SO₂ NAAQS
DATA REQUIREMENTS RULE

WHAT TO EXPECT, AND WHEN.

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This month, EM focuses on what states and facilities can expect, and when, in complying with the 1-hr sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS).

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A Bright Future on Solid Ground

by Dallas Baker, P.E., BCEE

Being President of A&WMA this past year has been an honor and a privilege. Certainly, 2015 will reside in my professional life as one I will reflect upon with great fondness due to the many relationships I’ve made. As my term comes to an end and I prepare to transition to the role of Immediate Past-President, I look forward to supporting incoming President Brad Waldron and the 2016 Board of Directors. The incoming leadership is balanced, experienced, and passionate about the Association and its Mission. Our future is bright.

Every President will remember his or her Board of Directors. I was blessed with an outstanding one that rolled up their sleeves, unified behind a vision, and advanced the position of the Association as well as any other. I am grateful for the support I’ve received during the past 12 months, especially from Past-President Michael Miller and Vice Presidents Diane Freeman, Kim Marcus, and Chris Nelson. I want to thank Diane, along with Brent Nixon, for their terrific service to the Board as their distinguished terms come to an end. I also want to thank departing Council Chairs Jennifer Tullier (Young Professionals) and Harry Klodowski (Sections & Chapters) for their outstanding service. These individuals represent the best and brightest of our organization.

This year was successful. Of the objectives I set out to achieve, a few remain unfinished perhaps, but one goal I wrote about in January, and of which I spoke at our Annual Business Meeting in June, was setting us on a sound fiscal path forward. Before I report our progress, I would be remiss if I didn’t acknowledge the leadership of Executive Director Stephanie Glyptis in this effort. Leading her capable team of association professionals at headquarters and working directly with the Board, Stephanie relentlessly identified cost control measures while preserving services and benefits where possible. Her dedication to the success of operations and serving our members is recognized by everyone on the Board. I give her a large measure of credit for the progress I’m pleased to be able to report.

At the end of 2014, the financial statements showed that the Association spent over $435,000 more than it received. In January, I looked at the neutral budget last year’s board approved and conservatively projected we could experience another six-figure net loss if revenues were less than strong and costs weren’t controlled. I’m pleased to report, as of this writing, we are expected to realize a net surplus by year’s end. We will begin 2016 in good standing and with a balanced budget, which is a testament to the professionalism and dedication of your leadership across the organization.

Reflecting on the many highlights this year brought, one that stands out was the keynote address of U.S. Environmental Protection Agency (EPA) Administrator Gina McCarthy at the Annual Conference & Exhibition. I enjoyed moderating the keynote program and hearing her perspectives on upcoming policies. Having the regulatory community look upon the Association as a respected, balanced forum to reach those it impacts, and having immediate reaction from those they regulate is something for which I have continuously advocated. My hope is that A&WMA builds upon these successes and assists in the professional development and critical decision-making of its members to benefit our noble profession and society.
The U.S. Environmental Protection Agency’s (EPA) 1-hr National Ambient Air Quality Standard for sulfur dioxide (SO2 NAAQS), established in June 2010, is somewhat unique in that air dispersion modeling and/or traditional monitoring data could be used to show compliance. While intended to provide states with additional flexibility, due to the inherently conservative nature of EPA’s preferred regulatory model, AERMOD, affected facilities and states were both challenged to complete the analysis needed for area designation and develop plans showing a path forward to attainment. In the first five years of the SO2 NAAQS, only 29 nonattainment areas have been determined, leaving the majority of the United States undesignated.

In April 2014, EPA proposed the SO2 Data Requirements Rule (DRR), which described the process to be used by the remaining undesignated areas to determine attainment or nonattainment with the SO2 NAAQS. Following the March 2015 filing of a consent decree, the final DRR was issued, establishing thresholds and timelines for analysis to meet the designation deadlines agreed upon in the consent decree.

The following two articles focus on the status of area designations for the 1-hr SO2 NAAQS, what to expect from the final DRR, and what to expect moving forward. The first article details the recent actions related to the 2010 SO2 NAAQS, and how these new actions push the schedule for area designations in the coming years. The DRR took a bit of the uncertainty out of the process, and established which areas would be more closely reviewed, as the article by Scott Janoe and Zach Craft discusses. In addition to areas with monitored data showing SO2 levels above the NAAQS, consistent with the consent decree, areas containing coal-fired power plants, areas with industrial sources emitting more than 2,000 tons per year, and areas determined to have clusters of smaller sources of SO2 emissions have to follow specific steps and timelines as part of the SO2 designation process.

The second article picks up with a discussion on the impacts of the DRR on facilities and the larger air quality community. The article, by Richard Hamel, notes that while the DRR took some of the uncertainty away and established a timeline for designation, the amount of analysis needed by states and affected facilities is significant given the relatively short timeframe. While providing some clarity, there are still questions that remain for those entities conducting the current and subsequent rounds of SO2 designation analysis. This article combines the progress made so far on the SO2 DRR and the additional clarifications that will be needed when considered alongside recent proposed updates to EPA’s analysis guidance.

Many thanks to the authors for contributing to this issue by sharing their experiences and perspectives on the challenges and opportunities states and facilities face when complying with the SO2 NAAQS.
1-Hr SO$_2$ NAAQS Designations and Implementation

A summary of the sequence of designation steps for four types of areas in the wake of the SO$_2$ NAAQS consent decree and final data requirements rule.
The U.S. Environmental Protection Agency’s (EPA) 1-hr National Ambient Air Quality Standard for sulfur dioxide (SO₂ NAAQS) has triggered a reevaluation of all areas where air quality might exceed the standard.

In issuing its final rule establishing the current SO₂ NAAQS in 2010, EPA emphasized its views that it must “ensure[e] the NAAQS is attained everywhere as expeditiously as possible,” and to that end that dispersion modeling reflects “the most technically appropriate, efficient, and readily available method for assessing short-term ambient SO₂ concentrations in areas with large point sources.”¹ SO₂ NAAQS attainment status has not been widely determined during the first five years, as EPA has so far designated only 29 SO₂ nonattainment areas in 16 states.² The vast majority of the United States remains undesignated for the SO₂ NAAQS.³

However, two subsequent actions have resulted in a flurry of EPA and state activity assessing ambient SO₂ levels. First, the agency entered a consent decree, which sets timelines for EPA to designate all remaining areas of the United States as attainment, nonattainment, or unclassifiable for the SO₂ NAAQS.⁴ Second, EPA issued its final SO₂ Data Requirements Rule directing states to take specific measures to determine SO₂ levels around numerous industrial facilities that collectively emit a majority of nationwide SO₂ emissions.⁵ For areas that are designated nonattainment for SO₂, the state air agency will become responsible for submitting a plan that will achieve compliance with
the SO₂ NAAQS within five years of the designation. In addition, new and modified industrial facilities in that area will be subject to more stringent air permitting rules. 3

This article summarizes the sequence of designation steps that follow from these two actions for four types of areas: areas containing coal-fired power plants, areas with monitoring data above the SO₂ NAAQS, areas with sources emitting more than 2,000 tons per year SO₂, and areas with clusters of smaller SO₂ sources.

Areas with Coal-Fired Power Plants
Outside of the 29 SO₂ nonattainment areas established in 2013, most of the areas to be designated next for the SO₂ NAAQS are areas that include certain coal-fired power plants. 4 Under the consent decree, EPA must designate areas containing plants that meet at least one of the following two criteria within 16 months of the consent decree’s entry (i.e., by July 2, 2016): 5

- The plant emits more than 16,000 tons per year SO₂; or
- The plant emits more than 2,600 tons per year SO₂ with an annual average emission rate of at least 0.45 lb of SO₂ per million BTUs.

The consent decree further specifies that these emission rates must be determined by reference to 2012 data from EPA’s Air Markets Database. As this database only includes power plants, and non-coal-fired plants would not be expected to have such SO₂ emission rates, the criteria have the effect of only affecting coal-fired units. 6 EPA’s latest announcement indicates that the agency has identified 68 plants that meet these criteria. 7

EPA’s most recent guidance on SO₂ designations advises that the agency expects to “consider county boundaries as the analytical starting point for determining SO₂ nonattainment areas.” 8 Thus, SO₂ emissions sources located within a county or otherwise near a coal-fired power plant may also be affected by EPA designations.

Areas with SO₂ Levels above the NAAQS
In addition to areas with coal-fired power plants, the consent decree also sets a July 2, 2016 deadline for EPA to designate for the SO₂ NAAQS any areas that have not yet been designated but, “based on air quality monitoring in the three (3) full calendar years preceding such deadline have monitored violations of the 2010 revised primary SO₂ NAAQS.” 9

This part of the consent decree will likely affect a relatively small number of areas in addition to those containing coal-fired power plants. EPA’s March 2015 communications to the states on SO₂ designations addressed areas that might meet this criteria based on 2012–2014 SO₂ ambient monitoring data in Georgia, Hawaii, Missouri, North Dakota, Wisconsin, and Wyoming. 10 It is possible that this list of areas may change: the list was compiled using 2012–2014 data, but the “three (3) full calendar years preceding” July 2, 2016 (i.e., the consent decree’s express basis for data that would trigger the July 2, 2016 deadline) would include 2013–2015.

