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National Air Pollution Control Programmes: analysis and suggestions for the way forward

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Executive Summary

The National Emission Ceilings Directive

The original National Emission Ceilings Directive (NECD, 2001/81/EC), adopted in 2001, set national emission limits for each Member State (and the EU as a whole) for sulphur dioxide (SO_2), nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs) and ammonia (NH_3) to be achieved from 2010 onwards. However, a number of Member States did not meet their ceilings by 2010 and data for 2018 shows that some have still not been able to achieve compliance for all pollutants, eight years after the original deadline.

Following a review of EU clean air policy and adoption of a Clean Air Policy Package on 18 December 2013[1], a new National Emissions Ceilings Directive (2016/2284/EU) was adopted[2], which set national emission reduction commitments (NERCs) for the original four air pollutants plus $PM_{2.5}$. NERCs are set for 2020-29 and 2030 onwards. They are expressed in percentage reductions between 2005 levels and the given target year and are projected to reduce the health impacts of air pollution by half compared with 2005 levels.

The Directive requires Member States to develop and report on National Air Pollution Control Programmes (NAPCPs) which should set out how they intend to meet their NERCs including the policies and measures (PaMs) to be taken. To avoid some of the issues encountered under the original Directive, the Commission adopted a common report format for NAPCPs which the Member States are required to follow. The first round of NAPCPs had to be submitted by 1 April 2019.

This report

This report **evaluates the Member States' NAPCPs and progress towards the 2020-29 and 2030 emission reduction commitments.** It examines the overall quality of the NAPCPs and the likelihood of Member States achieving compliance in the future. The report builds on the Commission's recent evaluation of the NAPCPs and the NAPCPs themselves, as well as a survey of selected EEB member organisations in Bulgaria, Denmark, Germany, Hungary, Italy, Poland, Portugal, Spain and Sweden.

This report is structured as follows:

- **Section 1** introduces the NECD and explains the requirements for the NAPCPs.
- **Section 2** provides the **outlook at a European level**. This includes a summary of the status of reporting across the EU covering timeliness, completeness as well as projected compliance.
- **Section 3** considers what a **model NAPCP** should contain.

[1] https://ec.europa.eu/environment/air/clean_air/index.htm

[2] It entered into force on 31 December 2016

- **Section 4** discusses the **key component of a successful NAPCP, appropriate, well planned and effective PaMs**.
- **Section 5** summarises the **key conclusions and provides recommendations for the Member States and European Commission**.

Main findings

The overall conclusion of this assessment of the Member States' NAPCPs is that, whilst there have been some good improvements with the NAPCP process as a whole relative to the previous Directive, there are major issues with the reporting process and level of detail provided by the Member States (particularly in relation to PaMs). There are a significant number of Member States projecting non-compliance with their emission reduction commitments, in particular for 2030 and for NH_3, NOx and NMVOC. When you factor in the quality of the emission projections and overall credibility of the PaMs reported in the NAPCPs, then the risk of non-compliance increases significantly for NH_3, NOx, PM2.5 and NMVOC. Our combined risk assessment (which builds on the Commission's own assessment of the risks of non-compliance) shows that there are only two Member States judged to be at a low risk of non-compliance with their emission reduction commitments for all pollutants for 2020-29 and only one for 2030. The remainder are judged to be either at a medium or high risk of non-compliance for all pollutants with more than half of the Member States at high risk of non-compliance for 2030 onwards.

Recommendations

Member States must:

1. Ensure the mandatory common format is used, including following the structure of the common format, and report as much of the optional content as possible and where relevant.
2. Provide full details of the PaMs to be adopted, including implementation route, timescales, benefits over time, costs and co-benefits.
3. Apply a PaMs selection process which uses clear and transparent parameters, focussing on the priority pollutants and sectors. Consider key uncertainties (in the underlying emission projections and likely impacts of the PaMs) and the risks of non-compliance if the PaMs are implemented, as well as the risk of non-compliance if certain PaMs are not to be implemented.
4. Engage fully and meaningfully with key stakeholders (including neighbouring Member States) at each stage of the process, allowing sufficient time for the consultation process to operate and for the feedback to be taken into account in the shaping of the final programme.
5. Develop and act on an improvement programme for the emissions inventory and projections, focussing on key sectors and components, seeking wherever possible to adopt more detailed methodologies. Key areas for improvement are identified in the Commission's review reports for each Member State.

The European Commission must:

1. Engage with the Member States to understand their experiences of working with the common reporting format and PaMs reporting tools plus usefulness of the supporting guidance to understand what improvements could be made and any specific support needs that could be provided.

2. Improve the common format (especially in the reporting on PaMs) well ahead of the next deadline for reporting, based on feedback from the Member States as well as the findings of the European Commission's evaluation and this report.

3. Enforce the requirement to use the common reporting format and PaMs reporting tool (and extend mandatory use to include section 2.7 of the common format on consultation and justification for the adoption of specific PaMs).

4. Enforce quick resubmission of NAPCPs for those Member States that were scored as high risk in the Commission's assessment i.e. not just those that are projecting non-compliance but also those where the quality of projections and/or robustness of PaMs is poor. At the latest within 18 months for the second and following submission.

5. Ahead of the 2025 Directive review enhance action on those pollutants where the Member States are projecting to face the greatest challenges with compliance, and propose additional EU wide actions that could help improve the situation, in particular for agricultural NH_3 emissions. The reason being that national level actions alone for some pollutants and sectors are unlikely to have the desired impacts.

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1.1 Policy context

1.1.1 Revised National Emission Ceilings Directive

Original National Emission Ceilings Directive (NECD, 2001/81/EC)

The original National Emission Ceilings Directive (NECD, 2001/81/EC), adopted in 2001, set absolute emission ceilings in tonnes for each Member State (and the EU as a whole) for sulphur dioxide (SO_2), nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs) and ammonia (NH_3). It brought into community legislation commitments already made under the Gothenburg Protocol of the UNECE Convention on Long Range Transport of Air Pollution (CLRTAP). These emission ceilings had to be achieved from 2010 onward although in reality, many Member States did not meet their ceilings for all pollutants at this time. The European Environment Agency's (EEA) latest assessment[3] of compliance, based on data for 2018, highlighted that some Member States still have not been able to achieve compliance for all pollutants, eight years after the original deadline. In particular:

- Five Member States have exceeded their 2010 national emission ceilings for NH_3, and one also exceeded its NMVOC ceiling. NH_3 is a particular challenge as EU emissions have increased relatively consistently over the last 5-6 years, although there appears to have been a slight decline in emissions in 2018 relative to the previous year (emissions are still higher than they were in 2010).
- All Member States have achieved compliance with their national emission ceilings for NOx and SO_2 (this has been the case since 2016).
- Overall, the 2010 emission ceilings for the EU as a whole were met for each of the four pollutants in 2018.

Under the original Directive, Member States were required to develop and report to the Commission national programmes for the progressive reduction of the relevant pollutants, in addition to the provision of information on the likely impact of policy measures on emissions in 2010. As the requirements for these programmes were not specified in the Directive or any supporting guidance, the format, content and level of detail provided varied significantly across the EU making it difficult to undertake comparisons and judge how effective they may be. The timescales for their reporting as well as the time lag related to reporting of emission inventories under the Directive meant that it was challenging to understand if Member States were on track to meet their emission ceilings in 2010 and beyond. This meant that the Commission was unable to take action until it was too late.

[3] https://www.eea.europa.eu/publications/national-emission-reduction-commitments-directive

Clean air policy review

Between 2011 and 2013 the Commission undertook a review of EU clean air policy including the original NECD[4] resulting in the adoption of a Clean Air Policy Package on 18 December 2013[5]. The package included the following elements:

- Clean Air Programme for Europe.
- Proposal for a revised NECD.
- Proposal for a new Directive aimed at the limitation of emissions of certain pollutants into the air from medium combustion plants (the MCPD).

The original proposal for a revised NECD expanded the scope of the original Directive to include $PM_{2.5}$ and methane and set commitments for 2020-29 and 2030 onwards. However, as part of the negotiations the commitments for methane were unfortunately removed. Furthermore, the European Parliament pushed for binding 2025 emission reduction commitments but this was pushed back by the Member States in Council and instead a requirement to report on progress was included (with the default expected to be a linear trajectory between 2020 and 2030 commitments).

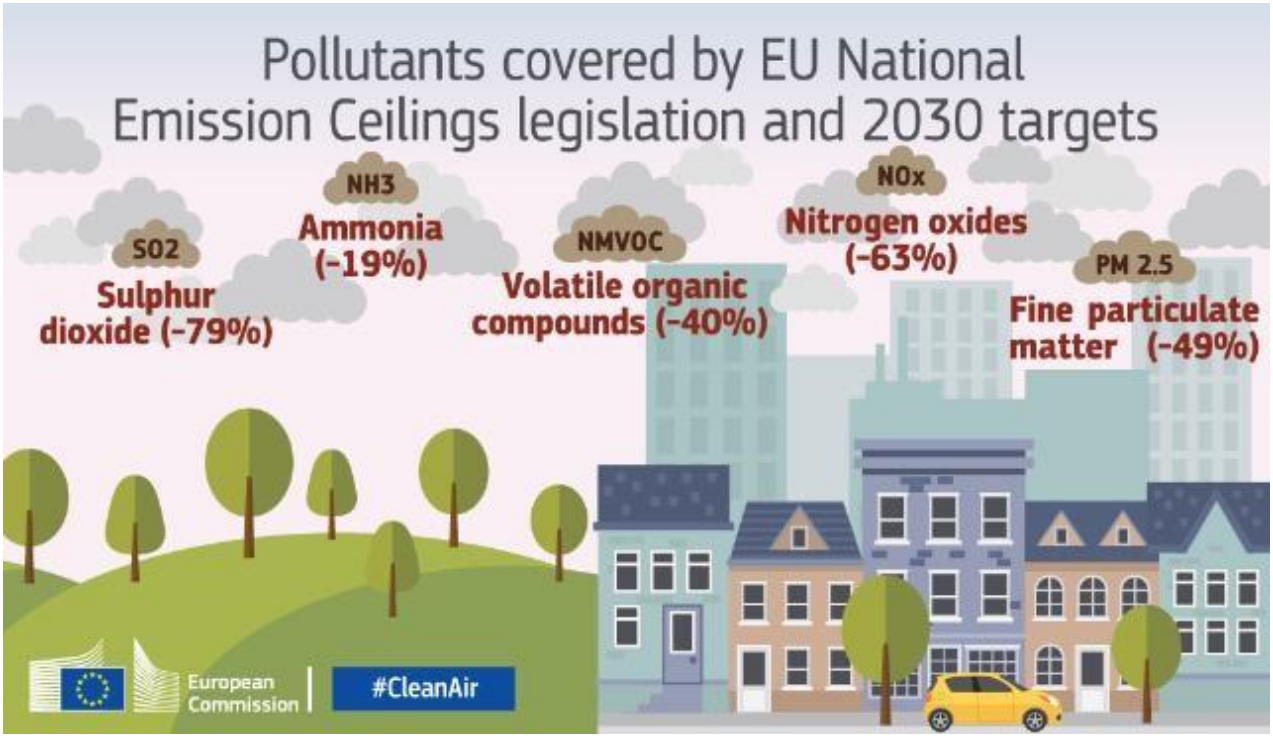
New National Emission Ceilings Directive (2016/2284/EU)

A new National Emissions Ceilings Directive (2016/2284/EU) subsequently entered into force on 31 December 2016 setting national emission reduction commitments (NERCs) for five air pollutants: those covered under the original Directive (SO_2, NOx, NMVOCs and NH_3) and $PM_{2.5}$. NERCs are set for 2020-29 and 2030 onwards with the emission ceilings for 2010 set in the earlier directive remaining applicable for Member States until the end of 2019. They are expressed in percentage reductions between 2005 levels and the given target year. The figure below summarises the emission reduction commitments included within the Directive to be achieved for the whole EU from 2030 onwards. These reductions are intended to reduce the health impacts of air pollution by half compared with 2005 levels.

[4] https://ec.europa.eu/environment/air/clean_air/review.htm

[5] https://ec.europa.eu/environment/air/clean_air/index.htm

Figure 1: Overall EU emission reduction commitments for 2030 onwards



Source: European Commission[6]

As well as the emission reduction commitments, the new Directive includes a number of new features including the following:

- **Flexibility measures:** The new Directive establishes a number of flexibilities (Article 5) that Member States may request are applied for the purposes of assessing compliance with their emission reduction commitments. This includes an 'adjustment' process, in which Member States may 'adjust' downwards their emission inventories if non-compliance with the national ceilings is caused by one of three factors: (i) the breach is caused by emissions from a new source which was not known previously when the NERCs were set (ii) changes in emission factors used for determining emissions for a particular source (iii) changes in methodologies for estimating emissions from a particular source. Member States wishing to use such a flexibility are required to notify the Commission by 15 February each year, and subsequently submit supporting documentation (by 15 March each year) for review and decision by the Commission.
- **Black carbon:** the new Directive is the first piece of EU legislation specifically addressing black carbon emissions. Whilst NERCs are not explicitly set for black carbon, the Directive does require Member States to prioritise measures to reduce emissions when taking action for the $PM_{2.5}$ NERCs.

[6] https://ec.europa.eu/environment/air/reduction/index.htm

Inventories must also be reported covering black carbon emissions although this is only if they are available.

- **National Air Pollution Control Programmes**: the Directive requires Member States to develop and report on National Air Pollutant Control Programmes (NAPCPs) which should set out how they intend to meet their NERCs including the measures to be taken. The NAPCPs are discussed in further detail in the following section.

- **Agriculture**: as well as NERCs for NH_3 (for which agriculture is the primary source), the Directive also includes a requirement for Member States to include in their NAPCPs a series of mandatory measures, and consider certain optional measures, targeted at reducing emissions from agriculture. These measures are set out in in Part 2 of Annex III of the Directive.

Article 11 of the NECD requires the Commission to report to the European Parliament and the Council, by 1 April 2020 and every four years thereafter, on progress with the implementation of the Directive. This should include the following:

> *(a) progress towards: (i) the indicative emission levels and emission reduction commitments… and, where applicable, the reasons for any non-achievement; (ii) ambient air quality levels in line with the air quality guidelines published by the World Health Organisation; (iii) the Union's biodiversity and ecosystem objectives in line with the 7th Environment Action Programme;*
>
> *(b) identification of further measures required at Union and Member State level to achieve the objectives referred to in point (a);*
>
> *(c) the uptake of Union funds to support the measures taken with a view to comply with the objectives of this Directive;*
>
> *(d) the results of the Commission examination of the national air pollution control programmes and their updates…;*
>
> *(e) an evaluation of the health, environmental and socioeconomic impacts of this Directive.*

The first implementation report on implementation was adopted in June 2020 (discussed further below)[7].

Furthermore, Article 13 requires the Commission to undertake a review of the Directive by 2025 and consider if further NERCs should be developed for post-2030, review the latest evidence regards NH_3 and measures for reducing emissions and consider whether to include mercury in future legislation.

National Air Pollution Control Programmes (NAPCP)

As discussed above, whilst the original NECD included a requirement for the development and reporting of NAPCPs, as there were no specific reporting requirements or minimum content defined, the programmes

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1593765728744&uri=CELEX:52020DC0266

submitted by the Member States varied significantly in format and content. As a result, they provided limited value in determining if and how the Member States were going to meet their emission ceilings by 2010.

To avoid repeating such issues, the new Directive includes specific requirements for the development and reporting of the NAPCPs in Article 6 including minimum reporting requirements in Part 1 of Annex III. When developing, adopting and implementing their programmes, Member States must:

- Assess to what extent national emission sources are likely to have an impact on air quality at a national level as well as in neighbouring Member States;
- Take account of the need to reduce air pollutant emissions to reach compliance with the air quality objectives in their territories and, where appropriate, in neighbouring Member States;
- Prioritise emission reduction measures for black carbon when taking measures to meet their NERCs for $PM_{2.5}$;
- Ensure coherence with other relevant plans and programmes established under EU or national legislation;
- Include the mandatory measures, and may include the optional measures, in Part 2 of Annex III aimed at reducing emissions from agriculture.

The first NAPCP also has to cover (as a minimum):

- the national air quality and pollution policy framework in which it has been developed including:
    - (i) the policy priorities and their relationship to priorities set in other relevant policy areas, including climate change and, when appropriate, agriculture, industry and transport;
    - (ii) the responsibilities attributed to national, regional and local authorities;
    - (iii) the progress made by current policies and measures in reducing emissions and improving air quality, and the degree of compliance with national and Union obligations;
    - (iv) projected further changes assuming no change to already adopted policies and measures;
- the policies and measures (PaMs) considered and eventually adopted to ensure compliance with the NERCs for 2020-29 and 2030 onwards (including the method of analysis, impacts on emissions, air quality and the environment, uncertainties and how coherence with other policy areas is maintained).
- for the PaMs selected for adoption, a timetable for their adoption, implementation and review and the competent authorities responsible.

