority of the MoE. It fundamentally relies on the so-called emission inventories, which are based on an approach combining direct collection of data reported by the operators of pollution sources with data obtained through model calculations based on the data reported by pollution source operators or established by statistical surveys, which are mainly conducted by the CZSO. The results of the emission inventories are presented in the form of emission balances, which are prepared for various territories and sectors. The sectoral classification of pollution sources arising from the Nomenclature for Reporting Codes (NFR) used for the international reporting of the aggregate emission data. The reporting includes the emissions of the main pollutants as well as the emission of particulate matter PM<sub>10</sub> and PM<sub>2.5</sub> and heavy metals.<sup>39</sup>

### Development of national emissions

The table below shows the development of the emissions of selected pollutants from 1990 to 2016.

**Table 9: Development of the emissions of selected pollutants from 1990 to 2016**

(kt; BaP in t)

Year	SO <sub>x</sub> (SO <sub>2</sub> )	NO <sub>x</sub> (NO <sub>2</sub> )	NM VOC	NH <sub>3</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	benzo[a]pyrene
1990	1,755	812	571	190	322	452	91
2000	233	295	302	87	51	70	17
2005	208	281	267	78	45	61	14
2010	164	226	242	72	45	59	17
2015	133	174	216	73	40	53	16
2016	115	165	213	73	39	52	16
<b>Emission reduction between 1990 and 2010 (%)</b>	<b>91</b>	<b>72</b>	<b>58</b>	<b>62</b>	<b>86</b>	<b>87</b>	<b>82</b>
<b>Emission reduction between 1990 and 2016 (%)</b>	<b>93</b>	<b>80</b>	<b>63</b>	<b>62</b>	<b>88</b>	<b>89</b>	<b>83</b>

Source: Prepared by the SAO based on emission balance data (Reporting\_2018\_v\_1-2\_1990-2016).

Directive 2001/81/EC<sup>40</sup>, which set out the ceilings for the total annual emissions<sup>41</sup> of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NM VOC) and ammonia (NH<sub>3</sub>) for the Member States from 2010 onwards had a fundamental impact on the reduction of anthropogenic emissions into the air. Between 1990 and 2016, the sulphur dioxide emissions decreased by 93%, nitrogen oxide emissions by 80%, non-methane volatile organic compound emissions by 63%, and ammonia emissions by 62% in

<sup>39</sup> The CHMI is responsible for the preparation and reporting of emission inventories according to Directive (EU) 2016/2284. The emissions are reported according to methodologies laid down in the *Convention on Long-Range Transboundary Air Pollution* (CLRTAP) and the EMEP/EEA emission inventory guidebook. Emission inventories are reported by 15 February for the year Y-2 and are available at the website of the Centre on Emission Inventories and Projections ([www.ceip.at](http://www.ceip.at)).

<sup>40</sup> Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

<sup>41</sup> The national emission ceilings applicable from 2010 are based on the *Convention on Long-Range Transboundary Air Pollution* (CLRTAP) of 1979, which is the main international co-operation and action framework to limit, gradually reduce and prevent air pollution, including its extension by the *Protocol to Abate Acidification, Eutrophication and Ground-level Ozone* of 1999, which was further revised in 2012 ("Gothenburg Protocol").

the Czech Republic. Although Czech Republic met and continues to comply with the emission ceilings<sup>42</sup>, significant adverse impacts on, and risks to, human health and the environment persist in connection with air quality in the Czech Republic.

---

<sup>42</sup> Directive 2001/81/EC set a commitment for the Czech Republic in the form of national emission ceilings for SO<sub>2</sub> (265 kt), NO<sub>x</sub> (286 kt), NMVOC (220 kt) and NH<sub>3</sub> (80 kt), which were to be achieved by 2010, including the commitment to not exceeding these emission ceilings in any subsequent year.

## Annex 3

### Main pollutants

**Suspended particulate matter** is a diverse mixture of organic and inorganic liquid and solid particles of various sizes, composition and origins. Airborne particulate matter represents a major risk factor with multiple effects on human health. Unlike gaseous substances, it does not have a specific composition (the size and composition of the particulate matter is influenced by its source) and, instead, they are a mixture of substances with various effects. At the same time, it acts as a vector for gaseous harmful pollutants. Suspended particulate matter is divided into primary and secondary particulate matter. Primary particulate matter is emitted directly from the sources and can be further divided into particulate matter originated from anthropogenic sources (fossil fuel burning, transport, technological processes, anthropogenic activities) and that coming from natural sources (sea salt aerosol, volcanic activity, space fallout...).