Areas with Sources Emitting More Than 2,000 Tons
For areas with industrial facilities emitting more than 2,000 tons per year SO₂, the designation timeline is more complex. To the extent such areas are not already subject to a July 2, 2016 deadline (i.e., based on the presence of a coal-fired power plant or ambient air monitoring data exceeding the SO₂ NAAQS), EPA’s consent decree deadline to designate these areas will depend on the states’ decisions on how to implement the SO₂ Data Requirements Rule, which applies to sources emitting more than 2,000 tons per year SO₂. 11 Two tracks are possible:

2017: First, “for a majority of the country,” EPA will promulgate an SO₂ designation by December 31, 2017. 12 The consent decree sets this deadline “for remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO₂ monitoring network meeting EPA specifications.” 13 In other words, the deadline is for all undesignated areas that have
not elected to use monitoring to comply with the SO\textsubscript{2} Data Requirements Rule. For sources subject to the SO\textsubscript{2} Data Requirements Rule, this provision of the consent decree may be construed to include areas for which a state elects to use dispersion modeling to characterize the SO\textsubscript{2} source\textsuperscript{19}, or sets an enforceable emission limit to reduce the source’s annual SO\textsubscript{2} emissions below 2,000 tons\textsuperscript{20}.

\textbf{2020:} Second, for those areas that are characterized using new ambient monitoring data under the SO\textsubscript{2} Data Requirements Rule, EPA will promulgate an SO\textsubscript{2} designation by December 31, 2020. The consent decree expressly applies this deadline to “all remaining undesignated areas” not covered by other consent decree deadlines.\textsuperscript{21} Read together with the other consent decree provisions, such areas would be limited to those that use ambient monitors to satisfy the data requirements rule and also lack prior nonattaining monitor data or a coal-fired power plant.

\textbf{Clusters of SO\textsubscript{2} Emission Sources}

Areas containing clusters of SO\textsubscript{2} emissions sources may be subject to the same designation deadlines as areas with sources above 2,000 tons per year—December 31, 2020—if characterized by new ambient SO\textsubscript{2} monitors, or otherwise December 31, 2017. This results from the SO\textsubscript{2} Data Requirements Rule’s applicability language, which extends to areas “that have been identified by the [state] air agency or the EPA Regional Administrator as requiring further air quality characterization.”\textsuperscript{22} EPA’s \textit{Federal Register} preamble suggests that the agency may plan to exercise this discretionary authority “where multiple smaller sources located in close proximity may collectively exceed the emissions thresholds and/or cause or contribute to NAAQS exceedances.”\textsuperscript{23}

\textbf{Conclusion}

Between the consent decree and the SO\textsubscript{2} Data Requirements Rule, EPA has set in motion a chain of events to develop significant new information
By 2020, EPA's new regime will affect a variety of SO₂ sources over a large part of the United States.

About ambient SO₂ levels near large SO₂ sources and ultimately use that information to identify new SO₂ nonattainment areas. The first affected sources will generally be coal-fired power plants and any other large SO₂ sources near them. By 2020, EPA's new regime will have the same effect for a variety of SO₂ sources over a large part of the United States.

References
8. These areas appear most likely to be in Georgia, Hawaii, Missouri, North Dakota, Wisconsin, and Wyoming.
9. These areas are in Arkansas, Colorado, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Missouri, Mississippi, North Carolina, North Dakota, Nebraska, New York, Ohio, Oklahoma, South Dakota, Tennessee, Texas, and Wisconsin.
10. Consent Decree at para. 1(b).
11. An exception to the July 2, 2016 deadline exists for coal-fired plants that have been announced for retirement. These units are not subject to the July 2, 2016 deadline. Consent Decree at paras. 1(b)-(c).
16. 40 C.F.R. § 51.1202 (eff. Sept. 21, 2015) (“This subpart applies to any air agency in whose jurisdiction is located one or more applicable sources of SO₂ emissions that have annual actual SO₂ emissions of 2,000 tons or more . . .”). As indicated below, EPA has also taken the position that clusters of SO₂ sources may be subject to the SO₂ data requirements rule.
17. 80 Fed. Reg. at 51,053, Tbl. 2.
18. Consent Decree at para. 2.
19. As allowed by 40 C.F.R. § 51.1203(d) (eff. Sept. 21, 2015).
21. Consent Decree at para. 3.
22. 40 C.F.R. § 51.1202 (eff. Sept. 21, 2015).
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Attainment Designations and the SO₂ Data Requirements Rule:

Progress So Far, But What Happens Next?

The designation process for the 1-hr sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS) has provided a seemingly endless amount of business for air dispersion modelers, monitoring experts, and other consultants for more than two years. Since the U.S. Environmental Protection Agency (EPA) issued its first set of 120-day letters in February 2013, identifying the 29 areas for which EPA proposed to make its initial nonattainment designations, a great deal has occurred, and each new event has had an impact on the air consulting world.

With the comment period now closed for agency, industry, and public input regarding the July 2016 deadline for designations under the Sierra Club and Natural Resources Defense Council vs. EPA consent decree, we pause to look at those events and how they impacted the process, and as the next round...
of work appears on the horizon in the context of the finalized 1-hr SO₂ Data Requirements Rule (DRR) and the proposed revisions to Appendix W (the federal guidelines on air quality modeling), we consider how these developments will affect the next wave of designation based work.

The History
The first set of nonattainment designations for 1-hr SO₂ came into effect in August 2013, triggering a series of complicated studies, many of which are still underway, to determine a path forward to get those areas into attainment. These studies have often involved the use of non-default features of EPA’s preferred regulatory model, AERMOD, or even the development of alternative modeling approaches requiring repeated interactions with EPA over many months to gain approval. Others have involved the deployment of on-site meteorological towers and ambient monitors to collect data for future designation work.

In May 2014, EPA issued the proposed DRR to provide a process by which the rest of the country would be designated relative to the NAAQS by proposing emission thresholds above which a facility would have to be studied, either via air dispersion modeling or ambient monitoring, to determine the attainment status of the area around it.

Additionally, the proposed rule established a recommended timeline for two additional sets of designations: December 2017 for designations based on modeling studies, and January 2020 for monitor-based designations. States and Tribal Agencies would have to decide by January 2016 whether each study would use the modeling or monitoring path, and those that were intent on using monitoring would need to have the monitors in place by January 2017. The final rule was expected to be released near the end of 2014.

With at least a proposed framework to define what facilities would be affected and how the studies should be approached, many companies began executing internal studies, generally under client–attorney privilege to protect their data, to determine where they stood relative to the standard and to allow time to prepare should any changes need to be made to bring the facility into compliance. The volume of this work tapered off, however, as the release date for the final rule was delayed by nearly a year to September 2015.

Enter the Consent Decree
That lull in the action ended quickly on March 2, 2015, when a consent decree was filed resolving a lawsuit brought by Sierra Club and Natural Resources Defense Council against EPA. The consent decree had two important elements to it: First, it created an additional, more immediate deadline for designations to be made for facilities with 2012 emissions of more than 16,000 tons of SO₂ (or more than 2,600 tons of SO₂ at an average SO₂ emission rate of 0.45 lb/MMBtu or higher, according to EPA’s Clean Air Markets.
Facilities that had announced units for retirement by the date of the consent decree were exempt, leaving 69 facilities affected immediately. Interestingly, as the Clean Air Markets Database only records emissions from electricity generating units (EGUs), this earlier deadline was targeted directly at coal-fired power plants to the exclusion of many non-power generating facilities across the United States with emissions higher than those affected by the new round of designations.

The second important element of the consent decree was that it formalized the two designation dates in the proposed DRR. This created an interesting dilemma: With the deadlines for the final two rounds of designations now fixed, the clock was ticking not only for the facilities above the thresholds in the consent decree, but also all of the other facilities with emissions above the proposed thresholds in the DRR. With the final DRR not yet published, there was the potential that the fixed deadlines could approach or even occur before the final rule was in place. But, without the final rule to confirm that the proposed approaches to attainment demonstrations would be those put in the final rule, or what the final emissions thresholds were that would require a facility to perform a study, how would one be sure that the time and effort put into an attainment study would ultimately meet the requirements of the finalized rule, or indeed, depending on which of the three emission thresholds in the proposed rule was chosen as the final, whether a facility was required to perform a study at all?

The Modeling Frenzy Begins

Despite these questions, with the timelines now fixed facilities moved forward with their studies under the assumption that the procedures for modeling and monitoring to gain an attainment designation would not change significantly from the Technical Assistance Documents (TADs) for modeling and monitoring that had existed in draft form since December 2013. This approach was not unusual in the air dispersion modeling world, where the vast majority of modeling guidance exists only in draft form in a variety of EPA memoranda and other documents, but is often treated as official.

