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The Magazine for Environmental Managers

July 2018



ISO 14001:2015

Pathway
to a
Successful
Upgrade



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ISO 14001:2015: Pathway to a Successful Upgrade

by Robert Basl

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by Daniel Sperling and Austin Brown



Following on from the focus of last month's topic on transportation and the 48th Annual A&WMA Critical Review by Dr. H. Christopher Frey, Drs. Dan Sperling and Austin Brown offer their perspective on the future of transportation, based on the book lead-authored by Dr. Sperling: *Three Revolutions: Steering Automated, Shared, and Electric Vehicles to a Better Future* (Island Press, 2018).



Focusing on the Now, with an Eye to the Future

by Chris Nelson, P.E. » president@awma.org

For A&WMA staff and leaders, July is a month to take a deep breath, reflect on the first half of the year, and then quickly reengage on Association business. So far in 2018, our international organization and members have delivered high-quality workshops on New Source Review, incineration technologies, and auditing; successful online training that highlighted critical issues related to air quality, hazardous waste, and storage tanks; and a half-dozen new issues each of *JA&WMA* and *EM*. Volunteer leaders met in Pittsburgh in April for leadership training. In June, members gathered in Hartford for our Annual Conference & Exhibition. Beyond these centrally planned events, our Sections and Chapters provided local programs to meet member needs. I hope you participated in some of these programs.

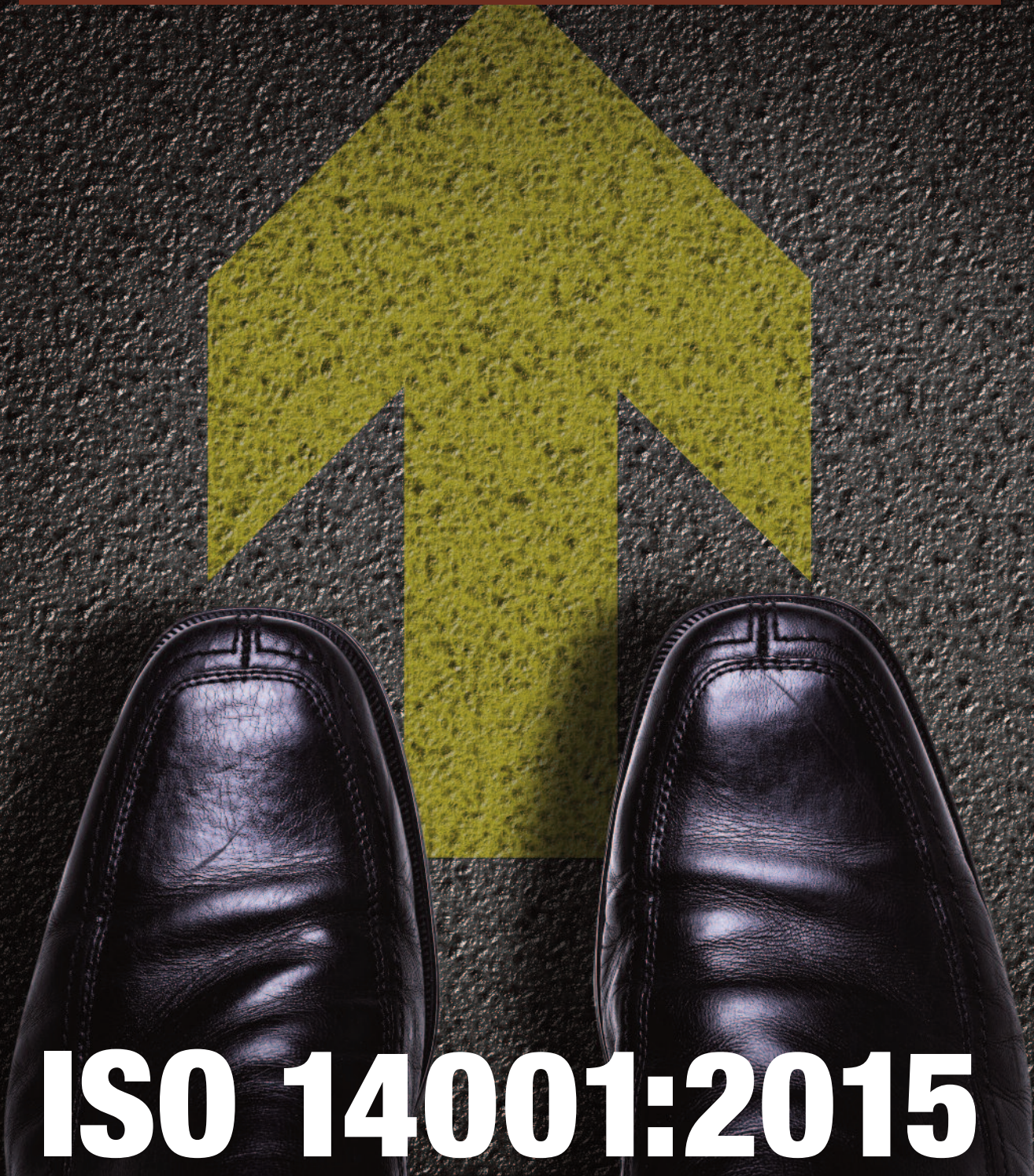
Looking forward to the second half of 2018, we will have more webinars, *JA&WMA* and *EM* content, audit workshops, and conferences. Our local team in Quebec City is already planning the 2019 Annual Conference & Exhibition. I am happy with the enthusiasm of both the local team and our general membership for the 2019 event. Please check out the online A&WMA calendar (https://www.awma.org/calendar_list.asp) for events that can help with your professional development and technical work. If you don't see what you need, please let us know.

