Guidance on Regional Haze State Implementation Plans for the Second Implementation Period

US EPA, OFFICE OF AIR QUALITY PLANNING AND STANDARDS

SEPTEMBER 10, 2019

Regional Haze Program

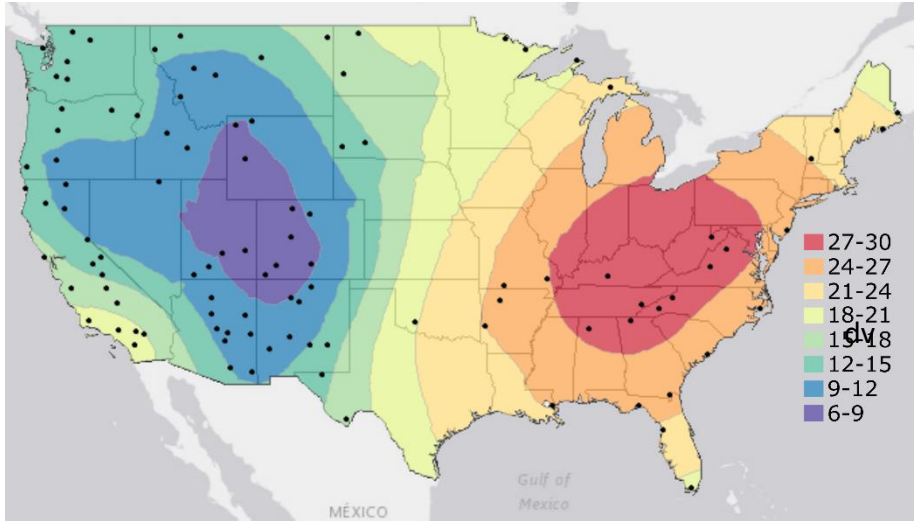
"Regional haze" is defined at 40 CFR 51.301 as "visibility impairment that is caused by the emission of air pollutants from numerous anthropogenic sources located over a wide geographic area."

The Regional Haze Rule (RHR or Rule) requires states to submit a series of State Implementation Plans (SIPs) to protect visibility in Class I areas and governs states' obligations and EPA's review of periodic SIPs.

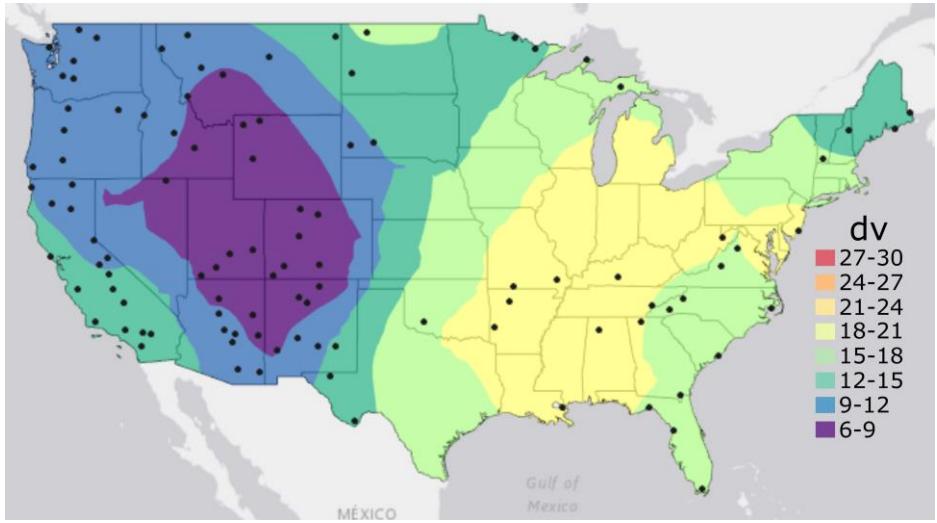
In January 2017, EPA issued a final rule updating the regional haze program for the second and subsequent implementation periods, including revising portions of the visibility protection rule promulgated in 1980 and the Regional Haze Rule promulgated in 1999.

First Planning Period: Visibility is Improving

2000-2004
Visibility (dv) on 20% most impaired days



2013-2017
Visibility (dv) on 20% most impaired days



The National Park Service estimates that as of mid-2014, emission controls established under the first planning period led to approximately 500,000 tons/year of SO_2 and 300,000 tons/year of NOx reductions. EPA estimates that visibility has improved significantly with the average visual range increased by 20 – 30 miles in Class I areas.

Ongoing Regional Haze Work

Resolve remaining first implementation period obligations, following a SIP path where possible.

