The Western United States is diverse and unique in climate, topography, land ownership, energy resource portfolios and demographics—all of which affect the efforts of western states and utilities to provide for the region’s energy needs. These factors also impact efforts to manage familiar air quality issues. New regulatory requirements, along with changes to the electricity system, are likely to influence western air quality management into the future.
The American West conjures images of wide-open spaces, pristine natural areas, and spectacular scenic vistas. While these are among the defining characteristics of the region, the West is, above all, very diverse. This diversity can profoundly influence air quality issues and associated challenges faced by electric utilities.

The West is served by a combination of electric utility companies and organizations, including investor-owned utilities, public utilities, and cooperatives. The generation and delivery of electricity to customers occurs largely within the context of the Western Electricity Coordinating Council (WECC) electric grid—an interconnected grid covering an 11-state region that also includes two provinces in western Canada and the Baja Norte region of Mexico. The WECC is a non-organized market in which the 38 balancing authorities tasked with managing power transactions often overlay two or more states. It is common for generation in one state to serve customers in another state.

The utility generation assets serving the region are diverse (see Figure 1). Historically, hydropower and thermal generation have comprised a significant amount of generation within the Pacific Coast states, while the Intermountain states have been more heavily dependent on coal-fired generation due to the presence of vast coal and lignite reserves. While sub-regions within the WECC continue to rely on coal, nuclear and hydro generation, changing state policies, regulatory drivers and fuel economics are combining to change the portfolio mix, especially with respect to capacity additions of gas, wind, and solar.

**Emissions from Western EGUs**

Existing western electric generating units (EGUs), like their eastern counterparts, are required to meet emission limitations for an extensive list of air pollutants including sulfur dioxide (SO2), oxides of nitrogen (NOx), particulate matter, mercury, and other hazardous air pollutants. Many western EGUs were built after the U.S. Clean Air Act (CAA) Best Available Control Technology requirements were in place and, therefore, have newer and more pollution control devices than older EGUs. More recently, numerous western units have completed, or committed to, new, additional pollution controls, fuel

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<th>2015 Net Generation by State/Province (GWh)</th>
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<td>British Columbia</td>
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<td>Baja California (WECC)</td>
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**Figure 1.** Net generation by state/province (GWh), 2015.  
conversions or retirements in response to new or updated standards and emission limitations and the growing concern about greenhouse gases (GHGs).

Figure 2 reflects the decline in emissions of two key pollutants (sulfur dioxide and oxides of nitrogen) from fossil fuel-fired generation in the West based on 1995–2015 data. These two pollutants are significant under the Regional Haze Rule (RHR), the Acid Rain Program, and the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide and ozone. Controls used for these purposes along with technology to reduce particulate matter also play a role in helping utilities to meet standards for hazardous air pollutants.

However, even as additional reductions are realized from EGUs and other significant sources in the West, other factors are making it more difficult to achieve CAA objectives. The impact of fire is especially large in the West, where over 70 percent of all fires in the United States have occurred during the past two decades. Persistent drought in some regions of the West has exacerbated the frequency and severity of fire and windblown dust events. Additionally, transport of air pollution from international sources as far away as Asia is now well documented. The returns from further investments in reducing emissions from local and regional domestic sources are offset by non-anthropogenic and anthropogenic sources beyond the control of local regulators.

**Western Utility Air Issues in the Near Term**

While GHG regulation is certainly an issue of more recent focus, conventional CAA air pollutant programs continue to be front and center on the agendas of the western states and electric utilities. Requirements arising out of the RHR and the ozone NAAQS programs raise the complex issues of background and transported air pollution.

**Regional Haze**

Perhaps no other air quality issue is as deeply associated with the Western United States as regional haze. Of the nation’s 156 Class I Federal areas, 118 are located in the western states. Western states, utilities, and stakeholders were engaged in the first discussions regarding source-specific attribution,
leading to additional pollution controls or early retirement of coal generation in the West.