As part of my role as A&WMA President, I get to speak to our volunteer leaders at multiple levels of the organization. Now that we have reached the midpoint of 2018, my dog and pony show is pretty well established. I want to see the organization drive 2018 programs and results, while keeping an eye on the type of organization we want to become in 2025 and beyond. This dual focus will help us continually evolve our organization and its member offerings to stay relevant and provide real member value, even as our membership and profession changes with the global economy.

We can't create new programs or services overnight, but we can make incremental progress and build upon our successes. When I envision a flourishing A&WMA in 2025, I see a continuation of our historical programs and publications with additional engagement between members and the use of modern media and technology. I often highlight three long-range focus areas for our 2018 Board: member mentoring programs, the use of modern media for content delivery, and an "A&WMA Academy" approach to content alignment. Over the next few months, I'll describe our progress and goals for these projects in this space. If you have ideas or volunteer energy to move the initiatives forward, we are always looking to connect leaders to opportunities.

Our long-term goals are important, but our regular member services can provide value today. By way of example, the July issue of *EM* focuses on the 2015 revisions to the ISO 14001 environmental management system. For manufacturing facilities that are certified to the ISO standard, these revisions required significant work to review, update, and implement on-site programs. New definitions, changes to required documentation, an emphasis on leadership commitment, and considerations of life-cycle perspectives mean that company ISO programs will look much different in 2018 than they did in 2014. I'm looking forward to sharing this issue of *EM* with my company's ISO 14001 experts and leaders.

Thanks for reading *EM*, and for your support of and contributions to A&WMA. **em**



ISO 14001:2015

Pathway to a Successful Upgrade

This issue reviews key changes in the ISO 14001:2015 Standard, including strategies for improving EMSs and integrating with other business systems to gain more value.

2018 marks an important year for companies who have adopted an environmental management system (EMS) that conforms to the ISO 14001 Standard.¹ While ISO 14001 has existed for more than 20 years, the changes adopted by the International Organization of Standards in 2015 are the most sweeping since the standard's inception. Organizations certified to the former version must incorporate the new requirements by September 15, 2018. The articles that follow examine key changes in the ISO 14001:2015 Standard, providing organizations with keen insight in order to navigate these changes and successfully improve their systems.

In the first article, Kelly Young, Greg Roberts, and Betty Hosteny provide a high-level overview of the key changes in the revised standard. This summary informs interested readers on where the emphasis should be placed as they work to make changes to their systems in advance of the September deadline.


Next, Christopher Bell clarifies important new terminology

and offers a comparison between common elements of the previous and revised standard. Readers actively involved in retooling EMS documents and procedures will find this roadmap particularly useful.

Organizations looking for ways to inject new life into a mature EMS or to integrate environmental management with existing quality management systems may find special value in my article on implementing the "process approach". This departure from the traditional clause-based system allows a company to infuse environmental awareness into areas of the organization they may not have historically considered while decentralizing ownership of environmental issues.

Finally, Anthony Mineo describes in great detail the logistics associated with obtaining a multi-site certification to ISO 14001:2015. Specific attention to the cost structure and potential savings will be helpful for larger organizations and those with certified integrated environment, health, and safety management systems. **em**


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July 19: 8:30 am–12:00 pm, Wilder Center, St. Paul, MN
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Register online and find details at www.awma.org/auditing.



Strategic Leadership



Context



Interested Parties



Risks and Opportunities



Lifecycle Perspective

Transitioning to the ISO 14001:2015 Standard

If you are currently certified, time is running out!

A summary of the key changes implemented in the ISO 14001:2015 Standard.

The changes to ISO 14001 firmly place it center stage as the instrument to manage the environmental pillar of sustainability. It is now more strategic, outward looking, and places greater emphasis on products and services rather than just on-site activities. Consequently, the new standard can act as a stepping stone to developing a holistic sustainability and corporate social responsibility strategy, or supporting the implementation of an existing one. Organizations that are transitioning should consider how their environmental management system (EMS) can support their wider sustainability aspirations and business strategy.

