Review of the National Air Pollution Control Programme – Hungary

Final Report for European Commission – DG Environment
Specific contract 070201/2019/819608/SFRA/ENV.C.3
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## Abbreviations

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<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>BaP</td>
<td>Benzo(a)pyrene</td>
</tr>
<tr>
<td>BAT</td>
<td>Best Available Technique</td>
</tr>
<tr>
<td>BC</td>
<td>Black Carbon</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane</td>
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<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>EEA</td>
<td>European Environment Agency</td>
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<tr>
<td>ETS</td>
<td>Emissions trading system</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>kt</td>
<td>Kilo tonne</td>
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<tr>
<td>NAPCP</td>
<td>National Air Pollution Control Programme</td>
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<tr>
<td>NECP</td>
<td>National Energy and Climate Plans</td>
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<tr>
<td>NFR</td>
<td>Nomenclature for Reporting</td>
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<tr>
<td>NH₃</td>
<td>Ammonia</td>
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<tr>
<td>NMVOC</td>
<td>Non-Methane Volatile Organic Compounds</td>
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<tr>
<td>NO₂</td>
<td>Nitrogen dioxide</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Nitrogen oxides</td>
</tr>
<tr>
<td>O₃</td>
<td>Ozone</td>
</tr>
<tr>
<td>PaMs</td>
<td>Policies and Measures</td>
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<tr>
<td>PM₁₀</td>
<td>Particulate matter 10 micrometres or less in diameter</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>Particulate matter 2.5 micrometres or less in diameter</td>
</tr>
<tr>
<td>RAG</td>
<td>Red; Amber; Green [rating]</td>
</tr>
<tr>
<td>SCR</td>
<td>Selective catalytic reduction [technologies]</td>
</tr>
<tr>
<td>SNCR</td>
<td>Selective non-catalytic reduction [technologies]</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulphur dioxide</td>
</tr>
<tr>
<td>WAM</td>
<td>With Additional Measures</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WM</td>
<td>With Measures</td>
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1 Introduction

1.1 Review of the National Air Pollution Control Programmes

1.1.1 This report

The following report presents the results of the review of the National Air Pollution Control Programme (NAPCP) submitted to the European Commission by Hungary on 18 May 2020.

EU Member States are required to prepare and report their NAPCP according to the minimum content and common format (Commission Implementing Decision (EU) 2018/1522)\(^1\) stipulated by Article 6 of the Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants\(^2\), hereafter referred to as the Directive or the NECD\(^3\). The NAPCP should demonstrate compliance with the Member State’s respective emission reduction commitments and set out how compliance will be achieved.

This review has been undertaken alongside a review of national air pollutant emission projections developed and reported by Member States under Article 10(2) of the NECD. These reviews have been commissioned by the European Commission as Service Request 2 and Service Request 7 under the Framework Contract No ENV.C.3/FRA/2017/0012 (specific contract 070201/2018/791186/SER/ENV.C.3 and 070201/2019/819608/SFRA/ENV.C.3).

Whereas most Member State NAPCP review reports feed into the intermediate horizontal review report under the specific contract (which presents conclusions and recommendations from the reviews at the EU-level, published June 2020), the review for Hungary does not because at the time of reporting of the final NAPCP, the analysis presented in the intermediate horizontal review report had already been finalised. The results of the review will however be included in the final horizontal review report which will be produced under this contract by end of 2021.

The horizontal review report also contains, for each Member State, an assessment of its risk of non-compliance with its emission reduction commitments, based on a cross-analysis of the information provided in the NAPCPs and projection submissions under Article 10(2) of the NECD. The risk assessment for Hungary is presented in Appendix 2 to the present report. Details on the methodology for that risk assessment are found in the horizontal review report.

1.1.2 Objectives of the NAPCP review

The purpose of the following report is to determine Member State compliance with the requirements of the NECD. The scope of the NAPCP review includes:

- The use of the NAPCP common format.
- NAPCP compliance with the minimum content requirements of the Directive (mandatory content (M)).
- The extent to which the optional content requirements (O) of the Directive are reported and what added value this brings to the quality of the NAPCP.

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\(^3\) Directive (EU) 2016/2284 repeals and replaces the previous National Emission Ceilings Directive (2001/81/EC) and is generally referred to as the new NECD or simply the NECD.
• **Consistency** between the NAPCP and the information in the air pollutant emission projections that were due to be submitted by Member States by 15 March 2019.

• The **extent** to which Member States are **reliant on additional PaMs** (as included in the ‘With Additional Measures’ (WAM) scenario) to achieve compliance.

• The extent to which the evidence provided on **selected PaMs is robust** and the level of confidence it provides that Member States will achieve their 2020 and 2030 emission reduction commitments.

• The extent to which **additional PaMs are put forward in view of wider air quality objectives** as set out in Article 1(2) of the NECD (referring to the objectives of the Ambient Air Quality Directives, the Union’s long-term objective of achieving levels of air quality in line with the air quality guidelines of the World Health Organisation (WHO), the Union’s biodiversity and ecosystem objectives and coherence with climate and energy policy priorities).

• The degree of **coherence with other plans and programmes in other policy areas**, predominantly the National Energy and Climate Plans (NECP).

### 1.2 Methodology

The key components of the review process are outlined in Figure 1-1. A comprehensive description of the process, methodology and checks followed are detailed in accompanying review guidelines which were provided to the NAPCP reviewers responsible for conducting this report.

**Figure 1-1 Overview of the NAPCP review methodology**

A central review team was used to conduct the initial screening checks. The purpose of the initial screening was to document Member State submissions in one central data log. For example, the information recorded includes the date, language and length of the NAPCP submission; accompanying annexes are similarly reviewed and logged and links to external websites are checked. The initial checks also record if the Member State uses the NAPCP common format.

The completeness assessment and in-depth review checks are structured according to the section headings of the NAPCP common format. Together, the review findings inform the extent to which the
NAPCP is compliant with the minimum content requirements, the extent to which evidence is robust and the level of confidence that the Member State will achieve its commitments. NAPCP completeness is rated according to a RAG rating (Red, Amber, Green rating as described in Appendix 1) while the in-depth checks involve a series of questions with pre-defined responses to be chosen from, designed to systematically determine the robustness and reliability of the evidence submitted.

1.3 NAPCP submission documents

An overview of the Member State’s NAPCP is presented in the table below. This information was gathered as part of the NAPCP initial screening.

**Table 1-1 Overview of the Member State NAPCP submission documents**

<table>
<thead>
<tr>
<th>Initial screening check</th>
<th>Response</th>
<th>Additional comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was the NAPCP submitted by 1 April 2019?</td>
<td>No</td>
<td>The NAPCP was submitted on 18 May 2020.</td>
</tr>
<tr>
<td>Was the common format used?</td>
<td>Yes</td>
<td>Hungary has provided an accompanying report on agriculture.</td>
</tr>
<tr>
<td>What is the length of the NAPCP?</td>
<td>65 pages</td>
<td>The NAPCP comprises 65 pages, the accompanying report 82 pages.</td>
</tr>
<tr>
<td>What language is the NAPCP reported in?</td>
<td>Hungarian</td>
<td>An annex (82 pages) describing NAPCP’s agricultural sub-programme is provided.</td>
</tr>
<tr>
<td>What language is the supporting documentation reported in?</td>
<td>Hungarian</td>
<td></td>
</tr>
<tr>
<td>How many external documents are referenced or provided in the NAPCP?</td>
<td>Four</td>
<td></td>
</tr>
<tr>
<td>Is it possible to identify the required information in the external documents (i.e. is the page and chapter reference provided)?</td>
<td>Yes</td>
<td>Weblinks are provided to external supporting datasets.</td>
</tr>
<tr>
<td>Can all external documents be accessed?</td>
<td>Yes</td>
<td>All weblinks provided are in working order.</td>
</tr>
</tbody>
</table>

**Completeness assessment**

A completeness assessment was conducted to identify gaps in reporting according to the minimum content requirements of the Commission Implementing Decision (EU) 2018/1522 laying down a common format of the NAPCP. The completeness assessment also reviewed the extent of reporting of optional content by the Member States. The results show a few gaps in reporting have been identified, as presented in Appendix 1 to this review. To summarise, the Hungarian NAPCP includes the minimum content required for:

- Policy priorities for emission reductions and other relevant policy priorities and the responsible authorities involved (section 2.3 of the NAPCP submitted by Hungary).
- Progress made by current PaMs in reducing emissions and improving air quality together with transboundary impacts (section 2.4).
- Projected emissions and emission reductions with existing measures (section 2.5).
• Additional PaMs considered and selected PaMs for adoption which have been reported by the Member State using the EEA PaM-tool (section 2.6 and 2.7).
• Projected emissions and emission reductions with additional measures (section 2.8).

The completeness assessment identified the following gaps:

• Detailed information has not been provided on the projected impact of existing measures on improving air quality under the WM scenario in section 2.5.2.
• Furthermore, based on information in section 2.8 a non-linear emission reduction trajectory is expected for NH₃, but in section 2.8.2 of the NAPCP proper details and justification have not been provided on this.

The Member State has reported the following optional content from the NAPCP common format:

• Where relevant, source sectors under the responsibility of each authority are specified in section 2.3 (table 2.3.2).
• Bar charts are provided by pollutant to show emission reductions achieved and graphics are used to show the number of exceedances per measurement station for air quality pollutants with exceedances in section 2.4.
• The data and methodologies used for analysing the current transboundary impacts of emissions are outlined in section 2.4.
• An overview of the optional measures considered related to agriculture (with reference to Annex III, Part 2 of the NECD) in section 2.6.4.
• Indicators to monitor progress under the WAM scenario are reported through the EEA-PaM tool (however these are not indicated in section 2.7 of the NAPCP).
2 Projected compliance with NECD emission reduction commitments

2.1 Margin of compliance

There are several different metrics that can be used to show the “margin of compliance” i.e. the margin by which compliance with the NECD emission reduction commitments is achieved or missed.

The following two approaches have been used in the overall assessment of NAPCPs and projections to calculate the margin of compliance:

1. **Calculating the difference between an emission reduction commitment and the projected emission reductions (difference expressed in percentage points)** – this approach is presented in the NAPCP review reports and follows the same approach as required in the NAPCP format. The emission reduction commitments specified in Annex II of the NECD are defined as percentage reductions on the 2005 emissions. Projected emissions of pollutants in 2020 and 2030 are compared to the 2005 emissions to calculate the projected emission reductions. These projected reductions are then divided by the 2005 emissions to obtain the projected reductions as a percentage of the 2005 emissions. These percentage reductions are then compared to the legally binding percentage reduction, with the difference between them representing the compliance margin expressed as percentage points. As such, negative percentage points indicate that the emission reduction commitment will not be met.

**Example**

A Member State emitted 500 kt of a pollutant in 2005 and had a 20% emission reduction commitment for 2020. If the 2020 projected emission is 360 kt, the projected emission reduction is 140 kt. This equates to 28% of 2005 emissions. The projected margin of compliance is 8 percentage points. This is illustrated in the figure below.
2. Calculating the difference between projected emissions and the compliance threshold (expressed as a percentage of the compliance threshold) – this approach is presented in the projections review reports and follows the same approach as used in the context of emissions inventories.