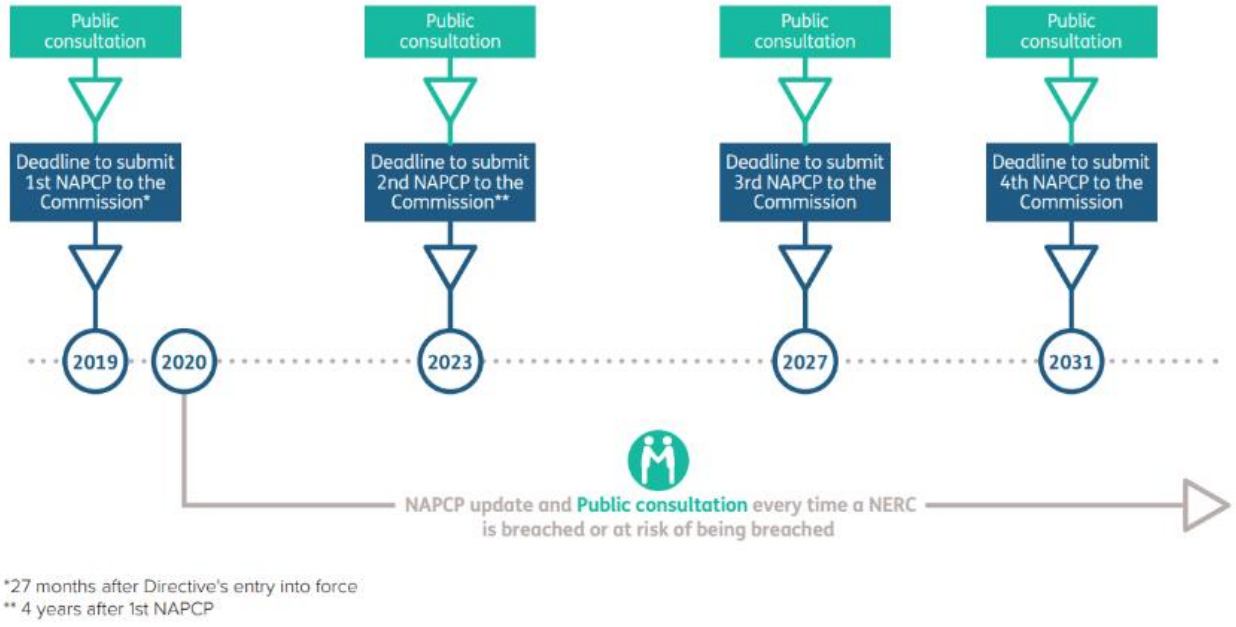
- the identified reduction trajectory between 2020 and 2030 and, where a linearly trajectory could not be followed, an explanation of the reasons why the indicative emission levels for 2025 cannot be met without measures entailing disproportionate costs.

Updated NAPCPs must then provide an assessment of the progress made with implementation of the programme, the reduction of emissions and impacts on air quality. They must also include any significant changes in the policy context, assessments, the programme or the implementation timetable.

To avoid some of the issues encountered under the original Directive, Article 6(10) requires the Commission to specify the format of the programme. As a result, Commission Implementing Decision (EU) 2018/1522[8] was adopted on 11 October 2018 setting out a common format for NAPCPs which the Member States are mandated to follow (discussed further in Section 3). To support their development, the Commission has also issued guidance for the Member States[9].

Member States were required to submit their initial (first) NAPCPs by 1 April 2019. If a Member State reports a risk of non-compliance with one or more NERC (via its NAPCP and/or as part of its reporting of emission projections) then it must resubmit an updated NAPCP within 18 months. The same requirement applies in case of an actual breach of a NERC based on national emission inventory data i.e. from 2020 onwards. These timelines plus the requirements for public consultation are summarised in the figure below.

Figure 2: Timeline for NAPCP adoption (replicated from EEB, 2017)[10]



[8] https://eur-lex.europa.eu/eli/dec_impl/2018/1522/oj

[9] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2019.077.01.0001.01.ENG

[10] EEB (2017): Clearing the Air – A critical guide to the new National Emission Ceilings Directive

Requirements to consult the public when developing and adopting NAPCPs have been explicitly set down in the NECD itself (Article 6(5)) and a requirement to report on such consultations has been included in the common reporting format. In addition, the supporting guidance sets out further details on how best to engage with the public. Public consultation should be undertaken to support the development of the NAPCP at a stage when all options are open rather than just towards the end when a draft NAPCP has already been developed and PaMs to be adopted have already been identified. This is a valuable opportunity for NGOs, sector representatives, research and other relevant stakeholders to feed into and influence the process.

1.1.2 European Commission review report

The Commission's first implementation report which includes an assessment of the NAPCPs was adopted on 26 June 2020[11]. The assessment was underpinned by an analysis of each NAPCP and of the 2019 Member State projections submitted under Article 10(2) of the Directive. Elements of this assessment have been used to inform the development of this report, notably the European outlook in Section 2.

The assessment found shortcomings in a number of areas related to the NAPCPs and projections including expected challenges with compliance for a number of pollutants and Member States (discussed further in Section 2). In particular, the report highlights that "…*Member States have to continue to explore additional and more stringent measures to ensure further and fully effective reductions of their national air pollutant emissions in an efficient manner. Ammonia stands out in this respect*."

1.2 This report

This report provides an **evaluation of the Member States' NAPCPs and progress towards the 2030 emission reduction commitments.** It aims to examine the overall quality of the NAPCPs and the likelihood of Member States achieving compliance in the future. The report builds on the Commission's recent evaluation of the NAPCPs, the NAPCPs themselves as well as a survey of selected EEB member organisations in Bulgaria, Denmark, Germany, Hungary, Italy, Poland, Portugal, Spain and Sweden. It should be noted that at the time of the 2019 reporting deadline and Commission's assessment, the UK was still a member of the EU and was thus included within the evaluation. Linked to this, and because emissions from the UK are still important from a European perspective, then the UK has been included within the European outlook within this report.

The report is structured as follows:

- **Section 2** provides the **outlook at a European level**. This includes a summary of the status of reporting across the EU covering timeliness, completeness as well as projected compliance. This section also includes commentary against a series of themes important for the NAPCPs.

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1593765728744&uri=CELEX:52020DC0266

- **Section 3** considers what a **model NAPCP** should contain based around the common reporting format.
- **Section 4** discusses the **key component of a successful NAPCP, appropriate, well planned and effective PaMs**. It considers how Member States should be prioritising PaMs, those that should be considered by the Member States and some of the key reporting challenges faced in this first round of NAPCPs.
- **Section 5** summarises the **key conclusions and recommendations**.
- **Appendix 1** presents **summary Member State factsheets** based on the responses to the member survey (with gaps filled by the authors in the absence of any information).

2 European outlook

This section considers the current situation across the EU following an assessment of the initial (first) NAPCPs prepared and submitted by the Member States under the revised NECD. It includes an overview of reporting and projected compliance across the EU followed by a discussion of the key themes and challenges emerging from the assessment.

2.1 Overview of status across the EU

2.1.1 Timeliness of reporting

Member States were required to report their NAPCPs to the Commission by 1 April 2019. However, as the figure below shows, only eight Member States submitted within this deadline (Belgium, Denmark, Estonia, Netherlands, Portugal, Finland, Sweden, United Kingdom) with the majority submitting final (Bulgaria, Czechia, Germany, Ireland, Spain, France, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Austria, Poland, Slovenia, Slovakia) or only draft NAPCP (Italy) after this date (some more than one year after the deadline). No programmes are available for two Member States at the date of publication of this report (Greece and Romania), while one Member State has prepared a draft but has not made it available to the public (Luxembourg)[12]. The main reasons cited for delays have been the time need for consultation activities as well as the need for alignment and coherence with the National Energy and Climate Plans (NECPs) that were due to be submitted to the Commission by the end of 2019 under Regulation (EU) 2018/199933 on the governance of the energy union and climate action. Greece and Romania are yet to submit a NAPCP (draft or final) and it is unclear if/when they may submit their programme or the reasons for the delays. The Commission has commenced infringement proceedings for these two Member States.

In its December 2020 report *Analysis of the air pollution policies and measures reported under the National Emissions reduction Commitments Directive (NECD[13])*, the European Environment Agency produced a timeline of Member States' submissions under the NECD (replicated in Figure 4 below). While this is focussed on the reporting of PaMs, it largely holds true for the reporting of NAPCPs.

[12] https://ec.europa.eu/environment/air/reduction/NAPCP.htm

[13] https://www.eionet.europa.eu/etcs/etc-atni/products/etc-atni-reports/etc-atni-report-3-2020-analysis-of-the-air-pollution-policies-and-measures-reported-under-the-national-emissions-reduction-commitments-directive-necd

Figure 3: Timeliness of NAPCP submission

Imagery ©2020 GeoNames, Microsoft, TomTom.

Figure 4: Member State PaMs submission timeline

From EEA, December 2020

2.1.2 Completeness of reporting

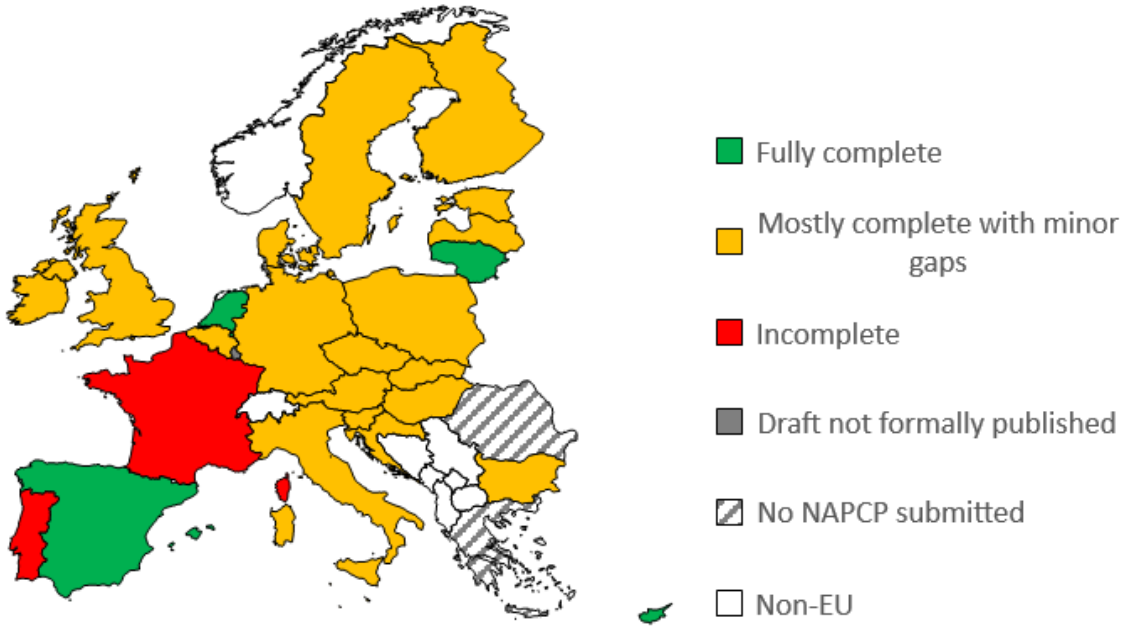
Commission Implementing Decision (EU) 2018/1522[14] sets out a common format for NAPCPs which the Member States are mandated to use. It was developed to ensure consistency and comparability between the NAPCPs across the EU. However, as the table below highlights, two Member States have not used the common format and a further ten have only partially used it. This makes a comparison between Member States harder to undertake and the risk of data gaps is higher.

Table 1: Use of common format in NAPCP submissions

Common format fully used	Common format partially used	Common format not used
Belgium, Bulgaria, Croatia, Cyprus, Finland, France, Hungary, Latvia, Lithuania, Netherlands, Portugal, Sweden, UK.	Austria, Czechia, Denmark, Germany, Ireland, Malta, Poland, Slovakia, Slovenia, Spain.	Estonia, Italy.

The common reporting format differentiates between mandatory and optional reporting requirements. The mandatory reporting requirements are those that are defined and set out in the Directive itself. The optional reporting requirements have been included to improve the level of reporting on, and understanding of, wider linkages and impacts of the NAPCPs e.g. costs and benefits of the Policy and Measures (PaMs) considered for adoption. Overall, the majority of Member States provided almost all of the mandatory reporting requirements with relatively few, minor gaps. Only France and Portugal had major gaps in the reported information.

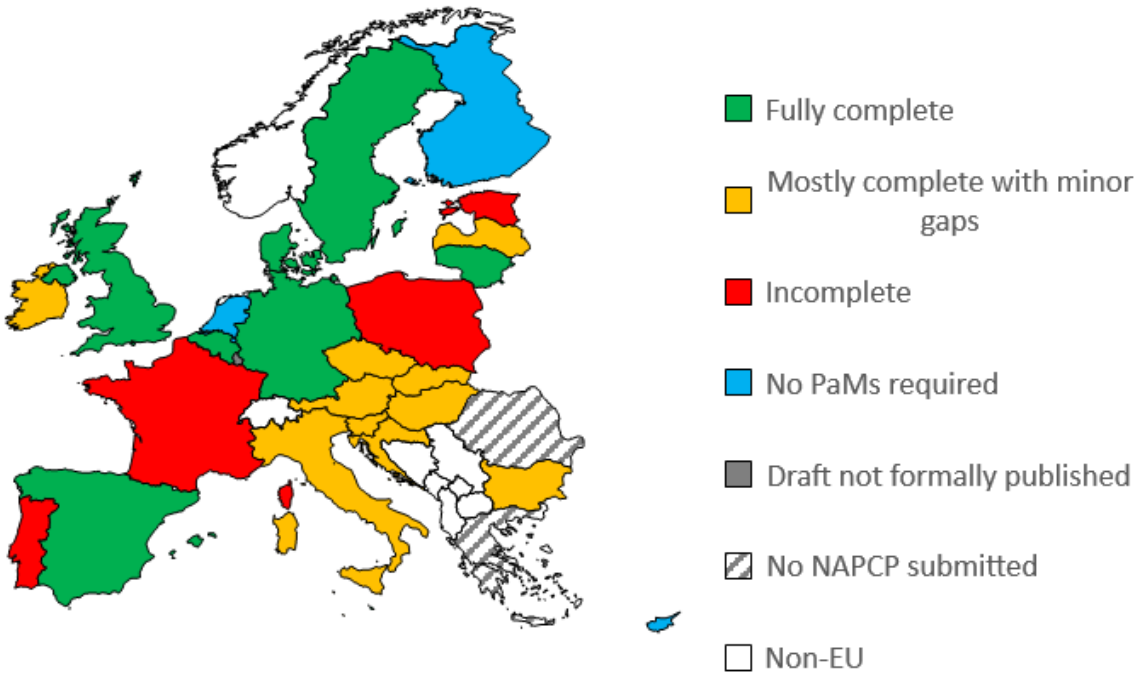
Figure 5: Completeness of mandatory reporting requirements



[14] https://eur-lex.europa.eu/eli/dec_impl/2018/1522/oj

Figure 6 categorises the reporting on PaMs for each Member State as either complete, mostly complete or incomplete. This was determined on the basis of the completion of the mandatory content sections of the common format relating to PaMs, as summarised in the Commission's horizontal review report.

Figure 6: Completeness of Reporting on PaMs



In relation to reporting of the optional content, Table 2 summarises the different elements included within the common reporting format and Table 3 highlights which Member States have reported this content. There is significant variability across the Member States and between the different optional elements.

Bulgaria, Czechia, Spain, Croatia and Slovakia reported more of the optional content than the other Member States. Whereas, Belgium, France, Ireland, Italy, Latvia, Malta, Poland and the UK reported the least.

The most commonly reported optional content were sections 2.3.2 (authorities responsible for different source sectors), 2.4.1 (graphics showing emission reductions due to existing PaMs), 2.4.2 (graphics showing air quality improvements due to existing PaMs) and 2.6.4 (additional details concerning agricultural measures from Annex III Part 2 of the Directive). For almost all other sections, more Member States chose not to report the optional content than those that did. In particular, no Member States reported on section 2.8.5 (projected impacts on the environment of the With Additional Measures (WAM) scenario) and very few reported on sections 2.3.1 (linkages to WHO guideline values), 2.4.3 (methods and data to assess transboundary impacts), 2.5.1 (uncertainties under the With Measures (WM) scenario), 2.5.2 (quantitative data on AQ impacts of the WM scenario), 2.6.3 (costs and benefits of the PaMs considered), 2.7.1 (comments received from the consultation on PaMs) and 2.7.2 (justification for adoption of PaMs).

Table 2: Summary of optional reporting content in the common format

Common format section	Optional Reporting Content	Common format section	Optional Reporting Content
2.2	Executive summary.	**2.6.1**	Reporting of pollutants affected by considered PaMs beyond the scope of the NECD.
2.3.1	Reference to World Health Organisation (WHO) guideline values within the outline of policy priorities.	**2.6.3**	Estimated costs and benefits of considered PaMs.
2.3.2	Identification of source sectors within the remit of different responsible authorities.	**2.6.4**	Additional details concerning the measures from Annex III Part 2 to the Directive targeting the agricultural sector to comply with the emission reduction commitments.
2.4.1	Provision of graphics to illustrate emissions reduction progress made by existing PaMs.	**2.7.1**	Reporting on comments arising from consultation regarding PaMs selected for adoption, and interim targets and indicators.
2.4.2	Provision of graphics to illustrate progress made by existing PaMs in improving air quality, and details on progress made in air quality zones.	**2.7.2**	Justification for adoption of PaMs.
2.4.3	Methodology and data used to assess current transboundary impact of national emissions.	**2.8.4**	Projected improvement in air quality resulting from the WAM scenario.
2.5.1	Associated uncertainties of projected emissions and emission reductions (WM scenario).	**2.8.5**	Projected impacts on the environment of the WAM scenario.
2.5.2	Quantitative data on the projected impact on air quality of the WM scenario.		