Following the CAA Amendments of 1990, the U.S. Environmental Protection Agency (EPA), western states, Federal Land Managers, and stakeholders, including the electric utilities, participated in the efforts of the Grand Canyon Visibility Transport Commission and its successor organization the Western Regional Air Partnership to produce pioneering contributions to the development and implementation of the first round of RHR planning. Indeed, much of the visibility protection framework in the existing RHR and the foundation of western regional haze planning was formulated in the West by these stakeholder processes.

As a general matter, western air quality provides superior visual range on the clearest days compared to other parts of the United States (see Figure 3). However, the ambitious goals associated with the RHR, coupled with public expectations regarding protection of the national parks, monuments, and wilderness areas, pose significant challenges for air quality planners and regulated sources.

The national visibility goal established by the U.S. Congress—“...the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution”—is not directly enforceable by a specific date. Rather, EPA and the states as co-regulators have responsibility to establish and implement a process of consultation, assessment, and planning that lead to emission controls on anthropogenic sources of visibility-impairing emissions. A well-conceived approach is intended to result in making “reasonable progress” toward the national visibility goal.

During the first planning period, over 50 stationary sources in the western states, including many fossil-fuel-fired EGU’s, were subject to Best Available Retrofit Technology (BART) determinations for visibility-impairing pollutants. In most cases, states made determinations about what controls were appropriate to reduce emissions of sulfur dioxide, oxides of nitrogen, and particulate matter. EPA then reviewed these determinations for consistency with the RHR. This became a contentious matter as EPA rejected a number of these determinations and substituted its own federal implementation plans. EPA also made “Reasonable Progress” determinations requiring additional controls on certain non-BART units. Several of these EPA actions have been litigated in the federal courts with a few waiting for final decisions. In other cases, settlement agreements were negotiated resulting in retrofits of pollution control equipment and/or the closure of certain coal boilers.
EPA recently proposed “Amendments to Requirements for State Plans” and “Guidance on Progress Tracking Metrics, Long-term Strategies, Reasonable Progress Goals and Other Requirements for Regional Haze State Implementation Plans,” both of which will apply during the second implementation period. Many western electric utilities commented on these proposals revealing several concerns about the regional haze program going forward. Concerns include:

- The basic requirements of Section 169A of the CAA adopted by Congress assigned a central role to the states and that role should be preserved with respect to the development of reasonable progress goals and long-term strategies.
- Western states have asserted that while it is an important guidepost, achieving “natural conditions” in Class I Federal areas should not be the overriding factor in planning decisions. It is not possible to completely remove manmade impairment from the nation’s vistas, especially due to emission sources outside the United States.
- The second planning period must focus on the diverse and broad range of significant sources affecting visibility conditions in mandatory Class I Federal areas through the use of improved methods of finding and accounting for air pollution. Focusing on stationary sources alone will not achieve sufficient progress especially on the worst visibility days. EPA has been urged to make adjustments to better account for the effects of smoke and the transport of emissions from sources beyond the borders of the United States.
- The role of “reasonably attributable visibility impairment” creates a misplaced emphasis in the context of the regional haze program and should be eliminated or substantially reconfigured.

Finally, a major issue for all utilities is EPAs proposal to “clarify the relationship between reasonable progress goals and long-term strategies,” which is the subject of litigation affecting the Texas and Oklahoma state plans. EPAs proposed approach returns the program to a BART-like process in determining controls for stationary sources, but without consideration of the impacts on visibility. Many utilities assert this is both an incorrect view of Congressional intent and an inappropriate federal intrusion to the state role under the CAA.

**Ozone**

EPA’s 2015 adoption of a more stringent ozone standard raises questions for some utilities regarding further reductions to address nonattainment areas. Historically, ozone in western states has not produced the regional-level nonattainment challenges that are persistent in the East. Instead, ozone nonattainment strategies have been focused on populous urban areas. Going forward, ozone will present different technical challenges.