Given that each emission reduction commitment specified in Annex II of the NECD is defined as a percentage reduction on the 2005 emissions, these two values can be combined to express a “compliance threshold” i.e. the maximum emission that can be emitted by a Member State from 2020 and 2030 onwards, and still be compliant with the emission reduction commitment for a pollutant. Projected emissions (under the WM and WAM scenarios) can be compared to the compliance threshold, and the compliance margin expressed as a percentage of the compliance threshold.

**Example**

A Member State emitted 500 kt of a pollutant in 2005 and had a 20% emission reduction commitment for 2020. The maximum the Member State can emit in 2020 to meet its 2020 emission reduction commitment (the “compliance threshold”) is 400 kt. If the 2020 projected emission is 360 kt, the commitment will be met by 40 kt and the projected margin of compliance is 10% of the compliance threshold.

Mathematically these two approaches are different as they use different reference points. However, they yield the same conclusions concerning compliance or non-compliance with the NECD reduction commitments. The largest numerical differences between the two approaches occur when there are significant differences between the 2005 emissions and the projected emissions for 2020 or 2030 (this is in particular the case for SO2).

The percentage point approach is used in the review of the NAPCP to understand the margin of compliance between the projected emission reductions presented in the NAPCP and the legally binding percentage emission reduction commitments (see Section 2.2 of this report).

The results of the projections review and of the assessment of the NAPCPs are brought together in the risk assessment for individual Member States (see Appendix 2 of this report), using the margin of compliance expressed as a percentage of the compliance threshold based on projections submitted under Article 10(2). The methodology for assessing the risk of non-compliance is explained in the accompanying horizontal review report.
2.2 Projected compliance and consistency with projections submitted under Article 10(2)

- With existing measures Hungary is projected to achieve 2020-2029 national commitments for NO\textsubscript{X} and SO\textsubscript{2}. Commitments for NMVOC, NH\textsubscript{3} and PM\textsubscript{2.5} are projected to be missed. For 2030 onwards commitments, non-compliance is projected for all pollutants.

- For 2020, 2025 and 2030, Hungary provided the projected emission levels under a WAM scenario in ranges (the only exception to this is the SO\textsubscript{2} emission level for 2020).

- Under the with additional measures (WAM) scenario, the commitments for 2020-2029 are projected to be achieved for NH\textsubscript{3}, NO\textsubscript{X} and SO\textsubscript{2}. For NMVOC and PM\textsubscript{2.5}, the commitments are projected to be missed. These conclusions apply to both the upper and the lower range of emission reductions provided.

- With the lower range of emission reductions, the level of PM\textsubscript{2.5} emissions is projected to increase between 2005 and 2020. According to the lower range of emission reductions under the WAM scenario, Hungary is projecting to miss the 2030 onwards commitments for NO\textsubscript{X}, NMVOC, NH\textsubscript{3} and PM\textsubscript{2.5}. According to the upper range of emission reductions, 2030 onwards emission reduction commitments are projected to be achieved for all pollutants.

The projections presented in this section are derived from the information reported by the Member State in their NAPCP in table 2.5.1 for the WM scenario and in table 2.8.1 for the WAM scenario. Hungary included 2019 projections using historical inventory data from 2017 in the NAPCP which is the same as the projections data submitted separately by the Member State under the Directive in March 2019.

In Figure 2-2, Figure 2-3 and Figure 2-4, the emission reductions needed for 2025 are interpolated according to the 2020-29 and 2030 onwards commitments set out in the NECD. Additional information is included to demonstrate the extent to which the projections meet the Member State commitments (shown, for each of the pollutants, as the difference expressed in percentage points between the projected emission reduction described in the NAPCP and the legal commitment). The percentage points do not represent the extent to which total emissions projected (kt) compare to the emission reduction commitment (in terms of kt of emissions).

**Under the WM scenario, progress towards the 2020-29 emission reduction commitments is as follows:**

- **SO\textsubscript{2}** - The projections of SO\textsubscript{2} emissions under the WM scenario show that Hungary can comply with the 2020-29 reduction commitments specified in the NECD with existing measures. In 2020, compliance with the emissions reduction commitments is projected to be achieved by 7 percentage points.\(^4\)

- **NO\textsubscript{X}** - The projections of NO\textsubscript{X} emissions under the WM scenario show that Hungary can comply with the 2020-29 reduction commitments specified in the NECD with existing measures. In 2020, compliance with the emissions reduction commitments is projected to be achieved by 6 percentage points.

- **NMVOC** - The projections of NMVOC emissions under the WM scenario show that Hungary cannot comply with the 2020-29 reduction commitments specified in the NECD with existing measures. In

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\(^4\) In table 2.5.1 of the NAPCP the indicated emission level for 2020 in the case of SO\textsubscript{2} is 23 kt per year. However, the percentage indicating the reduction for 2020 suggests an emission level of 20 kt per year that is in line with the projections submitted by Hungary under Article 10 (2) of the NEC Directive. This emission value was used in the review.
2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 12 percentage points.

- **NH₃** - The projections of NH₃ emissions under the WM scenario show that Hungary cannot comply with the 2020-29 reduction commitment specified in the NECD with existing measures. NH₃ emissions are expected to increase under the WM scenario between 2020 and 2030. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 1 percentage point.

- **PM₂.₅** - The projections of PM₂.₅ emissions under the WM scenario show that Hungary cannot comply with the 2020-29 reduction commitments specified in the NECD with existing measures. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 31 percentage points.

**Under the WM scenario, progress towards the 2030 onwards commitments is as follows:**

- **SO₂** – The projections of SO₂ emissions under the WM scenario show that Hungary cannot comply with the 2030 reduction commitments specified in the NECD with existing measures. In 2030, compliance with the emissions reduction commitments is projected to be missed with a margin of 8 percentage points.

- **NOₓ** - The projections of NOₓ emissions under the WM scenario show that Hungary cannot comply with the 2030 reduction commitments specified in the NECD with existing measures. In 2030, compliance with the emissions reduction commitments is projected to be missed with a margin of 20 percentage points.

- **NMVOC** - The projections of NMVOC emissions under the WM scenario show that Hungary cannot comply with the 2030 reduction commitments specified in the NECD with existing measures. In 2030, compliance with the emissions reduction commitments is projected to be missed with a margin of 38 percentage points.

- **NH₃** - The projections of NH₃ emissions under the WM scenario show that Hungary cannot comply with the 2030 reduction commitment specified in the NECD with existing measures. In 2030, compliance with the emissions reduction commitments is projected to be missed with a margin of 28 percentage points.

- **PM₂.₅** - The projections of PM₂.₅ emissions under the WM scenario show that Hungary cannot comply with the 2030 reduction commitments specified in the NECD with existing measures. In 2030, compliance with the emissions reduction commitments is projected to be missed with a margin of 50 percentage points.
Note: The extent to which the projections meet the Member State commitments is shown, for each of the pollutants, as the difference expressed in percentage points between the projected emission reduction described in the NAPCP and the legal commitment. A negative number indicates that the commitment is projected to be missed.

As the projections under the WM scenario demonstrate a gap in compliance with the Member State NECD emission reduction commitments for certain pollutants, the NAPCP includes projections under a ‘With Additional Measures’ (WAM) scenario.

For the NAPCP projections under the WAM scenario, Hungary presented the projected emission reductions (in kt) in ranges for all years. Projected emission reductions compared to the 2005 baseline year (in percentages) are presented in ranges for the years 2020, 2025 and 2030 (except for SO₂ for the year 2020).

According to the upper range of emission reductions, under the WAM scenario, progress towards the 2020-29 emission reduction commitments is as follows:

- **SO₂** – The projections of SO₂ emissions under the WAM scenario show that Hungary can achieve the 2020-29 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be achieved by 7 percentage points.

- **NOₓ** - The projections of NOₓ emissions under the WAM scenario show that Hungary can achieve the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be achieved by 3 percentage points.

- **NMVOC** - The projections of NMVOC emissions under the WAM scenario show that Hungary cannot comply with the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 2 percentage points.

- **NH₃** - The projections of NH₃ emissions under the WAM scenario show that Hungary can comply with the 2020 reduction commitments specified in the NECD with additional measures. In 2020,
compliance with the emissions reduction commitments is projected to be achieved with a margin of 11 percentage points.

- **PM$_{2.5}$** - The projections of PM$_{2.5}$ emissions under the WAM scenario show that Hungary cannot comply with the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 13 percentage points.

According to the upper range of emission reductions, under the WAM scenario, progress towards the 2030 onwards commitments is as follows:

- **SO$_2$** – The projections of SO$_2$ emissions under the WAM scenario show that Hungary can comply with the 2030 reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be achieved with a margin of 4 percentage points.
- **NO$_X$** - The projections of NO$_X$ emissions under the WAM scenario show that Hungary can comply with the 2030 reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be achieved exactly.
- **NMVOC** - The projections of NMVOC emissions under the WAM scenario show that Hungary can comply with the 2030 reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be achieved exactly.
- **NH$_3$** - The projections of NH$_3$ emissions under the WAM scenario show that Hungary can comply with the 2030 reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be achieved exactly.
- **PM$_{2.5}$** - The projections of PM$_{2.5}$ emissions under the WAM scenario show that Hungary can comply with the 2030 reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be achieved exactly.

According to the lower range of emission reductions, under the WAM scenario, progress towards the 2020-29 emission reduction commitments is as follows:

- **SO$_2$** – The projections of SO$_2$ emissions under the WAM scenario show that Hungary can achieve the 2020-29 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be achieved by 7 percentage points.
- **NO$_X$** - The projections of NO$_X$ emissions under the WAM scenario show that Hungary can achieve the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be achieved exactly.
- **NMVOC** - The projections of NMVOC emissions under the WAM scenario show that Hungary cannot comply with the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 15 percentage points.
- **NH$_3$** - The projections of NH$_3$ emissions under the WAM scenario show that Hungary can comply with the 2020 reduction commitments specified in the NECD with additional measures. In 2020, compliance with the emissions reduction commitments is projected to be achieved with a margin of 8 percentage points.
- **PM$_{2.5}$** - The projections of PM$_{2.5}$ emissions under the WAM scenario show that Hungary cannot comply with the 2020 reduction commitments specified in the NECD. In 2020, compliance with the emissions reduction commitments is projected to be missed with a margin of 28 percentage points.
According to the lower range of emission reductions, under the WAM scenario, progress towards the 2030 onwards commitments is as follows:

- **SO₂** - The projections of SO₂ emissions under the WAM scenario show that Hungary can comply with the 2030 onwards reduction commitments specified in the NECD. In 2030, compliance with the emission reduction commitments is projected to be achieved exactly.

- **NOₓ** - The projections of NOₓ emissions under the WAM scenario show that Hungary cannot comply with the 2030 onwards reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be missed by 13 percentage points.

- **NMVOC** - The projections of NMVOC emissions under the WAM scenario show that Hungary cannot comply with the 2030 onwards reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be missed by 25 percentage points.