Table 3: Completeness of Optional Content

Member State	Optional Content of Common Format Reported?														
	2.2	2.3.1	2.3.2	2.4.1	2.4.2	2.4.3	2.5.1	2.5.2	2.6.1	2.6.3	2.6.4	2.7.1	2.7.2	2.8.4	2.8.5
AT	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes	No
BE	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No
BG	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No
CY	Yes	No	Yes	Yes	Yes	No	No	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A
CZ	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No
DE	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No
DK	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	no
EE	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes	No
EL	No NAPCP submitted														
ES	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
FI	No	No	Yes	No	No	No	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FR	No	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	No
HR	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No
HU	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No
IE	No	No	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
IT	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
LT	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No
LU	Draft NAPCP not formally published														
LV	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
MT	No	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes	No	No	No	No

Member State	Optional Content of Common Format Reported?														
	2.2	2.3.1	2.3.2	2.4.1	2.4.2	2.4.3	2.5.1	2.5.2	2.6.1	2.6.3	2.6.4	2.7.1	2.7.2	2.8.4	2.8.5
NL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PL	Yes	No	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No
PT	Yes	No	Yes	Yes	Yes	No	No	No	N/A	N/A	Yes	N/A	N/A	N/A	N/A
RO	No NAPCP submitted														
SE	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	Yes	Yes	No	No
SI	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	No	Yes	No
SK	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No
UK	*No*	*Yes*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*Yes*	*No*	*No*	*No*	*No*

2.1.3 Projected compliance

Reported compliance

Table 4 lists the margins of compliance (the percentage difference between an emissions reduction commitment and projected emissions, with a negative margin indicating exceedance of the commitment) for each of the five pollutants relative to the 2020-29 and 2030 commitments. This is based on the WAM scenario, where available/relevant. The table shows that for most Member States and pollutants, they are projecting compliance under the WAM scenario (i.e. after the adoption of additional measures) for the 2020-29 commitments. For 2030, however, the number of Member States projecting non-compliance with the commitments for one or more pollutants increases (12 in total).

Table 4 also lists the total number of Member States reporting a margin of compliance greater than 10% (green), a margin smaller than 10% (yellow), and non-compliance (red) with commitments for each pollutant. The numbers presented in this table differ from those reported by the Commission in their implementation report in a small number of cases on account of the following:

- Where no WAM scenario was submitted separately under Article 10(2), numbers are based on the WAM scenario reported by the Member State in its NAPCP. This is the case for Austria, Hungary, Italy, Poland, Sweden, Slovakia and the UK; and
- Where no WAM scenario has been reported in either the Member States' NAPCP or its Article 10(2) submissions, numbers associated with the WM scenario are presented. This is the case for Austria, Cyprus, Finland, the Netherlands, Luxembourg and Portugal.

These data are included in order to enable a more complete appreciation of the likelihood of non-compliance across all Member States and pollutants. It is important to note that margins of compliance derived from Article 10(2) submissions are provided in Table 4 as the difference between projected emissions and the compliance threshold, expressed as a percentage of the compliance threshold. Margins of compliance obtained from the Member States' NAPCPs represent the difference between an emission reduction commitment and the projected emission reductions, expressed in percentage points. While the calculations are mathematically different, they lead to the same conclusions concerning commitment compliance or non-compliance.

The total numbers presented at the bottom of Table 4 indicate that for all pollutants, a greater number of Member States projected non-compliance or a slim margin of compliance (<10%) for 2030 than for 2020-29. The number of Member States reporting compliance by a clearer margin (>10%) is smaller for all pollutants in 2030 compared to 2020-29. Furthermore, for most of those Member States projecting compliance with the commitments, the margin of compliance is less than 10% so any future changes in the projections and/or PaMs to be adopted could lead to non-compliance.

Table 4: Projected margins of compliance (%) relative to NERCs based on emissions projections submitted under Article 10(2) (unless otherwise stated)

Member State	Margin of compliance (%) 2020-2029					Margin of compliance (%) 2030				
	SO_2	NOx	NMVOC	NH_3	$PM_{2.5}$	SO_2	NOx	NMVOC	NH_3	$PM_{2.5}$
AT [a]	*28*	*20*	*10*	*-12*	*16*	*11*	*1*	*1*	*-9*	*3*
BE	52	17	25	4	22	32	23	10	7	20
BG	54	13	3	10	10	11	3	1	4	57
CY [b]	45	1	5	28	24	50	18	5	22	0
CZ	29	15	16	8	23	24	3	0	6	29
DE	29	7	18	-3 [c]	11	19	1	4	2	2
DK	39	8	11	-8	-7	2	11	14	-7	-29
EE	57	7	22	-7	47	56	18	9	-3	35
EL	58	26	8	8	16	33	7	0	1	2
ES	49	9	5	2	7	32	10	-15 [d]	6	1
FI [b]	39	16	17	1	9	47	27	3	6	16
FR	53	6	12	0	22	31 [e]	16	8 [e]	3	0
HR	72	25	28	31	45	35	10	25	25	28
HU [f]	*7*	*0*	*-15*	*8*	*-28*	*0*	*-13*	*-25*	*-17*	*-12*
IE	46	15	-18	-9	28	30	-4	-34	-19	17
IT [f]	*35*	*7*	*6*	*3*	*13*	*9*	*5*	*4*	*1*	*2*
LT [h]	28	-47	5	7	14	18	-60	-25	-2	-14
LU [i]	*36*	*42*	*18*	*-24*	*18*	*19*	*-46*	*-6*	*-41*	*-16*
LV	37	-11	8	-6	23	8	3	7	2	22
MT	96	3	-6	15	42	78	-128	7	-6	19
NL [b]	38	17	19	11	28	1	7	10	10	14
PL [f]	*0*	*0*	*0*	*13*	*10*	*1*	*7*	*3*	*1*	*1*
PT [i]	54	16	8	8	21	10	10	-6	2	-25
RO	42	-3	-1	51	-32	-8	-17	-26	46	-100
SE [f]	*27*	*9*	*12*	*0*	*19*	*28*	*0*	*5*	*1*	*25*
SI [f]	*25*	*2*	*20*	*8*	*7*	*0*	*2*	*-4*	*1*	*-3*
SK	40	21	32	24	25	-8	11	30	7	26
UK [f]	25	3	4	-5	0	5	-1	-3	-12	-2

Member State	Margin of compliance (%) 2020-2029					Margin of compliance (%) 2030				
	SO_2	NOx	NMVOC	NH_3	$PM_{2.5}$	SO_2	NOx	NMVOC	NH_3	$PM_{2.5}$
Total Green	26	12	13	7	19	17	7	3	3	12
Total Yellow	2	13	11	13	6	9	14	16	16	8
Total Red	0	3	4	8	3	2	7	9	9	8

[a] Austria has only provided WAM emissions projections in its NAPCP for NOx, NH_3 and $PM_{2.5}$ for 2030. Margins of compliance for all other pollutants are based on the WM scenario..

[b] Cyprus, Finland and the Netherlands predict to achieve the commitments under the WM scenario and have not submitted a WAM scenario. The margins of compliance presented are for the WM scenario.

[c] The German NAPCP indicates that the NH_3 commitment for 2020-29 will be met which contrasts with the emissions projections submitted under Article 10(2), which indicate non-compliance.

[d] The Spanish NAPCP indicates that the NMVOC commitment for 2030 will be met which contrasts with the emissions projections submitted under Article 10(2), which indicate non-compliance.

[e] The French NAPCP indicates that the SO_2 and NMVOC commitments for 2030 will not be met which contrasts with the emissions projections submitted under Article 10(2), which indicate compliance.

[f] Hungary, Italy, Poland, Sweden, Slovenia and the UK did not submit emissions projections for a WAM scenario under Article 10(2). Margins of compliance presented are based on emissions reported in the respective NAPCPs.

[g] The Irish NAPCP indicates that the NMVOC commitment for 2020-29 will be met which contrasts with the emissions projections submitted under Article 10(2), which indicate non-compliance.

[h] The Lithuanian NAPCP indicates that only the NH_3 commitment will be met for 2020-29, and only the NH_3 and $PM_{2.5}$ commitments will be met for 2030. This contrasts with projections submitted under Article 10(2), indicating that only the NOx commitment will not be met for 2020-29, and only the SO_2 commitment will be met for 2030.

[l] Luxembourg did not submit a WAM scenario in their Article 10(2) submission, nor was an NAPCP submitted. The margins of compliance presented are for the WM scenario as reported in the Article 10(2) submission.

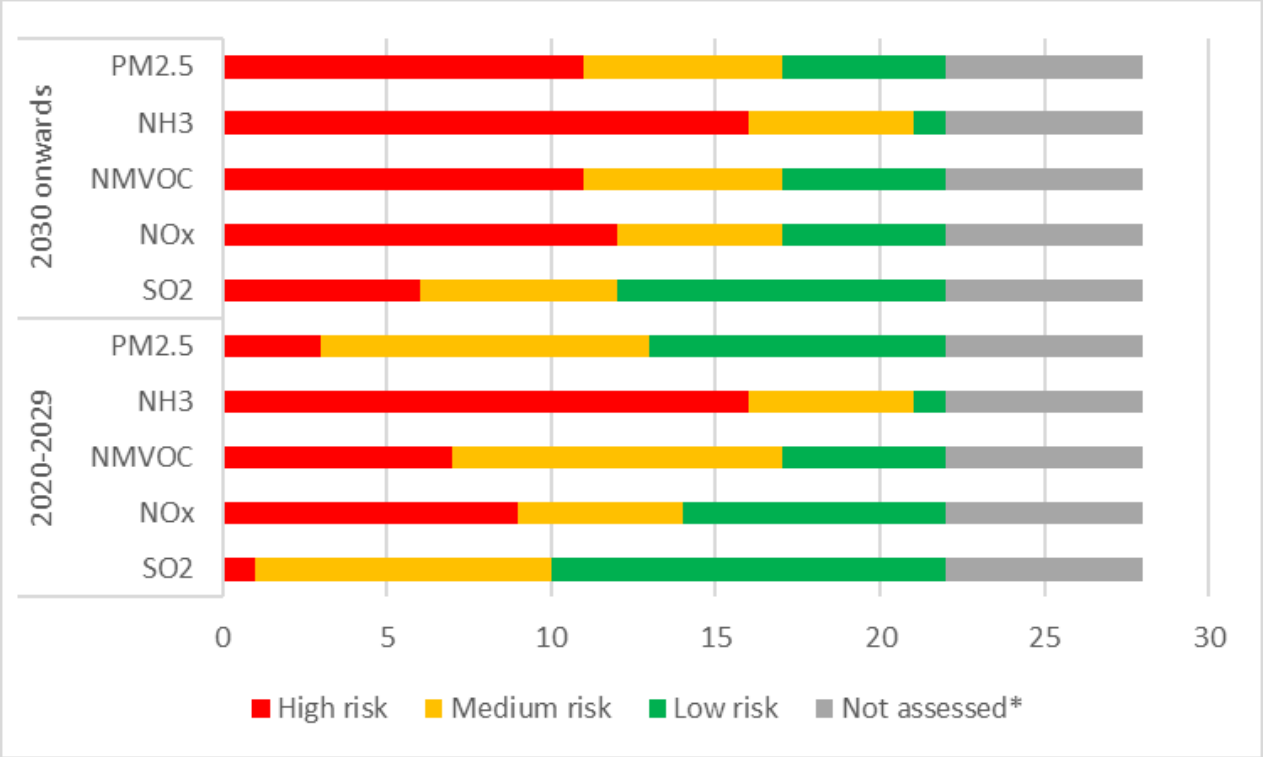
[i] Portugal did not submit a WAM scenario in their Article 10(2) or their NAPCP. The margins of compliance presented are for the WM scenario as reported in the Article 10(2) submission.

Risk of non-compliance by pollutant

The table above is based on the emission projections reported by the Member States to the Commission under the Directive (as part of their Article 10(2) submissions and/or within their NAPCP). The Commission's review of the NAPCPs and emission projections looked at the overall credibility of the underlying projections data and methodologies, the margin of compliance or non-compliance as well as the credibility of the PaMs being proposed for adoption. A risk assessment was undertaken following a methodology described in the

contractors' horizontal review report[15]. This sought to classify the risk of non-compliance for each Member State and reduction commitment (pollutants and years) going beyond just the emission projections reported by the Member States. This is summarised in Figure 7.

Figure 7: Risk of non-compliance



* Not assessed by the contractors due to a lack of reporting or data limitations.

The number of Member States judged to be at a high risk of non-compliance increases for all pollutants except for NH_3 as we look towards the 2030 emission reductions commitments. This increase is particularly significant for PM2.5 where three Member States are judged to be at a high risk of non-compliance with the 2020 commitments increasing to 11 for 2030. The numbers of Member States at a risk of non-compliance with the NOx and NMVOC commitments in 2030 is similar to those for PM2.5 (11 or 12 Member States). For NH_3, the number of Member States judged to be at a high risk of non-compliance is very high (16 Member States in total) for both the 2020 and 2030 emission reduction commitments.

The method employed in the review takes into account the credibility of the additional PaMs reported by the Member States in their NAPCPs. However, in the majority of cases the medium or high risk rating is allocated based on issues with the underlying emission projections.

[15] https://ec.europa.eu/environment/air/pdf/reduction_napcp/Horizontal%20review_final%2010Jun20.pdf

Overall risk of non-compliance

The overall risk of non-compliance with the 2020-29 and 2030 emission reduction commitments under the WAM scenario for each Member State is displayed in Figure 8 and Figure 9, respectively, aggregated for all pollutants. As discussed above, each Member State was defined as being at low, medium or high risk of non-compliance with the 2020-29 and 2030 commitments for each of the five pollutants as reported in the contractor's review report for that Member State's NAPCP (and summarised in the Commission's implementation report). This risk was then revised as necessary on the basis of the findings of the member survey response where available.

Each 'risk rating' was then translated to a 'risk score' per pollutant for 2020-29 and 2030 (a score of 1 for a low risk, 4 for medium risk and 9 for high risk). An overall score for the risk of non-compliance with 2020-29 and 2030 commitments was determined by calculating the mean of the individual scores for each of the five pollutants. Each Member State was then classed as at an overall high risk of non-compliance where this mean score was greater than 5.5, at medium risk where the score exceeded 2, and at low risk if it scored up to 2.

Greece and Romania did not submit NAPCPs and were therefore judged to be at high risk of non-compliance with their emissions reduction commitments. In addition, Luxembourg has not formally published its (draft) NAPCP and has therefore also been judged to be high risk.

Figure 8 and Figure 9 indicate that the majority of Member States are at high risk of non-compliance with both the 2020-29 and 2030 emission reduction commitments. Only two Member States are judged to be at low risk of non-compliance (Belgium and Slovakia), and only Belgium is at low risk of non-compliance with both the 2020-29 and 2030 commitments. More Member States are at high risk of non-compliance with their 2030 commitments than their 2020-29 commitments, in part due to the uncertainty surrounding the longer-term implementation and efficacy of PaMs selected for adoption, the level of reductions required as well as underlying uncertainties in longer-term emissions reduction projections. This highlights the scale of efforts that will be required by the Member States and Commission over the coming years if the 2030 commitments are to be achieved and the anticipated benefits for the EU realised.

Figure 8: Overall risk of non-compliance 2020-2029 (WAM Scenario)

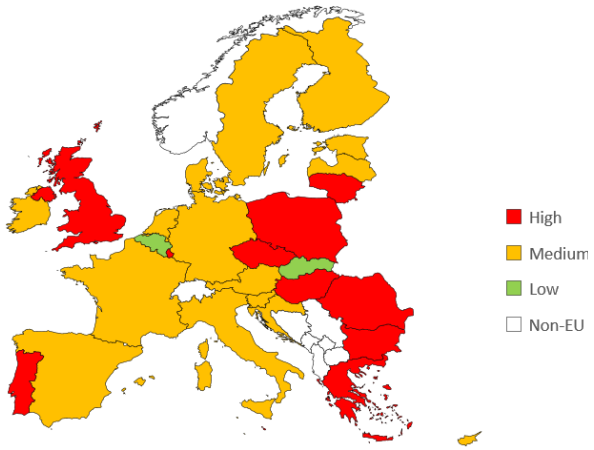
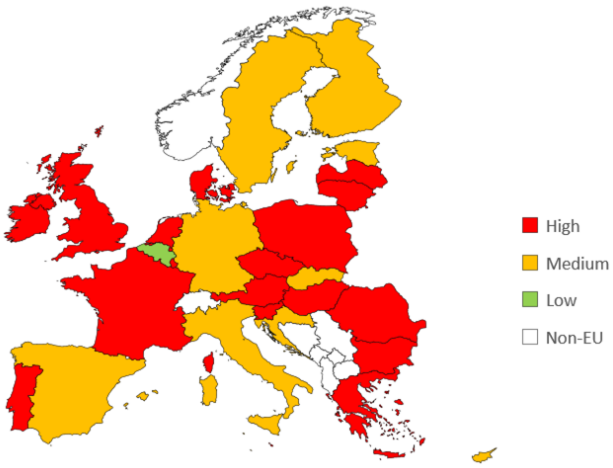


Figure 9: Overall risk of non-compliance 2030 (WAM Scenario)



Imagery ©2020 GeoNames, Microsoft, TomTom.