For the facilities included in the first round of designations, the already shortened timeline was further compressed. With all of the opposing interests related to each facility, the EPA Regions expected to have to quickly review the validity of as many as three separate modeling studies per facility on the consent decree list, from industry, state agencies, and outside interveners. As a result, the EPA Regions set a deadline for input from the state agencies and outside interests of September 18, 2015, for recommendations regarding attainment designations. Because of this, the six-month period from March to September 2015 was a frenzy of modeling studies that kept air dispersion modelers from environmental consulting companies across the country working late nights trying to keep up.

Because of the shortened deadline, there was no time to consider the monitoring route for these facilities. Instead, modeling under the guidelines set in the draft SO2 Modeling TAD was the order of the day. That guidance followed a methodology with some significant differences from typical regulatory modeling: Rather than attempting to predict the worst-case future air quality as is the rule when modeling during a permitting action, the SO2 Modeling TAD specifies that the modeling should characterize the air quality as it stands now or “modeling represents monitoring,” with significant changes to standard permit modeling. They include:

- the ability to model the three most recent years of actual emissions data rather than modeling worst-case potential to emit (PTE) emissions for each source;
- the use of full stack heights, regardless of whether those stack heights exceeded the good engineering practice (GEP) formula heights for each stack; and
- the placement of model receptors only where a monitor could reasonably be sited, meaning that bodies of water, fenced-in areas precluded from public access, and other locations could potentially be excluded from the receptor grid.

Typically, the process for these studies involved first modeling the PTE emissions of the facility if
there was any hope of a modeled result below the standard, because facilities demonstrating impacts below the standard using PTE emissions would not be subject to additional work in the future to show continued compliance with the NAAQS. Failing a successful modeling study using PTE, which was the case with nearly all of the facilities on the consent decree list, modeling with actual emissions was then attempted.

If that modeling also failed, a further round of modeling including refinement of the meteorological data and ambient background concentrations and possibly engineering changes to the facility itself would be tried. Finally, if it were determined that a modeling solution could not be found, the modeling results, along with other data, could instead be used to inform the placement of ambient monitors, either as part of the State Implementation Plan (SIP) or to develop a three-year monitoring plan for those facilities not part of the consent decree designations.

Appendix W and the Final Data Requirements Rule
As the consent decree modeling was nearing completion, facilities that were likely to be included in the next round of designations were also modeling their sites and many states were performing modeling of their own, with or without input from the facilities they were studying. Around this time, however, two additional curves were thrown at those affected by the DRR:

- On July 29, 2015, the proposed Revision to the Guideline on Air Quality Models (Appendix W) was published in the Federal Register.\(^4\) Along with the proposed changes to the guidance came a new version of AERMOD, as well as a recommendation that a new feature of AERMOD that corrects known issues in the model in certain low-wind conditions that is currently a non-default option, become a default part of the model.
- As many consultants, state agency modelers,
and concerned industry experts converged on Research Triangle Park for the 11th Conference on Air Quality Modeling and Proposed Rulemaking at EPA Headquarters, the final version of the DRR was signed on August 10, 2015, setting the threshold at which facilities were required to perform attainment studies at 2,000 tons. Additionally, a new option for attainment was presented: those facilities that chose to take an enforceable limit of 2,000 tons of SO₂ or less by January 13, 2017, would be exempt from further study.

Questions Moving Forward
The final DRR rule leads us to where we are today. Unfortunately, the level of detail in the final DRR was less than most interested parties had hoped for. Additionally, the proposed changes to the Guideline on Air Quality Models, while offering new refinements based on better science, are currently still considered to be non-default. These developments leave several important questions that may impact how the next round of SO₂ designation studies will be performed:

• Most agencies and industry have been operating under the assumption that the emissions threshold selected would not only be the most stringent that EPA proposed (1,000 tons in areas with populations over one million people or 2,000 tons for less populated areas), but that the final rule would eliminate the two-pronged approach and simply set the limit to 1,000 tons. Additionally, states still have the option to include any source, regardless of their emissions, if they believe there may be a concern with NAAQS compliance in their area. An example of this might be several sources just under the threshold clustered in an urban area that individually might not be a problem, but cumulatively could cause a NAAQS violation. But, if those facilities are all under 2,000 tons/year SO₂ emissions, could they not all simply take the 2,000-ton limit and be exempt from further review?

• Also regarding the 2,000-ton annual emissions threshold. What if a facility is just over the threshold and modeling shows potential impacts above the NAAQS, can that facility agree to take an annual 2,000-ton emission limit without having to demonstrate that the new limit would produce modeled results under the standard? While the rule would seem to suggest so, some states are proceeding as if this is not the case.

• The LOWWIND3 option for AERMOD, which corrects known issues that cause AERMOD to over-predict impacts in some low-wind situations and often results in lower modeled impacts, is proposed to become a default part of the AERMOD system, but currently is still considered non-default. As a result, justification for the use of LOWWIND3 would be required and have to be approved by the reviewing agency before being allowed, a process that can often take close to a year of negotiations back and forth to resolve. In fact, the proposed revisions might be made default faster than the process of getting the non-default option approved. The LOWWIND3 option, if the proposed revisions do go through, will be default before the deadline to submit modeling demonstrations, but potentially after the deadline to commit to a modeling or monitoring study, which is July 2016. Should those conducting modeling assume that LOWWIND3 will be made default at the risk that it may not be if the difference is compliance or non-compliance?

• Last, the final DRR did not clarify how EPA will address on-going maintenance of areas designated attainment using modeling featuring actual emissions, or monitors deployed for attainment designation purposes. For modeling, the requirements could range anywhere from performing a new study every year or several years on a rolling three years of recent actual emissions data to simply having to file paperwork periodically to show that a facility’s emissions have not increased such that the NAAQS might be threatened. It is suggested that monitors might be shut down depending on how low the ambient concentrations are found to be, but the criteria are not concretely defined.

Conclusion
These issues and more face those undertaking modeling exercises for their upcoming attainment demonstrations. The states themselves are also grappling with these issues without more detailed...
guidance from EPA, and each seems to have a slightly different approach. For LOWWIND3, some states are assuming it will be added as a default feature to AERMOD and are using it now. Others are holding off until the proposed revisions are approved. Without clarity on how to handle sources that may cause an attainment problem but are below the 2,000-ton threshold, most states appear to be moving forward almost as if the option to accept a 2,000-ton enforceable limit doesn’t exist. How will that play out?

Finally, there is the issue of maintenance: what are the conditions that require re-modeling a facility when actual emissions were used in the attainment demonstration and how long and under what conditions must a monitor employed to make an attainment designation continue operations? All of these questions need to be answered in the next few months. As usual, the best advice is to talk to your local state agency to better understand their approach and to work collaboratively toward a successful attainment study.

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**References**

Airport Carbon Accreditation: A Unique Industry-Driven Sustainability Program

The Airport Carbon Accreditation (ACA) Program, The Climate Registry (TCR), and CDP (formerly the “Carbon Disclosure Project”) are three voluntary sustainability programs with a focus on carbon management in the marketplace. While TCR and CDP are examples of industry-neutral programs that promote self-disclosure of an organization’s impacts as a first step toward identifying risk and opportunities along the path of sustainable development, the ACA Program takes the additional step of defining differentiated, but complimentary, pathways for members in a specific industry group to join in coordinated climate action.
In June 2009, the Airports Council International implemented the ACA Program with the objective of providing airports an industry-relevant carbon management standard. The ACA Program enjoys great popularity internationally with 119 participating airports and membership is expected to grow with the recent expansion of the ACA Program to North America. Over the past 12 months, four airports in the United States and two airports in Canada have successfully achieved ACA accreditation, while many other U.S. airports have expressed interest in joining the program.4 As of August 2015, a total of 125 airports have registered with the ACA Program. Figure 1 visualizes the distribution of airport participation by region.

The appeal of the ACA Program is due, in part, to good design, as well as successfully demonstrating positive outcomes. Conceived by practitioners in the airport industry for use by their peers, the ACA Program stipulates requirements that are concise, targeted, and directly relevant to airports, while at the same time flexible enough to account for an airport’s size, resources, and breadth of climate action. Additionally, the environmental performance data collected from participating airports enables the ACA Program to assert with high confidence the level of greenhouse gas (GHG) abatement achieved by its members. In the last year alone, ACA-certified airports reduced 375,493 metric tons of carbon dioxide (CO2) emissions,5 which is approximately equivalent to the 2014 GHG emission output of the Dighton natural gas-fired power plant in Massachusetts with nameplate capacity of 200 MW.6

**Levels of ACA Certification**

The ACA Program provides airports with a common framework for gradually managing the climate change impact of their operations, as well as those of close partners, including airlines, tenants, and customers. Airports entering the program must decide the extent to which they will commit to managing their carbon impact according to a four-level incremental scale. The key requirements by certification level are briefly described below. Additional descriptions of each certification level can be found online at www.airportcarbonaccreditation.org.

**Level 1.** Airports must assess the GHG impact of their own operations, that is Scope 1 and Scope 2 emissions as defined by the World Business Council for Sustainable Development’s GHG Protocol.7 Typically, Level 1 carbon footprints reflect emissions associated with electricity purchases, natural

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4. **Source:** Annual Report 2014-2015; Airport Carbon Accreditation, August 2015, p. 4.