Secondary particulates are those that are generated in the atmosphere by the ongoing chemical (chemical reactions) and physical (nucleation, condensation) processes and those that re-suspended (raised into atmosphere) as a result of human activity (transport) or weather factors (wind).

Fine particulates tend to coagulate and condense and grow in size but their final size rarely exceeds 2 µm. These particulates remain in the air relatively long, usually between 7 and 30 days. On the contrary, particulates resulting from mechanical dispersion tend to be larger in size than 2 µm and have a shorter life in the atmosphere.

The fine particulate matter in the fraction of under 2.5µm and the larger fraction differ significantly in terms of origin, composition, and behaviour.

The effect of the suspended particulates depends on their size, shape and chemical composition. The size of the particle is crucial for the entry into and deposition in the respiratory tract. Suspended particulates in the **PM<sub>2.5</sub>** fraction

**Source:** CHMI and NERP, see

[http://portal.chmi.cz/files/portal/docs/meteo/om/weather\\_links/Pocasi/Navody/Znecisteneni/susp\\_castice.pdf](http://portal.chmi.cz/files/portal/docs/meteo/om/weather_links/Pocasi/Navody/Znecisteneni/susp_castice.pdf).

#### **Polycyclic aromatic hydrocarbons (PAHs) – benzo[a]pyrene (BaP)**

PAHs have the ability to persist in the environment, accumulate in its components and living organisms, are lipophilic, and a number of them have toxic, mutagenic or carcinogenic properties. They are endocrine disruptors and affect birth weight and fetal growth. They have immunosuppressive effects by reducing immunoglobulin G and immunoglobulin A levels. They may be irritant in high concentrations (exceeding the concentration both in the outside environment and in the working environment). PAHs are indirect genotoxic compounds. The biotransformation system of the organism gradually produces metabolites with carcinogenic and mutagenic effects. The electrophilic metabolites covalently binding with the DNA then represent the basis for the carcinogenic potential of the PAHs. Benzo[a]pyrene (BaP) is the PAH that is most commonly used for carcinogenicity assessment in practice. In terms of carcinogenicity classification, BaP was listed as a Group 1 carcinogen by IARC in 2010.

**Source:** MoE – information about the health risks associated with air quality in 2016, see

[https://www.mzp.cz/cz/zdravotni\\_dusledky\\_znecisteneni\\_ovzdusi](https://www.mzp.cz/cz/zdravotni_dusledky_znecisteneni_ovzdusi).

#### **Sulphur dioxide (SO<sub>2</sub>)**

It mainly enters the air as a product of combustion of fuels containing sulphur and is emitted from a number of processes. Volcanic activity is a major natural source. During a certain time in the atmosphere, sulphur dioxide is turned into sulphur trioxide by a photochemical or catalytic reaction, which is then hydrated by atmospheric moisture into a sulphuric acid aerosol. The oxidation rate depends on the weather conditions, the temperature, sunshine, presence of catalyst particles, etc. Between 0.1% to 2% of the present SO<sub>2</sub> is usually eliminated within one hour. The resulting sulphuric acid may react with the alkaline particles of the dust aerosol, resulting in the production of sulphates and the consequent increase in the concentrations of suspended particulate matter. Sulphates settle on the ground surface gradually or are washed away from the air by rain. In the absence of alkaline particulates in the air, the rain water is acidified to a pH of < 4. In this way, the so-called acid rain is formed by sulphur oxides and nitrogen oxides. Acid rain causes extensive damage to forests and industrial crops by releasing metal ions from the soil, damaging microorganisms, reducing water quality and even causing fish death. Significant damage to historical buildings and works of art has also been observed as acid rain dissolves certain types of masonry and cause rock weathering.

**Source:** MoE – *Air Quality Protection Manual*, see

[https://www.mzp.cz/C1257458002F0DC7/cz/prirucka\\_ochrany\\_kvality\\_ovzdusi/\\$FILE/000-prirucka\\_OPLZZ\\_komplet-20140408.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/prirucka_ochrany_kvality_ovzdusi/$FILE/000-prirucka_OPLZZ_komplet-20140408.pdf).