Support states for the second and future implementation periods:

- 2018 Technical Guidance (completed Dec. 2018)
- Guidance on Regional Haze State Implementation Plans for the Second Implementation Period (completed Aug. 2019)
- 2028 Modeling (expected Summer 2019)

Key principles for the second planning period include:

- Implementing the program with states in the lead (cooperative federalism).
- Reducing state planning burdens and supporting states in complying with the CAA.
- Leveraging emission reductions achieved through other CAA programs that will further improve visibility in protected areas.
- Ensuring that we are on a path that enables compliance with the CAA and improved visibility in Class I areas.

Key Similarities and Differences: 1st and 2nd Implementation Periods

Similarities: 1st period and 2nd period

- There are no bright lines in the rule for what is reasonable, and therefore necessary, for states to include in their long-term strategies (LTS) for making reasonable progress.
- EPA maintained the approach to SIP development (develop LTS based on statutory and regulatory considerations, then project Reasonable Progress Goals (RPGs)).

Differences: 1st period vs. 2nd period

- Focus in 2nd period is on reasonable progress, as opposed to 1st period focus on both BART and reasonable progress.
- Visibility benefits are one of the five factors for BART identified in the first period, but are not one of the four statutory factors identified for reasonable progress.
- Unlike the 2005 BART Guidelines (which were required by the Act and described how to quantify the five statutory factors for BART in the first period), the RHR does not dictate an analytical methodology for evaluating the reasonable progress factors and instead provides a flexible process for states to follow in developing approvable submissions.
- Tracking metric uses anthropogenic impairment (vs. worst visibility).
- 51.308(f) is the applicable regulation, rather than 51.308(d) and 51.308(e)

Regional Haze Guidance: Purpose and Goals

Purpose: To help states develop approvable regional haze 2nd implementation period SIPs consistent with the Clean Air Act and the Regional Haze Rule.

The goals of this Guidance Document include:

- Support states in developing SIPs for complying with the CAA visibility requirements
- Highlight the discretion and flexibilities states have within the statutory and regulatory requirements to develop regional haze SIPs
- Reduce state planning burdens
- Leverage emission reductions achieved through CAA and other programs that further improve visibility

The required content of these SIPs is specified in the Regional Haze Rule (RHR) (40 CFR 51.308(f)), which was revised in 2017.

SIP Development Steps in the Guidance

Step 1	Ambient Data Analysis (covered in a December 2018 technical guidance document)
Step 2	Determination of Affected Class I Areas in Other States
Step 3	Selection of Sources for Analysis
Step 4	Characterization of Factors for Emission Control Measures
Step 5	Decisions on What Control Measures are Necessary to Make Reasonable Progress
Step 6	Regional Scale Modeling of the LTS to set RPGs for 2028
Step 7	Progress, Degradation, and URP glidepath checks
Step 8	Additional Requirements for SIPs

Consultation with Other States

Applies to many of the steps in the guidance document.

The Regional Haze Rule requires states to consult with other states that have emissions reasonably anticipated to contribute to visibility impairment in the same Class I area or areas.

States should consult with each other at a point in the process that is early enough, to the extent possible, to result in coordinated emission reduction strategies for making reasonable progress.

States are proceeding with SIP development on different timelines, and should initiate their consultation process whenever it makes sense to engage with other states in a timely manner.

Consultation meetings should be documented and responses to other states should be in writing.

Step 1 – Ambient Data Analysis

Applies only to a state with a Class I area.

The separate 2018 EPA Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program document addresses this step and can be found here:

https://www.epa.gov/visibility/technical-guidance-tracking-visibility-progress-second-implementation-period-regional

- How to identify the 20 percent most anthropogenically impaired days and the 20 percent clearest days.
- How to determine baseline, current, and natural visibility conditions for each Class I area within the state.

A webinar was held for the 2018 Technical Guidance in February 2019, and the webinar slides can also be found on the above website.

Step 2 - Determination of Affected Class I Areas in Other States

Applies to all states.

This step addresses how a state determines which out-of-state Class I areas “may be affected by emissions from the state.”

The state then considers these Class I areas (in addition to the areas within their states) in later steps to develop their long-term strategies (LTS) that include the control measures necessary to make reasonable progress.

A state has the flexibility to use any reasonable method for quantifying the impacts of its own emissions on out-of-state Class I areas, and it may use any reasonable assessment for this determination.

Step 2 - Determination of Affected Class I Areas in Other States (cont'd)

Determinations of affected Class I areas may be retained from the first implementation period; however, states should also consider whether any assumptions underlying previously determined linkages have changed.