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**Figure 1.** Accredited airports by region, worldwide.

gas combustion for heating, and transportation fuel combustion from the airport’s vehicle fleet.

**Level 2.** In addition to Level 1 requirements, airports must have a strategic plan for attaining GHG emission reductions, adopt an emission reduction target, and, more importantly, demonstrate an emissions performance improvement. The latter implies that an airport has assessed its Scope 1 and Scope 2 carbon footprint for at least two consecutive years in order to demonstrate a decreasing trend in GHG emissions.

**Level 3.** In addition to Level 2 requirements, airports must assess the GHG impact of close partners, such as airlines, tenants, and customers, and engage key partners in designing supplemental GHG emission reduction strategies. While airports must demonstrate emissions improvement of their own operations (i.e., Scope 1 and Scope 2 emissions), attainment of emissions reductions from airlines, tenants, and customers is not an ACA Program requirement.

**Level 3+.** In additional to Level 3 requirements, airports must attain carbon-neutrality for activities within their control (i.e., Scope 1 and Scope 2 emissions). This is typically accomplished through a combination of emission reduction strategies implemented on-site and the procurement of carbon offsets.

**Tips for a Smooth ACA Certification**

While the ACA Program is by design accessible to any interested airport, there are some elements that may pose a challenge to potential participants, especially those with little or no experience with carbon footprint verification. For airports considering participation in the ACA Program, below are five tips that can smooth the certification process.

1. **Become familiar with the carbon footprint verification requirements.** Note that at any level of participation, airports must have their carbon footprint verified by an independent third-party. More importantly, airports entering the program at Level 2 and beyond must verify at least two consecutive years of historic carbon footprint data, so that they can satisfactorily demonstrate emissions improvement over time.

2. **Minimize the number of individual GHGs covered in the airport’s carbon footprint.** While an airport may choose to assess GHG emissions for all six Kyoto Protocol-named gases, the ACA Program only requires the assessment of CO₂. Airlines should consider the merits of this option because, in most cases, reducing GHG coverage helps airports focus limited resources on the big carbon footprint drivers (e.g., electricity, natural gas consumption), rather than smaller and less consequential emission sources such as refrigerant leaks from air conditioning equipment.

3. **Allow sufficient time and resources for verification activities.** Verification is an iterative auditing process that requires close communication and coordination between the airport and verifier. Factors that increase the timeline for verification include the number and complexity of emissions sources, as well as the selected level of ACA certification. On the other hand, the verification process becomes more agile after the first year of verification, once the airport becomes familiar with the particulars of the ACA Program and verifiers become better acquainted with an airport’s organization, staff, and data management systems.

4. **Choose the appropriate level of ACA certification.** The level of certification should be commensurate to the strength and breadth of existing policies, procedures, and data management systems. For instance, Level 3 certification should only be pursued if the airport has commissioned or prepared a study that quantifies emissions from aircrafts, ground support equipment, and ground access vehicles.

5. **Contact an ACA administrator with questions.** Unlike some online retailers, ACA representatives are available to answer questions by phone or e-mail. Airports that maintain an open line of communication with the ACA staff from the onset of the application and certification process will certainly avoid bumps down the road.
Conclusion
The ACA Program embodies key features that make it a compelling sustainability initiative. It balances having a rigorous common framework for climate action while maintaining enough flexibility to accommodate a broad range of competencies and resources held by airports. Additionally, participating airports enjoy the hard benefits of reduced energy consumption and improved energy efficiencies, both of which induce GHG emissions reductions and operating cost savings; the economic benefits of carbon management may well extend to airlines and tenants as a result of active stakeholder engagement. Capital investment informed by a strategic carbon management plan could sway top airport decision-makers to pick improvement projects with long-term environmental and social benefits in the immediate vicinity and the region (e.g., think light rail access and connectivity with the greater metro area). Last, but not least, the emission reduction claims of the ACA Program are highly credible because every ton registered in the program has been vetted by an independent third-party or verifier. Actually, it is through the verification process that all stakeholders (i.e., airports, ACA administrators, investors, customers, and so on) have assurance that climate action is real, objective, and verifiable.

References
Dispatch from the 11th Conference on Air Quality Modeling

by Anthony J. Sadar

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Section 320 of the U.S. Clean Air Act requires that the U.S. Environmental Protection Agency (EPA) hold an air quality modeling conference at least every three years. The most recent modeling conference—the 11th Conference on Air Quality Modeling—was held at EPA’s Research Triangle Park, NC, campus on August 12 and 13, 2015. The conference updated the more than 250 attendees on the current status and proposed revisions to 40 CFR Part 51, Appendix W, Guideline on Air Quality Models. This article gives a synopsis of the conference and the public hearing on the associated rulemaking, and looks at some of the most significant substantive proposed revisions to the Guideline.

The conference was formally opened on Wednesday morning by George Bridgers of EPA’s Office of Air Quality Planning and Standards. Following the opening remarks, the conference proceeded with technical presentations by EPA staff on changes to Appendix W and American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), the workhorse dispersion model for most modeling projects. A new version of AERMOD (v. 15181), which included enhancements...
to its formulation and application such as the incorporation of the Buoyant Line and Point Source (BLP) dispersion algorithm, was released just prior to the conference and is the subject of much of the proposed revisions to Appendix W.

**Proposed Revisions to Appendix W**

EPA officials discussed several of the most significant *Guideline* revisions. (Note: Originally published in April 1978,1 the *Guideline* was later revised in 1986 and updated with supplements in 1987, 1993, and 1995. Revisions to the *Guideline* were also made in 2003 and 2005.) Some notable changes include: meteorological data for dispersion models; long-range transport (LRT) for National Ambient Air Quality Standards (NAAQS) and increment assessments; fine particulate matter (PM$_{2.5}$) and ozone in prevention of significant deterioration (PSD) compliance demonstrations; and impact analyses.

**Meteorological Data for Dispersion Models.**

EPA is allowing the incorporation of “prognostic meteorology data as an option where there is no representative National Weather Service (NWS) station, and it is prohibitive or not feasible to collect adequately representative site-specific data.” The Mesoscale Model Interface (MMIF) program is proposed as a tool to inform regulatory model applications. MMIF converts prognostic meteorological model output fields, such as from the Weather Research and Forecasting (WRF) model, to the parameters and formats needed for input into dispersion models.

**LRT for NAAQS and Increment Assessments.**

“EPA is proposing to remove CALPUFF as a preferred model for long-range transport and recommending its use as a screening technique along with other Lagrangian models for addressing PSD increment beyond 50 km from a new or modifying source. For NAAQS demonstrations, EPA does not consider a LRT assessment necessary beyond 50 km for inert pollutants.”

**Treatment of PM$_{2.5}$ and Ozone in PSD Compliance Demonstrations.** Section 5 (“Models for Ozone and Secondarily Formed Particulate Matter”) is new to the *Guideline*. This section makes a distinction between “nonattainment planning for NAAQS (multi-source) vs. permit (single source) modeling requirements.” Furthermore, the section emphasizes the importance of developing modeling protocols and consulting with the reviewing authority. A screening approach and an outline of a multi-tiered approach for single source permit assessments are also included in the section. As part of future rulemaking/guidance, EPA intends to provide Model Emissions Rates for Precursors (MERPs) that “represent a level of emissions of precursors that is not expected to contribute significantly to concentrations of secondarily-formed PM$_{2.5}$ or ozone.” A MERP “would neither replace existing Significant Emissions Rates (SERs) for these pollutants nor serve as the basis for the applicability of PSD requirements to sources with emissions above the SER.”

**Impact Analyses.** The proposed revision to Section 8 (“Model Input Data”) of the *Guideline* gives better definition of “the appropriate modeling domain and how to best characterize the various contributions to air quality concentrations in that domain.” Regarding source input, nearby sources “are proposed to be characterized by ‘actual’ emissions rather than ‘allowable’ emissions.” Besides discussion in the body of Section 8, this important change in nearby source input is found in Tables 8-1 and 8-2 of the proposed *Guideline*.

**Presentations and Public Hearing on the Associated Rulemaking**

The conference continued on Wednesday afternoon with a public hearing on the proposed rulemaking. Bob Paine of AECOM spoke on behalf of the American Iron and Steel Institute, Electric Power Research Institute, and Lignite Energy Council. In three separate presentations, Paine highlighted a variety of problematic conditions relative to AERMOD operation, including source characterization issues for near-field modeling involving urban areas and building downwash.

Perspectives from working with the Ambient Ratio Method (ARM) and ARM2 was given by Rich Hamel of ERM’s Boston office. Cathe Kalisz of the American Petroleum Institute gave insight on the
use of AERMOD with an alternate nitrogen oxides chemistry scheme. Bart Brashers of Ramboll Environ and Tom Wickstrom of ERM provided separate reports on the use of MMIF with the WRF model.