2.2 Key themes

2.2.1 Coherence with other policy areas

A core element of the revised NECD and enhanced requirements for the development of NAPCPs was to improve and ensure coherence of the programmes with other policy areas, notably air quality as well as climate and energy policy. The commitments set out in the NECD are intended to contribute towards achieving the air quality objectives in the Ambient Air Quality Directive (2008/50/EC) as well as improving air quality to levels aligned with the WHO air quality guidelines.

Member States were explicitly required to report on the policy priorities for their NAPCP and their relationship to priorities set in other relevant policy areas, including climate change and, when appropriate, agriculture, industry and transport. Emission projections for NECD pollutants should be consistent with greenhouse gas projections reported under Regulation (EU) No 525/2013. Member States also had to report on the progress made by current policies and measures in reducing emissions and improving air quality, and the degree of compliance with air quality objectives. Finally, for PaMs considered and eventually adopted they should report on how coherence with other policy areas is maintained. Optional reporting content within the common reporting format includes the quantitative impacts of existing and additional PaMs on air quality although as discussed earlier very few Member States provided this level of detail.

In general, most Member States have clearly reported their current air quality policy priorities and challenges within their NAPCPs and described progress achieved by current PaMs overall in improving air quality. However, very limited information has been reported on the PaMs themselves making it difficult to understand which ones have had the greatest impacts to date. For additional PaMs there has been limited evidence reported of how air quality has been taken into account for their selection and impacts on air quality of

individual PaMs were typically not reported (as optional content). Seven Member States did quantitatively assess the impacts on air quality of the PaMs selected for adoption and included within the WAM scenario.

In relation to coherence of the NAPCPs with energy and climate change priorities, a key issue related to the legal timelines for preparation and submission of the NAPCPs (by 1 April 2019) and the national energy and climate plans (NECPs) (draft plans by 31 December 2018 and final plans by 31 December 2019). This meant that most Member States (at least those that submitted their NAPCPs on time or close after the deadline), could only ensure coherence of the NAPCPs with the draft NECPs. This has been provided as a justification for delays in submission. It has also created some challenges for Member States in identifying PaMs for adoption and for developing emission projections that take into account the impacts of the NECPs. Aside from this, most NAPCPs have captured the key energy and climate change priorities and these seem to have been taken into account for the identification and selection of PaMs for adoption e.g. including PaMs from the NECP in the list of PaMs considered for adoption in the NAPCP It is noteworthy that the European Commission Communication 'An EU-wide assessment of National Energy and Climate Plans[16]' offers an interesting analysis: it highlights that "there continues to be insufficient reporting of the projected impacts of the planned policies and measures on the emissions of air pollutants by Member States in their final [National Energy and Climate] plans", also flagging that "the final [National Energy and Climate] plans provide insufficient analysis of potential trade-offs between air and climate/energy objectives (mostly related to increasing amounts of bioenergy)".

Spain's submission is a good example of alignment of the NAPCP with broader climate and energy policy ambitions. The NAPCP refers to the draft NECP, the decarbonisation strategy, national transport plan and other industrial strategies. The programme seeks to capitalise on potential co-benefits between air quality and climate policy by identifying cross-cutting PaMs that can deliver progress in both areas, and the synergies between additional PaMs and other policy areas are discussed.

Belgium's NAPCP successfully incorporates climate change policy from a technical perspective. Belgium's reported air quality projections are made with the same modelling framework as used for greenhouse gas projections, thereby ensuring consistency in underlying assumptions regarding economic activity, fuel consumption, etc. Furthermore, the projections in the NAPCP take account of the effect of climate change and energy policy on NECD pollutant emissions.

2.2.2 Public consultation

With some exceptions, including Portugal, most NAPCPs indicate that a public consultation was included in the programme drafting process. Where public consultation took place, NAPCPs generally do not provide a link to consultation documents and outcomes. Notable exceptions to this are Poland, which provides links to documentation for five separate consultations, and Sweden, which includes a consultation report in an annex to the NAPCP. While a few Member States, including Hungary and Spain, acknowledge issues raised in their

[16] COM(2020) 564 final, 17.09.2020;

consultations, there is generally no indication provided as to how consultation outcomes have informed the drafting of the NAPCP. Responses to the survey of selected EEB member organisations indicates that consultations were generally held for advanced or completed drafts of the NAPCP, and that little changed in the programmes following the consultation process.

In some cases, including in Denmark and Sweden, consultation was completed too late for outcomes to inform any large additional analysis or changes to the programme. Sweden recognises that its NAPCP does not address issues identified in the consultation, but states that future revisions of the programme will take account of consultation feedback.

Member States provide varying levels of detail as to who took part in consultation processes. A number of member survey responses indicate that NGOs were able to provide feedback when the consultations took place. Other respondents to public consultations included industry representatives (including the transport and agricultural sector). There is no evidence of a transboundary public consultation undertaken by any Member State.

2.2.3 Emission projections

The emission projections developed and reported by the Member States to the Commission underpin the entire NAPCP process and judgement of expected compliance with future reduction commitments. If the emission projections are not robust then the evaluation of the NAPCPs is immaterial to some extent. A key component of the Commission's implementation review has been an in-depth review of the Member States' emission projections. This has involved a review of the reported emissions data and supporting information against the TCCCA quality criteria set in Annex IV, Part 2 of the Directive (Transparency, Consistency, Comparability, Completeness and Accuracy).

The review of projections identified the following shortcomings in the Member States' projections:

	• **Transparency:** This was the main issue identified with the majority of Member States providing insufficient information on the methodologies, input datasets and assumptions used for the development of their emission projections. The following Member States were marked down on transparency: Belgium, Estonia, Ireland, Greece, Spain, Croatia, Italy, Cyprus, Lithuania, Luxembourg, Hungary, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, and Sweden.
	• **Consistency**: This part of the review identified a significant number of Member States where major improvements in consistency were required. Issues related to misallocations in the projections between sources, sources not included in the projections but were in the historical inventory and inconsistencies between the reference year and historical inventory.
	• **Comparability**: This was generally not an issue identified for most Member States as part of the review. Some country specific challenges were identified related to certain sectors and/or the fact that relatively simple methodologies were being applied.

	• **Completeness**: As for comparability, the projections were generally considered complete for most Member States. Some omissions were identified in a few cases but these were typically for smaller sources.
	• **Accuracy**: For a number of Member States, accuracy was identified as an issue. The main reasons for this typically related to the use of very simple methodologies for the compilation of the projections and poor quality input data. Completeness and consistency issues also influenced the findings. The following Member States were flagged as having accuracy issues: Bulgaria, Greece, Croatia, Italy, Latvia, Luxembourg, Hungary, Poland, Portugal and Romania. Accuracy tended to vary between the Member States rather than by pollutant reflecting the fact that Member States with a good projections system in place tended to have more accurate projections across all pollutants and vice-versa. Some pollutant variation was observed with the accuracy of SO_2 emission projections tending to be high across the EU whereas NH_3 emission projections were typically the lowest relative to the other pollutants.

As transparency is such a critical element for understanding the overall quality of the projections (and enabling assessment against the other criteria), it is critical that the Member States invest and focus on making significant improvements to future reporting in this space e.g. as part of their Informative Inventory Reports (IIRs) – to be submitted annually to the European Commission – and/or other projections related reports. A lack of transparency can disguise other issues within the projections e.g. accuracy.

A common issue identified as part of the review was inconsistencies between the latest emission projections reported to the Commission under Article 10(2) of the Directive and those used within the NAPCP for considering and assessing PaMs for compliance with the NERCs. This typically meant that the NAPCPs were based on older versions of the emission projections so wouldn't have captured the latest updates to the projections and underlying data (e.g. inclusion of new policies, changes in activity data for different sectors). Whilst this is to be expected due to the timing of both submissions, this does raise some challenges with respect to the robustness of the assumptions and data reported in the NAPCPs.

Furthermore, the review identified a number of Member States whose emission projections for 2025 show a non-linear reduction between the emission reduction commitments for 2020 and 2030. In these instances, the Directive requires the Member States to report detailed information on the measures they will adopt to bring them back onto the linear reduction trajectory; in most cases this was not reported raising question marks over the ability of those Member States to meet their 2030 onwards emission reduction commitments. In fact, the review identified that where the linear reduction trajectory is not achieved in 2025, the Member State is projecting non-compliance with either or both of the corresponding 2020-29 and 2030 onwards emission reduction commitments. This was not discussed in the Commission's implementation report (although is captured in the supporting contractor report) despite the significance of the findings.

The Commission is providing ongoing reviews and capacity building support to the Member States with respect to emission inventories and projections although in many instances the challenges can be more institutional in nature thus making it difficult to provide impactful, external support. For example, there may

be challenges within a Member State with respect to collation and access to data for certain sectors and/or different departments have responsibilities for climate and air quality (and development of projections and policy measures) creating coherence challenges.

2.2.4 Policies and Measures (PaMs)

Under the NECD and subsequent implementing decision (2018/1522), Member States are required to report on the additional policies and measures (PaMs) considered for adoption as part of the NAPCP and those selected for adoption in the final NAPCP. This is alongside reporting on trends in emissions and progress made towards meeting commitments under the previous NECD. Note that "additional" should not include existing PaMs, including EU legislation which has been passed at community level but not yet implemented by the Member State. Note also that the terms "adopted" and "selected for adoption" have been interpreted in different ways in different Member States: for some, adopted simply means that the measure has been proposed in a policy paper, whereas for others, a PaM is only adopted once internal legislation has been passed.

Section 2.6 of the implementing decision requires that Member States report PaMs being considered for adoption using an online portal developed by the European Environment Agency. EEA has produced a data viewer for reported PaMs which can be found here: https://www.eea.europa.eu/data-and-maps/dashboards/overview-of-compliant-air-pollution-policies. Some of the issues around reporting of PaMs are explored below, in section 4.4.

Existing PaMs

In general, Member States have not reported in detail on existing PaMs and certainly not comprehensively, for example by including information on PaMs which did not deliver the emission results anticipated. There is an established methodology for reporting on national emissions, developed under the previous NECD and UNECE Convention on the Long-Range Transboundary Air Pollution (CLRTAP). As a result, the evolving trends in emission are well documented although, in general, Member States did not identify the extent to which those trends were as a direct result of policies implemented under the previous NECD or as a result of other polices, process or socio-economic trends. The impacts of individual PaMs were generally not reported, although neither did the common format require this information.

Additional PaMs

The horizonal review report on the first round of NAPCP reporting, prepared for the European Commission, stated that 20 Member States reported additional PaMs through the EEA's reporting tool, with a further two reporting outside the tool (despite the requirements of the implementing decision). Two Member States, Finland and The Netherlands, projected that they would achieve their emission reduction commitments using existing PaMs and so did not report the consideration of additional PaMs. However, the EEA's data viewer for the process lists PaMs for just 15 Member States, with only 11 appearing in the downloadable version of the PaMs database.

The European Commission's own report to the European Parliament on the implementation of the NECD[17] identifies a number of issues with the reporting of additional PaMs, concluding that:

> "*Overall, there is insufficient information provided in the NAPCPs about the PaMs to confidently confirm their credibility; information is in particular lacking as regards the projected uptake of the PaMs, their implementation timescale and the level of emissions reductions foreseen*."

The reporting of additional PaMs is considered further in Section 4.

[17] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1593765728744&uri=CELEX:52020DC0266

3 Model NAPCP – what does good look like?

As introduced in Section 1.1.1, Commission Implementing Decision (EU) 2018/1522[18] sets out a common format for NAPCPs which the Member States are mandated to follow (although as discussed in the previous section, a number of Member States either did not follow the format or only followed it partially). Alongside the common reporting format, the Commission also issued guidance for the Member States to guide them on how to develop and report on the NAPCPs[19]. It is unclear at this stage the Member States' experience of using the common reporting format as well as the usefulness of the supporting guidance. This should be explored following this first round of reporting ahead of future submissions. Anecdotally, some Member States indicated that the format and guidance was made available too late in the process for them to be able to make best use of it.

What is clear from the Commission's review of implementation and the detailed review of the NAPCPs is that there is no single Member State who has developed a "model" NAPCP i.e. a programme that meets all of the requirements of a good NAPCP. This includes the information that has been reported but, more importantly, the way in which it has been developed. Table 5 on the following page, structured according to the key sections of the common reporting format, sets out the common challenges that Member States faced, what good really looks like and signposting to some good practice examples from the Member States' NAPCPs.

[18] https://eur-lex.europa.eu/eli/dec_impl/2018/1522/oj

[19] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2019.077.01.0001.01.ENG

Table 5: Summary of common issues and challenges, what good looks like and Member State good practice examples, broken down according to the common reporting format

Common issues and challenges	What does good look like?	Member State good practice examples
Executive summary (ES) [section 2.2 of common reporting format]		
Only 11 MSs submitted an ES. Many ES sections did not follow structure and contents of the common format. Some sections presented information that was not consistent with the main body of the NAPCP.	A concise summary of the sections of the NAPCP, written using language that is accessible to the general public and consistent with the information in the main body of the programme.	**BG:** The NAPCP for Bulgaria includes an ES which provides an accurate summary of the programme, and is consistent with the structure and content requirements of the common format.
National air quality and pollution policy framework [section 2.3]		
Some MSs propose a decentralised NAPCP policy framework which can lead to greater engagement of local authorities, but without a clear structure in place it could lead to poor coordination of action across local bodies and overlap of responsibilities. Some NAPCPs do not differentiate between authority roles sufficiently, leaving room for overlap of responsibilities.	The section should outline the policy priorities, setting the context for the NAPCP. Links should be made to existing policy, including climate change policy where co-benefits can be achieved in the delivery of the NAPCP. NAPCP priorities and objectives should be coherent and aligned with existing policy. Responsibilities are assigned to authorities, ensuring credible delivery of the programme. Many MSs have identified national government in an oversight and coordinating role which can ensure cohesion among other authorities.	**HU:** Hungary outlines a NAPCP framework which could facilitate cohesion and collaboration between responsible authorities. Different bodies have clearly differentiated responsibilities, with the Ministry of Agriculture assuming a coordination and oversight role. The programme benefits from cross-sectoral coordination by the national government. **ES:** Spain's NAPCP identifies synergies between air quality and climate and energy policy. **CZ:** Czechia explicitly links its programme to delivery of Ambient Air Quality Directives objectives and national air quality policy.
Progress made by current PaMs [section 2.4]		
The degree of detail on current PaMs and their impacts on air quality to date is varied. Many NAPCPs do not relate emissions reductions to specific PaMs. Few NAPCPs provided quantitative analysis of current transboundary impacts. Some MSs did not	While it is not always possible to quantify the impact of existing PaMs on emissions reductions and air quality, an indication of the key drivers of historic emissions reductions should be provided, with links made to the suite of existing PaMs.	**AT:** Austria's NAPCP identifies current PaMs by sector and provides graphics illustrating emissions reductions by pollutant for each sector. This detailed split connects existing measures to emissions reductions achieved to date.