States reassessing their linkages for the second implementation period may make this determination based on the state's recent emissions or anticipated emissions in 2028.

The most common approach to assess which out-of-state Class I areas may be affected by aggregate emissions from a given state in the first implementation period was to use a photochemical transport model to track the contribution due to emissions from whole states to specific Class I areas.

This determination is a suitable topic for interstate consultation, which should be documented.

What's Covered in Step 3 - Selection of Sources for Analysis

a) Determining which pollutants to consider

b) Estimating baseline visibility impacts for source selection

c) Using estimates of visibility impacts to select sources

d) Option to consider the four statutory factors when selecting sources

e) Option to consider the five additional factors when selecting sources

f) Sources that already have effective emission control technology in place

g) Special considerations for wildland fires

h) Documentation of the source selection process and result

Step 3 - Selection of Sources for Analysis Key Messages

Applies to all states.

The step addresses how states select the emission sources for which an analysis of emission control measures will be completed.

Selection of a source at this step does not necessarily mean emission controls will ultimately be required for that source.

A state may consider estimated visibility impacts (or surrogate metrics for visibility impacts), the four statutory factors, the five required factors listed in the RHR (section 51.308(f)(2)(iv)), and any other factors that are reasonable to consider.

Determining which pollutants to consider

- IMPROVE data and the 2018 EPA technical guidance document can be used to develop light extinction budgets (i.e., pie charts showing the light extinction contribution from each ambient PM species) for single days and average budgets for the 20 percent most anthropogenically impaired days.

Step 3 - Selection of Sources for Analysis Key Messages (cont'd)

Estimating baseline visibility impacts for source selection

States may find some or all of the following techniques useful for the source selection process for the second implementation period.

- Emissions divided by distance (Q/d)
- Trajectory analyses
- Residence time analyses
- Photochemical modeling (zero-out and/or source apportionment)

States have the flexibility to express visibility impacts in units of light extinction (inverse megameters, Mm^{-1}) or in deciviews.

We recommend that states use estimates of 2028 emissions (resolved by day and hour, as appropriate) to estimate visibility impacts (or related surrogates) when selecting sources, rather than values of recent year emissions.

Step 3 - Selection of Sources for Analysis Key Messages (cont'd)

Using estimates of visibility impacts to select sources

- A state may define a reasonable value of its chosen metric to serve as a threshold, such that only sources with impacts above this threshold are selected for analysis of control measures.

Option to consider the four statutory factors when selecting sources in Step 3

- At the source selection stage, a state can consider any or all of the four reasonable progress statutory factors, if that information is already available particularly:
  - Remaining useful life
  - Cost of compliance

Option to consider the five additional factors when selecting sources in Step 3

- States can consider the long-term strategy five additional factors when selecting sources in this step or in step 4 when evaluating control measures, but the five factors must be considered in developing the LTS.

Sources that already have effective emission control technology in place

- It may be reasonable for a state not to select an effectively controlled source, such as recent installed controls for complying with New Source Performance Standards (NSPS) or went through Best Available Control Technology (BACT) review under the Prevention of Significant Deterioration (PSD) .

Step 3 - Selection of Sources for Analysis Key Messages (cont'd)

Special considerations for wildland fires

- The Regional Haze Rule defines wildland wildfires to be natural events.
- For the purpose of the regional haze program, EPA considers prescribed fires to be anthropogenic sources of visibility-impairing pollutants.
- The Rule requires all states to consider basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs in their LTS (one of the five additional factors).
- The Rule allows states to propose an adjustment to the endpoint of the Uniform Rate of Progress (URP) glidepath to account for wildland prescribed fire impacts.
- If in-state prescribed fires contribute significantly to visibility impairment at one or more Class I areas, the state may show it has considered basic smoke management practices and smoke management programs in any reasonable way, which might or might not involve an analysis of control measures, to meet the Rule requirement.

Documentation of the source selection process and result

- The RHR requires SIPs to include a description of the criteria used to determine the sources or groups of sources it evaluated for potential controls and a state must document the technical basis, including modeling, monitoring, cost, engineering, and emissions information, of its source selections.

What's Covered in Step 4 - Characterization of factors for emission control measures

a) Determining which emission control measures to consider

b) Selection of emissions information for characterizing emissions-related factors

c) Characterizing the cost of compliance (statutory factor 1)

d) Characterizing the time necessary for compliance (statutory factor 2)

e) Characterizing energy and non-air environmental impacts (statutory factor 3)

f) Characterizing remaining useful life of the source (statutory factor 4)

g) Characterizing visibility benefits

h) Reliance on previous analysis and previously approved approaches

Step 4 - Characterization of Factors for Emission Control Measures Key Messages

Applies to all states.