David Long of AEP, Mark Garrison of ERM, and Gale Hoffnagle of TRC, representing the concerns of members of the A&WMA Atmospheric Modeling and Meteorology Committee, gave individual presentations. Since reference was made frequently by EPA presenters in the morning session to resolving numerous modeling issues by “consultation with the appropriate reviewing authority” found in paragraph 3.0(b) of the Guideline, Hoffnagle stated that “case-by-case is not guidance.” He further pointed out that the models are being asked to do what they have never been asked to do before, given that in the past averaging times were longer and the inherent uncertainty of models was not as critical.

The Wednesday afternoon session was rounded out by separate presentations on CALPUFF guidance by Christopher DesAutels of Exponent and Mark Garrison of ERM, the SCIPUFF dispersion model by Biswanath Chowdhury of Sage-Management, the recently revamped SCICHEM model by Eladio Knipping of EPRI, and a general policy oriented testimony by Rob Kaufmann of Koch Companies for the NAAQS Implementation Coalition (consisting of trade associations, companies, and other entities dealing with the challenges of meeting the new NAAQS).

The second day of the conference began as the previous day’s afternoon session ended, with a presentation by a representative of the NAAQS Implementation Coalition. Beth Barfield of ERM spoke for the coalition, providing results of an interesting study using virtual sources and model input parameters in AERMOD and related programs to demonstrate significant modeling issues such as model overprediction during very light wind conditions.

David Heinhold of AECOM testified on behalf of the American Forest & Paper Association and the American Wood Council regarding challenges related to modeling low-level emission sources like roadway dust and the legitimacy of locating receptors on railroad tracks and river rapids. Heinhold was followed by Zach Emerson from the National Council for Air and Stream Improvement for the pulp and paper industry, who addressed measurement uncertainty and emissions variability on modeled impacts. He pointed out that the uncertainty associated with emissions data used for model input cannot be ignored, since data treatment methods can adversely impact the ambient concentration results.

Bob Paine of AECOM and Carlos Szembek of ERM gave a good explanation of the use of the Emissions Variability Processor (EMVAP) for determining permitted emission rates for highly variable sources (e.g., emergency backup engines or bypass stacks).

Ron Petersen and Sergio Guerra of CPP, Inc. provided individual presentations on building downwash problems and solutions and background concentration issues and the need for a new approach for updating AERMOD. Guerra was perhaps the most passionate of all the speakers when
he endorsed a Technical Review Advisory Committee (TRAC) to help assure more realistic modeling and more reasonable, timely guidance in the future. The TRAC, composed of leading experts from EPA, industry, and academia, would have the ability “to evaluate, approve, and incorporate new methods without the need to undergo a long and infrequent rulemaking process.”

David Long of AEP explained that, along with other data concerns, the lack of hourly temperature data records in the Clean Air Markets Division dataset used in air quality modeling can lead to some serious issues with AERMOD modeling, since accurate temperature data is needed to “properly calculate plume rise and exit velocity in AERMOD simulations.”

Chris Rabideau of Chevron, on behalf of the API Air Modeling Group, addressed a number of modeling difficulties while endorsing a scientific advisory panel for achieving more expedient modeling guidance (as per TRAC above).

Cindy Langworthy, a lawyer with Hunton & Williams LLP, representing the Utility Air Regulatory Group, expressed one overarching procedural concern: “EPA’s continued reservations about accepting model improvements developed with support from industry groups in order to make timely improvements to EPA’s preferred models.” Langworthy claimed that it has been the group’s experience that “approval of new techniques developed by anyone outside of the federal government are delayed.”

As the Thursday morning session came to an end, George Schewe of Trinity Consultants addressed the question “Is AERSCREEN always greater than AERMOD?” He found that AERSCREEN is not always conservative; it is not always higher than AERMOD for 1-hr concentrations. AERSCREEN is higher for stacks in rural areas, but lower for most source types in urban areas. And his investigation found that AERSCREEN results are generally higher than AERMOD results for 24-hr and annual concentrations. He concluded that the screening model performs better in rural situations and for longer averaging periods. It also performs well for rural and area sources.

Jeff Bennett of Barr Engineering addressed ozone and photochemical modeling and was interested in more details on issues such as the role of MERPs.

This discussion was the last of the prepared presentations. The hearing was then opened to oral comments.

The final commenters of the day were Sierra Club attorney Bridget Lee, Peter Guo of Apex TITAN, and George Schewe of Trinity Consultants.

Lee informed EPA that the Sierra Club is “very concerned with the proposal to incorporate the LOWWIND3 and U* beta options as regulatory defaults” since the adoption of these options “could lead to underprediction of air quality impacts”; and, “with respect to the tier demonstration approach for addressing single source ozone and PM$_{2.5}$ impacts, we’re still in the process of assessing this approach but again have concerns about whether it would fulfill EPA’s obligations under Section 165 [New Source Review regulations].”

Guo recommended the retention of SCREEN3 as a preferred screening model and Schewe noted the untimeliness of the Appendix W changes.

**Post Conference**

The comment period for the proposed changes closed on October 27, 2015. Subsequently, EPA’s goal is to release a comment summary and response by early 2016, make appropriate changes to the *Guideline* for the internal review process by the end of March 2016, and have a final Appendix W revision signed by the EPA Administrator no later than June 2016.

Complete conference information, including the official transcript, can be accessed online at http://www.epa.gov/ttn/scram/11thmodconf.htm.

**Reference**

Looking for 2016 programming and activities for your Section or Chapter? We can help you find a qualified QEP in your area to:

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It seems that Microsoft Windows and Apple OS X users always are on opposite sides of a divide. But the divide is vanishing, or at least becoming less of an issue. Business computing is more operating system (OS)-neutral and hardware-independent than ever before. No matter your job or role, your preferred OS or device, you can pretty much access the information you need and perform any necessary functions 24/7, no matter where you are.

Some OS Differences Remain…
Personally, I avoid turning on my Windows PC. It takes a long time to start up and crashes now and then, leaving me with the “blue screen of death.” Similarly, I dread Microsoft’s “update Tuesdays” when my PC automatically applies hundreds of thousands of updates at the most inconvenient time. I head for the break room for a fresh cup of brew. Eventually, the updates are complete and I start my work.

My PC needs new life breathed into it. Maybe it’s time for an OS upgrade or a new computer altogether. The last time I upgraded an OS (a different PC), I saw a small performance boost before the computer soon became slow again.

In contrast, I turn on my Apple MacBook, it boots up in 10 seconds or so, and I start work. If I start Microsoft Office for Mac and find that a software update needs to be installed, it takes only a few minutes. The day I submitted this column, I upgraded my OS from Yosemite (OS X 10.10) to El Capitan (OS X 10.11) in less than 30 minutes. I cannot imagine installing a Windows update in so short a time—and getting it to work the first time.

A while back, I mentioned my switch from PC to Mac (See “Can Windows and Other OSs Play in the Same Sandbox?”, EM, February 2014). Now, I am fairly comfortable with the Apple OS and hardware. I admit that I miss a few of the Windows software programs, as the Mac versions lack certain features I have used for years in the Windows versions. I have not found a usable version of Quicken, for example, or any version of Microsoft Visio or Project for the Mac.
...But the Divide Is Closing

The divide—between enthusiasts of Microsoft and Apple; Windows and OS X; PCs and Macs—is closing. This is not because the two are becoming more the same, but because enterprise computing is becoming more OS-neutral and hardware-independent. No matter your role or the type of laptop, tablet, or smartphone you use, you can more easily access more information than ever before.

For example, enterprise software vendors have moved many business-critical applications to the Cloud: vendors like SAP and Oracle once promoted client/server software applications and now promote Cloud applications; the de facto office apps—Google and Microsoft Office—are now subscription-based, Cloud apps; and environment, health, and safety (EH&S) buzzwords are “Cloud” and “Mobility.”

Benefits of the Vanishing OS Divide

The notable shift in computing offers the business community some surprising benefits.

1. Free OS Upgrades Encourage Rapid Technology Adoption

Operating system upgrades are free, which encourages organizations to upgrade rather than use outdated technology. In July, Microsoft released Windows 10, and offers free upgrades for Windows 7 and 8 users (http://www.microsoft.com/en-us/windows/features). Microsoft will release the Windows Mobile upgrade soon, which will be free to Windows Phone users.

In September, Apple released its El Capitan OS X. If you own a Mac computer, the upgrade is free (http://www.apple.com/osx/). Apple also released iOS 9 in September. The upgrade is free to iPhone and iPad users with compatible devices.

Google offers its Android OS free to smartphone and tablet users (https://www.android.com/) and its Chrome OS free to Chromebook users (https://www.google.com/chrome/).

2. App Stores Replace DVDs

The latest notebook computers are lighter, smaller, and lack DVD drives; smartphones and tablets never had them. App stores displace the need for DVDs. To obtain videos or software, you sign up for an account or a subscription and stream digital videos and download software directly to your devices.

3. Mobile Apps Allow Data Entry on the Go

Many EH&S software vendors offer mobile applications that integrate with their enterprise apps. Workers enter data at the point of generation, rather than parsing data to EH&S or Operations. You enter an incident record from a smart watch, smartphone, or tablet. You complete a checklist or enter operating data via smartphone or tablet.