Western air regulators point out that ozone exceedances in remote locations, including western national parks, originate from what is likely a mix of anthropogenic and non-anthropogenic sources. The transport of pollutants, and the role of natural events such as wildfires and stratospheric intrusions are just a few examples of scientific issues that are not well understood.

The Western States Air Resources Council (WESTAR) has commented on these challenges:

“There are significant uncertainties about the origin, magnitude, frequency, duration and geographic distribution of ozone in the West. Transported background ozone or the precursor pollutants that cause ozone may originate in another state, in Mexico, Canada, or Asia. It may be the product of wildfires. Characterizing multiple natural events (wildfire, stratospheric intrusions), occurring with varying intensities, and sometimes overlapping over space and time will require resources beyond the states’ limited means. Implementing a more stringent ozone standard in the West will require a much better understanding of the role of background and transported ozone .”

EPA is not due to finalize nonattainment designations for the 2015 ozone standard until 2017, but states are already
faced with making new pollution control decisions. This challenge is likely to impact conventional pollutant emissions as well.

The Road Ahead

The U.S. electricity generation and delivery systems have experienced a profound transition in recent years brought about by a myriad of factors. New requirements to address GHG emissions loom large as drivers for accelerating change. In particular, the Clean Power Plan, which is now in the hands of the federal courts and soon to be in the hands of a new Administration, attempts to leverage options available to electric utility companies both within and outside the “fenceline” of EGUs. In addition, other factors, including the changing economics of competing forms of electricity generation as well as numerous state-level energy and climate policies, are working to produce changes in western electric resource portfolios that affect not only GHG emissions, but are likely to impact conventional pollutant emissions as well.

References


3. The 1978 Powerplant and Industrial Fuel Use Act barred the use of oil and natural gas as a primary fuel in new EGUs until it was repealed in 1987.

4. For a discussion of atmospheric chemistry and the roles of sulfur dioxide and nitrogen oxides with respect to visibility impairment, see Section 4 of William C. Malm, Introduction to Visibility, Cooperative Institute for Research in The Atmosphere, Colorado State University (May 1999).


10. Section 169A(f) of the CAA states: “For purposes of section 7604(a)(2) of this title, the meeting of the national goal specified in subsection (a)(1) of this section by any specific date or dates shall not be considered a ‘nondiscretionary duty’ of the Administrator.”

11. See testimony of Aaron Flynn, Hearing on EPA’s Regional Haze Program: Litigation During the Program’s First Planning Period, U.S. House Committee on Science, Space, and Technology Subcommittee on Environment (March 23, 2016).

12. Settlements involving RHR requirements and that include the retirement of coal boilers have been negotiated for several facilities, such as the San Juan Generating Station in New Mexico, the Navajo Generating Station on the Navajo Nation, the Boardman facility in Oregon, the Craig Station in Colorado, and others.


15. See, for example, Testimony of Will Allison, Director of Air Pollution Control Division, Colorado Department of Public Health and Environment, EPA Public Hearing – Denver, CO (June 1, 2016).

16. Mary Uhl, WESTAR Testimony, Denver, CO (June 1, 2016) at p. 1. “As we have learned from data analysis and research, the 1999 Regional Haze Rule goal of attaining “Natural Conditions” at Class 1 Federal areas by 2064 is not universally achievable unless some revisions are made. Although we can do everything feasible and reasonable over time to make significant reductions in manmade pollution under state and federal control, we are still challenged by visibility impairment from transported international pollution and natural sources of haze such as wildfires, dust storms, and volcanic activity, which can overwhelm the benefits achieved by local, state, and federal controls that reduce anthropogenic emissions on the haziest days in the West.”

17. See related discussion by the U.S. Court of Appeals for the Fifth District in granting the Petition for a Stay in Texas et al. v. EPA, No. 16-60118, July 15, 2016, at p. 28-31.

18. Letter from Western States Air Resources (WESTAR) Council to EPA (Docket ID No. OAR-HQ-OAR-2008-0699), March 16, 2015, at p. 4.