It is important to note that ISO 9001 Quality Management System (QMS) and Occupational Health and Safety Assessment Series (OHSAS) 18001 are also changing. The ISO 9001:2015 version and the ISO 45001:2018 (the ISO Health and Safety Management System standard replacement of OHSAS 18001) are now available to organizations seeking triple certifications. The good news is all ISO management system standards will now follow an ISO high-level standard structure, which means that the majority of requirements will be common or at least comparable among the standards and more readily allow for organizations to integrate business operations and systems that are at the core. Organizations

While the entire ISO 14001:2015 looks very different, many of the requirements from its 2004 predecessor have been incorporated with little content change; however, there are five primary changes that are critical to understand.

Strategic Leadership

Senior management will need to promote and be accountable for the EMS, which is now expected to be integrated with business processes and compatible with the organization's business strategy. Before, senior management could get away with minimal involvement (e.g., sign policy, appoint a management representative, attend management reviews, etc.). Now senior management must promote and direct others to consider the environment in their day-to-day responsibilities and business processes. There is also an expectation for senior management to be fully engaged in defining several of the new requirements, in particular, context and needs of interested parties, as well as intended outcomes.

Context

Organizations now need to demonstrate a broader understanding of the context in which their business operates. Your EMS will need to consider internal and external issues that could help or hinder your organization in achieving the



Overall, ISO 14001:2015 is intended to drive greater business value by helping organizations to appreciate and respond to the risks and the opportunities presented from a changing environment.

certified to ISO 9001, and/or OHSAS 18001 (and transitioning toward ISO 45001), could integrate these systems to allow for more a robust management system focusing on your overall business strategy.

ISO 14001:2015 Update: Five Key Changes

EMSs certified to ISO 14001 can be insular, peripheral, and ultimately a tick-the-box exercise. The 2015 version is an improvement on its predecessor, bringing it up to date and strengthening its role in sustainable development and its integration with business operations. Overall, ISO 14001:2015 is intended to drive greater business value by helping organizations to appreciate and respond to the risks and the opportunities presented from a changing environment.

intended outcomes of the EMS. Leadership will need to examine influences within their industry, the community, the region, and the world. In the previous versions of ISO 14001, the question was: "how does an organizations' activities, products, and services impact the environment?"; now there is a second, equally important question: "how does the environment impact your organization?"

Interested Parties

Your EMS must become more outward-looking by understanding the needs and expectations of interested parties, such as customers, shareholders, regulators, community, employees, contractors, and trade groups. You must define relevant internal and external interested parties, their needs

and expectations, and determine whether you must comply with their needs (i.e., through regulations and permits) or whether you want to comply with those needs and expectations (i.e., voluntarily adopt them). Organizations will also need to plan communications relevant to these compliance obligations.

Risks and Opportunities

You will need to consider the impact of a changing environment on your organization and manage risks and opportunities to build resilience into your EMS and organization. Previously, the standard addressed only impacts. The revised standard now requires an organization to also examine overall risks and opportunities. Risks and opportunities arise from several sources, including impacts, but context, needs and expectations of interested parties, compliance obligations, and the scope of your EMS must also be considered.

Lifecycle Perspective

Organizations should determine environmental aspects at each stage of its product or service (i.e., supply chain, design, production, transportation/delivery, use, maintenance, end of life treatment, and final disposal) and not just those relating to on-site production activities. Where appropriate, environmental requirements should be included at the design/development

stage and during procurement. Information about potential significant environmental impacts can be provided during the delivery, use and end-of-life treatment of the product or service. The revised standard also requires outsourced processes to be controlled or influenced.

Next Steps

With less than two months remaining to transition existing ISO 14001 certificates, time is of the essence. The most efficient method for tackling some of these key changes is to facilitate a cross-functional team workshop. Bringing representatives from key functions together to brainstorm context, interested parties, integration, risks, and opportunities will also help foster engagement and bring a life cycle perspective to your internal discussions.

Of course you should also brief senior management on the changes and ask what they expect to achieve from the management system: Reduce costs? Better control risks? Reduce or eliminate impacts on the environment? Stay in compliance? Improve relations with stakeholders? Move the company toward sustainability? These intended outcomes should be the foundation of your EMS and add value to your business. **em**

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ISO 14001 and Environmental Management Systems: Where Are We?

A look at the new ISO 14001:2015 standard, which includes a more strategic approach to designing and implementing environmental management systems (EMSs).