**Nitrogen oxides (NO<sub>x</sub>)**

Nitrogen oxides include nitrous oxide, nitric oxide, nitrogen dioxide, and dinitrogen pentoxide, jointly referred to NO<sub>x</sub>. The main anthropogenic sources of nitrogen oxides include emissions from transport and from combustion processes, mainly from large sources. In the atmosphere, nitrogen oxides are gradually turned into nitric acid, which reacts with dust particles as well as magnesium and calcium oxides or ammonia to form solid particles. These particles are removed from the atmosphere by sedimentation and by rain. While the nitrate ions that enter the soil and water through this mechanism may have a positive effect on plant growth, higher concentration may result in fish deaths and excessive aquatic plant growth (water eutrophication). Nitrogen dioxide (NO<sub>2</sub>) combined with oxygen and volatile organic compounds (NMVOC) and supported by ultraviolet light contributes to the formation of ground-level ozone and the so-called photochemical smog. High concentrations of ground-level ozone are harmful for plants including

**Source:** MoE – *Air Quality Protection Manual*, see

[https://www.mzp.cz/C1257458002F0DC7/cz/prirucka\\_ochrany\\_kvality\\_ovzdusi/\\$FILE/000-prirucka\\_OPLZZ\\_komplet-20140408.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/prirucka_ochrany_kvality_ovzdusi/$FILE/000-prirucka_OPLZZ_komplet-20140408.pdf).

**Volatile organic compounds (NMVOC)**

Non-methane volatile organic compounds (NMVOC) represent organic compounds or mixtures thereof, other than methane, with vapour pressure of 0.01kPa or more at 20°C or of corresponding volatility under the specific conditions of their use.

The organic solvent sector is the most significant source of NMVOC emissions. It mainly includes the paint applications, degreasing, the printing industry, and the manufacture and processing of chemical products.

NMVOC emissions are also generated from the imperfect combustion of fossil fuels. This mainly concerns the combustion of fuels in transport. Other NMVOC emission sources include private household heating and public power

**Source:** MoE – *Air Quality Protection Manual*, see

[https://www.mzp.cz/C1257458002F0DC7/cz/prirucka\\_ochrany\\_kvality\\_ovzdusi/\\$FILE/000-prirucka\\_OPLZZ\\_komplet-20140408.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/prirucka_ochrany_kvality_ovzdusi/$FILE/000-prirucka_OPLZZ_komplet-20140408.pdf).



## Annex 4

**Table 10: NERP implementation status – comparison of the evaluations by the MoE and the SAO**

Code	Priority measure	Implementation status Environment Report 2016	Implementation status – SAO analysis
AA3	Promote the accelerated renewal of the passenger vehicle fleet	<b>Not implemented</b>	<b>Not implemented</b>
AA5	Stimulate the use of alternative fuel vehicles in road freight transport by reducing the road tax rate	The issue is addressed in the NAP <i>Clean Mobility</i> .	<b>Not implemented</b>
AA6	Support the procurement of alternative fuel vehicles for public transport	<b>Implemented on a continuous basis</b>	The measure was not the subject of audit by the SAO. <b>Implemented on a continuous basis</b> under support from the IROP.
AA7	Promote the construction of the refuelling and charging infrastructure for alternative fuel vehicles in transport	<b>Implemented on a continuous basis</b>	The measure was not the subject of audit by the SAO. <b>Implemented on a continuous basis</b> under support from the OPT.
AA8	Support the procurement of environmentally friendly passenger vehicles	<b>Completed</b>	<b>Not implemented</b>
AA9	Increase the maximum fee for permitting motor vehicles to enter selected locations and parts of towns	<b>Completed</b>	<b>Completed</b>
AA10	Promote the introduction of low-emission zones	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis</b> (However, no low-emission zone has been introduced yet)
AA11	Rationalise the road charges with a view to the impact of transport on air quality at the relevant location	<b>Completed</b>	<b>Completed</b>
BA1 CA1	Promote the prioritised implementation of measures to reduce emissions from stationary sources in energy, industrial and agricultural sectors	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis</b>
BA2	Promote the implementation of measure to reduce energy consumption and increase energy efficiency	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis</b> supported, for example, from PA5 of the OPE and from PA3 of the OPEIC, with <b>significant risks regarding the utilisation of the funding.</b>
BA3	Reduce the share of fossil fuels in stationary combustion sources not covered by the EU ETS	<b>Implemented partially</b>	<b>Not implemented</b> (a more detailed analysis to be prepared by 31 December 2018, with the implementation timeline unknown)
DA1	Promote the accelerated replacement of heat sources in the sector of local heating in households	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis</b>
AB1	Build a backbone network of high-capacity roads for motor transport	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis.</b> A single priority scheme has been put into operation; several priority schemes are under construction, but most of them only exist in the ŘSD plans, with the implementation expected to start in the period 2018–2020; one priority scheme is in the project preparation stage.
AB2	Priority construction of city and municipality bypass roads		