- **NH₃** - The projections of NH₃ emissions under the WAM scenario show that Hungary cannot comply with the 2030 onwards reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be missed by 17 percentage points.

- **PM₂.₅** - The projections of PM₂.₅ emissions under the WAM scenario show that Hungary cannot comply with the 2030 onwards reduction commitments specified in the NECD. In 2030, compliance with the emissions reduction commitments is projected to be missed by 12 percentage points.

Hungary has not provided a WAM scenario with the projections submitted under Article 10(2) of the NECD.

Figure 2.3 Projected attainment of emission reduction commitments (WAM scenario used in the NAPCP): upper range of emission reductions

Note: The extent to which the projections meet the Member State commitments is shown, for each of the pollutants, as the difference expressed in percentage points between the projected emission reduction described in the NAPCP and the legal commitment. A negative number indicates that the commitment is projected to be missed.
Note: The extent to which the projections meet the Member State commitments is shown, for each of the pollutants, as the difference expressed in percentage points between the projected emission reduction described in the NAPCP and the legal commitment. A negative number indicates that the commitment is projected to be missed.

Further analysis related to the risk of non-compliance, taking into account the information provided in both the NAPCP and the projections submissions, is presented in Appendix 2.
3 Findings of the in-depth NAPCP review

3.1 NAPCP overview (M)

- The NAPCP was submitted on 18 May 2020, thus the deadline set in NECD was not met.
- The common format was used for the NAPCP by Hungary.
- The title of the programme and responsible authority are specified in table 2.1.1 of the NAPCP.
- A weblink is provided to access the NAPCP online.

The NAPCP adheres to the common format specified by the Commission Implementing Decision (EU) 2018/1522, pursuant to Article 6 of the NECD. The NAPCP is made up of one main report of 65 pages in length. It is accompanied by one annex, totalling 82 pages. The submission of the NAPCP was made on 18 May 2020. Information on PaMs was reported via the EEA-PaM tool.

Of the four external links provided, all are in working order. External references are publicly available. They point to official air quality data sources, to the current air quality plans and to the national PM$_{10}$ reduction programme. All these are relevant and recent.

Hungary has clearly titled the NAPCP, indicating the date it was published and specifying the responsible competent authority for the programme.

External weblinks are provided to access the NAPCP online and to direct to a website hosting the consultation documents for the NAPCP of Hungary.

The NAPCP includes an analysis on transboundary impacts but it does not refer to any form of transboundary consultation being conducted.

3.2 Executive summary (O)

Hungary has not provided an executive summary.

3.3 The national air quality and pollution policy framework (M, O)

- Air quality policy priorities are described, and an overview of relevant objectives is given. WHO guideline values are referenced as long-term strategic goals but not set as specific targets.
- The climate and energy related policy framework is presented by summarising the relevant policy documents and an overview of relevant policy priorities for agriculture, industry and transport is given with respect to national climate and air policies. Additional specific sectorial policies have not been described in the NAPCP.
- Roles of different authorities are described with relevant details. The overall responsibility is with the Ministry of Agriculture.

The NAPCP provides a qualitative overview of air quality in Hungary, reporting challenges to air quality with PM$_{10}$, NO$_X$ and O$_3$ concentration levels. This corresponds to the information in the EEA air quality country factsheet for Hungary. However, from the EEA fact sheet it is clear that BaP concentration is also a challenge$^5$, which is not referred to in the NAPCP separately from PM.

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WHO guidelines related to NO₂, SO₂, O₃, PM₁₀ and PM₂.₅ are referenced as a long-term strategic objective, but no further details are provided.

Hungary describes the policy priorities with regards to GHG reduction targets up to 2030: an overall 40% GHG reduction is planned (compared to 1990 level) as set in the final NECP. However, separate ETS and non-ETS sectors related goals are not detailed.

Policy priorities concerning renewable energy sources described in the NAPCP are aligned with EU goals. The review has found that the NAPCP refers to renewable energy objectives included in the draft NECP, despite the NECP having been finalised before the NAPCP submission.

Energy efficiency objectives are laid down in the National Decarbonisation Roadmap and the final NECP. The target is that the total final energy consumption of the country in 2030 would not be higher than it was in 2005.

Hungary provides an overview of relevant policy priorities for agriculture, industry and transport with respect to climate and air national policies. Additional specific sectoral policies have not been described in the NAPCP.

The relevant authorities are reported in accordance with the minimum content requirements of section 2.3.2 of the common format. Relevant ministries (Ministry of Agriculture - air pollution and agriculture; Ministry for Innovation and Technology - climate change, industry and transport) are responsible for policy making with an overall responsibility and coordinating role at the Ministry of Agriculture. Implementation is the responsibility of the Ministry as well of the National Environmental Protection Authority and its regional (county-based) authorities. These authorities are responsible for permitting and enforcement. Monitoring is attributed to the National Meteorological Service (OMSZ), that also assists the Ministry in reporting tasks. Local authorities have an implementation role in certain aspects e.g. smog alert plans, garden waste burning etc. Overall, the roles are clearly defined and can support effective implementation of the NAPCP.

3.4 Progress made by current PaMs in reducing emissions and the degree of compliance with national and EU obligations, compared to 2005 (M, O)

3.4.1 Progress made by current PaMs in reducing emissions

Detailed emission trends by pollutants have been provided in the NAPCP. Emission sources and analysis of trends are reported by sector. A generally decreasing trend is presented between 1990 and 2017, for SO₂, NOₓ and NMVOC.

In the case of NH₃, emissions fell significantly between 1990 and 1995, mainly because of the decreasing activity of the agricultural sector. Since then, emissions stagnated at around 80-90 kt per year. Since 2010, an increasing trend in emissions of NH₃ have been observed.

PM₂.₅ emissions vary in Hungary between 2000 (the year of the first official data) and 2017. The reason for this is that the main source is household heating, which, because of the increasing gas prices, shifted to biomass between 2008 and 2013. After 2013 the gas prices again decreased, which contributed to a decrease in the use of biomass and thus PM emissions.

Current PaMs contributing to emission reductions are not described.

The NAPCP highlights the increasing relative influence of household heating on PM₂.₅, SO₂, NOₓ and NMVOC emission trends. The main air pollution reduction policy document, the intersectoral action plan on PM₁₀ reduction (adopted in 2011), is referenced but details on current PaMs contributing to emission reductions are not provided.
Bar charts are provided by pollutant to show emission reductions achieved and contribution of different sources to total emissions over varying timeseries (depending on the pollutant) (section 2.4.1.3).

### 3.4.2 Progress made by current PaMs in improving air quality

For Hungary, NO$_2$, PM$_{10}$ and O$_3$ present a challenge to air quality. In 2017, O$_3$ concentration has exceeded the maximum daily eight-hour mean target value in all the ten air quality zones. The NO$_2$ annual mean limit value is exceeded in two air quality zones, while PM$_{10}$ has exceedances with daily and annual limit values in three zones. Infringement procedures are in progress for the cases of NO$_2$ and PM$_{10}$.

Current PaMs contributing to air quality improvements are not described in the NAPCP.

A graphic is used to show the number of exceedances per measurement station for ozone and two others to show the annual load factor for O$_3$ and PM$_{10}$ (section 2.4.2.1).

### 3.4.3 Current transboundary impact of national emission sources

The NAPCP states that Hungary is a net pollution ‘importer’ and provides a qualitative analysis of the transboundary impact on PM pollution. According to a report made by the Hungarian Meteorological Service in 2016, using the EMEP’s chemical transport model, 70-80% of the PM pollution in Hungary has a transboundary origin, coming mainly from Romania and Poland. Approximately 65% of PM emitted in the territory of Hungary is leaving the country and affects mostly pollution levels in Slovakia and Croatia.

Despite the evidence of the transboundary impact of national emission sources, the NAPCP does not include any references to any form of transboundary consultation being conducted.

### 3.5 Projected situation assuming no change in currently adopted PaMs (M, O)

In accordance with section 2.5.1 of the common format, Hungary provides emission projections under a WM scenario for all NECD pollutants in 2020, 2025 and 2030 compared with a 2005 base year.

As stated in section 2.2 of this report, under the WM scenario, Hungary is projected to achieve its 2020-29 national commitments for NO$_X$ (by 6 percentage points) and SO$_2$ (by 7 percentage points). For NMVOC, NH$_3$ and PM$_{2.5}$ the commitments for 2020-29 are projected to be missed. Emissions of PM$_{2.5}$ are expected to increase in 2020 compared to 2005, after which a downward trend is projected. NH$_3$ emissions are projected to increase steadily between 2020 and 2030. 2030 onwards commitments are not projected to be met for any of the pollutants.

The NAPCP is based on the latest (March 2019) projections submission, using historical data from 2017 inventory. Therefore, they are judged as sufficiently up to date to capture the impact of current PaMs in the WM scenario.

A qualitative description of air quality is provided for PM$_{10}$, NO$_2$ and O$_3$, with exceedances for all three pollutants. However, this reflects only the current situation, the projected impact is not described. Quantitative data is not reported.

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6 In table 2.5.1 of the NAPCP the indicated emission level for 2020 in the case of SO$_2$ is 23 kt per year. However, the percentage indicating the reduction for 2020 suggests an emission level of 20 kt per year that is in line with the projections submitted by Hungary under Article 10 (2) of the NEC Directive. This emission value was used in the review.
3.6 Policy options considered to comply with emission reduction commitments for 2020 and 2030, intermediate emission levels for 2025 and stakeholder consultation (M, O)

- Hungary has considered 38 PaMs for adoption. 22 PaMs are grouped within 7 packages, and 16 are presented individually. 15 PaMs target the agriculture sector, 10 PaMs the energy sector, 9 PaMs the transport sector and 4 PaMs industry sector.
- The PaMs will contribute to a reduction of emissions of all NECD pollutants: PM$_{2.5}$ emissions (19 PaMs), NO$_X$ emissions (18 PaMs), NMVOC emissions (17 PaMs), NH$_3$ emissions (14 PaMs) and SO$_2$ emissions (12 PaMs).
- Estimated emission reductions of the PaMs have been reported for the seven packages at package level and at PaM level for 11 individual PaMs. For four individual PaMs zero is indicated as estimated emission reduction and for one individual PaMs no estimation is provided.
- Out of the 38 considered PaMs, 4 are included in the WM scenario, all relate to energy sector. The other 34 PaMs are included in the WAM scenario.
- The PaMs reflect the main emission sources of each pollutant and are coherent with the air quality and climate and energy policies.
- The PaMs present a balanced range of policy instruments. Of the 38 PaMs, 14 involve regulatory components.
- For all PaMs, the national government is named as the responsible authority for implementation.
- The PaMs are reported to have a positive effect on air quality, especially in relation to NO$_2$, PM$_{10}$ and O$_3$ concentration levels.