Environmental protection—along with health and safety—has long been the subject of compliance and management systems. The prominence of formal environmental management systems (EMSs) was enhanced with the publication, in 1996, of the International Organization for Standardization's (ISO) 14001 EMS standard,¹ which was significantly revised in 2015. ISO 14001 has become the most widely used EMS model, whether implemented for certification (i.e., verified by third-party auditors, with almost 350,000 certificates having been issued worldwide as of 2016), or used as a guide by companies who do not seek third-party verification.² EMSs play an essential role in sustainable development strategies, including those suggested by ISO 26000. They are also woven into the fabric of environmental compliance, with ISO 14001 having been recognized by the U.S. Environmental Protection Agency (EPA) and many states as a framework for effective compliance programs.³

The common building blocks of an effective EMS, reflected in ISO 14001 and other models, are straightforward; they include (1) top management leadership, policy setting, and

control, and it has sometimes been implemented in a formalistic manner that is not integrated with an organization's culture and existing systems. This has led to criticism that ISO 14001 can result in complex systems that do not always reliably deliver superior environmental performance. Another difficulty, particularly in the certification context, has been a failure to distinguish between auditable requirements and guidance. Other critics have complained that the standard was too flexible and high level, and was not tough enough to drive meaningful improvements in environmental performance.⁴

ISO 14001:2015—Overview

ISO 14001:2015 was the first major revision to the standard since its initial publication in 1996 (a minor revision was published in 2004), and reflected in part an effort to respond to some of the criticisms. The most visible and obvious change was to bring the standard in line with Annex SL, ISO's generic management systems framework.

Annex SL is an effort by ISO to create consistency among common elements of ISO's various management systems



Though ISO 14001:2015 is much longer and more detailed than its predecessor, some elements have been made simpler or more flexible.

review; (2) identifying environmental issues/risks (or "aspects," in the vocabulary of ISO 14001) and legal and other requirements; (3) establishing objectives to successfully manage these risks and requirements in line with policy; (4) implementing programs and procedures (including for emergencies) that establish how, by whom, and when those objectives will be met; (5) training people so that they know their risks and what to do to best manage them; (6) monitoring, measuring, and auditing to track performance and verify implementation; (7) taking preventive and corrective action; (8) continual improvement; and (9) documentation and record keeping.

Though very popular, ISO 14001 has faced headwinds in the United States, particularly on the certification front. The reputation of ISO 14001 has suffered from a perceived over-emphasis on documentation, with a proliferation of detailed procedures and a sometimes unhealthy focus on document

standards. This was in part a response to complaints that the proliferation of ISO management systems standards was creating burdensome and sometimes conflicting implementation challenges. Since Annex SL contains generic management systems language, some of its structure, concepts, and vocabulary may be unfamiliar in the environmental context. However, it is ISO's hope that this will make easier, and thus encourage, the implementation of the ever-growing portfolio of ISO management systems standards.

The imposition of Annex SL contributed to ISO 14001:2015 having twice as many clauses and ending up much longer than the original. The increased detail was also the result of adding to the standard many of the implementation practices developed during almost 20 years of implementation, as well as an effort to increase the emphasis on taking a more strategic approach to environmental management.

Review of Selected Changes

ISO 14001:2015 maintains in principle the “plan-do-check-act” framework of the original. However, the structure and phraseology have changed somewhat, with “planning,” “support,” “performance,” and “improvement” all revolving around “leadership.” The order of the various clauses has also changed. For example, while the substantive portion of ISO 14001:1996 opened with “policy,” ISO 14001:2015 begins with a new Clause 4, “Context of the organization,” that is intended to push the organization to have an overall strategic understanding of its place and purpose (i.e., not limited to environmental), including interested parties, and take these and a number of other factors into account in determining the scope of the EMS.

“Policy” now appears as a sub-clause under a new Clause 5 titled “Leadership,” that adds more detail on top management’s obligations and also includes a sub-clause on structure and responsibility. Consistent with the general goal of more explicitly linking the EMS with the bigger picture, top management’s obligations include integrating the EMS into the organization’s business processes and making sure that the environmental policy and objectives are compatible with the strategic direction of the organization. The increased emphasis on the responsibilities of top management is also reflected in a much more detailed discussion of “management review” (Clause 9.3).

The planning elements (Clause 6) are generally the same, though the 2015 revision has added a significant amount of detail, much of which reflecting what was common practice

under the 1996 edition. Consistent with the overall theme of the revision, more attention is given to strategic planning. The section on identifying environmental “aspects” explicitly encourages looking at issues from a “life cycle perspective,” and the sub-clause on compliance not only requires organizations to know their legal obligations, but also adds the common sense step of determining how they apply to the organization. The section on “operational controls” (Clause 8) is also much more detailed, with life cycle appearing once again.

References to compliance appear far more frequently in ISO 14001:2015, though the treatment of “compliance obligations” may raise eyebrows in the United States. A “requirement” is defined as a “need or expectation that is stated, generally implied or obligatory” and organizations are expected to determine which “requirements” of “interested parties” (very broadly defined and identified by the organization) will become “compliance obligations.” Taking “other requirements” on board as obligations was part of the original ISO 14001 (consistent with the “say what you do/do what you say” theme). However, characterizing as “compliance obligations” the “needs or expectations of others” voluntarily accepted as “organizational requirements” was an interesting decision. Particularly in the United States, one should be very cautious in re-defining such a central concept as “compliance obligations,” which brings with it an array of long-established legal, risk management and other liability consequences. Trying to explain that an organizational requirement voluntarily entered into is a “compliance obligation,” even if only for ISO 14001 EMS purposes, may create both internal and external risk management and communications challenges.⁵

In Next Month’s Issue...