Common issues and challenges	What does good look like?	Member State good practice examples
report transboundary impacts at all, while others provided a qualitative description.	Evidence of detailed consideration of transboundary impacts informed by a transboundary consultation, where relevant.	**CZ:** Czechia's NAPCP quantitatively describes transboundary emissions impacts. The modelling undertaken is described and evidence is provided of consultation and technical cooperation with Poland.
Projected further evolution assuming no change to already adopted policies and measures [section 2.5]		
Not all MSs submitted projections for 2020, 2025 and 2030, or used a simple interpolation approach. Some presented projections are not sufficiently recent to capture all relevant existing PaMs. Underlying uncertainties and assumptions in projections have not been widely reported. Most MSs only provided qualitative descriptions of air quality improvements under the WM scenario. NAPCPs which included 'optional' quantitative descriptions of projected improvements in air quality generally did not follow the common format.	Up-to-date projections are required which account for all existing PaMs presented and discussed in the NAPCP and take into account policies in other areas e.g. climate. The projections methodology should be clearly described, and any uncertainties and assumptions disclosed. Where applicable, sensitivity testing of uncertain projection parameters should be conducted and results provided. Quantitative projections of impacts on air quality should be described. In line with the common format, the projected numbers of compliant and non-compliant air quality zones should be provided.	**DK:** Denmark presents emissions projections for 2020, 2025 and 2030 based on projections developed in 2018. This is sufficiently up-to-date to incorporate all existing PaMs. Uncertainties associated with emissions from certain sectors have been qualitatively outlined. Sensitivity testing has been conducted for ammonia emissions based on alternative assumptions on future livestock production. The NAPCP provides projections of future air quality for 2020 and 2030 under the WM scenario.
Policy options considered in order to comply with the emission reduction commitments for 2020, and 2030, intermediate emission levels for 2025 [section 2.6]		
Descriptions of PaMs generally lacked detail on what they entail, what sectors they affect and who must comply with them. Where emissions reductions have been quantified, this is generally done for packages rather than for individual PaMs. The credibility of emissions reductions from individual PaMs therefore can't be	Member States should consider PaMs that target all pollutants, not just those with projected gaps in meeting commitments e.g. PaMs should be considered that would also target pollutants contributing to air quality issues. This way, MSs can go beyond just their commitments and deliver even greater emissions reductions and improvements in air quality.	**ES:** Spain's NAPCP sets out its suite of considered PaMs in clear detail and relates them to relevant sectors. **SE:** Sweden's NAPCP refers to evaluations undertaken to consider additional PaMs, including a socio-economic cost efficiency appraisal. It is accompanied by a Strategic Environmental Assessment (SEA) which sets out air quality impacts

Common issues and challenges	What does good look like?	Member State good practice examples
assessed. Few NAPCPs considered the environmental impacts of PaMs. Little detail has been provided on the approach for selecting PaMs. Costs and benefits are not widely reported. Uncertainty in emissions reductions and cost/benefit estimations has not been accounted for. Some MSs conflated existing and additional PaMs, and assessed existing PaMs as 'additional'.	A clear distinction is required between existing PaMs which have already been adopted, and additional PaMs for consideration. Emissions reductions and wider impacts at the individual PaMs level is preferrable as it allows the credibility of stated emissions reductions (and likely costs and benefits) to be evaluated. Reductions can be presented as a range of values to address the underlying uncertainties. A detailed cost-benefit analysis can inform the selection and adoption of PaMs. Outcomes from public and other consultations should be accounted for in identification of PaMs for consideration through to selection for adoption. The NAPCP should document the feedback received and how it has been taken into account for selection of PaMs.	of additional PaMs and qualitatively describes environmental impacts (e.g. eutrophication). **SK:** PaMs are based on their potential for reducing emissions of specific pollutants and associated costs through use of marginal abatement cost curves. **DK:** The environmental impact of PaMs is considered in the form of nitrogen deposition implications.
The policies selected for adoption by sector, including a timetable for their adoption, implementation and review and the competent authorities responsible [section 2.7]		
Information on consultations conducted in support of PaMs adoption is generally not provided. Where consultations are mentioned, it is generally unclear how PaMs adoption reflects the outcomes. Interim targets and indicators for PaMs implementation are generally not discussed.	Information on the sources of funding for adopted PaMs allows their implementation to be assessed for credibility. Details on the outcomes of consultations and the approach for selecting PaMs justifies the choice of measures. An outline of the targets and indicators for assessing PaMs implementation ensures that a credible, longer-	**SE:** Sweden justifies the selection of adopted PaMs on the basis of the findings of an accompanying report considering the timescales needed to address compliance gaps, and costs and benefits. The NAPCP presents key issues identified during consultation, including objections from industry bodies and requests for more ambitious PaMs from stakeholder groups. The programme states that

Common issues and challenges	What does good look like?	Member State good practice examples
There is generally little justification for adopted PaMs, and there is limited rational provided for the exclusion of certain considered PaMs from the adopted suite.	term monitoring and tracking system is in place to confirm that the NAPCP is on course to achieve emissions reduction compliance.	refinements based on these outcomes will be incorporated into future revisions. **CZ:** Indicators for PaMs implementation are described, mainly focused on tracking emissions from different sectors against the WM scenario.
Projected combined impacts of PaMs (WAM) on emission reductions, air quality and the environment and the associated uncertainties [section 2.8]		
Where non-linear emissions reduction trajectories have been adopted between 2020 and 2030, justification is generally not provided. Few programmes presented the impacts of the WAM scenario on air quality and the environment. Where this information was reported, it did not follow the common format indicators.	Quantitative projections of impacts on air quality should be described. In line with the common format, the projected numbers of compliant and non-compliant air quality zones should be provided. The impact of transboundary impacts on future emissions, and efforts to achieve commitments, should be considered.	**DE:** Modelled air quality projections and maps provided, although air quality data not available at the zone level. Changes in wet and dry deposition are estimated for some pollutants. **UK & HU:** Both presented their WAM scenarios with a range of emissions reductions, accounting for the uncertainty and underlying assumptions in projecting impacts of PaMs. **CZ & PL:** Modelling of air quality impacts considered emissions from other countries and the impacts these are likely to have on air quality within their territory.

4 Key policies and measures

4.1 Overview

Policies and measures (PaMs) form the core of the NAPCP, setting out what the Member State will do in order to achieve its emission reduction commitments. The term is consistent with EU legislation on climate change although the reporting requirements of the NECD and Monitoring Mechanism Regulation (MMR, for energy and climate change PaMs), while similar, have some crucial differences. This makes it difficult to draw direct comparisons between PaMs reported under the NECD and MMR (see section 4.4). This issue has also been analysed in the European Environment Agency's report "*Analysis of the air pollution policies and measures reported under the National Emissions reduction Commitments Directive (NECD)*[20]"

Several Member States have projected non-compliance with their emission reduction commitments for 2030, even with their WAM scenario, i.e. the PaMs selected for adoption are insufficient to ensure compliance. Table 4 shows the pollutants for which non-compliance has been projected (under the WM scenario if the WAM scenario was not reported) and the Member States which reported such non-compliant projections. There were a number of Member States to which the European Commission's risk assessment assigned a high risk to their projections and risk of non-compliance, despite them projecting compliance (see Figure 7).

In terms of developing a programme of action to achieve the emission reduction commitments, it is important to also identify the key sectors and sources which contribute to national emissions. These will differ for the different pollutants, for example, agriculture is the overwhelmingly key source sector for ammonia emissions, both animal husbandry (including the handling, storage and spreading of manure) and the use of inorganic fertiliser on arable crops. For NOx, the transport, energy production and industrial sectors will be key source sectors, while for NMVOC, industrial and domestic product use will be more important. $PM_{2.5}$ has multiple sources, but the key focus will be combustion sources, in particular energy production (coal and oil) and domestic heating using solid fuel.

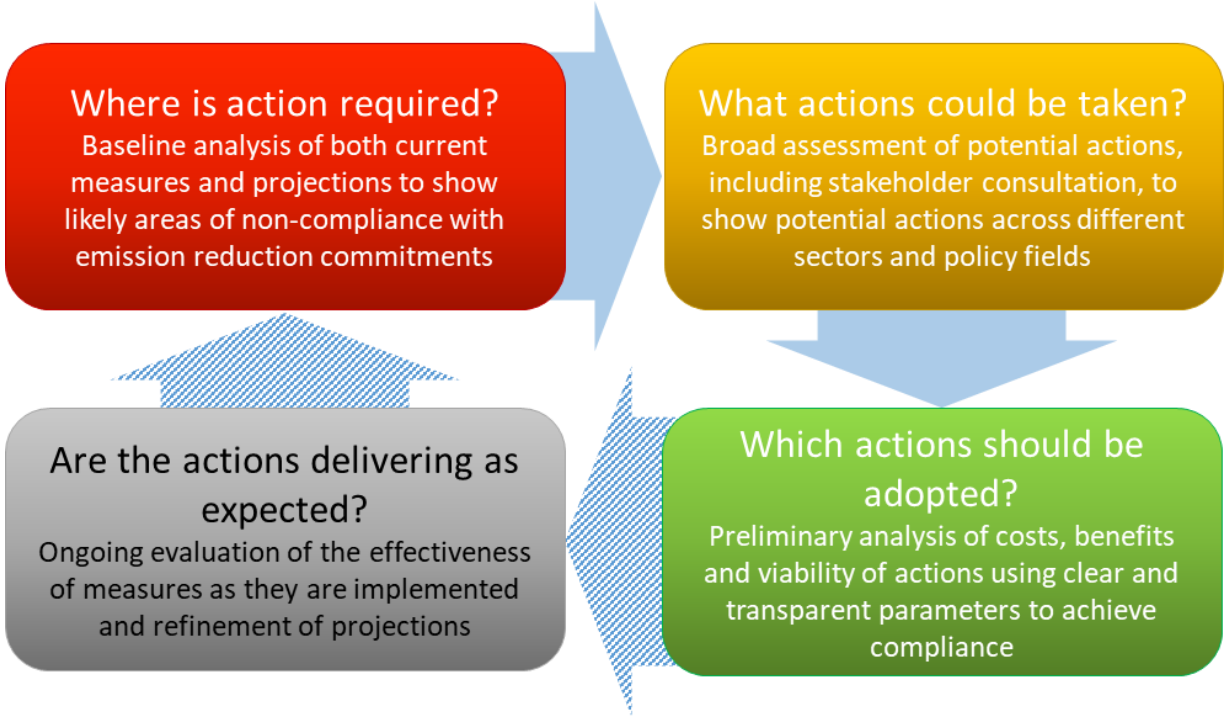
4.2 Selecting the most appropriate PaMs

The process for selecting PaMs will differ across Member States but should follow the same basic process, as described inFigure 10. This shows not only the main steps in selecting PaMs for adoption but also the cyclical nature of the process; the submissions made in 2019 are the first iteration of the NAPCPs and projections. The requirements of the NAPCP clearly point to the need to both improve projections (reducing uncertainty) and to evaluate the effectiveness of PaMs on an ongoing basis, as they are implemented. Where a shortfall in achieving the emission reduction commitments is identified, additional PaMs need to be identified, reviewed and where appropriate, adopted and implemented. Several Member States (as identified in table 4) submitted an NAPCP which did not project compliance with the 2030 targets. Not only is this not

[20] https://www.eionet.europa.eu/etcs/etc-atni/products/etc-atni-reports/etc-atni-report-3-2020-analysis-of-the-air-pollution-policies-and-measures-reported-under-the-national-emissions-reduction-commitments-directive-necd

in line with the legal requirements of the NECD (under which a demonstration of compliance with additional PaMs is mandatory) but also points to the need to have already started the process of identifying and considering further additional PaMs.

Figure 10: Outline process for selecting PaMs



For each of these steps, a series of supplementary questions needs to be asked to ensure the evidence base is robust and all relevant options have been considered. These are summarised in Table 6.

Table 6: Additional considerations at each stage of the PaMs selected process

Stage	Primary Issues	Additional questions
Where is action required?	The WM scenario is both credible and complete	• Does it include all of the existing measures (current EU community measures are classed as existing, even if not yet implemented), including those in other policy areas? • Are the measures all being implemented or are the likely to be implemented? • Have they been properly described?
	The WM forecast accurately reflects the likely benefit of existing measures	• Are the emissions reductions assigned to the measures credible? • Is the trajectory realistic, reflecting implementation times? • Have the key uncertainties been taken into account? • Are legislative instruments required and has the process for developing these been initiated/completed?

Stage	Primary Issues	Additional questions
		• Are sufficient resources available for full implementation? • Does the implementing body have the capacity, powers and budget to undertake their role?
	The compliance gap (where one exists) has been properly described	• Has the margin of uncertainty been estimated and accounted for?
	The key source sectors contributing to non-compliance have been identified	• Are the key sources for current emissions accurately described? • Are the key sectors for future emissions accurately described, reflecting likely future changes in economic activity and sectors
	The mandatory and non-mandatory measures specified in the NECD (Article 6 and Annex III, Part 2) have been reviewed	• Have existing measures meeting the requirements been identified and described?
What action could be taken	The measures considered are related to the priority pollutants and sectors identified in Step 1	• Has the potential impact on air quality been considered (especially for NO_X and $PM_{2.5}$)? • Do the measures include all mandatory agriculture measures specified in Part 2 of Annex III not currently in place? • Do the measures include *non-mandatory* agriculture measures specified in Part 2 of Annex III not currently in place?
	Have all relevant sources of information been accessed to provide potential actions?	• Have the stakeholder and expert communities have been engaged? • Have all relevant Government Departments and agencies have been consulted? • Has best practice from within and external to the EU been considered? • Have neighbouring Member States been consulted to assess where cooperative action could give rise to additional measures? • Have future trends and developments been taken into account?
	A credible assessment has been made as to the potential impact of the measures, at least to a first approximation	• Have costs and benefits of the measures been estimated? • Has an assessment been made of potential co-benefits and co-effects?
Which actions should be adopted	There is a clear and consistent set of parameters by which potential measures can be assessed	

Stage	Primary Issues	Additional questions
	That the measures *not* being adopted have been rejected for consistent and credible reasons	• If key measures identified for that pollutant and sector have been rejected, has a clear and credible reason has been provided? • Have viable alternatives have been identified to ensure compliance with emission reduction commitments?
	The measures adopted address the priority pollutants and sectors	
	Sufficient detail has been provided about the measures to be adopted	• A full description of the measure, in detail, and its route of implementation • The body responsible for its implementation has been assigned and sufficient capacity, capability and resources are available • The timescale for adoption is clear and credible, including any necessary legislative process • The emissions reductions for the measure are clear, credible and provided both as a total reduction and timeseries • The costs and benefits accruing from the measure, assessed using a consistent and credible methodology • Any necessary enabling measures are in place or planned, e.g. legislative frameworks to allow for the creation of low emission zones, or to collect accurate information about agricultural activity • Relevant stakeholders (include from the sector(s) affected) have been consulted • Conflicts and co-benefits with other policy areas have been assessed • Any double counting with existing measures and plans, and other measures to be adopted, has been assessed and eliminated
	The sum of the emissions reductions from the measures is consistent with the difference between the WM and WAM scenarios	• Is this sufficient to achieve compliance with emission reduction commitments? • Have uncertainties been assessed and accounted for?
Are the action delivering as expected?	A credible evaluation mechanism has been put in place prior to implementation	• Have performance/success metrics been identified? • Are the metrics subject to ongoing evaluation? • Are the projected outcomes measurable?
	Uncertainties in the projections are reduced	• Is the emission inventory and projection consistent with international best practice? • Is an improvement programme in place which addresses the key uncertainties? E.g. those

Stage	Primary Issues	Additional questions
		identified as part of international reviews including the Commission's evaluation programme. • Are the projection metrics (e.g. economic activity) subject to regular review and update? • Is there a programme in place to collect and improve activity data?
	Governance and institutional structures are in place to review evaluation outcomes, consider additional measures and update the NAPCP where required	

4.3 PaMs all Member States should consider for adoption

Following the process described in the previous section will clearly produce different results for different Member States. Variations in economic structure, governance, and the level of maturity of pollution control policies will dictate not only the key sources and actions but also the form they take and the route to implementation. Nevertheless, there are policies for each pollutant and source sector which it would be reasonable to expect will have been considered for adoption, unless already in place in full, and for which there would need to be a strong justification for not adopting as part of the final NAPCP. Table 7 shows some of the PaMs which it would be reasonable to expect are considered as part of an NAPCP, although it is not intended to be fully comprehensive.

Ideally, the EEA's PaMs database would provide a way of checking whether a Member State had considered the actions set out in Table 7. However, aside from the issues identified in section 4.4 and the fact that PaMs are usually described in the native language of the country concerned (making review difficult for international observers), it is often not possible to discern from the entries the full nature or extent of the PaM. This is partly due to descriptions used by Member States being imprecise and partly to the requirements of the common reporting format being insufficiently detailed. While the reporting under the new NECD is certainly an improvement on that required by the previous Directive, the database is still some way short of being a usable and accessible reference for the policies and measures on air pollution being implemented across the EU. Given that the PaMs are central to actually achieving emission reductions across the Union, emphasis should be put on both improving the quality of reporting and the accessibility of the information.

Table 7: PaMs which should be considered by Member States

	NOx	SO_2	$PM_{2.5}$	NMVOCs	NH_3
Road Transport	Accelerated uptake of zero-tailpipe emission vehicles Accelerated phase out of older vehicles, related to the highest emitting vehicle classes Ban combustion-engine vehicles in city centres Improved public transport Improved transport planning, facilitating public transport, cycling and walking		Accelerated phase-out of older vehicles related to the highest emitting vehicle classes	Petrol vapour recovery measures (delivery and retail)	n/a
Non-road transport and mobile machinery	Accelerated uptake of Stage V engines Accelerated uptake of electric/hybrid drivetrains	Ensure max 10 ppm sulphur fuels for inland shipping and introduce max 0.1% sulphur fuel for	Accelerated uptake of Stage V engines Diesel particulate filters (retrofitting old ones and mandatory for new ones,	Accelerated uptake of Stage V engines	n/a

	NOx	SO_2	$PM_{2.5}$	NMVOCs	NH_3
	Retrofitting of SCR on existing engines	marine shipping (with enforcement)	where not already required by community law) Accelerated uptake of electric/hybrid drivetrains Ensure max 10 ppm sulphur fuels for inland shipping and introduce max 0,10% sulphur fuel for marine shipping (with enforcement)		
Industrial processes	SCR on large and medium combustion plant Energy efficiency programmes	Phase out of coal and oil for heating Energy efficiency programmes	Phase out of coal and oil for heating Energy efficiency programmes	VOC emission controls (direct and fugitive, process dependent, based on BREF or similar guidance) Incentivisation of low VOC products and processes	n/a
Energy production	Phase out of coal, peat and oil	Phase out of coal, peat and oil	Phase out of coal, peat and oil	n/a	n/a

	NOx	SO_2	$PM_{2.5}$	NMVOCs	NH_3
	Energy efficiency programmes Increased renewable energy generation SCR on large and medium combustion plant	Energy efficiency programmes Increased renewable energy generation	Energy efficiency programmes Increased renewable energy generation		
Domestic heating and product use	Energy efficiency programmes Private and public building insulation Transition away from solid-fuel and gas burning stoves and boilers – replace by non-combustion heating systems	Energy efficiency programmes Phase out of coal and high sulphur oil for heating	Energy efficiency programmes Insulation of public and private buildings Replacement of older solid-fuel burning stoves and boilers Transition away from solid-fuel burning stoves and boilers/replace by non-combustion heating systems	Non-combustion heating systems High VOC product controls, e.g. incentivising zero or low VOC products, such as paints and coatings	n/a

	NOx	SO_2	$PM_{2.5}$	NMVOCs	NH_3
Agriculture	n/a	n/a	Ban on agricultural waste burning (with effective enforcement)	n/a	Measures listed in NECD Annex III, Part 2 and UNECE guidance[21] including: • Nitrogen cycle management • Livestock feeding strategies • Low-emission animal housing systems • Low-emission manure storage systems • Low-emission manure spreading techniques • Mineral fertilizers, including the replacement of urea based fertilizers

[21] UNECE Framework Code for Good Agricultural Practice for Reducing Ammonia Emissions of 2014 (http://www.unece.org/index.php?id=41358) and revisions when available

	NOx	SO_2	$PM_{2.5}$	NMVOCs	NH_3
Horticulture	SCR on greenhouse heating systems	Phase out of coal and oil for heating	Ban on horticultural waste burning	n/a	n/a

4.4 Reporting challenges

As described in section 1.1, the reporting requirements under the original NECD meant that insufficient information was required from Member States to enable full scrutiny of the measures they already had in place and were planning to implement, to achieve compliance with their emission ceilings. Thus, tracking progress towards the legislative targets and ensuring the Member States had the appropriate measures in place was not possible in any meaningful way.