3.6.1 Summary of the information reported

The assessment presented in this section is based on the information reported by Hungary via the EEA PaM-tool. Where relevant, it is complemented with the information from the main body of the NAPCP. Hungary has considered altogether 38 additional PaMs for adoption. Of these, 16 are reported as individual PaMs and 22 are within a total of 7 packages of PaMs. Altogether 15 PaMs are considered for the agriculture sector, 10 PaMs for the energy sector, 9 PaMs for the transport sector and 4 PaMs for the industry. In the NAPCP the 38 PaMs are reported as 28, as some of the PaMs reported via the EEA-PaM tool are combined in the NAPCP. Despite the aggregation in the NAPCP, the PaMs reported in the NAPCP and via the EEA PaM-tool are mostly consistent.

The only difference is in the description of one PaM (numbered as 2.6.1.10 in the table 2.6.1 of the NAPCP and having the PaM ID of 80491 in the EEA PaM tool). The energy sector-related measure of ‘Supporting the use of heating methods with low or zero local air emissions in regions with high air pollution’ in the NAPCP talks about ‘regions with illegal burning’ and indicates promoting electric heating, while the description submitted via the EEA-PaM tool indicates ‘regions with high air pollution’ and promotion of ‘cleaner fuels’ like gas or electricity.

The descriptions of the PaMs are clear and PaMs proposed in each sector are judged by the reviewers as reasonable. However, as the emission reductions for PaMs included in packages are not quantified for the individual PaMs, it is not feasible to confidently comment on whether the projected impacts on emissions are realistic and achievable. Further uncertainty is coming from the fact that the projected quantified reductions are given in ranges, in most of the cases with approximately 50 percent difference between the higher and lower end of the ranges.

According to the information reported, four of the PaMs reported via the EEA PaM-tool are included in the WM scenario. All these are targeting the energy sector:
• Improving and upgrading the energy efficiency of buildings
• Intensification of the support system for the replacement of the most polluting household heating equipment (boilers, stoves, fireplaces)
• Improving the efficiency of energy production, phase-out of coal-based energy production
• Supporting the use of heating methods with low or zero local air emissions in regions with high air pollution

It is unclear based on the evidence presented in the NAPCP whether these are existing or additional PaMs. The other 34 PaMs are reported under the WAM scenario.

The 38 PaMs reported via the EEA PaM-tool are presented in the following tables.

### Agriculture (9 PaMs presented within 3 packages, plus 6 individual PaMs.)

<table>
<thead>
<tr>
<th>Package: Improving feed monitoring and other technology development requirements in livestock farms to reduce ammonia emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introducing technology development requirements in livestock farms to reduce ammonia emissions</td>
</tr>
<tr>
<td>Introduction of feed regulations</td>
</tr>
<tr>
<td>Tracking the feeding of farm animals through the nutrient content of feed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Package: Measures related to urea-based fertilisers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce ammonia emissions from urea-based fertilisers by using methods that have been shown to reduce ammonia emissions by at least 30% compared with the use of the reference method</td>
</tr>
<tr>
<td>Replacement of urea-based fertilisers with ammonium nitrate-based fertilisers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Package: Promoting the use of manures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promoting the practical application of nutrient management</td>
</tr>
<tr>
<td>Promoting the replacement of inorganic fertilisers with organic fertilisers</td>
</tr>
<tr>
<td>Application of low protein feed</td>
</tr>
<tr>
<td>Requirements for application of manure</td>
</tr>
</tbody>
</table>

### Single measures

| Ban open field burning of agricultural harvest residue, waste and forest residue |
| Covering slurry storage |
| Establish a national nitrogen budget |
| Targeted development of agricultural emission inventory |
| Defining the small farm category to capture the range of those affected by the exemption from emission reduction measures. |
| Compilation of a national advisory code of good agricultural practice |

### Energy supply and consumption (2 PaMs presented within 1 package, plus 8 individual PaMs)

<table>
<thead>
<tr>
<th>Package: National programme to increase energy efficiency in buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving and upgrading the energy efficiency of buildings (ESCO programme for private costumers) (energy consumption)</td>
</tr>
<tr>
<td>Intensification of the support system for the replacement of the most polluting household heating appliances (boilers, stoves, fireplaces) (energy consumption)</td>
</tr>
</tbody>
</table>

### Single measures

| Improving the efficiency of energy production, phase-out of coal-based energy production (energy supply) |
| Energy development of district heating systems, increasing the number of homes with district heating (energy supply) |
Introduction of regulations for the operation of combustion plants with rated thermal input less than 140 kWth (this is reported as an additional measure, yet it is related to the implementation of the EU Ecodesign Directive thus should not be considered as additional PaM) (energy consumption)

Modification of Social Fuel Support Scheme (other)
Limiting the use of some high-polluting solid fuels for residential use by defining quality requirements (energy supply)
Supporting the use of heating methods with low or zero local air emissions in regions with high air pollution (energy supply)
Awareness-raising programme for the use of low-emission fuels and residential heaters and for familiarization with appropriate heating modes (other)
Zero net CO₂ emission social housing development program (energy consumption)

Industry (A single package of 4 PaMs.)

Package: Promotion of use of low emissions industrial technologies.
Developing and launching programmes to encourage local production and product use.
Revision of emission limit values for activities which are not covered by IED
Elaboration of guidance documents for the use of Best Available Techniques.
Promotion of use of emerging technics

Transport (7 PaMs presented within 2 packages, plus 2 individual PaMs.)

Package: Regulation tools for increase of environmental performance of transport
Promote creation of low-emission zones and the application of other environmental regulatory instruments related to transport.
Revision of the environmental classification system for motor vehicles
Require the preparation of sustainable urban mobility plans for urban transport subsidies.

Package: Transport related national awareness raising activity
Information campaign on the importance of managing transport demand
Campaigns on the benefits of using alternative modes of transport (electric vehicles, public transport, non-motorized transport)
Information campaign for energy- and cost-saving way of car usage (eco-driving)
Information campaign on transport-related health effects

Single measures
Promotion of usage of low or zero-emissions vehicles
Development of infrastructure of alternative fuels.

3.6.2 Pollutants targeted and projected emission reductions

According to the NAPCP projections under a WM scenario, the adoption of additional PaMs is required to achieve the emission reduction commitments for PM₂.₅, NH₃ and NMVOC in 2020, and for all NECD pollutants in 2030. The additional PaMs presented in the NAPCP will contribute to emission reductions of all NECD pollutants: PM₂.₅ emissions (19 PaMs), NOₓ emissions (18 PaMs), NMVOC emissions (17 PaMs), NH₃ emissions (14 PaMs) and SO₂ emissions (12 PaMs).

Hungary does not consider PaMs that specifically target emission reductions of black carbon (other than as a component of PM₂.₅) or any other pollutant.
The estimated emission reductions have been reported at the level of packages for the seven groups of measures. In the case of packages, emission reductions have not been presented separately for each individual PaM. Out of the 16 individually presented measures, quantified reductions are reported for 15 PaMs. Emission reductions are given in ranges of kilo tonnes.

No or zero emission reductions have been reported for the following five individual PaMs:

1. Compilation of a national advisory code of good agricultural practice (zero is indicated).
2. Defining the small farm category to capture the range of those affected by the exemption from emission reduction measures (zero is indicated).
3. Targeted development of agricultural emission inventory (zero is indicated).
4. Establish a national nitrogen budget (zero is indicated).
5. Modification of Social Fuel Support Scheme (no quantified emission reduction is indicated).

The lack of quantified emission reductions is justified in these cases given the nature of the PaMs:

- (1), (4) and (5) provide a framework within which other more specific PaMs would be implemented;
- (2) and (3) do not reduce emissions but provide information to give a better understanding to inform future decisions on PaMs.

Table 3-1 presents the total emission reductions estimated for PaMs presented. Projected quantified emission reductions are given in ranges in table 2.6.1 of the NAPCP and via the EEA PaM-tool. Figures presented in the table shows the highest and the lowest expected reductions based on the ranges reported. In some cases, there is more than 100% difference between the upper and lower range estimates. That creates uncertainty in drawing conclusions on whether the commitments could be achieved with the PaMs considered for adoption by Hungary.

Table 3-1 Projected total emission reductions from the PaMs considered for adoption

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>highest emission reduction in the given ranges</td>
<td>lowest emission reduction in the given ranges</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO₂</td>
<td>7</td>
<td>18</td>
<td>32</td>
<td>2</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>NOₓ</td>
<td>11</td>
<td>34</td>
<td>56</td>
<td>3</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>NMVOC</td>
<td>20</td>
<td>63</td>
<td>89</td>
<td>11</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>NH₃</td>
<td>10</td>
<td>12</td>
<td>25</td>
<td>4</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>18</td>
<td>22</td>
<td>31</td>
<td>8</td>
<td>11</td>
<td>16</td>
</tr>
</tbody>
</table>

When comparing the upper range of total emission reductions estimated for PaMs considered for adoption (Table 3-1) to the 2005 baseline, the PaMs are expected to achieve the following emission reductions in 2020, 2025 and 2030 (the values related to the lowest emission reductions of the ranges are indicated in brackets):

- SO₂: 16 percent for (5 percent) in 2020, 42 percent (26 percent) in 2025 and 74 percent (49 percent) in 2030
- NOₓ: 7 percent for (2 percent) in 2020, 21 percent (11 percent) in 2025 and 35 percent (15 percent) in 2030
• NMVOC: 14 percent for (8 percent) in 2020, 43 percent (14 percent) in 2025 and 61 percent (21 percent) in 2030
• NH$_3$: 12 percent for (5 percent) in 2020, 14 percent (8 percent) in 2025 and 29 percent (12 percent) in 2030
• PM$_{2.5}$: 45 percent for (20 percent) in 2020, 55 percent (28 percent) in 2025 and 78 percent (40 percent) in 2030

3.6.3 Coherence between the PaMs considered and policy priorities

The PaMs considered for adoption are fully coherent with policy priorities described in the NAPCP. However, there is no evidence to suggest that PaMs considered aim to achieve greater reductions than the national emission reduction commitments for the purpose of supporting other policy priorities.

3.6.4 Responsible authorities and timescales for implementation of PaMs considered

The PaMs reported involve a range of policy instruments, including economic, fiscal, regulatory, planning, educational and information instruments. Of the 38 PaMs, 14 involve regulatory components, showing strong dependence on regulatory instruments. This means that implementation and enforcement are of key importance for reaching the planned emission reductions.

Hungary indicated the government as the responsible authority level for implementation for all 38 considered PaMs. The roles of different authorities are well-defined which should support effective implementation (see more details in chapter 3.3).

Implementation of most of the PaMs is due to start in between 2020 and 2021 (30 of the 38 PaMs). This allows around ten years for the PaMs to deliver required emission reductions, which is considered realistic. For three PaMs (two agricultural and one industrial) 2022 is given as a starting date and for a further three agricultural PaMs and one PaM in the energy sector, 2025 is the first year of implementation. As emission reductions are given only at package level, it cannot be judged whether emission reductions from the PaMs starting later will be achieved in time for 2030. For ‘replacement of urea-based fertilisers with ammonium nitrate-based fertilisers’ it is indicated that the PaM will be implemented from 2026 only if the 2025 review shows that the ammonia emission reduction commitment cannot be met.