One challenge is the availability and affordability of intrinsically safe mobile devices, required in many operations environments. These devices must not create sparks that can set off explosions, be usable when workers wear personal protective equipment, and be more rugged than the typical consumer device. Priced at $1,200–$2,000 each, they often cost more than many full-featured computers.

4. Self-Service Avoids ‘Lost in Translation’

Self-service interactions with technology let you conduct your own transactions rather than parse information to others so they can take action. You use a smartphone to record a “near miss” incident rather than calling someone else—key parties can see the information on a shared system. You manage daily action items using an integrated EH&S app. You “help yourself,” only speaking to a system admin when the app does not work as expected or if you need to do something out of the ordinary.

5. Collaboration and Cloud Help Manage Risk

Automated workflows, electronic content management and collaboration tools allow you to access data like never before. Dashboards allow you to gauge progress regarding key performance indicators (KPIs). You make better, faster, decisions and manage enterprise risk.

While the technology we use today is very different from what we used just a few years ago, it continues to adapt to the way we work. Adding consumer technology to the mix provides a better user experience and helps manage enterprise risk.
Redefining Project Success

by David Elam

Historically, we’ve defined project success in terms of the triple constraints of budget, schedule, and scope. A successful project was one that was completed by properly balancing the budget, schedule, and scope requirements. Over time, we learned to describe project success in terms of the benefits the project produced instead of simply the features it possessed. Although, budget, schedule, scope, features, and benefits remain important, Dr. Harold Kerzner argues in *Project Management 2.0: Leveraging Tools, Distributed Collaboration, and Metrics for Project Success* that these evaluation criteria are no longer adequate to define project success in today’s ever-changing business environment.

Dr. Kerzner emphasizes that project success is determined by the business value the project creates. His point is valid: How can a project that is completed within budget, on time, and according to a performance specification be successful if it doesn’t deliver business value? This is an important shift in thinking, prompting us to continually evaluate our projects in terms of the business value they create. Should it become evident that a project will no longer produce business value, then it must be re-scoped (and re-budgeted and rescheduled!) to yield business value or it must be abandoned.
Project Value (Re)Defined

Dr. Kerzner defines the following four categories of project value:

• **Financial Value**: The ability to deliver a long-term revenue stream that satisfies the financial needs of project stakeholders. Notably, he identifies compliance with Occupational Safety and Health Administration (OSHA) and U.S. Environmental Protection Agency (EPA) requirements as creating financial value. This is an important perspective, shifting compliance from cost avoidance to value creation.

• **Future Value**: The ability to produce a stream of deliverables that support the future business needs of the firm. Sustainability projects that reflect process improvements, improve resource utilization, or reduce wastes can create future value for the enterprise.

• **Internal Value**: The ability to create a continual stream of successfully managed projects that create business value for the organization. The principles of continual improvement, best practices, and total quality management are fundamental to the creation of internal value. Projects undertaken by the organization must align with the principles and practices that are designed to drive continual improvement.

• **Customer-Related Value**: The ability to satisfy the business value needs of customers so that the business relationship moves from one of a commodity supplier to one of a trusted partner. In the case of environmental projects, this value creation concept can be extended to include the relationship that a company establishes with the community in which it operates. Healthy community relationships based on trust and respect effectively create an operating partnership in which the company and community both benefit.

When environmental projects are viewed from a value creation perspective, it is clear that most projects can produce value in multiple categories. The challenge is working with stakeholders to define project value and measure it in a world that still operates in terms of budget, schedule, and scope.

Stakeholder Management

As noted in a previous column (see “Standardized Project Management,” EM March 2013, pp 20-22), the 5th Edition of *A Guide to the Project Management Body of Knowledge (PMBOK)* added a tenth knowledge area, “stakeholder management”. Importantly, stakeholder management forces project managers to focus on and elevate the importance of all stakeholders in the project management process. The PMBOK calls on project managers to (1) identify all stakeholders and (2) recognize that stakeholders and their interrelationships may change as the project progresses.

Stakeholder management is critical to recognizing and realizing the value attributes of a project. Today’s environmental projects typically involve numerous stakeholders, often with different and sometimes conflicting goals or expectations, and hence, different definitions of value. Further, the stakeholder community may change and individual stakeholder goals may change as the project progresses. As a result, the definition of project value also may change as the project progresses. The dynamics and interrelations of the stakeholder community—particularly in a business environment that is increasingly influenced by social media—require a level of project manager attention and engagement that may not have been required when budget, schedule, and scope were the principal determinants of a project’s success.

As environmental project managers, we will be well-served by combining Dr. Kerzner’s advice and the stakeholder management expectations of PMBOK to define and measure project value over the life of the project. If we fail to understand, measure, and report project value within the framework of stakeholder expectations, we’re at risk for delivering an unsuccessful project even if it meets the established budget, schedule, and scope requirements. em

References


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In the 1900s, it took John D. Rockefeller 46 years to amass $1 billion. If you draw a comparison with today, Andrew Mason, the founder of Groupon, made $1 billion in just two years. Mason is not the only one whose career has moved at hyperspeed; in fact, he is among a growing list of young superstars who have moved up the career ladder faster than normal.

As a young professional, I am sure that you also want to develop your career with this same intensity and speed. Though certain people’s rocket ascent may seem like pure luck along with some fortunate timing, you will discover that these standouts were all characteristically very strategic in their approach to career development. Below, I present four simple and overlooked strategies that can help you ascend the career ladder at hyperspeed.

1. **Become an Expert in Your Field**

It’s as simple as it sounds. If you want to truly excel in your field, you must first become a subject matter expert. According to strategy consultant Dorie Clark, "the first ingredient in becoming a recognized expert is … cultivating true knowledge of your subject matter." To advance and stand out among other professionals in your line of work, it is paramount that you fully understand the major issues, problems, and solutions in your industry.

Organizations like A&WMA are a great foundation to learn about the issues that surround air and waste management. Becoming an active member and even leader within an organization like A&WMA will empower you with a broad knowledge of the industry. In short, you must understand how things work in your industry, and even more specifically in your company, to emerge as a leader in your profession.

More specifically, you need to learn the history of key environmental regulations such as Title V and RCRA. Pause and ask yourself: What problems were these regulations trying to solve? How have they succeeded or failed in addressing the underlying concern? You also need to be able to make predictions about where the industry is going. Moreover, you need to make those predictions known so that people know who you are and begin to pay attention to you as someone on whom they can rely for trusted information. If leading professionals know that they can count on you, they will be more likely to ask...
you for advice. One of the best ways to build your network is by offering something of value for which you can use as leverage in connecting with industry leaders.

Begin by focusing on one topic or regulation. Be the master and point person regarding this issue and be sure to know the issue’s past, present, and future. Know the key problems in your industry, as well as the common solutions. Have your own creative responses that illustrate that you bring additional value to the table. When you are recognized as an expert, people gravitate to you instead of the other way around. Be the person that your company cannot survive without. As Seth Godin writes in his book, Linchpin: Are You Indispensable, strive to be the linchpin, or “… the essential element, the person who holds part of the operation together. Without the linchpin, the thing falls apart.”

2. Develop Connections within Your Industry
As you have undoubtedly heard before, the ability to advance your career is not only dependent on what you know, but who you know. Do not just build your resume, but further develop your power-base of connections. Metcalfe’s law states that the value or utility of a telecommunications network is proportional to the square of the number of users connected to it. As a result, the power and utility of your network will depend on the number of connections that you make; maintain, and ultimately develop into lasting relationships.

The power of connections and the expansion of your network will afford you a wide variety of opportunities, whether they are in your career, business, or in so many more ways that you never knew existed. It is essential to know that building your network is more like an art form than a skill. Creating a vast network requires that you make real connections one at a time. For example, you should take advantage of A&WMA’s Annual Conference & Exhibition to meet other influencers in the field. You can even take the additional step to volunteer and eventually lead different committees to establish your value and build your reputation within the air and waste management industry.

With regard to developing connections, the most important message to take away is that you need to give before you receive. No industry leader is going to want to give you anything, whether it is their time, connection, or endorsement, without a need or desire to do so. You must create that void by offering something of value. When you are starting off as a young professional, the main thing you have to offer is your time. Take advantage of this to develop a reputation as a trusted resource. When you do so, leading professionals will seek you out for information, and you will not even need to ask for their time.

3. Don’t Burn Out
It has been said that the work–life balance has been replaced with the work–life blend. In other words, people live to work instead of work to live. This can sometimes lead to the feeling of “I am always working.” Examples of this include always checking e-mail, working through lunch, and not taking time for yourself by exercising or spending time with friends and family. You may feel that working this hard will advance your career in the short term, but beware that in the long term, this imbalance is bound to catch up with you and you will likely burn out.

Be sure to take the time to disconnect and focus on you. Pause and ask yourself whether this will matter five years from now. More likely than not, the answer is no. Unwinding can take many forms. Many top performers develop, in addition to a number of other attributes, the habit of meditating. The essential aspect of meditating is that you need to do it consistently. A good common practice is 5–20 minutes per day as soon as you wake up and before you go to bed. You can begin by meditating for one minute per day and continue progressing as you feel that you can concentrate on only your breathing.