Under energy and climate change, firstly the Monitoring Mechanism Regulation (MMR, 525/2013) and latterly the Energy Union and Climate Action Regulation (2018/1999), the European Commission has established a comprehensive reporting system which includes both emissions inventories and projections and the actions Member States are taking to comply with their emissions control obligations. The system includes reporting on actions currently in place and those planned for adoption, as well as, where available, the costs and benefits of the actions. The European Environment Agency established a reporting portal through which Member States are required to report information on PaMs, setting it up in such a way as to allow automated reporting[22]. This both reduces the reporting burden on Member States and, because reporting is through a web interface, encourages greater transparency in the PaMs development and implementation process.

The new NECD and subsequent implementing decision sought to adopt some of the terminology and reporting processes used under the energy and climate framework. For example, WAM projections scenarios are common to both, although the "current baseline" scenario is WM under the NECD and WEM (with existing measures) under the energy and climate frameworks. The national plans and programmes under the original NECD have become Policies and Measures (PaMs) under the new NECD, a term common to both policy areas.

However, despite the changes to the reporting system implemented under the new NECD, with their increased emphasis on projections and the measures Member States would implement to achieve their emission reduction commitments, a number of issues have arisen from the first round of reporting. It is worth bearing in mind that this is only the first round of reporting under the new NECD and that delays in the adoption of the implementing decision meant that some tools and processes were not as advanced as was expected by the time Member States were due to prepare NAPCPs and the PaMs within them. It is reasonable to expect that some of these issues will be resolved for most Member States by the time the second National Air Pollution Control Programme is due in March 2023 or sooner, '*within 18 months of the submission of the latest national emission inventory or national emission projections if, according to the submitted data, the obligations set out in Article 4 are not complied with or if there is a risk of non-compliance'*.

[22] More information on the outputs from the Energy and Climate reporting process can be found here: https://www.eea.europa.eu/themes/climate/national-policies-and-measures

Nevertheless, some of the issues may require changes to the implementing provisions in order to resolve them.

4.4.1 Timing

The timescale for submission of NAPCPs came after, but overlapped strongly with, the timescale for submission of National Energy and Climate Plans (NECP). Many Member States lacked the capacity to address both issues at the same time which meant that preparation of NAPCPs was delayed. It also meant that the PaMs considered for adoption under the NAPCP tended to be those that addressed sources of greenhouse gasses, such as transport and energy production. While these are also key sectors for air pollution, it meant that other sectors, such as agriculture (as a source of ammonia) and industrial processes and products (as a source of NMVOCs) did not receive the same level of attention.

4.4.2 Scope

One of the crucial differences between reporting PaMs for energy and climate and for air pollution is that, under energy and climate, information is required on both current and proposed PaMs, including costs and benefits where they are available. Under the NECD and its implementing decision, only PaMs being considered for adoption and those selected for adoption need to be reported in any detail; including information on costs and benefits is optional. Furthermore, only PaMs being considered for adoption need to be reported through the EEA's reporting portal (section 2.6 of the implementing decision), which means that information on PaMs under consideration and those selected for adoption is not necessarily reported in the same place. It also means that of the three categories of PaMs – those currently being implemented, those considered for adoption and those selected for adoption – only those under consideration are reported in detail, which is probably the least useful of the three.

It is worth noting that any PaMs selected for adoption in the 2019 NAPCP which are implemented before 2023 will not be included in the 2023 reporting round as they will not be "new" PaMs. Thus, it will not be possible to track policy implementation across different reporting rounds, nor will it be possible to scrutinise future NAPCPs to check whether PaMs were implemented as described in previous versions.

4.4.3 Definitions

As noted earlier, the NECD and implementing decision include a number of terms which were not precisely defined, and which were thus subject to differing interpretations be different Member States. Terms such as "selected for adoption" carried different meanings in different countries, and prescribed categories, such as the instrument type or sectors affected, were applied inconsistently. This was not helped by the way in which the common format was structured, which allowed both text and numerical responses in some fields (and which thus hampered automated checks and comparisons). While this is less of an issue for individual Member States, it makes intercomparisons problematic and thus reduces the potential for the development of common good practice.

4.4.4 Completeness of reporting

This has been referred to earlier in this report. Completeness of reporting for PaMs can be checked through the EEA's reporting portal outputs viewer. At the time of writing, only 20[23] of the EU's 27 Member States have reported their PaMs using the reporting portal, despite this being a legal requirement with a deadline of 31 March 2019 (the UK has also reported). Several countries reported dates for adoption of PaMs as preceding the date of the report, some going back as far as 2004, which makes it difficult to view them as "new" PaMs as opposed to existing ones. More common was a failure to identify any date for adoption. In addition, the number of PaMs reported does not necessarily equate to the level of ambition in the Member State. For example, Belgium's 72 PaMs selected for adoption includes a large number which are essentially duplicated between its two main regions.

[23] The horizontal review report of the first round of reporting states that 20 Member States reported PaMs through the EEA tool, with a further two reporting without using the tool and two more not needing to report as projections showed compliance under their WM scenario. The EEA's data viewer lists PaMs from 15 Member States while the downloadable version of the database shows only 11.

5 Conclusions and recommendations

5.1 Overall conclusions of the assessment

5.1.1 What are the main findings?

The overall conclusion of this assessment of the Member States' NAPCPs is that, whilst there have been some good improvements with the NAPCP process as a whole relative to the previous Directive, there are major issues with the reporting process and level of detail provided by the Member States (particularly in relation to PaMs). There are also a significant number of Member States projecting non-compliance with their emission reduction commitments, in particular for 2030 and for NH_3, NOx and NMVOC. When you factor in the quality of the emission projections and overall credibility of the PaMs reported in the NAPCPs, then the risk of non-compliance increases significantly for NH_3, NOx, PM2.5 and NMVOC. Our combined risk assessment (which builds on the Commission's own assessment of the risks of non-compliance) shows that there are only two Member States judged to be at a low risk of non-compliance with their emission reduction commitments for all pollutants for 2020-29 and only one for 2030. The remainder are judged to be either at a medium or high risk of non-compliance for all pollutants with more than half of the Member States at high risk of non-compliance for 2030 onwards.

Member States were required to report their NAPCPs to the Commission by 1 April 2019. However, only eight Member States submitted within this deadline (Belgium, Denmark, Estonia, Netherlands, Portugal, Finland, Sweden, United Kingdom). The majority submitted after this date, some more than one year after the original deadline. While 16 of these late submissions were final versions (Bulgaria, Czechia, Germany, Ireland, Spain, France, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Austria, Poland, Slovenia, Slovakia), two submitted only draft NAPCPs (Italy, Luxembourg, with the latter not having made it available to the general public). The main reasons cited for delays have been the time required for consultation activities as well as the need for alignment and coherence with the National Energy and Climate Plans (NECPs) that were due to be submitted to the Commission by the end of 2019 under Regulation (EU) 2018/199933 on the governance of the energy union and climate action. Greece and Romania are still yet to submit an NAPCP (draft or final) and it is unclear if/when they may submit their programme or the reasons for the delays. The Commission has commenced infringement proceedings for these two Member States.

5.1.2 What has worked well?

The main positive findings of the assessment have been the overall improvements in the quality and consistency of the NAPCPs, at least relative to the process under the original Directive. Whilst there have still been differences in approach and presentation of reporting, the common reporting format does appear to have ensured (even for those Member States that did not necessarily use it fully or at all) that the Member States have reported on most of the key areas required by the Directive. At least some of the Member States have also reported on some of the optional content included within the common reporting format which helps to provide greater transparency and context for the NAPCP as a whole and the likely impacts of existing and additional PaMs.

In addition, linking the emissions and projections data submission more closely to the UNECE processes has brought a greater degree of technical rigour to the process and meant that some Member States have had to develop projections for the first time. The attempts to establish greater links with reporting on climate change mitigation, through the structures and language used, and the explicit need to report on coordination with energy and climate programmes, are a move in the right direction. Further improvements here will help reduce the reporting burden on Member States while also providing greater transparency and consistency, as well as a greater range of potential benefits from air quality PaMs.

Furthermore, the Commission's comprehensive evaluation of the Member States' reporting of both emission projections and the NAPCPs has been valuable in identifying the key issues with both elements and the improvements that need to be made. This has also been helpful for understanding the overall risk of non-compliance with the emission reduction commitments, going beyond just the reported emissions data. The key now is how this information is used by both the Member States and the Commission to improve the quality of reporting in the future but, more importantly, how the emission reduction commitments can be achieved.

5.1.3 Not so well?

As described above and earlier in the report, only eight Member States submitted their NAPCPs within the reporting deadline and now, more than one year later, two Member States still have not reported their NAPCPs. There do appear to have been some timings challenges for the Member States with the common reporting format only being adopted in October 2018 and the supporting guidance in March 2019 (although drafts of both were discussed with the Member States much earlier than this). Furthermore, the timings for the submission of the final NECPs (December 2019) also made it challenging for the Member States to ensure coherence between the two.

Half of the Member States fully used the common reporting format to report their NAPCPs with most of the remainder using it partially. Three Member States chose not to use it despite the fact that this was mandatory. Whilst most of the mandatory information required by the Directive and common reporting format was provided, very little of the optional content was provided. In particular, reporting on the impacts of current and additional PaMs on air quality in the future would have provided a valuable resource for understanding how the NAPCPs may contribute to improving air quality and compliance with national and EU level air quality objectives.

As the Commission noted in its report to the European Parliament, the reported PaMs "*range from very specific ones (e.g. restricting operation in a given plant) to very general ones (e.g. promoting energy efficiency or transport strategies), the latter leading necessarily to more uncertainty in projected emissions reductions*." This lack of detail on reported PaMs fundamentally undermines confidence that they will deliver the emission reductions projected. Moreover, a lack of information on the form of implementation, timescales or impacts makes it impossible to develop a repository of good European practice for use in the development of future plans. The low levels of detail provided on current PaMs also makes it impossible for the outside observer to

assess whether a Member State's PaMs are new and innovative or simply catching up with what is commonly done elsewhere.

Of particular concern is the widespread projection of non-compliance with NERCs for NH_3, even where the mandatory measures described in Annex III of the NECD have been adopted. It may be that Member States viewed these measures as the totality of what they were required to do, rather than the *minimum* requirement. Further measures on NH_3 emission reduction will be required. However, it is also clear that, unlike other key emission sources such as road transport and industry, there are few community measures on NH_3 emission reduction from agriculture. It may be that the Common Agricultural Policy acts as a hinderance to the development of such measures (either real or perceived) but without them it seems unlikely that all Member States will institute the necessary controls on a unilateral basis, in the same way that they would (could) not have introduced emission limits for road vehicles in a unilateral way.

The two key components of the NAPCP are "what is the Member State going to do", i.e. the PaMs, and "what impact will it have", i.e. the projections. There were widespread issues regarding the accuracy, consistency, and transparency of the reported projections. While it is true that this was the first time projections were reported to the Commission, and for some Member States the first time they had been prepared, it is also the case that significant improvements will be needed over the reporting cycle. Without such improvements, there will be little confidence in projections of compliance.

The two elements of the consultation process also require improvement: internal and external. External consultation, i.e. with other Member States, was a mandatory requirement of the NAPCP development process. However, most Member States failed to undertake this in a meaningful way (at least based on the reported information available and feedback from some EEB member organisations), instead relying on existing community level cooperative programmes and processes (e.g. the UNECE EMEP programme). The combined modelling and assessment work undertaken by Czechia and Poland demonstrated both what can be achieved through cooperative programmes and the additional PaMs and benefits which are available. Structures and guidance to facilitate such cross-Member State working need to be strengthened.

While almost all Member States undertook a level of internal consultation, this report has shown that the quality and value of that work was often limited. Meaningful engagement with stakeholders derives multiple benefits over the long term, including the buy-in of key stakeholders, faster implementation with lower resistance, additional data and PaMs and, ultimately, a more successful plan. However, meaningful engagement takes more time than the traditional "decide-announce-defend" approach to policy making and so Member States need to initiate the process of developing their NAPCP much earlier in the reporting cycle to also ensure meaningful public participation, and be supported in doing so through guidance and information sharing through the Commission.

5.2 Recommendations

Based on the findings of this assessment we set out below a series of recommendations, broken down by those targeted at the Member States and those relevant for the Commission.

5.2.1 Recommendations for the Member States

The primary objectives for a Member State's NAPCP are fourfold:

- To set out a plan to achieve the NERCs;
- To engage with, and gain buy-in from, key stakeholders as part of the development of the programme;
- To allow implementation in the fastest and most efficient way; and
- To ensure acceptance by the Commission with the minimum of comment and amendments.

To this end, the following improvements will be required although, clearly, these will vary between Member States:

- Ensure the common reporting format is used, including following the structure of the common format, and report as much of the optional content as possible and where relevant.
- Provide full details of the PaMs to be adopted, including implementation route, timescales, benefits over time, costs and co-benefits.
- Apply a PaMs selection process which uses clear and transparent parameters, focussing on the priority pollutants and sectors (as described in section 4.2). Consider key uncertainties (in the underlying emission projections and likely impacts of the PaMs) and the residual risk of non-compliance if the PaMs are fully implemented, as well as the risk of non-compliance if certain PaMs are not to be implemented.
- Engage fully and meaningfully with key stakeholders (including neighbouring Member States) at each stage of the process, allowing sufficient time for the consultation process to operate and for the feedback to be taken into account in the shaping of the final programme.
- Develop and act on an improvement programme for the emissions inventory and projections, focussing on key sectors and components, seeking wherever possible to adopt Tier 2 or 3 methodologies (Tier 2 should be a minimum requirement for key categories). Key areas for improvement are identified in the Commission's review reports for each Member State.

5.2.2 Recommendations for the European Commission

Now that the first round of reporting and evaluation of projections and NAPCPs has been completed, there are some clear lessons learnt and outstanding issues to resolve in the short term to both improve future reporting but, most importantly, to ensure that the Member States are on track to achieve their emission reductions commitments, now (for 2020) and in the future. Key recommendations are set out below:

- Engagement with the Member States should be undertaken (potentially in the form of a survey) to understand their experiences of working with the common reporting format and PaMs reporting tools

plus usefulness of the supporting guidance. The aim of this is to understand what improvements could be made for the future and any specific support needs that could be provided to the Member States e.g. capacity building on the development and assessment of PaMs (a similar programme has been running with the Member States, supported by the Commission, on designing and evaluating PaMs under the Effort Sharing Decision).

- Improvements to the common format (especially in the reporting on PaMs) well ahead of the next deadline for reporting based on feedback from the Member States as well as the findings of the European Commission's evaluation and this report. Changes to the common reporting format would then lead to changes in the PaMs reporting tool which would need to be clearly communicated to the Member States considering the challenges faced with the current round.

- Enforcing the requirement to use common format and PaMs reporting tool (and extend mandatory use to include section 2.7 of the common format on consultation and justification for the adoption of specific PaMs).

- Enforcing without delay resubmission of NAPCPs for those MSs that were scored as high risk in the Commission's assessment i.e. not just those that are projecting non-compliance but also those where quality of projections and/or robustness of PaMs is poor.

- In the run-up to the review of the Directive that the Commission is obliged to report on in 2025, the Commission should give special attention to those pollutants where the Member States are projecting to face the greatest challenges with compliance and propose additional EU wide actions that could help improve the situation, in particular for agricultural NH_3 emissions. The reason being that national level actions alone for some pollutants and sectors are unlikely to have the desired impacts.