In the cases of two PaMs implementation runs only for two years as their results can be obtained in that period. These are the PaMs on compilation of a national advisory code of good agricultural practice (2020-2021) and on the revision of emission limit values for activities which are not covered by the IED (2022-2023).

3.6.5 Details of the methodology for evaluation and selection of PaMs

Hungary does not provide details of the methodology for the evaluation and selection of the PaMs for adoption. However, references to data sources used for the analysis are indicated: 2019 projections, expert estimations and the COPERT 5 model.

3.6.6 Estimation of costs and benefits of the individual PaM or package of PaMs considered

Hungary has not provided a quantified estimation of costs and benefits of the PaMs.

3.6.7 Impacts on air quality and the environment of individual PaMs or packages of PaMs considered

As stated in section 3.3 of this report, in Hungary PM$_{10}$ and NO$_2$ present the biggest challenge to air quality. O$_3$ levels also do not comply with the target values, therefore the reduction of its precursors
(NO\textsubscript{X} and NMVOCs) is also relevant. Reduction of PM, NO\textsubscript{X} and NMVOCs emissions is well-addressed through PaMs related to household heating, transport, industry and agriculture (19 PaMs will contribute to reduction in emissions of PM, 18 PaMs of NO\textsubscript{X} and 17 PaMs of NMVOC).

Hungary has not described the impact of the PaMs considered with regard to the attainment of WHO guideline values for air pollution.

Impacts of the PaMs on air quality is not reported via the EEA PaM-tool and is only generally addressed in the NAPCP. However, it is clear that the measures will have a positive effect on air quality, especially for NO\textsubscript{2} and PM\textsubscript{10} concentrations and on O\textsubscript{3} precursors other than NO\textsubscript{X}.

The impacts of PaMs on the environment have only been addressed by referring to the reporting obligations under NECD Article 9 based on which a monitoring network is established and will enable Hungary to monitor the impacts.

There is no indication that the assessment of air quality impacts has followed the recommendations included in the NAPCP guidance.

### 3.7 The policies selected for adoption by sector including timetable for adoption, implementation and review and responsible competent authority (M, O)

- Hungary selected 32 PaMs for adoption out of the considered 38.
- Selected PaMs are reported to contribute to emission reductions of all relevant pollutants and sectors.
- The sources of funding for the implementation of the PaMs are not presented.
- PaMs selected for adoption are coherent with air quality, climate and energy policy priorities. The use of biomass fuels is mentioned as a field where energy and climate objectives can contradict air quality and emission reductions objectives.

#### 3.7.1 Assessment of the credibility of the PaMs selected for adoption per sector

32 out of 38 PaMs have been selected for adoption. 20 PaMs are grouped in 6 packages and 12 are presented individually. As in the NAPCP some measures are combined, 22 PaMs are selected for adoption according to that document.

The NAPCP does not explain the choices made to select PaMs for adoption.

The six PaMs not selected for adoption apply to the energy sector. The PaMs selected for adoption are reported to contribute to emission reductions of all NECD pollutants: NO\textsubscript{X} (17 PaMs), NMVOC (15 PaMs), NH\textsubscript{3} (14 PaMs), PM\textsubscript{2.5} (14 PaMs) and SO\textsubscript{2} (6 PaMs).

Table 3-1 presents the total emission reductions estimated for PaMs selected for adoption. Projected quantified emission reductions are given in ranges in table 2.6.1 of the NAPCP and are also reported via the EEA PaM-tool. Figures presented in the table show the highest and the lowest projected reductions. In some cases, there is more than 100% difference between the upper and lower range estimates. That creates uncertainty in concluding on whether the commitments could be achieved with the PaMs selected for adoption.
When comparing the upper range of total emission reductions estimated for the PaMs selected for adoption (Table 3-1) to the 2005 baseline, the PaMs are expected to achieve the following emission reductions in 2020, 2025 and 2030 (the values related to the lowest emission reductions of the ranges are indicated in brackets):

- **SO₂**: 9 percent (2 percent) in 2020, 14 percent (5 percent) in 2025 and 26 percent (12 percent) in 2030
- **NOₓ**: 6 percent (1 percent) in 2020, 19 percent (9 percent) in 2025 and 32 percent (13 percent) in 2030
- **NMVOC**: 10 percent (6 percent) in 2020, 38 percent (11 percent) in 2025 and 53 percent (17 percent) in 2030
- **NH₃**: 12 percent (5 percent) in 2020, 14 percent (8 percent) in 2025 and 29 percent (12 percent) in 2030
- **PM₂.₅**: 38 percent (18 percent) in 2020, 43 percent (23 percent) in 2025 and 58 percent (33 percent) in 2030

It should be mentioned that quantified reductions reported via the EEA PaM-tool are not consistent in all cases with projected emission reductions in section 2.8.1 of the NAPCP (particularly for NOₓ, SO₂ and NMVOC). The sum of the quantified emission reductions provided for the PaMs selected for adoption does not correspond to the difference between the total emissions projected in the WM and WAM scenarios. The biggest differences can be seen in the case of NOₓ: for 2020, projections in the NAPCP indicate higher emissions in the WAM scenario (102-106 kt/year) than in the WM scenario (97 kt/year), while emission reductions reported via the EEA PaM-tool suggest a decrease. The reason for these inconsistencies is not clear.

Indicators for evaluating progress are reported via the EEA PaM-tool for four PaMs selected for adoption, as set out below. For two PaMs (indicated with “∗” in the table below) target values are also provided for the year 2030. Interim targets are not provided for any of the PaMs. These indicators and further details on progress monitoring are not presented in the NAPCP.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>NOₓ</td>
<td>9</td>
<td>31</td>
<td>52</td>
<td>2</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>NMVOC</td>
<td>14</td>
<td>55</td>
<td>77</td>
<td>8</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td>NH₃</td>
<td>10</td>
<td>12</td>
<td>25</td>
<td>4</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>15</td>
<td>17</td>
<td>23</td>
<td>7</td>
<td>9</td>
<td>13</td>
</tr>
</tbody>
</table>

When comparing the upper range of total emission reductions estimated for the PaMs selected for adoption (Table 3-1) to the 2005 baseline, the PaMs are expected to achieve the following emission reductions in 2020, 2025 and 2030 (the values related to the lowest emission reductions of the ranges are indicated in brackets):

- **SO₂**: 9 percent (2 percent) in 2020, 14 percent (5 percent) in 2025 and 26 percent (12 percent) in 2030
- **NOₓ**: 6 percent (1 percent) in 2020, 19 percent (9 percent) in 2025 and 32 percent (13 percent) in 2030
- **NMVOC**: 10 percent (6 percent) in 2020, 38 percent (11 percent) in 2025 and 53 percent (17 percent) in 2030
- **NH₃**: 12 percent (5 percent) in 2020, 14 percent (8 percent) in 2025 and 29 percent (12 percent) in 2030
- **PM₂.₅**: 38 percent (18 percent) in 2020, 43 percent (23 percent) in 2025 and 58 percent (33 percent) in 2030

It should be mentioned that quantified reductions reported via the EEA PaM-tool are not consistent in all cases with projected emission reductions in section 2.8.1 of the NAPCP (particularly for NOₓ, SO₂ and NMVOC). The sum of the quantified emission reductions provided for the PaMs selected for adoption does not correspond to the difference between the total emissions projected in the WM and WAM scenarios. The biggest differences can be seen in the case of NOₓ: for 2020, projections in the NAPCP indicate higher emissions in the WAM scenario (102-106 kt/year) than in the WM scenario (97 kt/year), while emission reductions reported via the EEA PaM-tool suggest a decrease. The reason for these inconsistencies is not clear.

Indicators for evaluating progress are reported via the EEA PaM-tool for four PaMs selected for adoption, as set out below. For two PaMs (indicated with “∗” in the table below) target values are also provided for the year 2030. Interim targets are not provided for any of the PaMs. These indicators and further details on progress monitoring are not presented in the NAPCP.
<table>
<thead>
<tr>
<th>PaM</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy development of district heating systems, increasing the number of homes with district heating.</td>
<td>Change in number of homes with district heating</td>
</tr>
<tr>
<td>Promotion of usage of low or zero-emissions vehicles*</td>
<td>Number of electric vehicles; Number of CNG fuelled buses; Number of CNG fuelled passenger cars; Number of LNG fuelled bus and trucks; Number of LNG fuelled passenger cars; Number of hydrogen-fuelled vehicle</td>
</tr>
<tr>
<td>Development of infrastructure of alternative fuels*</td>
<td>Number of charging points for electric vehicles; Number of CNG filling stations; Number of LNG filling stations; Number of LPG filling stations; Number of hydrogen filling station</td>
</tr>
<tr>
<td>Information campaigns on transport-related health effects.</td>
<td>Number of campaigns organised.</td>
</tr>
</tbody>
</table>

Authorities responsible for the implementation of all 32 PaMs are national ministries that are already involved in the implementation of current PaMs. In line with the existing policy framework, the Ministry of Agriculture will be responsible for the implementation of PaMs related to emissions, air pollution and agriculture, and the Ministry for Innovation and Technology responsible for the ones connected to climate change and transport. No issues concerning the implementation of the PaMs selected for adoption are identified in the NAPCP.

**Agriculture**

Altogether 15 PaMs are reported by Hungary. This includes nine PaMs in three packages and six individual PaMs. In the NAPCP, Hungary has selected for adoption all the mandatory measures from Annex III Part 2 of the NECD. It is noted in the NAPCP that ammonium carbonate fertilisers are not in use in Hungary, therefore a ban on these is not necessary. As regards the optional measures:

- The application of slurries spread to grassland is not carried out in Hungary and so the use of the trailing hose, trailing shoe or through shallow or deep injection (A.4.(a)iii) is reported as not relevant.

- The incorporation of manures and slurries spread to arable land is already adopted in national regulation and the conditions are stricter than those described in Annex III Part 2 of the NECD (A.4(a)iv).

Modifications to mandatory measures have not been reported by Hungary. However, it is noted that the measure under point C (preventing impacts on small farms) will be established separately for plant production and for the livestock sector. It is understood not to have an effect on the expected emission reductions. Modifications are made to the following optional measures selected for adoption, relating to the timeline for introduction:

- A.3(a) (Replace urea-based fertilisers by ammonium nitrate-based fertilisers) will be adopted from 2025 if needed,
- A.4.(a)i (only spreading manures and slurries in line with the foreseeable nutrient requirement of the receiving crop or grassland with respect to nitrogen and phosphorous, also taking into account the existing nutrient content in the soil and the nutrients from other fertilisers) from 2022, and
• A.4(d) (low protein feeding strategies) from 2025.
• For A.4(b)i (for slurry stores constructed after 1 January 2022, using low emission storage systems or techniques) the implementation is planned in two steps.

Justification in the NAPCP is reported for all these modifications.

The PaMs selected for adoption for the agricultural sector all fall under the measures set out in Annex III, part 2 of the NECD; no additional PaMs have been considered.