Exercise is another option and is an excellent way of taking care of your body. Your body releases important endorphins and releases stress in a healthy way when you exercise, whether it be playing a sport, going to the gym, running, or even walking to work. Obviously, exercise is only effective when maintaining a healthy diet.
It is also important to spend quality time with family and friends.

Getting organized will allow you the time you need to recharge the batteries. Prioritizing your to-do lists by whether they fit into one of four categories is an effective way of organizing your schedule to accomplish your top tasks: (1) important and urgent; (2) important and not urgent; (3) not important and urgent; and (4) not important and not urgent. Eventually, you should be focusing most of your time on category 2, the important and not urgent tasks. This way, you are not spending most of your time putting out fires at the last minute. If you focus on the important and not urgent tasks, you are most effectively working toward long-term goals and reducing stress from procrastination.

4. Be Reliable

Being reliable can lead to career and business opportunities that may not otherwise have been available to you. It is self-fulfilling: Proving yourself to be reliable leads to trust, which is the foundation for building great relationships. In short, keep your word. As a young professional, sometimes all that you have to offer is your word; strangers need to trust you in good faith and are taking a risk on you.

Personally, I follow a basic rule that I learned from copywriter John Carlton: “You show up where you said you’d be, when you said you’d be there, having done what you said you’d do … every time, with no excuses allowed.” In other words, if you are given a task, be sure that you make room to get that task done.

References

3. Metcalfe’s law is attributed to Robert Metcalfe in regard to Ethernet.
EPA’s Updated CMAQ 5.1 Modeling System Provides States with Powerful Tools for Air Quality Management

The U.S. Environmental Protection Agency (EPA) has released a new version of its Community Multi-scale Air Quality (CMAQ) modeling system, a powerful computational tool used by states and regions for air quality management. States use CMAQ to develop and assess actions needed to attain National Ambient Air Quality Standards (NAAQS). The National Weather Service uses CMAQ to produce daily U.S. forecasts for ozone air quality.

CMAQ has a “one-atmosphere” perspective, which incorporates three models into one system: meteorological models that represent atmospheric and weather activities; emissions models that represent man-made and naturally occurring contributions to the atmosphere; and an air chemistry–transport model that predicts the atmospheric fate of air pollutants under varying conditions. The system simultaneously models multiple air pollutants, including ozone, particulate matter, and a variety of air toxics across different spatial scales. This enables regulators to better determine optimal air quality management scenarios at the community, state, and country level.

The newest version of the modeling system—CMAQ 5.1—includes improved fine-resolution modeling abilities, expanded spatial scales, updated representations of physical and chemical atmospheric processes, and enhanced land-use data.

EPA updates CMAQ every three years. “Science is always evolving, and we need to keep models up-to-date with the most current state-of-the-science to assist the development of sound policies,” said EPA scientist Rohit Mathur, Ph.D.

Model Applications
CMAQ has been used for over 15 years and has thousands of users in more than 50 countries. The modeling system stands out from other air

by Alissa Kocer, Ann Brown, Emily Smith, Rohit Mathur, Jon Pleim, and Deborah Luecken

Alissa Kocer is a student services contractor with the U.S. Environmental Protection Agency (EPA), Research Triangle Park, NC. Ann Brown, Emily Smith, Rohit Mathur, Jon Pleim, and Deborah Luecken are all with EPA’s Office of Research and Development, Research Triangle Park, NC.
quality models because it incorporates input from a large, world-wide user community. To support the CMAQ user community, EPA and the University of North Carolina at Chapel Hill host the Community Modeling and Analysis System (CMAS) Center, which distributes CMAQ software, hosts user e-mail exchanges, and provides new user training for CMAQ.

Users include scientists, researchers, and air quality modelers. “These users have helped assess and improve the model’s functionality,” said EPA scientist Jon Pleim, Ph.D. “Their input has helped EPA scientists prioritize modeling research to improve CMAQ’s capabilities.”

CMAQ has also been used to analyze the air quality benefits of several major air pollution rules, including EPA’s new fuel and car standards that require the amount of sulfur in gasoline to be reduced by more than 60% starting January 1, 2017. Under the new rule, motor vehicle particulate matter emissions are to be reduced by 70% and nitrogen oxides emissions by 80%.

In developing the rule, CMAQ was used to calculate 8-hr ozone concentrations, daily and annual PM$_{2.5}$ concentrations, annual nitrogen dioxide ($NO_2$) concentrations, annual and seasonal (summer and winter) air toxics concentrations, visibility levels, and annual nitrogen and sulfur deposition total levels. These factors were calculated for the years 2018 and 2030, with and without the rule. CMAQ results were used in combination with other tools to determine that the new standards will help avoid up to 2,000 premature deaths per year and 50,000 cases of respiratory ailments in children.

By providing an updated tool for examining and developing more efficient, accurate, and cost-effective ways to reduce air pollution, CMAQ 5.1 is a community modeling resource that is helping improve both human and ecosystem health.

**New Features in 5.1**

With CMAQ 5.1, users will experience enhanced fine-resolution modeling capabilities, allowing them to view air quality in smaller settings, such as metropolitan areas. By tracking pollution at a smaller scale, researchers and air quality managers can identify air pollution hot spots to inform remediation strategies for protecting public health.

Enhancements in CMAQ 5.1 also enable expansion to spatial scales covering the Northern Hemisphere. Users can study the intercontinental movement of air pollution and how that movement affects air quality and how air quality interacts with climate change. Air quality modelers can use this feature for regional modeling applications and air quality managers can use it to assess local and national-scale air quality management programs.

CMAQ’s temporal flexibility allows model simulations to evaluate long-term (annual to multi-year) and short-term (weeks to months) pollutant climatologies. CMAQ 5.1 provides detailed information about concentrations of air pollutants in a given area for any specified air quality or climate scenario and can model air quality at urban, regional, and hemispheric scales.

The physical and chemical atmospheric processes in CMAQ 5.1 have been updated to provide a realistic portrayal of atmospheric chemistry over a broader range of conditions, modulated by both man-made and natural emissions. The modeling system’s improved resolution for land use data shows changes in vegetation over time, which may contribute to a better understanding of biogenic emissions and their role in air quality.

CMAQ 5.1 also includes updates to the chemical mechanisms to improve nitrogen cycling and halogen chemistry. The aerosol module has been revised to include additional sources and mechanisms for formation of secondary organic aerosols. There are also improvements to biogenic and sea salt emissions, aerosol nucleation, gravitation settling of coarse aerosols, and bidirectional soil nitric oxide.

Several modifications have been made to improve computational efficiency, including code restructuring and optimization, improved input and output, and faster solution technique for planetary boundary layer mixing.
What Do Trudeau’s Liberals Have in Store for the Environment?

What will the new Liberal government’s environment agenda look like? Below is a list of some of the most substantive promises made.

- **Public transit**—Over 10 years, the Liberals promise to quadruple federal investment in public transit, pumping almost $20 billion into transit infrastructure.
- **Green infrastructure**—The Liberals have promised significant investment in local water and wastewater facilities, clean energy, and climate-resilient infrastructure, including flood mitigation systems and climate change preparedness.
- **Clean technology**—The Liberals have promised to invest an additional $100 million per year in clean technology and $200 million more per year to support innovation and the use of clean technologies in the natural resource and agricultural sectors.
- **Energy**—The government will introduce new energy efficiency standards for consumer and commercial products and new financial instruments to encourage investment in energy savings and retrofits. —By Mark Sabourin, EcoLog

Manitoba Vows to Enshrine Environmental Rights into Law

Manitoba has become the first province to join the Blue Dot program, a grassroots initiative of the David Suzuki Foundation. Premier Greg Selinger has committed the province to passing an Environmental Bill of Rights that will enshrine a right to a healthy environment into provincial law.

Blue Dot was launched in 2014. Its ultimate objective is to enshrine the right to a healthy environment into the Canadian Charter of Rights and Freedoms. So far, 93 municipalities representing 7.8 million people have passed declarations recognizing their residents’ right to a healthy environment.

A provincial Bill of Rights, as promised by Manitoba, elevates this to a much higher level. Ontario passed an Environmental Bill of Rights in 1993, and is still the only province to have done so, but what Manitoba is promising is even more powerful. For instance, Ontario’s Environmental Bill of Rights does not create a substantive right to a healthy environment. If Manitoba’s Bill of Rights follows the Blue Dot prescription, it will. It will also include procedures that will allow residents to enforce that right if they feel it is being infringed. —By Mark Sabourin, EcoLog

EPR Report Gives Top Marks to British Columbia

EPR Canada, an independent not-for-profit organization with a mandate to promote extended producer responsibility (EPR) policies across the country, has given British Columbia an “A” for its EPR programs.

EPR Canada’s current September 2015 report card covers activities in 2014 and is the first time any jurisdiction has earned an “A”.

EPR Canada tracks programs that place the full onus on producers to design, operate, and finance diversion programs across the full lifecycle of products. It distinguishes EPR from product stewardship, which shares responsibility with government or quasi-government administrative bodies.