Oil and Gas Production

The oil and gas industry faces a wide range of environmental compliance obligations for their facilities just from the nature of those facilities. Midstream oil and gas facilities must consider permitting and regulatory applicability for traditional stationary combustion sources, fugitive emissions from transmission and operations, and environmental impacts during construction of new or modified facilities. This issue will discuss regulatory challenges and opportunities for the midstream oil and gas sectors that must coordinate local, state, and federal requirements from multiple agencies.



Though ISO 14001:2015 is much longer and more detailed than its predecessor, some elements have been made simpler or more flexible. One major change is a decrease in the number of places in the standard that documentation is required, a clear response to the user community's dismay over the volume of documentation generated by implementing ISO management systems standards. Examples of other changes include removal of the requirement for a "management representative" in the discussion of roles and responsibilities (Clause 5.3), and some of the formal training requirements have been replaced by a more outcome-oriented set of competency requirements in which training is an option (Clause 7.2).

ISO 14001:2015 is accompanied by a 13-page "informative annex" intended to provide guidance. For organizations considering maintaining or obtaining a third-party verified "certificate," it will be important to insist that this annex does not establish new or different requirements and that it does not contain auditable criteria. Further, it should be understood that the annex is sometimes a compromise vehicle for expressing views on which a consensus could not be reached in the normative portion (the "shalls") of the standard. The extensive discussion in the annex of environmental aspects

and compliance should be read in this light. Sometimes the annex is used to reintroduce elements that were removed from the normative standard. For example, though reference to "management representatives" was eliminated from the normative portion of ISO 14001:2015, the term reappears in the annex (A.5.3). That reappearance in the annex should not be interpreted, at least for certification purposes, as requiring organizations to have a "management representative."