A document titled ‘Agricultural sub-programme for 2019-2030 of the NAPCP’ is submitted as an Annex to the NAPCP. The 82-page document is prepared by the Department of Agricultural Modernisation of the Ministry of Agriculture. The document describes the legal background for emission reductions, the main trends for NH$_3$ emission and the current PaMs. The document highlights that since 2009-2010 NH$_3$ emission of agricultural origin is growing, mainly because of an increase in livestock (cows) and the increase in fertiliser use. The ‘Action Plan’ included in the sub-programme includes all 11 PaMs presented in the NAPCP (i.e. all 15 PaMs reported via the EEA PaM tool).

In 2017 the agricultural sector contributed 91% to the total national NH$_3$ emissions in Hungary. 46% of NH$_3$ emissions came from animal husbandry and manure management and 45% from plant production and agricultural soils. The PaMs selected for adoption are appropriate and clearly have a significant impact on these emission sources.

In the NAPCP under the WM scenario, Hungary reports an increasing trend in NH$_3$ emissions between 2020 and 2030. Reasons for this are not clarified in the NAPCP. Under the WAM scenario, the expected emission levels for 2020, 2025 and 2030 are given in ranges, and with the highest end of the ranges, the trend is still increasing.

In conclusion, the PaMs are clear; their projected emission reductions are coherent with the expectations presented in the NAPCP. However, despite selection of additional measures for adoption, even the upper end of NH$_3$ emission reductions illustrates an increasing trend.

Energy supply and consumption

Altogether 4 individual PaMs have been selected for adoption in the energy sector. 6 PaMs that were considered for adoption were eventually not selected. Two PaMs are designed to affect the supply side: one by regulating combustion plants with rated thermal input less than 140 kWth, and one by aiming to increase the number of homes connected to district heating. The two other PaMs focus on the consumption side by providing financial support to promote the residential use of low or zero-emission heating modes in regions with high air pollution and by organising awareness raising campaigns. The assumptions behind the PaMs are clear and the measures are realistic.

Non-industrial combustion is by far the largest emitter of PM$_{2.5}$ in Hungary, with 84 percent of emissions of this pollutant originating from this sector in 2017. For NMVOC and NO$_x$, non-industrial combustion is the second-largest source (25 percent and 20 percent of national total emissions of these pollutants respectively). Therefore, decreasing household heating emissions is a key element of the Hungarian NAPCP. The objectives of the four PaMs are appropriate, but their effectiveness is uncertain and cannot be judged based on the information provided. The supporting framework for district heating and for residential use of low or zero-emission heating modes are not detailed enough for assessing them, and success of these PaMs can be constrained by people’s engagement. Uncertainty is especially true in the case of the soft measures on awareness raising, as its effects depend on people’s behaviour. Overall, there is uncertainty related to the effectiveness of the PaMs and to the credibility of the projected quantified emission reductions (possibly this is one reason for the wide ranges of emission reductions provided by Hungary for these PaMs).

Energy industry and non-industrial combustion contributed 86 percent of total SO$_2$ emissions in Hungary in 2017. The PaMs to promote district heating systems, to regulate combustion plants, and those related
to domestic heating are clearly targeting these main sources of SO\textsubscript{2} emissions and are credible and appropriate. However, their effectiveness is constrained by the same elements described above.

**Transport**

Two packages of PaMs and two individual PaMs are reported as selected for adoption in the transport sector. One package, with three PaMs, focuses on regulatory tools (low-emission zones, traffic calming, new parking systems, taxation based on environmental performance) in order to increase the environmental performance of the sector. The other package, with four PaMs, puts the emphasis on awareness raising activities (campaigns for promoting alternative modes of transport, eco-driving, health effect of transport), without clear details provided.

The two individual PaMs target low and zero-emission mobility. Hungary plans to establish proper infrastructure for alternative fuels (45,000 electric charging points and 300 CNG, 250 LNG, 750 LPG and 15 hydrogen filling stations by 2030), and also plans to elaborate a support scheme for low and zero-emission vehicles, in order to create the market for alternative fuels. However, the details of the support scheme are not reported.

Although the PaMs include also regulatory measures, the focus is mainly on economic instruments and on awareness raising. The assumptions behind the measures are appropriate and the measures are credible. Even so, their effectiveness is uncertain and cannot be judged based on the information provided, especially in the cases of soft measures aimed at raising awareness, as their effects depend on people’s behaviour.

The largest projected quantified emission reductions are reported for awareness raising measures, but based on the information provided it is impossible to judge if the numbers are realistic.

**Industrial Processes**

The EEA PaM-tool includes one package of four PaMs related to industrial processes. This contains measures that help to spread low-emission technologies by developing or updating BAT guidance documents, promoting the use of emerging techniques (with tax incentives), revision of emission limits for non-IED sectors and encouraging local production and product use. The regulatory PaMs (BAT, emission limits) are credible and realistic. However, the measure on BATs refers to an existing EU legislation. Therefore it should have been treated as existing PaM and include under WM scenario. In the cases of the two PaMs related to economic incentives (emerging technologies, local production) the information provided is insufficient to credibly judge the effectiveness of the measures and the frameworks are not presented in detail.

3.7.2 Feedback from the consultation undertaken

Hungary does not report any feedback received from the consultation with respect to the final selection and design of the PaMs selected for adoption. From the information in the NAPCP it cannot be clearly assessed whether there was any consultation related to the selection of PaMs.

3.7.3 Sources of funding

Hungary has not identified in the NAPCP any sources of funding for the implementation of the PaMs.

3.7.4 Coherence with plans and programmes set up in other relevant policy areas

As stated in sections 3.3 and 3.6.7 of this report, the main air quality challenge in Hungary relates to the concentration levels of NO\textsubscript{2}, PM\textsubscript{10} and O\textsubscript{3} in ambient air. The adopted PaMs target these pollutants or their precursor pollutants and therefore will help to tackle these challenges. It is not reported in the NAPCP that PaMs selected for adoption aim to achieve greater reductions than the national emission reduction commitments for this purpose.

The description presented in the NAPCP demonstrates that coherence with climate and energy policies (including transport) was considered when developing the NAPCP. Although the text of the NAPCP
refers to the draft NECP, given the late submission of the NAPCP the review finds that coherence with the final NECP should have already been ensured.

It is highlighted that objectives of those policies go hand in hand with emission reduction and air quality objectives. The only exception to this is the use of biomass fuels. This is especially relevant in Hungary, where biomass has a relatively high share in domestic heating. In the case of biomass use in power plants and industry, it is reported that air pollutant emission limits are set to control the negative impacts of air pollutants and enforcement has a key importance.

3.8 Projected combined impacts of PaMs on emission reductions, air quality and the environment and associated uncertainties (where applicable) (M, O)

- Under the WAM scenario, 2020-29 emission reduction commitments are projected to be met for NH$_3$, NO$_X$ and SO$_2$. For NMVOC and PM$_{2.5}$ the respective commitments for 2020-29 are projected to be missed.

- For 2025 and 2030, Hungary provided the projected emission levels under a WAM scenario in ranges. According to the lower range of emission reductions, Hungary projects to miss the 2030 onwards commitments for NO$_X$, NMVOC, NH$_3$ and PM$_{2.5}$. According to the upper range of emission reductions, 2030 onwards emission reduction commitments are projected to be achieved for all pollutants. For NH$_3$, a non-linear emission reduction trajectory is reported but explanation on this is not provided.

- Hungary has not provided the optional information on projected improvement on air quality within the WAM scenario.

3.8.1 Likelihood of achievement of projected emission reductions

According to the projections included in the NAPCP, emission reductions under the WAM scenario for 2020 and 2030 will not achieve all of the national emission reduction commitments in the NECD.

As stated in section 2.2, under the WAM scenario, 2020-29 emission reduction commitments are projected to be met for NH$_3$, NO$_X$ and SO$_2$. For NMVOC and PM$_{2.5}$ the respective commitments for 2020-29 are projected to be missed. For PM$_{2.5}$, a significant increase in emissions is foreseen assuming the lower range of projected emission reductions. By the year 2025, commitments for the period of 2020-29 will be met for SO$_2$ only. For NO$_X$, NH$_3$, NMVOC and PM$_{2.5}$ compliance is foreseen only with the upper level of emission reductions.

For 2030 onwards commitments, compliance is projected only for SO$_2$ assuming both the lower and upper end of emission reductions ranges. For NO$_X$, PM$_{2.5}$, NMVOC and NH$_3$ only the upper range of emission reductions is projected to achieve compliance. The large differences between the lower and upper ranges create uncertainty related to compliance.

Despite this uncertainty, the NAPCP does not state if an assessment of further additional PaMs will be undertaken. According to the lower range of emission reductions under the WAM scenario, the largest margins with which the 2030 onwards commitments are projected to be missed are for NMVOC (25 percentage points) and NH$_3$ (17 percentage points).

Conclusions from the NAPCP review on whether the projected emission reductions per pollutant are likely to be realised in practice are presented in Table 3-3.
<table>
<thead>
<tr>
<th></th>
<th>Do the PaMs selected for adoption target the key emitting sectors?</th>
<th>Are the projected emission reductions for 2020 and 2030 likely to be achieved?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SO₂</strong></td>
<td><strong>Yes</strong>&lt;br&gt;In 2017, 86% of the total national emissions came from energy industries and non-industrial combustion. Both sources are targeted by the adopted measures.</td>
<td><strong>Partly</strong>&lt;br&gt;PaMs are relevant and appropriate but their effectiveness is uncertain as not enough detail on the design of the PaMs is provided. As the success of the PaMs can be constrained by people’s engagement, their ability to deliver the expected reductions is questionable. Projected quantified emission reductions do not seem to be realistic. Values for emission reductions reported for the PaMs are not coherent with the differences between the WM and WAM projections.</td>
</tr>
<tr>
<td><strong>NOₓ</strong></td>
<td><strong>Yes</strong>&lt;br&gt;In 2017, 38% of NOₓ emissions came from road transport with the largest contributor being heavy duty vehicles with 15%. Non-industrial combustion is the second largest source with a 20% share. PaMs selected for adoption are appropriate to target these main sources.</td>
<td><strong>Partly</strong>&lt;br&gt;PaMs are relevant and appropriate but the projected quantified emission reductions do not seem to be realistic in all cases. Emission levels are given in ranges, with significant differences between the upper and lower end of the range. Emission reductions reported for the PaMs are not coherent with the difference between the WM and WAM scenario projections.</td>
</tr>
<tr>
<td><strong>NMVOC</strong></td>
<td><strong>Partly</strong>&lt;br&gt;No PaMs are proposed to limit emissions from the use of solvents and other products, although in 2017 this sector had the highest share (32%) in total national emissions. The second largest source is non-industrial combustion (25%) that is targeted by the PaMs selected for adoption.</td>
<td><strong>Partly</strong>&lt;br&gt;Although the projected quantified emission reductions seem to be realistic for the PaMs selected for adoption, emission reductions reported for the PaMs are not coherent with the differences between the WM and WAM scenario projections.</td>
</tr>
<tr>
<td><strong>NH₃</strong></td>
<td><strong>Yes</strong>&lt;br&gt;The two main sources of NH₃ emissions in Hungary are animal husbandry and manure management and plant production and agricultural soils. The 15 agricultural PaMs are projected to contribute to emission reductions in these sectors.</td>
<td><strong>Partly</strong>&lt;br&gt;PaMs are relevant and appropriate but the projected quantified emission reductions do not always seem to be realistic. In the NAPCP, emission levels are given in ranges which suggest a considerable uncertainty in the estimates provided.</td>
</tr>
</tbody>
</table>
Do the PaMs selected for adoption target the key emitting sectors? Are the projected emission reductions for 2020 and 2030 likely to be achieved?