As in previous years, the federal government scored an “F”. It and Alberta were the only jurisdictions to receive a failing grade.


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Canadian Report is compiled with excerpts from EcoLog News and the EcoCompliance.ca newsletter, both published by EcoLog Information Resources Group, a division of Annex Newcom LP. For more Canadian environmental information, visit www.ecolog.com. Note: All amounts in Canadian dollars.
EPA Proposes New Rules to Reduce Potent GHG Emissions

The U.S. Environmental Protection Agency (EPA) has proposed a rule that it says takes new steps to curb emissions of hydrofluorocarbons (HFCs), potent greenhouse gases (GHGs) used in refrigeration and air conditioning.

EPA says the proposed rule would improve the way refrigerant is sold, handled, recovered, and recycled. The proposal would strengthen the existing requirements for handling refrigerants and apply those rules to ozone-depleting and HFC refrigerants. EPA estimates the rule would further reduce enough HFC emissions in 2025 to equal 7 million metric tons of carbon dioxide.

EPA also announced that it intends to initiate a proposed rulemaking under EPA’s Significant New Alternatives Policy Program in 2016 that would change the status for certain high global warming potential HFCs to “unacceptable” where safer alternatives are available and also approve several new climate-friendly alternatives for a variety of industry applications.

Additional information about the proposed rulemaking can be found online at http://www2.epa.gov/snap/608-proposal.
ACEEE State Scorecard: MA Edges Out CA as Most Energy-Efficient State

Energy efficiency measures continue to flourish in states across the country, with several states, including California, Maryland, Illinois, Texas, and Washington, DC, taking major steps that improved their scores in the 9th annual edition of the State Energy Efficiency Scorecard, released by the American Council for an Energy-Efficient Economy (ACEEE).

The State Scorecard ranking of the states is issued annually with the support of the U.S. Department of Energy. Key findings of the 2015 State Scorecard include:

• The top 10 states for energy efficiency are Massachusetts, California, Vermont, Rhode Island, Oregon, Connecticut, Maryland, Washington, and New York, with Minnesota and Illinois tied for 10th place. Massachusetts retains the top spot for the fifth consecutive year based on a strong commitment to energy efficiency under its Green Communities Act. In California, requirements for reductions in greenhouse gas (GHG) emissions, major efforts to achieve energy efficiency in schools, and implementation of a cap-and-trade program earned the state several more points this year, putting it only a half-point behind Massachusetts in the state rankings.

• A solid 20 states rose in the State Scorecard rankings. California, a leading state, is also one of the most improved states this year. Maryland, Illinois, the District of Columbia, and Texas also deserve recognition for improvement over the past year. Maryland increased its commitment to energy efficiency in 2015 by establishing new, more aggressive energy savings targets for utilities. Illinois is one of the first states to adopt the newest building energy codes, and has taken notable actions to ensure code compliance across the state. The District of Columbia is among the most improved for the second year in a row, due to its progress across a number of policy areas and the ramping up of D.C. Sustainable Energy Utility programs.

• Overall, 16 states fell in the rankings this year, due to such factors as policy or program rollbacks or failure to keep pace as other states expanded efficiency efforts. The five states most in need of improvement are: North Dakota, Wyoming, South Dakota, Louisiana, and Mississippi, although new efficiency programs in Louisiana and Mississippi mean these states may not be at the bottom of the ranking for much longer. While not in the bottom five states, New Mexico dropped the farthest in 2015, losing four points and falling six positions from 25th to 31st in the rankings. This is due, in part, to the state’s failure to adopt energy building codes beyond the 2009 requirements.

Additional information about the 2015 State Scorecard rankings can be found online at http://aceee.org/state-policy/scorecard.
An organic garden and farm products manufacturer is taking its green message a step further by creating its own biodiesel to run its fleet of trucks.

Peats Soil, which makes potting mixes, soils, and mulches in South Australia, is creating biodiesel from the “dirty water” gathered from food manufacturing locations. The biodiesel will fuel a fleet of 14 new Scania trucks that will be used for Peats’ collection and delivery operations throughout South Australia.

Managing Director Peter Wadewitz said the project involves collecting residual water and then extracting the fats from that water. Enzymes are then added to break down the fats, followed by 20% ethanol to assist in the completion of the process.

“We plan to produce a million liters of bio fuel in a year. With additional investment we can make it a continuous project.”

—Peter Wadewitz
$700,000, and will increase to $1 million in the later stages but Wadewitz expects the recoup the investment through reduced energy costs.

“It is very important to be commercially sustainable," Wadewitz said. “There’s no point in being environmentally sustainable if you’re going to go broke.”

The biodiesel production facility was established in partnership with the University of Adelaide. The university approached Wadewitz with the idea and provided laboratories to research and develop the manufacturing concept.

This first stage of research and development was funded from the Australian Research Council, but Wadewitz says that he is paying to produce the bio fuel at the Peats Soil’s Operations Depot at Brinkley, South Australia.

Wadewitz said the company will soon build large anaerobic digestion pods to extract methane from food scraps to feed a turbine to create up to 30,000 tons of “green organic” power.

Wadewitz said the company plans to expand their renewable energy projects in to India and China. em

A&WMA is looking for course instructors!

The Air & Waste Management Association is recruiting instructors to be a part of the Professional Development Course program at the 2016 Annual Conference in New Orleans, Louisiana on June 20-23, 2016.

Course dates: Sunday, June 19 and Monday, June 20.

A&WMA is seeking courses in the following areas/topics:

- Air Pollution
- Modelling and Monitoring
- Environmental Management
- Air and Waste Management
- Air and Waste Regulatory Compliance and Permitting
- QEP Prep
- Any other area of interest in line with the mission and goals of A&WMA

If you are interested in teaching a course, please visit http://ace2016.awma.org/courses and fill out a Course Proposal Form.

The deadline for submission is Monday, December 14, 2015.

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Listed here are the papers appearing in the December 2015 issue of EM’s sister publication, the Journal of the Air & Waste Management Association. For more information, go to www.tandfonline.com/UAWM.

**Review Paper**

- Healthcare waste management practice in the West Black Sea Region, Turkey: A comparative analysis with the developed and developing countries

**Technical Papers**

- Development and implementation of a remote-sensing and in-situ data assimilating version of CMAQ for operational PM$_{2.5}$ forecasting Part 1: MODIS Aerosol Optical Depth (AOD) data-assimilation design and testing
- Production of sugarcane bagasse-based activated carbon for formaldehyde gas removal from potted plants exposure chamber
- Characterization of PM$_{2.5}$ and PM$_{10}$ fugitive dust source profiles in the Athabasca Oil Sands Region
- Testing odorants recovery from a novel metalized fluorinated ethylene propylene gas sampling bag
- Odor compounds released from different zones of two adjacent waste treatment facilities: Interactive influence and source identification
- Urban traffic pollution reduction for seda cars using petrol engines by hydro-oxide gas inclusion

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**Upcoming Webinar...**

**Environmental Enforcement and NextGen Enforcement Tools: Views from Enforcement Defense Counsel**

December 8, 2015 12:00 – 1:30 pm Eastern
Fees: Members $99.00; Non-Members $149.00

> EPA’s NextGen Enforcement isn’t just about new technology, e-reporting, desk penalty assessments, and settlements. Enforcement defense involves consideration of litigation risks and potential litigation outcomes. Enforcement defense counsels are watching EPA’s proclamations about new tools with an eye toward such risks and outcomes. Panel members are experienced defense counsel and will discuss what EPA’s NextGen Enforcement might mean in court and how companies can prepare themselves and reduce litigation and enforcement risks.

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**Events sponsored and cosponsored by the Air & Waste Management Association (A&WMA) are highlighted in bold. For more information, call A&WMA Member Services at 1-800-270-3444 or visit the A&WMA Events Web site: www.awma.org/events. To add your events to this calendar, send to: Calendar Listings, Air & Waste Management Association, One Gateway Center, 3rd Floor, 420 Fort Duquesne Blvd., Pittsburgh, PA 15222-1435. Calendar listings are published on a space-available basis and should be received by A&WMA’s editorial offices at least three months in advance of publication.**

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21–22 2016 A&WMA Intercouncil Meetings
New Orleans, LA

**MARCH**

15–17 Air Quality Measurement Methods and Technology
Chapel Hill, NC

**APRIL**

12–14 Guideline on Air Quality Models: The New Path
Raleigh, NC

**MAY**

15–18 Strive for Sustainability
Federation of New York Solid Waste Associations meeting
Bolton Landing, NY | nylfederation.org

**JUNE**

20–23 2016 A&WMA Annual Conference & Exhibition
New Orleans, LA

**AUGUST**

16–19 Power Plant Pollutant Control “MEGA” Symposium
Baltimore, MD

**SEPTEMBER**

27–30 Atmospheric Optics: Aerosols, Visibility, and the Radiative Balance
Jackson Hole, WY

**DECEMBER**

7–8 Vapor Intrusion, Remediation, and Site Closure
San Diego, CA

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