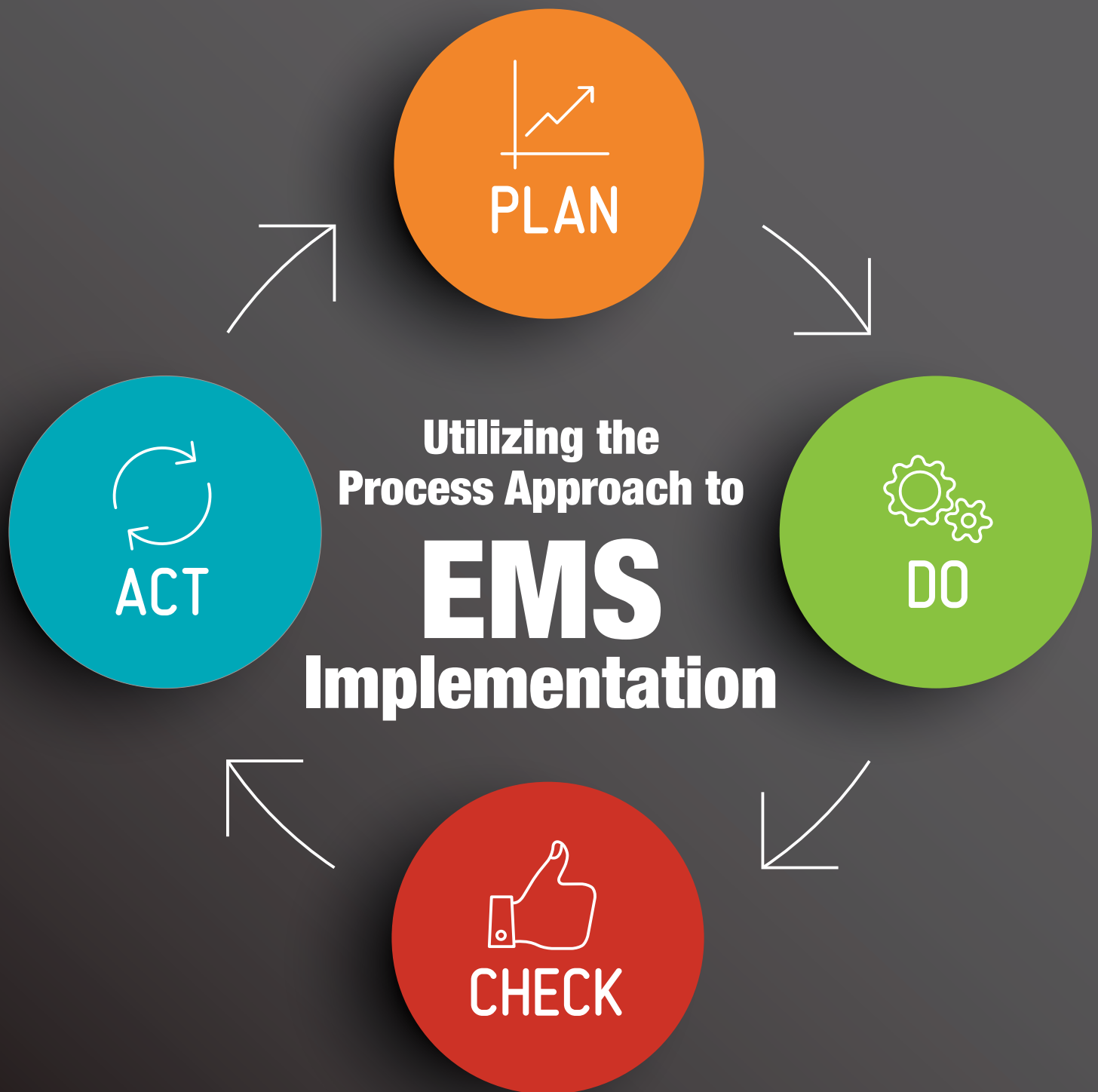
Conclusion

The new ISO 14001:2015 reflects an effort by ISO to harmonize the EMS standard with other ISO management systems standards, and the desire of the drafters to add more detail reflecting decades of implementation experience. In addition, ISO 14001:2015 includes a more strategic approach to designing and implementing EMSs, taking into account broad themes such as sustainable development, life cycle thinking, transparency, and stakeholder engagement. In a context where organizations have become increasingly sophisticated regarding risk management and EMSs in the 20+ years since ISO 14001 was first published, it will be interesting to see how the market and stakeholders (or "interested parties") react to ISO 14001:2015. **em**

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2. The ISO Survey of Management System Standards Certifications 2016; International Organization for Standardization, Sept. 2017. See <https://www.iso.org/>.
3. For a perspective of the U.S. government on compliance systems generally: See §8B2.1 of the U.S. Sentencing Commission's *Sentencing Guidelines Manual*, which describes the elements of an ethics and compliance program; and *Principles of Federal Prosecution of Business Organizations*, Section 9-28.000 of the *U.S. Attorney's Manual*. For a selection of EPA's views on EMSs: See www.epa.gov/ems (last visited May 24, 2018); *Compliance-Focused Environmental Management Systems—Enforcement Agreement Guidance* (EPA, Jan. 2005); and *Guidance on the use of Environmental Management Systems in Enforcement Settlements as Injunctive Relief and Supplemental Environmental Projects* (EPA, June 2003).
4. For a meta-analysis of over 90 articles on ISO 14001: See Boiral, Guillaumie, Heras-Saizarbitoria, Tene. Adoptions and Outcomes of ISO 14001: A Systematic Review; *International Journal of Management Reviews* **2018**, *20*, 411-432.
5. For a more detailed discussion of EMSs and environmental law: See Bell, C. "Environmental Management Systems and Environmental Law". In *Environmental Law Handbook*, 23d Ed. (2017).



The revised ISO 14001:2015 Standard presents an opportunity for organizations to fundamentally rethink their approach to EMSs.

Forward-thinking companies have long embraced the concept of adopting an environmental management system (EMS) as a means to drive sustainability, promote regulatory compliance, and foster continual improvement. The ISO 14001 International Standard is the most widely recognized framework for establishing an EMS. Core components include:

- Developing an environmental policy;
- Identifying environmental aspects;
- Defining applicable compliance obligations;
- Setting environmental objectives;
- Controlling significant impacts;
- Planning for emergency situations; and
- Monitoring/measuring performance.

While there are many other elements to an ISO 14001-conforming EMS, all center on the principle of PLAN-DO-CHECK-ACT. Originally published in 1996, the standard was most recently updated in 2015. Organizations with an EMS certified to the ISO 14001 Standard must upgrade their systems prior to September 15, 2018. The 2015 version brought with it a number of new requirements, as well as a complete reorganization of the structure. The changes needed to conform to the new standard present an opportunity for organizations to fundamentally rethink their approach to EMSs. Specifically, one should consider the “process approach.”

Historically, organizations have structured their EMSs to align with the elements or clauses of the ISO 14001 Standard. In other words, each section or requirement of the standard carried with it a corresponding procedure to describe how a company planned to accomplish that item. These procedures were often compiled in a voluminous manual that defined the EMS. While usually thorough and detailed, these manuals were often only understood by a handful of personnel.

It was frequently the case that the EMS manager or similar

role was well versed in the system, but understanding throughout the rest of the organization was inconsistent at best. A different strategy was needed to support the goal of continual improvement.

Since the early 2000s, quality management systems (QMSs) adopted in the automotive industry have embraced what is known as the “process approach”. Rather than structuring the management system to simply mirror each clause of the standard, the process approach more closely aligns with the way a company does business. Although written procedures are still needed in many cases, they do not form the core of the system.