Appendix 1 Member State Factsheets

Member State	Bulgaria (BG)
Timelines of reporting	NAPCP submitted on 26 September 2019. PaMs submitted via EEA PaM-tool on 17 December 2019.
Use of common format	Common format used.
Public consultation	A public consultation was launched on 24 June 2019, lasting 30 days. No working links are provided to the consultation outcomes. One NGO was part of the public consultation, but NGOs were not invited to the working group overseeing the NAPCP.
Existing PaMs	While information has been provided on historic emissions reductions, no detail is provided on existing PaMs.
Credibility of projections data (with measures scenario)	Projections are sufficiently up-to-date to capture current PaMs.
Additional PaMs considered	Seven additional PaMs considered covering the agriculture, transport and residential heating sectors, including: • Introduction of national standardsfor coal quality and only requirements for wood moisture content; • Restricting vehicle imports to low-emission vehicles; • Establishing low emission zones in Sofia and Plovdiv; and • Introducing rules on best agricultural practice for fertiliser use and manure management.
Additional PaMs selected for adoption	All PaMs identified for consideration have been selected for adoption. No detail is provided on the process for selecting and adopting PaMs. No PaMs are proposed or adopted for the power sector.
Credibility of PaMs	It remains unclear how some of the residential heating PaMs would be implemented and enforced. Achieving emissions reductions through vehicle import restrictions is dependent on modal shift, which is not guaranteed, therefore the credibility of this PaM is in question. Agricultural PaMs are voluntary requirements and as such there is uncertainty whether they would deliver emissions reductions.

Member State	Bulgaria (BG)
	Emissions reductions are reported for packages of PaMs, not for individual PaMs, making it difficult to assess their credibility. Sources of funding for implementation are not identified.
Key uncertainties / gaps	There are uncertainties regarding the emissions reductions and air quality impacts that adopted PaMs will deliver. Limited capacity and data to perform large-scale dispersion modelling and assessments.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance with commitments projected for all pollutants for 2020-2029 and 2030 under the WAM scenario.
Overall credibility of NAPCP	The NAPCP indicates that adopted PaMs will achieve compliance with commitments, but there are questions over the credibility and implementation of some proposed PaMs.
Transparency	Emissions projections are insufficiently detailed and documented.
Completeness	No clear detail is provided on existing PaMs. An opportunity to develop PaMs for the power sector has not been taken.
Consistency	The NAPCP is internally consistent.
Accuracy	Emissions projections are largely based on Tier 1 methodologies and statistical methods rather than detailed modelling.

Member State	Czechia (CZ) [a]
Timelines of reporting	NAPCP submitted on 13 January 2020. PaMs submitted via the EEA-PaM tool on the same day.
Use of common format	Common format partially used.
Public consultation	A public consultation undertaken, but no information on outcomes is provided, and links to consultation activities are broken, A consultation with Poland was undertaken resulting in a sharing of emission data.
Existing PaMs	Information is provided on historic air quality trends and current air quality in Czechia, but no detail is provided on current PaMs and their impacts.
Credibility of projections data (with measures scenario)	Projections are sufficiently up-to-date to capture current PaMs. A number of sectors appear to be missing estimates (e.g. NOx and NMVOC emissions from 3B Manure Management and 3D Agricultural Soils). Emissions from gasoline evaporation are reported differently to the historical inventory.
Additional PaMs considered	28 additional individual PaMs reported in the NAPCP and the EEA-PaM tool, including: • Developing a new national code of good agricultural practice; • Reducing the share of solid fossil fuels in primary energy sources; • Information support regarding household heating; • Shifting freight transport from road to rail; and • Development of the State Air Pollution Monitoring Network.
Additional PaMs selected for adoption	PaMs selected for adoption are not explicitly identified, however, the NAPCP states that the WAM scenario is based on six quantified PaMs. These include: • Stricter obligations on the storage and application of fertilisers; • Replacement of heat sources in the residential stationary combustion sector; and • Additional emission reductions by 2030 from road transport.

Member State	Czechia (CZ) [a]
	No detail is provided on the process for selecting and adopting PaMs.
Credibility of PaMs	Where emissions reductions are projected for PaMs, these are reasonable provided implementation is carefully monitored. Details on transport measures indicate that they have not been fully designed yet, therefore it is not possible to confirm whether projected emission reductions are realistic. The NAPCP defines indicators for five PaMs in the WAM scenario, thus providing information on how implementation will be monitored. Sources of funding for implementation are identified at a high level.
Key uncertainties / gaps	There are uncertainties regarding the emissions reductions that adopted PaMs in the transport sector will deliver.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance with commitments projected for all pollutants for 2020-2029 and 2030 under the WAM scenario.
Overall credibility of NAPCP	The NAPCP indicates that adopted PaMs will achieve compliance with commitments. There are questions over the credibility and implementation of some proposed PaMs, and there are issues with the completeness and consistency of projections.
Transparency	Emissions projections for the agriculture sector are insufficiently detailed and documented.
Completeness	No clear detail is provided on existing PaMs, and the suite of adopted PaMs is not clearly disclosed.
Consistency	PaMs presented in the NAPCP are not fully consistent with those listed in the EEA-PaM tool. Emissions from gasoline evaporation are inconsistently reported in the historical inventory and the projections.
Accuracy	There appear to be significant inaccuracies in the projection of emissions of NH_3 from agricultural sources. There are minor errors with emissions from 1A3a, s, d, e Non-Road Transport.

[a] Note: A members' survey form was not completed and returned for Czechia. The MS Factsheet for Czechia has therefore been completed by AQC based on a review of the NAPCP.

Member State	Germany (DE)
Timelines of reporting	NAPCP submitted on 22 May 2020.
Use of common format	Common format partially used.
Public consultation	A two-month public consultation ran between 28 December 2018 and 28 February 2019. No official link to available documentation exists, and it is not clear how responses were taken into account.
Existing PaMs	Key drivers of emissions reductions to date have been identified, including: • Use of low sulphur fuel in the energy sector; • Fleet renewal and low emission zones for HGVs and buses; • Introduction of emission limits for domestic wood combustion; • Low sulphur content fuel and plant desulphurisation (SO_2); and • Restrictions on use of solvent additives in industry.
Credibility of projections data (with measures scenario)	Emissions projections are sufficiently up-to-date to capture all existing PaMs. The NAPCP provides estimates for uncertainty of inventoried emissions and describes uncertainties in the future development of the energy sector, but provides no quantification of uncertainty.
Additional PaMs considered	The NAPCP identifies 23 additional PaMs across transport, energy supply, agriculture and industry. These include: • Reducing use of nitrogen fertilisers; • Phasing out of coal; • Flue gas cleaning for combustion processes in industry; • Incentivising customers to buy Euro 6 emissions vehicles; and • Retrofitting diesel buses with selective catalytic reduction.
Additional PaMs selected for adoption	Of the 23 identified PaMs, 21 are selected for adoption. The remaining two PaMs will be considered for adoption if the phase-out of coal does not deliver the emissions reductions required to achieve SO_2 and NO_x commitments.

Member State	Germany (DE)
Credibility of PaMs	Emissions reductions are sometimes reported for packages of PaMs and not always reported for individual PaMs, making it difficult to assess their credibility. Timescales for PaMs implementation are generally realistic and justifiable. Implementation will be funded with existing budgets from relevant bodies and government departments. Several existing PaMs are incorrectly included in the WAM scenario.
Key uncertainties / gaps	Germany has been allowed to keep stricter national emission standards for solid fuel boilers instead of introducing the weaker Eco-design requirements. However, wood burning might be on a substantial rise in the coming years due to the targets for renewable energies in the heating sector – leading to more PM2.5 emissions than projected in the NAPCP.
Any PaMs for methane and/or coal phase out?	Coal phase out is considered and selected for adoption.
Expected compliance	Emission reduction commitments for all pollutants are projected to be achieved for 2020-2029 and 2030.
Overall credibility of NAPCP	The NAPCP indicates that the suite of adopted PaMs will achieve all commitments but identifies significant uncertainty in projections which could threaten compliance. The $PM_{2.5}$ commitments may not be achieved if solid fuel boiler design regulations are not implemented following the granting of an exemption from implementing EU design requirements.
Transparency	Outcomes of the consultation process have not been made available. Details on emissions projections are not easily accessible as they are spread out in multiple reports with only a brief summary in the IIR.
Completeness	Implementation of PaMs, timescales and funding are not detailed.
Consistency	Several existing PaMs have been included in the WAM scenario.
Accuracy	Data about assumptions and emissions reduction potential at the individual PaMs level is not available.

Member State	Denmark (DK)
Timelines of reporting	NAPCP submitted on 1 April 2020.
Use of common format	Common format partially used.
Public consultation	A public consultation was conducted from 24 January to 11 March 2019. Responses were received from NGOs, industry bodies and municipal organisations. Responses were not accounted for in the NAPCP.
Existing PaMs	Existing PaMs, including EU legislation, are summarised. These include: • Introduction of environmental zones restricting vehicle access in cities; • Improving manure application techniques and storage; and • Implementing a scrappage system for old wood burning stoves.
Credibility of projections data (with measures scenario)	Emissions projections are sufficiently up-to-date to capture all existing PaMs. The NAPCP qualitatively describes significant uncertainty in projections, mainly arising from lack of information on domestic wood burning, differences between real time vehicle emissions and emissions factors, and uncertainties regarding future market trends in the dairy sector.
Additional PaMs considered	The NAPCP identifies five individual PaMs and a package of 11 PaMs targeting the agriculture, energy supply and transport sectors. These include: • Reducing emissions from inorganic fertiliser use; • Awareness campaigns for correct operation of domestic stoves; and • Diesel car scrappage. However most of the considered measures are pre-existing PaMs and are incorrectly identified as ‘additional’.
Additional PaMs selected for adoption	Of the considered PaMs, 15 were selected for adoption. There is no explanation of the procedure for selecting and adopting PaMs.

Member State	Denmark (DK)
Credibility of PaMs	Expected emissions reductions missing for many PaMs and pollutants. A national committee for NH_3 emissions is identified as having the greatest emissions reduction potential, but it is not clear how this will deliver reductions. The NAPCP summarises the funding allocated to support implementation, but provides no details on the source of funding.
Key uncertainties / gaps	Lack of detail surrounding emissions reductions potential of PaMs. Many PaMs are existing measures and are incorrectly considered 'additional'. Phase out of oil and gas boilers could result in increase in domestic wood burning, which would lead to higher $PM_{2.5}$ emissions. This has not been addressed in the NAPCP.
Any PaMs for methane and/or coal phase out?	Incorporated under the government's ambition to achieve carbon neutrality by 2050.
Expected compliance	Projections indicate that commitments for NH_3 and $PM_{2.5}$ will not be achieved. Identified uncertainties present a risk of non-compliance with commitments for all pollutants.
Overall credibility of NAPCP	The NAPCP indicates projected non-compliance with some commitments, and identifies significant uncertainty in projections which could threaten compliance. The NAPCP does not sufficiently detail how PaMs will ensure compliance.
Transparency	Outcomes of the consultation process have not been made available.
Completeness	Emissions reductions associated with PaMs have not been uniformly reported.
Consistency	The NAPCP is generally consistent, although it fails to consider potential increases in emissions that may arise from some PaMs. Several considered PaMs are existing measures.
Accuracy	Data about assumptions and emissions reduction potential at the individual PaMs level is not available for all PaMs and pollutants.

Member State	Spain (ES)
Timelines of reporting	NAPCP submitted on 3 October 2019. PaMs submitted via EEA PaM-tool on 22 October 2019. Annexes and standalone executive summary were submitted on 31 January 2020.
Use of common format	Common format partially used.
Public consultation	Initial public consultation held between 31 September and 9 October 2018. Public consultation on the draft NAPCP conducted between 9 April and 10 May 2019. No link provided to consultation outcomes, although they are mentioned in the NAPCP.
Existing PaMs	Summary of significant drivers of historic emissions reductions are identified. These include: • Roll-out of desulphurisation techniques in thermal power plants; • Introduction of Euro emissions standards, especially for HGVs; • EU legislation on paints and use of solvents.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with no information provided regarding the methodology. Projections were reported for all sectors for all pollutants, and are consistent with the historical inventory. Emissions for some categories are made using a Tier 1 approach, which impairs their accuracy.
Additional PaMs considered	The NAPCP identifies 13 packages of PaMs comprised of 57 individual PaMs. These include: • Implementing fertiliser application systems that minimise emissions; • Reducing burning of vegetation debris in olive groves; • Promoting building energy efficiency; • Developing new electricity-generating installations using renewable energy; and • Renewal of vehicle fleets.

Member State	Spain (ES)
Additional PaMs selected for adoption	Of the considered PaMs, eight packages (50 individual PaMs) were selected for adoption. PaMs were selected for adoption on the basis of their consistency with the draft NECP and the need to address non-compliance under the NECD.
Credibility of PaMs	Expected emissions reductions provided for only the adopted PaMs (eight packages covering 50 individual PaMs), making it difficult to assess the credibility of other PaMs. Adopted PaMs mainly target energy and decarbonisation, and fail to address NMVOC where emission reductions are not projected to meet commitments. The NAPCP provides no details on the source of funding for PaMs.
Key uncertainties / gaps	Lack of detail surrounding emissions reductions potential of PaMs.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Projections indicate that commitments for 2020, 2025 and 2030 will be achieved for all pollutants other than NMVOC.
Overall credibility of NAPCP	The NAPCP indicates compliance for all pollutants except for NMVOC. No PaMs are considered or adopted which would address NMVOC emissions.
Transparency	Outcomes of the consultation process have not been made available, and details of the projection methodology and approach are lacking.
Completeness	Emissions reductions associated with considered PaMs have not been uniformly reported. No PaMs have been considered to address the NMVOC non-compliance.
Consistency	The NAPCP is generally consistent, and projections are consistent with data in the NECP.
Accuracy	Data about assumptions and emissions reduction potential at the individual PaMs level is not available for all PaMs and pollutants.

Member State	France (FR) [a]
Timelines of reporting	NAPCP submitted on 9 October 2019.
Use of common format	Common format used.
Public consultation	A link is provided to a consultation process undertaken for the development of the 2017 document. There is no link to material for the submitted NAPCP. No transboundary consultation was completed.
Existing PaMs	Historic emissions trends are presented and the key drivers for reductions to date are identified. These include: • Improvements to storage of livestock manure and application of fertilisers; • Greater use of renewable energy in industry; and • Application of emissions abatement technologies in transport.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format, but lacked detailed documentation. Projections are based on historical inventory data from 2013 and 2016, and are therefore not sufficiently up-to-date to reflect current PaMs.
Additional PaMs considered	50 additional individual PaMs reported in the NAPCP and the EEA-PaMs tool, covering agriculture, transport, energy consumption and industry. However, these PaMs have all previously been adopted by national law, and only 10 are planned for implementation in 2019 or later. Of these 10, one involves implementing EU Regulation on Non-Road Mobile Machinery and cannot be considered 'additional'
Additional PaMs selected for adoption	Only 9 of the 50 individual PaMs selected for adoption are actually 'additional' PaMs.
Credibility of PaMs	In many cases, PaMs have a 10 year timeline to deliver reported emission reductions which is realistic. Estimated emissions reductions are only provided for existing PaMs, thus it is not possible to assess the credibility of anticipated emissions reductions from additional PaMs. Details on PaMs in the transport sector are insufficient to determine credible implementation. The NAPCP provides no details on the source of funding for PaMs.

Member State	France (FR) [a]
Key uncertainties / gaps	There are uncertainties regarding the emissions reductions that adopted cross-cutting and transport sector PaMs will deliver.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance with commitments projected for all pollutants for 2020-2029 under the WAM scenario. Compliance with commitments for NO_x, NH_3 and $PM_{2.5}$ only for 2030 under the WAM scenario.
Overall credibility of NAPCP	The NAPCP indicates that adopted PaMs will not achieve compliance with NMVOC and SO_2 commitments for 2030. Most considered and adopted PaMs are misrepresented as 'additional' when they have been previously adopted. There are uncertainties questions over the credibility and implementation of some proposed measures.
Transparency	Emissions projections are insufficiently detailed and documented.
Completeness	Projected emissions for NO_x and NMVOC from the agricultural sector are not reported. Other sector projections are reported to a good standard of completeness.
Consistency	Projections appear to be consistent with historic inventories, even though they are outdated. Most PaMs in the WAM projections should be in the WM scenario.
Accuracy	Projections are assumed to use a mixture of Tier 1 and Tier 2 methodologies, which limit the overall accuracy.

[a] Note: A members' survey form was not completed and returned for France. The MS Factsheet for France has therefore been completed by AQC based on a review of the NAPCP.