AB21	Renew the fleet in public administration with alternative fuel vehicles	<b>Implemented on a continuous basis</b>	<b>Not implemented</b>
AB22	Improve the functionality of the system of regular vehicle inspections	Completed	<b>Implemented on a continuous basis.</b> The latest research recommends more extensive modifications of the legislation.
AB23	Shift freight from roads to railways	Implemented partially	<b>Implemented on a continuous basis</b> With regard to the nature of the measure, the fulfilment of this indicator by PA1 of the OPT, and the results of an analysis, there are significant risks of the failure to implement the measure in full and in time.
AB24	Lay down the conditions for the operation of construction machinery	<b>Deadline missed;</b> expected to be completed by the end of 2017.	<b>Deadline missed (repeatedly)</b> expected to be completed by the end of 2018
AB25	Authorise municipalities to issue a decree governing the conditions for the transport of bulk materials by commercial vehicles	<b>Cannot be implemented as per the ruling of the Constitutional Court</b>	<b>Not implemented</b> cannot be implemented, as per the ruling of the Constitutional Court
CB1	Reduce ammonia emissions from the application of fertilisers to arable land and from livestock production beyond the minimum requirements of the Good Agricultural Practice.	<b>Implemented on a continuous basis</b>	<b>Implemented on a continuous basis.</b> The measure was supported under SO 2.2. in PA2 of the OPE. In addition, it is supported from the RDP, which was not included in the audit.
CB7	Reduce ammonia emissions from the application of mineral fertilisers	<b>Will be implemented</b> by an amendment to Decree No. 377/2013	<b>Will be implemented</b> by an amendment to Decree No. 377/2013. <b>The amendment had not been passed before the conclusion of the SAO audit.</b>
DB9	Accelerate the entry into force and, if required, apply stricter efficiency and emission parameters regarding the heating equipment specified in the implementing regulation for Directive 2009/125/EC on ecodesign	<b>Completed</b>	<b>Completed</b>
DB10	Restrict the availability of stationary combustion sources with a rated heat input of under 300kW designed for coal combustion	<b>Under preparation</b>	<b>Under preparation</b>

**Source:** Prepared by the SAO on the basis of the Report on the Environment of the Czech Republic 2016.

## Annex 5

Table 11: Projects audited under PA2 of the OPE

(in CZK)