Recent versions of International Standards for Quality Management, including ISO 9001:2015, provide explicit direction for entities seeking certification to employ the process approach. While ISO 14001:2015 does not contain a parallel mandate, multiple cues can be found that could be interpreted as strongly suggesting that a process approach strategy should be used or at least acknowledged. Probably the most obvious is the replacement of the term “procedure” with the term “process” throughout the standard.

Implementing the Process Approach

How does one go about employing the process approach in an environmental management system? Key steps include: identifying the processes, defining EMS requirements for each process, and implementing EMS requirements for each process.

Identify the Processes

What are the high-level steps needed for an organization to achieve product or service realization? These often correspond to departments or functions within a company that are well understood. Main processes are typically identified as having inputs and outputs that connect to other upstream or downstream processes. For example, Sales -> Purchasing

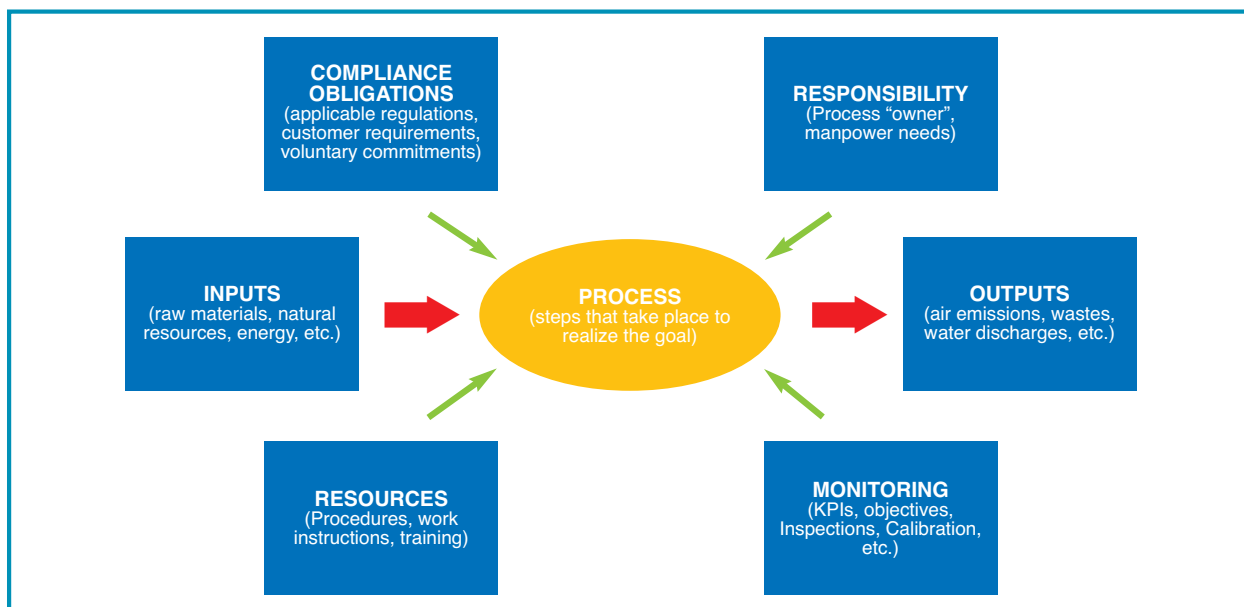


Figure 1. Turtle Diagram.

-> Receiving -> Production -> Shipping might be common main processes for most companies.

To accomplish these main processes effectively, an organization will likely need a number of support processes. These do not necessarily flow sequentially, but instead can be implemented anywhere. Examples include engineering, maintenance, human resources, quality control, environment, health, and safety, and so forth.

Finally, management processes provide the tools that help the main and support processes function efficiently. Such "tools" typically found might be training, document/records control, internal auditing, corrective/preventive action, and management review.

A facility flow diagram is often a valuable means of communicating the identified processes and their interaction.

Define EMS Requirements for Each Process

Once the processes employed by the organization are understood, each can then be mapped to identify the applicable EMS requirements. With respect to an EMS, key requirements to be identified for each process might include:

- Environmental aspects/impacts (inputs and outputs);
- Compliance obligations;
- Process owners and other roles and responsibilities;
- Training requirements;
- Applicable work instructions/procedures;
- Monitoring/measuring, including any associated records; and
- Responsibilities for achieving defined objectives.

Tools such as a turtle diagram (see Figure 1) have long been used in automotive quality circles to define management system requirements for each process. Some sort of visual documentation of each defined EMS process is usually helpful when communicating to affected personnel.

Implement EMS Requirements for Each Process

While mapping out each defined process, it is recommended to identify an "owner". This would typically be a manager or supervisor of the area who would be both competent enough to understand the EMS requirements and have authority to support the achievement of such requirements in their area. Ideally, this owner would even participate in the development of the process map.

Training would then be provided to owners and others who work within the process to the EMS expectations and obligations affecting their jobs. Finally, internal audits would be performed against the EMS requirements in each

process to gauge the effectiveness of implementing both the internal procedures and ISO 14001 requirements in each process.