This step addresses how a state should characterize (i.e., collect information on) the relevant factors (four statutory factors and visibility benefits) that are necessary to make reasonable progress.

- Cost of compliance
- Time necessary for compliance
- Energy and non-air environmental impacts
- Remaining useful life of the source

A state may also consider one or more of the five additional factors in the RHR (section 51.308(f)(2)(iv) – a state must consider these factors in source selection, the control analysis, or both), as well as the visibility benefit of an emission reduction measure.

The Rule provides states with considerable flexibility to decide how to characterize the factors, but the approaches must be reasonable and documented.

Step 4 - Characterization of Factors for Emission Control Measures Key Messages (cont'd)

Determining which emission control measures to consider

- The first step in characterizing control measures for a source is the identification of technically feasible control measures for those pollutants that contribute to visibility impairment.
- The projected 2028 scenario can be a reasonable and convenient choice for use as the baseline control scenario for measuring the incremental effects of potential reasonable progress control measures on emissions, costs, visibility, and other factors.
- The state must consider the emission reduction measures identified by other states for their sources as being necessary to make reasonable progress in a Class I area.

Selection of emissions information for characterizing emissions-related factors

- Use emissions information to estimate the emission reductions from the potential control measures
- The emissions reductions are then used to calculate cost effectiveness and estimate visibility benefits

Step 4 - Characterization of Factors for Emission Control Measures Key Messages (cont'd)

Characterizing the cost of compliance (statutory factor 1)

- We recommend the use of Air Pollution Control Cost Manual in order to facilitate apples-to-apples comparisons of control options.

Characterizing the time necessary for compliance (statutory factor 2)

- A state should justify the time needed to install a control measure as being reasonable.

Characterizing energy and non-air environmental impacts (statutory factor 3)

- This factor involves assessing the energy consumed by a control measure installed at a source and generation of wastes for disposal and impacts on other environmental media, such as nearby water bodies.

Characterizing remaining useful life of the source (statutory factor 4)

- Typically, states would consider this factor by considering the useful life of the control system rather than the source.

Step 4 - Characterization of Factors for Emission Control Measures Key Messages (cont'd)

Characterizing visibility benefits

- If using visibility benefits of controls as a factor, states should analyze the benefits of the control measure using natural background conditions and in light extinction units.

Reliance on previous analyses and previously approved approaches

- It may be appropriate for a state to rely on a previous BART analysis or reasonable progress analysis for the characterization of a factor.
- For example, information developed in the first implementation period on the availability, cost, and effectiveness of controls for a particular source, if the previous analysis was sound and no significant new information is available.

What's Covered in Step 5 – Decisions on What Control Measures are Necessary to Make Reasonable Progress

a) Considering the cost of compliance and visibility benefits

b) Time necessary for compliance

c) Energy impacts and non-air quality environmental impacts

d) Remaining useful life

e) Establishing emission limitations, compliance schedules, and other measures necessary to make reasonable progress

Step 5 – Decisions on What Control Measures are Necessary to Make Reasonable Progress Key Messages

Applies to all states.

This step addresses how a state makes decisions about what emission control measures for a source are necessary to make reasonable progress.

A state should make control decisions that are reasonably consistent among and across sources within the state.

Consider measures adopted by other contributing states, including all measures that have been agreed upon through interstate consultation.

Step 5 – Decisions on What Control Measures are Necessary to Make Reasonable Progress Key Messages (cont'd)

Considering the cost of compliance and visibility benefits

- States can consider visibility benefits of potential control measures.
- A state may find it useful to develop thresholds for single metrics to organize and guide its decision-making, but must explain the reasoned basis of any thresholds.
- A measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.

Time necessary for compliance

- We recommend that states consider the time necessary for compliance as part of their determination of what compliance deadlines for selected control measures are reasonable. The regulations preclude considering the fact that a control cannot be installed and become operational within the implementation period in determining whether a measure is necessary to make reasonable progress.

Energy impacts and non-air quality environmental impacts

- EPA recommends that states consider energy impacts by accounting for any increase or decrease in energy use at the source as part of the costs of compliance.
- EPA recommends that states consider relevant non-air quality environmental impacts, such as water usage or waste disposal of spent catalyst or reagent.

Step 5 – Decisions on What Control Measures are Necessary to Make Reasonable Progress Key Messages (cont'd)

Remaining useful life

- EPA recommends that states consider remaining useful life by using it to calculate emission reductions, annualized compliance costs, and cost/ton values.