Audited entity	SO	Project – number	Subsidy (as per the subsidy decision)	Project indicator fulfilment
LOCAL HEATING SECTOR (HOUSEHOLDS)				
Ústí Region	2.1	CZ.05.2.32/0.0/0.0/15_016/0000006	178,200,000.00	On a continuous basis
Ústí Region	2.1	CZ.05.2.32/0.0/0.0/17_067/0005159	161,700,000.00	On a continuous basis
Central Bohemian Region	2.1	CZ.05.2.32/0.0/0.0/15_016/0000013	569,580,000.00	On a continuous basis
Central Bohemian Region	2.1	CZ.05.2.32/0.0/0.0/17_067/0005165	517,800,000.00	On a continuous basis
Moravian-Silesian Region	2.1	CZ.05.2.32/0.0/0.0/15_016/0000010	516,120,000.00	On a continuous basis
Moravian-Silesian Region	2.1	CZ.05.2.32/0.0/0.0/17_067/0005161	891,480,000.00	On a continuous basis
South Bohemian Region	2.1	CZ.05.2.32/0.0/0.0/15_016/0000003	320,000,000.00	On a continuous basis
South Bohemian Region	2.1	CZ.05.2.32/0.0/0.0/17_067/0005153	303,000,000.00	On a continuous basis
<b>SO 2.1 total for regions</b>			<b>3,457,880,000.00</b>	
SEF	2.1	CZ.05.2.32/0.0/0.0/15_016/0000219	23,700,000.00	On a continuous basis
SEF	2.1	CZ.05.2.32/0.0/0.0/17_067/0005160	23,700,000.00	On a continuous basis
SEF	2.1	CZ.05.2.32/0.0/0.0/15_016/0000007	195,800,000.00	On a continuous basis
SEF	2.1	CZ.05.2.32/0.0/0.0/17_067/0005155	177,900,000.00	On a continuous basis
<b>SO 2.1 total for the SEF</b>			<b>421,100,000.00</b>	
<b>SO 2.1 total</b>			<b>3,878,980,000.00</b>	
INDUSTRY				
Cement Hranice, akciová společnost	2.2	CZ.05.2.32/0.0/0.0/15_008/0000710	39,581,275.80	Completed
METAZ Týnec a.s.	2.2	CZ.05.2.32/0.0/0.0/15_008/0001064	95,856,227.35	Completed
Severočeské doly a.s.	2.2	CZ.05.2.32/0.0/0.0/15_008/0001045	11,323,874.65	Project under implementation
Wotan Forest, a.s.	2.2	CZ.05.2.32/0.0/0.0/15_008/0001081	61,358,162.80	Project under implementation
<b>SO 2.2 total for final beneficiaries</b>			<b>208,119,540.60</b>	
SEF	2.2	CZ.05.2.32/0.0/0.0/15_008/0000001	19,255,679.00	Completed
SEF	2.2	CZ.05.2.32/0.0/0.0/15_008/0000227	6,074,750.00	Project under implementation
SEF	2.2	CZ.05.2.32/0.0/0.0/15_008/0000970	30,624,750.00	Completed
<b>SO 2.2 total for the SEF</b>			<b>55,955,179.00</b>	
<b>SO 2.2 TOTAL</b>			<b>264,074,719.60</b>	
MONITORING				
CHMI	2.3	CZ.05.2.32/0.0/0.0/15_017/0002594	55,101,620.09	Completed
CHMI	2.3	CZ.05.2.32/0.0/0.0/15_017/0002616	21,480,754.23	Project under implementation
CHMI	2.3	CZ.05.2.32/0.0/0.0/15_017/0002640	16,573,952.59	Project under implementation
CHMI	2.3	CZ.05.2.32/0.0/0.0/15_017/0002641	31,648,604.97	Project under implementation
CHMI	2.3	CZ.05.2.32/0.0/0.0/15_017/0002642	10,260,697.65	Project under implementation
<b>SO 2.3 total for the CHMI</b>			<b>135,065,629.53</b>	
SEF	2.3	CZ.05.2.32/0.0/0.0/15_017/0001433	5,877,878.00	Project under implementation
SEF	2.3	CZ.05.2.32/0.0/0.0/15_017/0002123	1,769,323.00	Completed

SEF	2.3	CZ.05.2.32/0.0/0.0/15_017/0002542	2,532,340.00	Completed
<b>SO 2.3 total for the SEF</b>			<b>10,179,541.00</b>	
<b>SO 2.3 TOTAL</b>			<b>145,245,170.53</b>	
<b>OPE TOTAL</b>			<b>4,288,299,890,13</b>	

**Source:** Prepared by the SAO on the basis of project documents.

**Explanatory notes:**

“COMPLETED” – the project declares that the indicators have been fulfilled.

“IMPLEMENTED ON A CONTINUOUS BASIS” – the available interim evaluations of the project suggest that the indicators will be achieved after the completion of the project.

“PROJECT UNDER IMPLEMENTATION” – as of the completion of the audit, the stage of the project did not enable the evaluation of the level of fulfilment of the indicator.

**Table 12: Projects audited under the NPE**

**(in CZK)**

Audited entity	Priority subarea	Project – number	Subsidy (as per the subsidy decision)	Project indicator fulfilment
INDUSTRY				
ADM Olomouc s.r.o.	2.1	01591621	2,249,854.00	Project under implementation
BPS Pacov s.r.o.	2.1	01491621	1,530,600.00	Project under implementation
Elektrárny Opatovice, a.s.	2.1	01521621	10,000,000.00	Project under implementation
PRECIOSA ORNELA, a.s.	2.1	01571621	2,414,563.00	Project under implementation
<b>NPE total for final beneficiaries</b>			<b>16,195,017.00</b>	
SEF	2.2	08561522	180,000.00	Completed
SEF	2.2	08571521	317,628.00	Project under implementation
SEF	2.1	00511628	8,415,000.00	Project under implementation
SEF	5.2	00111721	418,000.00	Completed
<b>NPE total for the SEF</b>			<b>9,330,628.00</b>	
<b>NPE TOTAL</b>			<b>25,525,645.00</b>	

**Source:** Prepared by the SAO on the basis of project documents.

**Explanatory notes:**

“COMPLETED” – the project declares that the indicators have been fulfilled.

“PROJECT UNDER IMPLEMENTATION” – as of the completion of the audit, the stage of the project did not enable the evaluation of the level of fulfilment of the indicator.