<table>
<thead>
<tr>
<th>PM$_{2.5}$</th>
<th>Partly</th>
<th>Partly</th>
</tr>
</thead>
<tbody>
<tr>
<td>84% of the emissions came from non-industrial combustion in 2017. This sector is targeted by the adopted PaMs, but the NAPCP and the EEA PaM tool do not contain appropriately detailed information for assessing them</td>
<td>PaMs are relevant and appropriate but the projected quantified emission reductions do not seem to be realistic in all the cases. Emission reductions reported for the PaMs are not coherent with the difference between the WM and WAM scenario projections, especially for 2020. In the NAPCP, emission levels are given in ranges which suggest a considerable uncertainty in the estimations provided.</td>
<td></td>
</tr>
</tbody>
</table>

This analysis of the credibility of the PaMs in achieving emission reductions, has also been used in the assessment of the risk of non-compliance presented in Appendix 2.

3.8.2 Deviation from the linear trajectory for 2025

Although with the upper range of emission reductions for NH$_3$ a non-linear reduction trajectory is reported (emissions are expected to decrease in 2020, stagnate by 2025 but then increase in 2030), no explanation is given for this in the NAPCP.

3.8.3 Use of flexibilities

Hungary has not reported any information with regard to flexibilities in section 2.8.3. of the common format.

3.8.4 Projected impacts on air quality and the environment.

Hungary has not provided the optional information on projected improvement in air quality under the WAM scenario.
4 Conclusions and recommendations

4.1 Conclusions

Hungary submitted its NAPCP on 18th May 2020, well after the deadline set by the NECD. The NAPCP follows the structure of the common format established by the Commission Implementing Decision (2018/1522) and the EEA PaM-tool was used to report the PaMs considered and selected for adoption. Hungary meets the minimum reporting requirements of the common format except in two cases:

- Detailed information has not been provided on the projected impact of existing measures on improving air quality under the WM scenario in section 2.5.
- The information in section 2.8 it shows that a non-linear emission reduction trajectory is followed for NH₃, but in section 2.8.2 of the NAPCP proper details and justification have not been provided on this.

Under the WM projections scenario reported in the NAPCP (which are consistent with the 2019 projections reported under Article 10(2)), Hungary is projected to miss all of its 2030 onwards emission reduction commitments. Thus, additional PaMs are considered and selected for adoption in the NAPCP.

Hungary has considered 38 PaM for adoption of which 32 were eventually selected. The analysis of the additional PaMs considered and selected for adoption has demonstrated that overall, the PaMs selected for adoption are relevant and appropriate but their effectiveness in several cases is uncertain as not enough detail on the design of the PaMs is provided. In the cases of measures targeting promotion and support of certain tools, the support schemes are not detailed and the success of these PaMs can be constrained by public engagement. Uncertainty is especially true in the case of the soft measures on awareness raising, as their effects depend on changes in people’s behaviour. Consequently, it is hard to judge based on the evidence, whether the emission reductions are realistic. Furthermore, the values on projected reductions reported for the PaMs are not always coherent with the differences between the WM and WAM scenario projections in the NAPCP (particularly for SO₂, NOₓ and NMVOC).

Some of the PaMs proposed by Hungary relate to existing EU legislation (e.g. implementation of BAT under the Industrial Emissions Directive, Ecodesign Directive). These PaMs should be included as existing PaMs instead of additional PaMs as has been done. This would result in lower emissions from the WM scenario, and less reduction under the WAM scenario, but the overall compliance gap from the commitments will be the same under the WAM scenario.

As presented in section 2.2 of this report, the projected emission reductions under the WAM scenario used in the NAPCP projections are presented as ranges. In the case of 2030 emission reductions, there are significant differences between the lower and upper ranges (particularly for NOₓ, NMVOC and NH₃), which lead to uncertainties when determining compliance. Hungary has not provided a detailed description of the sources for such large uncertainties, nor demonstrated plans to limit these uncertainties. Although with the lower range of emission reductions 2030 onwards commitments are projected to be missed for all pollutants except SO₂, the NAPCP does not state if an assessment of further additional PaMs will be undertaken. Furthermore, as presented in Appendix 2 to this report, Hungary has not submitted emission projections under a WAM scenario under Article 10(2). Thus, compliance with the NECD commitments is determined according to the projected evolution of emissions under the WM scenario. In the risk assessment, this resulted in a high risk of non-compliance with 2020-29 commitments for NMVOC, NH₃ and PM₂.₅ as well as for all 2030 onwards commitments.

Positive highlights from the review of the NAPCP for Hungary are:

- Air quality policy priorities include a medium-term objective of achieving levels of air quality in line with the World Health Organisation (WHO) guidelines (setting stricter standards compared to EU limit and target values).
• Additional PaMs reported via the EEA PaM-tool are well described and optional content is reported presenting indicators to evaluate progress in the cases of four PaMs and target values for two PaMs for the year 2030.

• Reporting projected emission levels under the WAM scenario in ranges demonstrates that Hungary took account of uncertainties in the impacts of the PaMs. In itself, this is recognised as a positive element in the NAPCP. However, because of the wide ranges provided without an explanation or a discussion of how these uncertainties could have been minimised, this approach increased the uncertainty in reaching compliance under WAM scenario.

4.2 Recommendations

Recommendations are prioritised according to the following categories:

1. **Ensuring compliance**  – non-compliance with the NECD, where the minimum content is not reported and/or the Member State does not demonstrate how it may achieve its emission reduction commitments.

2. **Areas for improvement**  – the NAPCP is reported to be compliant with its emission reduction commitments and provides the minimum content required by the common format but areas for improvement to strengthen compliance have been identified.

3. **Encouragements**  – where optional reporting and/or the NAPCP could be closer aligned with the guidance document on preparation of initial NAPCPs to strengthen the quality of the NAPCP.

**Ensuring compliance**

• A qualitative description of projected air quality improvements under the WM scenario should be added (section 2.5).

• Under the WAM scenario, the projected emission reductions are given in ranges (section 2.8) with significant differences between the upper and lower estimated. The Member State should provide a more detailed description of the reasons for large ranges in projected emission reductions under the WAM scenario and should demonstrate how it plans to limit uncertainties (e.g. more frequent review, special indicators etc.) and achieve its emission reduction commitments (e.g. by introducing potential further PaMs).

• As the WAM scenario does not ensure compliance with the 2030 onwards commitments further measures should be assessed to limit the risk of non-compliance

• According to the lower range of emission reductions reported, for NH₃ a non-linear emission reduction trajectory is expected whereby emissions are projected to decrease in 2020 and 2025 but increase in 2030. An explanation on this should be provided under section 2.8.2.

**Areas for improvement**

• In accordance with the NECD, where appropriate, transboundary consultations are to be conducted (Article 6(6)). Member States should provide links to relevant websites on the consultation undertaken (section 2.1.1. of the common format). The NAPCP in section 2.4.3 includes an outline of the transboundary impact of air pollution, concluding that transboundary effects are quite significant in the case of Hungary. However, no information is provided on transboundary consultation activities that may have been undertaken (if any). The Member State is encouraged to provide further details on any relevant transboundary consultation activities undertaken to develop the NAPCP.

• Inconsistencies between the total quantified emission reductions from the PaMs selected for adoption and the difference between the WM and WAM projections scenarios should be clarified.
Encouragement

- It would be beneficial to add the indicators reported via the EEA PaM-tool to the NAPCP. Besides, more indicators and interim target values, in addition to the already identified ones would help with monitoring the progress of implementation and the PaMs review process (section 2.7.1).

- The NAPCP would benefit from adding a summary of the views received during the consultation on design and selection of the PaMs (section 2.7.1).

- The NAPCP would benefit from including the optional reporting requirements under section 2.8.4 on projected improvement of air quality under the WAM scenario, to illustrate changes related to the challenging pollutants like NOx, PM and O3.

- Description of the current PaMs and their impact on reducing emissions of NECD pollutants and improving air quality could be added under section 2.4.
Appendix 1 Completeness assessment

A completeness assessment was conducted to identify gaps in reporting according the minimum content requirements of the common format (Commission Implementing Decision (EU) 2018/1522). The completeness assessment also reviewed the extent of optional reporting by Member States.

For mandatory reporting requirements, the status has been assessed using the traffic light RAG rating as presented in the table below.

Table A1 - 1 Traffic light RAG rating for completeness assessment of mandatory reporting

<table>
<thead>
<tr>
<th>RAG</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>No information provided for mandatory reporting requirement</td>
</tr>
<tr>
<td>Amber</td>
<td>Evidence is incomplete or unclear to meet reporting requirement</td>
</tr>
<tr>
<td>Green</td>
<td>Evidence is sufficient to meet reporting requirement</td>
</tr>
<tr>
<td>N/A</td>
<td>Mandatory reporting requirement not relevant for the given Member State or mandatory only when available and not available in the given Member State (e.g. where mandatory reporting requirements apply only where a non-linear emission reduction trajectory is followed)</td>
</tr>
</tbody>
</table>

Table A1 - 2 Assessment of the NAPCP compliance screening with the minimum content requirements