Establishing emission limitations, compliance schedules, and other measures necessary to make reasonable progress

- SIPs are required to include enforceable emission limitations (or other measures), deadlines for their implementation, and provisions to make the measures practicably enforceable including averaging times, monitoring requirements, and record keeping.
- If a state determines that an emission control at a source is necessary to make reasonable progress and there is not already an enforceable emission limit corresponding to that control in the SIP, the state is required to adopt emission limits based on those controls as part of its LTS in the SIP via the regional haze second implementation period plan submission.

Step 6 - Regional Scale Modeling of the LTS to Set the RPGs for 2028 Key Messages

Applies only to a state with a Class I area.

In this step, States will determine the visibility conditions in 2028 that will result from implementation of the LTS and other enforceable measures to set the Reasonable Progress Goals (RPGs) for 2028.

The relationship between the LTS and the RPGs for the clearest and most impaired days is a key concept in the regional haze program, as the two RPGs provide a way for the states to check the projected outcome of the LTS against the goals for visibility improvement.

Step 6 - Regional Scale Modeling of the LTS to Set the RPGs for 2028 Key Messages (cont'd)

Adjustment of RPGs using a post-modeling approach

- At the time a state (or an RPO on behalf of a state) is prepared to model the impacts of states' Long Term Strategies, the outcome of some final state decisions on emission control measures may not be known.
- The comparison of the RPG for the 20 percent most anthropogenically impaired days to the URP glidepath must be done with an RPG value that reflects only measures that have been adopted or will be adopted.
- If measures (including out-of-state measures) change after the modeling has been completed, it is possible to use a post-modeling approach to adjust an RPG before the SIP revision is submitted.

Step 7 - Progress, Degradation, and URP Glidepath Checks Key Messages

Applies only to a state with a Class I area.

This step addresses how a state compares the RPGs to the baseline period and the Uniform Rate of Progress (URP) glidepath.

The Rule requires:

- Comparing the 20 percent most anthropogenically impaired days and the 20 percent clearest days in 2028 at the in-state Class I area to 2000-2004 conditions.
- Determining the URP that would achieve natural conditions at the in-state Class I area in 2064.
- Comparing the 2028 RPG for the 20 percent most anthropogenically impaired days to the 2028 point on the URP glidepath for the in-state Class I area.

Step 7 - Progress, Degradation, and URP Glidepath Checks Key Messages

If the RPGs are above the URP glidepath, the guidance offers examples approaches to meeting the Rule requirement to make a “robust demonstration” that no further control measures would be reasonable to require.

Calculation of the number of years it would take to attain natural visibility conditions

- If a state’s RPG is above the URP glidepath, the state must calculate the number of years it would take to attain natural visibility conditions if visibility improvement were to continue at the rate of progress selected by the state as reasonable for the implementation period.

Step 8 - Additional Requirements for SIPs

Applies to all states.

This step addresses a few additional rule requirements, including consultation with other states, tribes (if applicable), and consultation with FLMs.

The second implementation period SIP should include a progress report addressing the period since submission of the progress report for the first implementation period.

Monitoring strategy and other elements

- IMPROVE Program
- Baseline and future inventories

Appendices

APPENDIX A - Clean Air Act Provisions, and EPA Rulemakings, and EPA Guidance Documents Related to SIPs Addressing Visibility Protection

- Handy summary of the CAA provisions, and all rulemakings and guidance on Regional Haze

APPENDIX B - Relevant Provisions of the Regional Haze Rule (40 CFR Part 51) as Revised in 2017

- Selected provisions from the Regional Haze Rule relevant to the preparation of SIPs due by July 31, 2021

APPENDIX C - Definitions

APPENDIX D - Steps in Developing a Regional Haze SIP

- Detailed list of steps for what should be included in a Regional Haze SIP
- Could be used as a “check list”

Steps for Success

Early engagement with your EPA Regional Office

- EPA Regional Offices can work with you to answer specific questions regarding sources, emissions controls, and potential state approaches
- OAQPS/HQ can provide clarification on the Regional Haze Rule and program requirements and ensures program consistency across the nation

Selection and decision criteria should be documented for each relevant step.

States should ensure that all decisions are supported by reasonable analyses and explanations.

Consult with other states when ready but early enough to coordinate emission reduction strategies.

Questions?

Following the webinar, if you have questions, please contact your EPA Regional Office.

If you need help with contacting the appropriate Regional Office, please email Liz Etchells at etchells.elizabeth@epa.gov

The guidance document and webinar slides will be posted here:

https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period