Member State	Hungary (HU)
Timelines of reporting	NAPCP submitted on 18 May 2020.
Use of common format	Common format used.
Public consultation	Public consultation on the draft NAPCP conducted from 6 March 2019. Respondents included at least one NGO. No link provided to consultation outcomes, although some comments are partly included in the NAPCP.
Existing PaMs	Existing PaMs are not identified in the NAPCP.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with no information provided regarding the methodology. Projections were reported for all sectors. Emissions for some categories are made using a Tier 1 approach. The impacts of some factors appear to be overestimated (e.g. transboundary pollution) while some sources appear to be underestimated (e.g. increase in the vehicle fleet and NH_3 from agriculture).
Additional PaMs considered	The NAPCP identifies 38 additional PaMs covering the agriculture, energy, transport and industry sectors, including: • Promoting the replacement of inorganic fertilisers with organic fertilisers; • Establishing a national nitrogen budget; • Revision of emission limit values for activities which are not covered by the IED; • Promotion of usage of low or zero-emissions vehicles; and • Development of infrastructure of alternative fuels.
Additional PaMs selected for adoption	Of the 38 considered PaMs, 32 were selected for adoption. No detail is provided on the process for selecting and adopting PaMs. The PaMs that promise to be the most effective have not been selected in the residential sector.
Credibility of PaMs	Emissions reductions are reported for packages of PaMs, and some individual PaMs.. In some cases there are just brief descriptions of PaMs, No timetables for their implementation are provided and funding

Member State	Hungary (HU)
	sources are not identified. As such, it is difficult to assess their credibility
Key uncertainties / gaps	Emissions reductions reported via the EEA PaM-tool are not consistent with projected emission reductions in the NAPCP. Emissions reductions are expressed as ranges, indicating significant uncertainty as to whether the commitments can be achieved. Interim targets are not provided for any PaMs. The values on projected reductions reported for the PaMs are not always coherent with the differences between the WM and WAM scenario projections. In some cases, it is impossible to judge if the reduction numbers provided are realistic. Funding sources are not identified.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance is predicted for all pollutants in the WAM scenarios (except for NMVOC and $PM_{2.5}$ for 2020-2029). There are ranges for emission reductions, with the upper values just meeting the targets (except for SO_2).
Overall credibility of NAPCP	The NAPCP indicates compliance for all pollutants except for NMVOC. No PaMs are considered or adopted which would address NMVOC emissions.
Transparency	Outcomes of the consultation process have not been made available, and details of the projection methodology and approach are lacking.
Completeness	Emissions reductions associated with considered PaMs have not been uniformly reported. No PaMs have been considered to address the NMVOC non-compliance.
Consistency	The NAPCP is generally consistent, and projections are consistent with data in the NECP.
Accuracy	Data about assumptions and emissions reduction potential at the individual PaMs level is not available for all PaMs and pollutants.

Member State	Italy (IT) [a]
Timelines of reporting	NAPCP not yet published; it is still in draft form.
Use of common format	Common format not used.
Public consultation	Public consultation opened on 26 August 2020 and ran until 6 December 2020.
Existing PaMs	The NAPCP provides information on policy instruments rather than specific implemented PaMs. These include: • 'Agricultural guidelines for reducing ammonia emissions in the Po River Basin'; • A Po River Basin Agreement, adopted in 2013, to tackle air pollution; • A decree on the certification of heat generators for domestic use.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with no information provided regarding the methodology. Projections were not reported for some pollutants and sectors (including NH_3 for 1B Fugitive emissions). Emissions for some categories are made using a Tier 1 approach, and emissions from some sectors appear to be overestimated ($PM_{2.5}$ from road transport) and underestimated (NH_3 from agriculture).
Additional PaMs considered	The NAPCP identifies 24 additional PaMs covering the agriculture, energy consumption and supply, and transport sectors. These include: • A ban on construction of new manure lagoons; • Fostering uptake of energy efficient technologies in public buildings; • Public awareness campaigns on energy efficiency issues; • Replacing old biomass plants with high efficiency, low emission plants; and • Encouraging uptake of electric vehicles.

Member State	Italy (IT) [a]
Additional PaMs selected for adoption	All considered PaMs have been selected for adoption. No detail is provided on the process for selecting and adopting PaMs.
Credibility of PaMs	Description of PaMs related to the transport sector is limited and it is unclear how the anticipated emissions reductions will be achieved in practice. Emissions reductions and implementation timeframes are not sufficiently realistic. Sources of funding for implementation are not identified.
Key uncertainties / gaps	There are uncertainties surrounding the implementation of transport sector PaMs, and their potential emissions reductions. No transboundary consultation has been carried out. There are uncertainties regarding the air quality impacts that adopted PaMs will deliver.
Any PaMs for methane and/or coal phase out?	Coal phase-out by 2025 identified as a PaM selected for adoption.
Expected compliance	Compliance is predicted for all pollutants in the WAM scenario.
Overall credibility of NAPCP	The NAPCP indicates compliance for all pollutants, but it is unclear how some adopted PaMs will deliver sufficient emissions reductions to ensure compliance.
Transparency	Outcomes of the consultation process have not been made available, and details of the projection methodology and approach are lacking.
Completeness	Projections do not include all sectors for all pollutants.
Consistency	There appear to be inconsistencies between projections and the historic inventory.
Accuracy	There appear to be inconsistencies between projections and the historic inventory, resulting in inaccuracies in the overall projections.

[a] Note: At the time of writing, Italy's NAPCP was available only as a draft.

Member State	Malta (MT) [a]
Timelines of reporting	NAPCP and PaMs submitted via EEA PaM-tool on 18 March 2020.
Use of common format	Common format partially used.
Public consultation	Stakeholder and public consultations reported to have been completed but no working links provided to consultation outcomes.
Existing PaMs	Shift to ultra-low sulphur fuel in power plants; reform in power sector; ban of leaded petrol; public transport reform; increasing roadside checks and road worthiness testing; economic measures and incentives related to the road sector; environmental permitting for industry.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with no information provided regarding the methodology. Brake wear for electric vehicles has been omitted from projections with no explanation. Emissions appeared to be inaccurate for some sectors (including SO2 from 1A3bii Road Transport).
Additional PaMs considered	An additional 42 PaMs were reported covering energy consumption and supply, industry, transport, and agriculture. These include: • Financial support schemes for solar PVs; • Developing a Soil Action Plan; • Conducting a study into the implementation of Low Emission Zones; and • Developing a national cycling strategy.
Additional PaMs selected for adoption	All PaMs identified for consideration have been selected for adoption. No detail is provided on the process for selecting and adopting PaMs.
Credibility of PaMs	Five of the 42 considered PaMs are included in the WM scenario and should not be considered as additional PaMs. Emissions reductions are reported for packages of PaMs, not for individual PaMs, making it difficult to assess their credibility. Insufficient information provided regarding PaMs for the industry sector, raising questions about their credibility. Timescales for PaMs implementation are generally realistic

Member State	Malta (MT) [a]
	and justifiable, although sources of funding for implementation are not identified.
Key uncertainties / gaps	Not all reported PaMs have been included in projections and it is unclear what their impact on future emissions reductions will be.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance is predicted for all pollutants in the WM and WAM scenarios except for NO_x (2030 ceiling) and NMVOCs (2020 and 2030 ceilings).
Overall credibility of NAPCP	The NAPCP identifies that Malta is at risk of non-compliance with NOx and NMVOC commitments in 2030 and does not sufficiently detail how PaMs will ensure compliance.
Transparency	Insufficient information is provided concerning some PaMs, and details of the projection methodology and approach are lacking.
Completeness	Details on consultations are not accessible. Not all considered PaMs are included in future projections.
Consistency	PaMs reported in the NAPCP are not consistent with those in the EEA-PaM tool.
Accuracy	Emissions projections do not cover all sectors, and there are inaccuracies in emissions for some sectors.

[a] Note: A members' survey form was not completed and returned for Malta. The MS Factsheet for Malta has therefore been completed by AQC based on a review of the NAPCP.

Member State	Poland (PL)
Timelines of reporting	NAPCP published on 29 June 2019.
Use of common format	Common format partially used.
Public consultation	Public consultation held between 1 February 2019 and 22 February 2019. Link provided to consultation responses. Links are also provided to comments gathered during consultations with government ministries and agencies, the Committee for European Affairs, the Permanent Council Committee of the Council of Ministers, and the Council of Ministers. No feedback was provided on comments/contribution made by the public and NGOs through the public consultation.
Existing PaMs	Historic emissions trends are presented and the key drivers for reductions to date are identified. These include: • Implementation of EU legislation for combustion plants, agriculture, solvent use, and road transport emissions; and • Introduction of fuel requirements for the energy and industry sectors.
Credibility of projections data (with measures scenario)	Projections were included but not using the correct reporting format. Submitted projections lacked sufficient detail and documentation, with limited information provided regarding the methodology. Projections did not appear to omit any sectors.
Additional PaMs considered	The NAPCP presents 18 PaMs, although these are mainly existing measures and are incorrectly identified as 'additional'. No PaMs have been identified for adoption in the EEA-PaM tool. PaMs in the NAPCP include: • Prohibition of ammonium carbonate fertiliser use; • Implementation of a Clean Air Programme; • Introduction of a Low Emission Transport Fund; and • Developing a national policy framework for the development of infrastructure for alternative fuels.

Member State	Poland (PL)
Additional PaMs selected for adoption	A suite of 17 PaMs has been selected for adoption, although eight of these are not listed among the PaMs considered for adoption. This inconsistency is not explained.
Credibility of PaMs	Emissions reductions are reported for packages of PaMs, not for individual PaMs, making it difficult to assess their credibility. Sources of funding for implementation are not identified. There is no assessment about the impact of the proposed measures.
Key uncertainties / gaps	The NAPCP confuses additional and existing PaMs, and does not present any PaMs which do not currently exist. The NAPCP states that a linear emission reduction trajectory is not cost-effective for the first five years and will therefore not be followed. No evidence or reasoning is provided to justify this decision. No impact of PaMs on air quality is provided.
Any PaMs for methane and/or coal phase out?	The Programme refers to the 2040 Polish Energy Strategy and is mentioning coal phase out; however, without providing any detail, specific date or commitments. Methane is not mentioned in the Programme.
Expected compliance	Compliance is predicted for all pollutants in the WAM scenario.
Overall credibility of NAPCP	The NAPCP indicates compliance for all pollutants. However, the WAM scenario is not representative of additional PaMs, as it consists of existing PaMs. Uncertainties and inaccuracies in the projections suggest that there is a risk that commitments are not met, especially as the projections achieve compliance by only a slight margin.
Transparency	Details of the projection methodology and approach are lacking.
Completeness	Projections include all relevant sectors for all pollutants.
Consistency	There appear to be significant internal inconsistencies in the NAPCP, with unexplained discrepancies between considered and adopted PaMs.
Accuracy	Projections for 2025 are based on a linear interpolation between 2020 and 2030 predictions, which is an inaccurate projection approach.

Member State	Poland (PL)
	Projections for transport emissions of NO_x do not account for anticipate reductions in vehicle emissions in future years.

Member State	Portugal (PT)
Timelines of reporting	NAPCP published on 1 April 2019.
Use of common format	Common format used.
Public consultation	No public consultation undertaken to date.
Existing PaMs	Historic emissions trends are presented and the key drivers for reductions to date are identified covering the agriculture, energy supply, industry and road transport sectors. These include: • Reducing the use of nitrogen fertilisers; • Implementing heat recovery technologies in place of fireplaces; • Introduction of Low Emission Zones in cities; and • A clean air media campaign.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with limited information provided regarding the methodology. Projections did not appear to omit any sectors.
Additional PaMs considered	No additional PaMs have been considered.
Additional PaMs selected for adoption	No additional PaMs have been selected for adoption.
Credibility of PaMs	No additional PaMs have been selected for adoption.
Key uncertainties / gaps	No additional PaMs have been selected for adoption.
Any PaMs for methane and/or coal phase out?	No additional PaMs have been selected for adoption.
Expected compliance	Existing PaMs are projected to result in non-compliance with emissions reduction commitments for most pollutants for 2030 onwards. No PaMs have been considered or adopted, and no WAM scenario is presented in the NAPCP.

Member State	Portugal (PT)
Overall credibility of NAPCP	The NAPCP identifies that existing PaMs are not sufficient to achieve emissions reduction commitments, but no additional PaMs are presented. It remains unclear how the NAPCP will ensure compliance.
Transparency	Details of the projection methodology and approach are missing.
Completeness	No additional PaMs are identified to ensure compliance with the emissions reduction commitments. Emissions of NH_3 from non-road transport are not included in projections; all other sources are correctly included.
Consistency	There appear to be inconsistencies in incorporation of some sectors (stationary combustion, mobile combustion, fugitive emissions and agriculture) in projections.
Accuracy	There appear to be inaccuracies in incorporation of some sectors (stationary combustion, mobile combustion, fugitive emissions and agriculture) in projections.

Member State	Sweden (SE)
Timelines of reporting	NAPCP published on 28 March 2019. Corrections were submitted on 25 October 2019.
Use of common format	Common format used.
Public consultation	A draft NAPCP was subject to public consultation from 16 November 2018 to 7 January 2019. The consultation report is included in Annex 4 of the Background Report.
Existing PaMs	Existing PaMs are not identified in the NAPCP.
Credibility of projections data (with measures scenario)	Projections were submitted in the correct reporting format. Submitted projections lacked sufficient detail and documentation, with limited information provided regarding the methodology. Projections appeared to omit some sources including 5B2 anaerobic digestion at biogas facilities.
Additional PaMs considered	Of 15 additional PaMs considered, 12 were selected, targeting agriculture, energy supply, industry and transport. These include: • Changes in spreading and storage of manure; • Implementing NOx reductions in existing combustion plants; • Phasing out old diesel-fuelled passenger cars and light duty vehicles; • Increased electrification of the vehicle fleet; and • Changes in social behaviour and transport infrastructure planning.
Additional PaMs selected for adoption	12 considered PaMs have been selected for adoption. An accompanying Background Report points out that PaMs were selected on the basis of a cost-benefit appraisal and consideration of the timescales needed to address the compliance gaps.
Credibility of PaMs	Emissions reductions are provided individually for PaMs, but only for NH_3 and NO_x. PaMs in the agricultural sector are expected to be funded via the European Agricultural Fund for Rural Development. PaMs related to NH_3 are reliant on voluntary measures, impairing the

Member State	Sweden (SE)
	credibility of achieving emissions reductions. Funding sources are not clearly identified for other PaMs.
Key uncertainties / gaps	PaMs related to the transport sector are dependent on behavioural changes and modal shifts, and there are uncertainties associated with this.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	The NAPCP projects compliance with emissions reduction commitments for all pollutants, but with no margin of safety for NOx and very small margin of safety for NH3.
Overall credibility of NAPCP	PaMs are reliant largely on voluntary measures and behavioural changes, and leave no margin of safety, so there is significant uncertainty regarding their capability to ensure compliance.
Transparency	Details of the projection methodology and approach are missing.
Completeness	The NAPCP lacks a description of existing PaMs. No policy priorities are identified for the agriculture and energy/industry sectors. Projections appeared to omit some sources. Some information is not given in the NAPCP itself, but in an accompanying Background Report which is not fully consistent with the NAPCP.
Consistency	Datasets used in projections differ from those used in NECP projections. However, projected emissions are consistent with historical emissions.
Accuracy	Emissions projections use Tier 1 methodologies for some sectors, which limit the accuracy.

Member State	Slovakia (SK) [a]
Timelines of reporting	NAPCP submitted on 9 March 2020. PaMs submitted via EEA PaM-tool on 30 March 2020.
Use of common format	Common format partially used.
Public consultation	The NAPCP is reported to have been based on proposals arising from discussions at meetings of working groups of the Air Protection Strategy. It is unclear who comprises these working groups. Proposed measures were subsequently consulted with the World Bank. No links to the outcome of these consultations are provided, and there is no evidence of a public consultation.
Existing PaMs	Summary of significant drivers of emissions reductions between 2004 and 2017 provided by pollutant. These include: • Low sulphur content fuel and plant desulphurisation (SO_2); • Renewal of road vehicle fleets (NO_x); • Introduction of low-solvent coating types (NMVOCs); • Increased use of inorganic nitrogen fertilisers (NH_3); and • Compliance with BATs for the energy sector ($PM_{2.5}$).
Credibility of projections data (with measures scenario)	Projections did not omit any sources and were submitted in the correct reporting format. Minor inconsistencies and inaccuracies found in $PM_{2.5}$ projections, but not for other pollutants. Submitted projections were not sufficiently detailed and documented.
Additional PaMs considered	Additional measures identified for a WAM and WAM+ scenario, including: • Support for alternative fuelled vehicles and vehicle testing; • Support for households to replace solid fuel boilers with low-emissions systems; • Implementing wood moisture standards for fuel wood; • Review of options to introduce inspections of household solid fuel use; • Termination of coal mining in the Upper Nitra mines; and

Member State	Slovakia (SK) [a]
	• Support for connecting households to district heating.
Additional PaMs selected for adoption	All additional PaMs considered were selected for adoption except for supporting connection of households to district heating systems. No detail is provided on the process for selecting and adopting PaMs.
Credibility of PaMs	Additional PaMs selected for adoption appear to be coherent with other policy requirements, including the NECP. Planned implementation periods and implementing authorities are clearly defined. Projected emissions reductions from measures targeting agriculture and energy consumption appear to be unrealistically high. Funding sources are not identified for all adopted PaMs, raising questions about how they will be implemented.
Key uncertainties / gaps	Projections of emissions reductions under the WAM scenario are not presented, only described, and there are no quantifications under the WAM+ scenario.
Any PaMs for methane and/or coal phase out?	None explicitly reported.
Expected compliance	Compliance is predicted for all pollutants in the WAM scenario except for SO_2 and NO_x. No information provided regarding compliance under the WAM+ scenario.
Overall credibility of NAPCP	The NAPCP identified that Slovakia is at risk of non-compliance with commitments in 2030 and does not sufficiently detail how PaMs will ensure compliance.
Transparency	Details on projections, especially WAM and WAM+ scenarios, are not provided.
Completeness	Information on consultations has not been provided. Unclear how PaMs have been identified and selected for adoption.
Consistency	PaMs are consistent and coherent with other policy priorities. Minor inconsistencies in NAPCP.
Accuracy	Emissions reduction potential of some PaMs appear to be overestimated.

[a] Note: A members' survey form was not completed and returned for Slovakia. The MS Factsheet for Slovakia has therefore been completed by AQC based on a review of the NAPCP.

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