<table>
<thead>
<tr>
<th>Reference to the NAPCP common format</th>
<th>RAG Rating</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Title of the programme contact information and websites</td>
<td>Green</td>
<td>The title of the programme, contact information and websites are provided.</td>
</tr>
<tr>
<td>2.3.1 Policy priorities and their relationship to priorities set in other relevant policy areas</td>
<td>Green</td>
<td>National air quality priorities are provided for emission reductions, air quality, climate and energy, agriculture, transport and industry.</td>
</tr>
<tr>
<td>2.3.2 Responsibilities attributed to national, regional and local authorities</td>
<td>Green</td>
<td>Roles and responsibilities are attributed by authority across all levels of governance.</td>
</tr>
<tr>
<td>2.4.1 Progress made by current PaMs in reducing emissions, and the degree of compliance with national and Union emission reduction obligations</td>
<td>Green</td>
<td>Progress and the degree of compliance is described by pollutant according to current PaMs, but the current PaMs are not detailed. Two weblinks are provided for publicly available datasets.</td>
</tr>
<tr>
<td>2.4.2 Progress made by current PaMs in improving air quality, and the degree of compliance with national and Union air quality obligations</td>
<td>Green</td>
<td>Progress is described in relation to EU air quality standards for SO$<em>2$, PM$</em>{10}$, PM$_{2.5}$, NO$_2$ and O$_3$. Weblinks are provided to publicly available datasets.</td>
</tr>
<tr>
<td>2.4.3 Where relevant, current transboundary impact of national emission sources</td>
<td>Green</td>
<td>Current transboundary impacts are described.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Reference to the NAPCP common format</th>
<th>RAG Rating</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5.1 Projected emissions and emission reductions (WM scenario)</td>
<td>Green</td>
<td>Emission reductions are reported under a WM scenario together with all the minimum content required.</td>
</tr>
<tr>
<td>2.5.2 Projected impact on improving air quality (WM scenario)</td>
<td>Red</td>
<td>A qualitative description is provided for exceedances of PM$_{10}$, NO$_2$ and O$_3$ but no years are reported and so it is not possible to determine the projected impact or improvement.</td>
</tr>
<tr>
<td>2.6.1 Details concerning the PaMs considered in order to comply with the emission reduction commitments (reporting at PaM level)</td>
<td>Green</td>
<td>Hungary provides the minimum content for this reporting requirement using the EEA PaM-tool.</td>
</tr>
<tr>
<td>2.6.2 Impacts on air quality and the environment of individual PaMs or packages of PaMs considered in order to comply with the emission reduction commitments (where available)</td>
<td>Green</td>
<td>Impacts on air quality and the environment are reported in the NAPCP (section 2.6.2). Impacts are not reported to the EEA PaM-tool.</td>
</tr>
<tr>
<td>2.6.4 Additional details concerning the measures from Annex III Part 2 to Directive (EU) 2016/2284 targeting the agricultural sector to comply with the emission reduction commitments</td>
<td>Green</td>
<td>Hungary provides the minimum content for this reporting requirement using the EEA PaM-tool.</td>
</tr>
<tr>
<td>2.7.1 Individual PaMs or package of PaMs selected for adoption and the competent authorities responsible</td>
<td>Green</td>
<td>Hungary provides the minimum content for this reporting requirement using the EEA PaM-tool.</td>
</tr>
<tr>
<td>2.7.2 Assessment of how selected PaMs ensure coherence with plans and programmes set up in other relevant policy areas</td>
<td>Green</td>
<td>Hungary provides the minimum content for this reporting requirement using the EEA PaM-tool. Mandatory content for this section has been reported.</td>
</tr>
<tr>
<td>2.8.1 Projected attainment of emission reduction commitments (WAM)</td>
<td>Green</td>
<td>Emission reductions are reported under a WAM scenario together with all the minimum content required.</td>
</tr>
<tr>
<td>2.8.2 Non-linear emission reduction trajectory</td>
<td>Red</td>
<td>According to the upper range of emission projections reported, a non-linear emission reduction trajectory is followed for NH$_3$ whereby emissions are expected to decrease in 2020 and 2025 but increase in 2030. No explanation is provided.</td>
</tr>
<tr>
<td>2.8.3 Flexibilities</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The rating used for the completeness assessment of optional reporting by Member States refers to only two categories, whereby the Member State either reported the information (Green) or it did not (White).
This rating reflects the fact that the reporting is optional and therefore where the information was not provided, or where it was incomplete or unclear, the assessment should not consider this a gap in reporting.

### Table A1 - 3 Rating for completeness assessment rating of optional reporting

<table>
<thead>
<tr>
<th>Rating</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Evidence is sufficient to meet reporting requirement</td>
</tr>
<tr>
<td>White</td>
<td>No information provided for optional reporting requirement or evidence is incomplete or unclear to meet optional reporting requirement</td>
</tr>
</tbody>
</table>

### Table A1 - 4 Completeness assessment of the NAPCP for the optional content requirements

<table>
<thead>
<tr>
<th>Reference to the NAPCP common format</th>
<th>RAG Rating</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 Executive summary</td>
<td>White</td>
<td>No executive summary is provided.</td>
</tr>
<tr>
<td>2.3.1 Policy priorities and their relationship to priorities set in other relevant policy areas: Reference to WHO guideline values</td>
<td>Green</td>
<td>The WHO guideline values are specified in the NAPCP with regard to air quality policy priorities.</td>
</tr>
<tr>
<td>2.3.2 Responsibilities attributed to national, regional and local authorities: Source sectors under the responsibility of the authority</td>
<td>Green</td>
<td>Where relevant, source sectors under the responsibility of the authority are specified.</td>
</tr>
<tr>
<td>2.4.1 Progress made by current PaMs in reducing emissions, and the degree of compliance with national and Union emission reduction obligations: Provision of graphics</td>
<td>Green</td>
<td>Bar charts are provided by pollutant to show emission reductions achieved over varying timeseries (depending on the pollutant).</td>
</tr>
<tr>
<td>2.4.2 Progress made by current PaMs in improving air quality, and the degree of compliance with national and Union air quality obligations: Provision of graphics and progress made in a specific air quality zone</td>
<td>Green</td>
<td>Graphics are used to show the number of exceedances per measurement station for air quality pollutants with exceedances, but no descriptions are provided for the specific air quality zones in exceedance with the EU air quality standards.</td>
</tr>
<tr>
<td>2.4.3 Methodologies and data used to show the current transboundary impact of national emission sources</td>
<td>Green</td>
<td>The data and methodologies used are outlined.</td>
</tr>
<tr>
<td>2.5.1 Associated uncertainties of the projected emissions and emission reductions (WM scenario)</td>
<td>White</td>
<td>Associated uncertainties are not reported.</td>
</tr>
<tr>
<td>2.5.2 Quantitative data on the projected impact on improving air quality (WM scenario)</td>
<td>White</td>
<td>Quantitative data is not reported.</td>
</tr>
<tr>
<td>2.6.1 Details about additional pollutants concerning the PaMs considered in order</td>
<td>White</td>
<td>No additional pollutants are targeted by the PaMs considered.</td>
</tr>
<tr>
<td>Reference to the NAPCP common format</td>
<td>RAG Rating</td>
<td>Explanation</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>to comply with the emission reduction commitments: Reporting of affected pollutant(s) beyond the scope of the NECD</td>
<td>White</td>
<td>An estimation of the costs and benefits of PaMs is not provided.</td>
</tr>
<tr>
<td>2.6.3 Estimation of costs and benefits of the individual PaM or package of PaMs considered in order to comply with the emission reduction commitments</td>
<td>White</td>
<td>Measures to reduce NH$_3$ emissions from livestock and to reduce emissions from harvest residue are included among the additional PaMs considered.</td>
</tr>
<tr>
<td>2.6.4 Additional details concerning the optional measures from Annex III Part 2 to Directive (EU) 2016/2284 targeting the agricultural sector to comply with the emission reduction commitments</td>
<td>Green</td>
<td>Indicators to monitor progress are reported, but not comments from the consultation.</td>
</tr>
<tr>
<td>2.7.1 Individual PaMs or package of PaMs selected for adoption and the competent authorities responsible: Reporting of relevant comments arising from the consultation and provision of interim targets and indicators</td>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>2.7.2 Explanation of the choice of selected measures</td>
<td>White</td>
<td>No explanation is provided on the choice of selected measures.</td>
</tr>
<tr>
<td>2.8.4 Projected improvement in air quality (WAM)</td>
<td>White</td>
<td>No information is provided on the projected impact on air quality improvements under a WAM scenario.</td>
</tr>
<tr>
<td>2.8.5 Projected impacts on the environment (WAM)</td>
<td>White</td>
<td>No information is provided on the projected impact on the environment under a WAM scenario.</td>
</tr>
</tbody>
</table>
Appendix 2 Assessment of the risk of non-compliance

The description of the methodology used for this assessment is presented in the Horizontal Report.

In the following tables, the information used in the decision tree process is presented in black font. Information not used in the decision tree process is presented in grey font and italics.

Where information is required but not reported, the response to the decision tree question is ‘not reported’ (NR). Where information is not required and not reported, the response to the decision tree question is ‘not applicable’ (n/a).

### Risk of non-compliance with 2020-2029 emission reduction commitments

<table>
<thead>
<tr>
<th>Decision tree question</th>
<th>Relevant scenario</th>
<th>2020 – 2029</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SO₂</td>
</tr>
<tr>
<td>Can the Member State achieve the emission reduction commitments? (projections submitted under Article 10(2))</td>
<td>WM</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>NR</td>
</tr>
<tr>
<td>Are the projections submitted under Article 10(2) considered to be of good quality?</td>
<td>WM</td>
<td>Partially</td>
</tr>
<tr>
<td>Are the NAPCP projections consistent with the latest projections submitted under Article 10(2)?</td>
<td>WM</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>n/a</td>
</tr>
<tr>
<td>Does the NAPCP present credible additional PaMs selected for adoption?</td>
<td>WAM</td>
<td>Partially</td>
</tr>
<tr>
<td>Is the margin of compliance (percent of the compliance threshold) likely to ensure compliance with the emission reduction commitments? (projections submitted under Article 10(2))</td>
<td>WM</td>
<td>Yes (14)</td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>NR</td>
</tr>
</tbody>
</table>

### Risk of non-compliance

| Additional comments on high risk scores | Hungary did not submit projections under a WAM scenario under Article 10(2). As such, compliance is based on the projections submitted under a WM scenario, which show that Hungary is projected to miss the 2020-29 emission reduction commitments for NMVOC, NH₃ and PM₂.₅. |
Regarding the quality of the WM projections submitted under Article 10(2), the projections review concluded that minor improvements are necessary for the NMVOC and PM$_{2.5}$ emission projections; however, in the case of NH$_3$, major improvements are needed. The quality of the projections is affected by poor transparency (no information presented in the IIR). As well, accuracy issues for NH$_3$ were identified which may affect the extent to which Hungary can achieve the emission reduction commitment.

### Risk of non-compliance with 2030 emission reduction commitments

<table>
<thead>
<tr>
<th>Decision tree question</th>
<th>Relevant scenario</th>
<th>2030 onwards</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>NMVOC</th>
<th>NH$_3$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can the Member State achieve the emission reduction commitments? (projections submitted under Article 10(2))</td>
<td>WM</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Are the projections submitted under Article 10(2) considered to be of good quality?</td>
<td>WM</td>
<td>Partially</td>
<td>Partially</td>
<td>Partially</td>
<td>No</td>
<td>Partially</td>
<td></td>
</tr>
<tr>
<td>Are the NAPCP projections consistent with the latest projections submitted under Article 10(2)?</td>
<td>WM</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Does the NAPCP present credible additional PaMs selected for adoption?</td>
<td>WAM</td>
<td>Partially</td>
<td>Partially</td>
<td>Partially</td>
<td>Partially</td>
<td>Partially</td>
<td></td>
</tr>
<tr>
<td>Is the margin of compliance (percent of the compliance threshold) likely to ensure compliance with the emission reduction commitments? (projections submitted under Article 10(2))</td>
<td>WM</td>
<td>No (-29)</td>
<td>No (-60)</td>
<td>No (-90)</td>
<td>No (-42)</td>
<td>No (-110)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WAM</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
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</tr>
</tbody>
</table>

**Risk of non-compliance**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Risk of non-compliance</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

**Additional comments on high risk scores**

Hungary did not submit projections under a WAM scenario under Article 10(2).