Benefits of the Process Approach

Admittedly, some work is involved with transitioning an EMS to the process approach. One may ask, what are the benefits? The perceived value or benefits will vary from organization to organization, but in general you can expect to experience the following if done correctly:

1. **EMS requirements are selectively identified for each process.** Historically, it was difficult for those working in a given area to understand which parts of the EMS applied to them. Using the process approach clearly defines what is expected in each area.
2. **Decentralized EMS accountability.** A common weakness in environmental management systems is when all activities and knowledge flow through the EMS manager. By assigning and empowering process owners, EMS knowledge and accountability is pushed out to those most familiar and routinely involved in the process.
3. **Broader involvement.** By identifying the processes employed by the entire organization, "new" areas of a company's operations are inherently brought into the EMS. EMS requirements for more administrative functions, such as design, sales, and purchasing, are now considered. Coincidentally, this also helps satisfy new ISO 14001:2015 requirements for life-cycle consideration.
4. **Internal audits are more effective.** Rather than trying to audit a given procedure or element site-wide, adopting the process approach results in auditing a specific area against all applicable ISO requirements.
5. **Alignment with other management systems.** Organizations that are certified to current versions of quality management system standards should already have incorporated process approach concepts. This may present new opportunities to integrate environmental management into existing business processes.

Conclusion

Although not explicitly required, organizations upgrading to the ISO 14001:2015 Standard should consider the benefits of embracing the process approach in their environmental management systems. Given the general trend in management systems over the past 15 years, one can easily see a future where ISO 14001 implementation will require a process-based system. **em**

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ISO 14001:2015

Reducing Certification Operating Costs

A look at how multisite certification of adherence to the ISO 14001:2015 Standard is a way to reduce overall certification costs when your organization has more than five sites.

The International Organization for Standardization originally published ISO 14001: Environmental Management Systems in 1996 to provide a framework to protect the environment and respond to changing environmental conditions in balance with socio-economic needs. This standard serves as the means for an organization to manage environmental matters, fulfill compliance obligations, and address environmental risk and opportunities. The standard also serves to level the playing field when organizations compete around the world and are expected to have an environmental management system (EMS) in place. The standard was revised in November 2004 and again in September 2015. Full adoption of ISO 14001:2015 is required by September 2018 to retain certification.

Like other quality assurance systems, ISO 14001 adheres to a systematic management method referred to as PDCA (Plan-Do-Check-Act) popularized by W. Edwards Deming in the mid-1900s (see Figure 1): **Planning** is the step of understanding objectives and the process to achieve them; **Doing** is the step to implement the process; **Checking** is the step to measuring and monitoring progress; and **Acting** is the step to improve the process.

ISO also recently published ISO 45001:2018 Occupational Health and Safety Management Standards (intended to replace OHSAS 18001:2007 Occupational Health and Safety Management Systems), as well as the recently revised ISO 9001:2015 Quality Management Systems. These systems may be simultaneously in place in an organization. As such, the committees that assisted in the revision of these standards, created a consistent table of contents, allowing various responsible parties within an organization to converse in a common management system language.



Figure 1. Plan-Do-Check-Act – Continuous Improvement Cycle.

While the scope of the ISO 14001:2015 Standard covers essentially the same topics as the prior 2004 version, the table of contents is now laid out in 10 sections rather than 4. New to the 2015 version is a section called, “Context of the Organization”. The objective of this section is for the organization to view both external and internal issues that may affect the organization’s ability to achieve the intended outcomes of its EMS.

Also within the “Context of the Organization” section, the standard further clarifies scope. While the old version did require the organization to define and document scope, it didn’t prescribe how to satisfy the requirement. The new standard specifically states what the organization needs to consider what may impact the EMS effectiveness, including (1) external and internal issues, (2) compliance obligations, (3) its organizational units, functions, and physical boundaries, (4) its activities, products, and services, and (5) its authority and ability to exercises control and influence.

“Compliance obligation” is also a new term, which replaces “legal requirements and other requirements”. Compliance obligations includes mandatory obligations, such as laws and regulations, as well as voluntary obligations, such as adherence to organizational commitments, industry standards, contractual relationships, codes of practice, and agreements with community groups and non-governmental organizations (NGOs).

The revised standard places emphasis on a risk planning process to ensure the organization identifies risk and opportunities relative to its EMS. This planning process ties back to the context of the organization and understanding how environmental matters, compliance obligations, and other affected parties (e.g., suppliers, subcontractors, and the local community) are affected. Consideration of “opportunities” is also new and may not be intuitive at first. Several examples include job creation, sponsoring a community wellness clinic, and donating emergency equipment to local police and fire.

While identifying and understanding risks and opportunities are essential, the standard also expects that actions and methods to evaluate effectiveness are incorporated into the EMS. For example, an upgraded wastewater treatment plant should have evidence of improved performance. Although the term “preventive action” has been eliminated, this important concept remains a component of the new standard under its operational planning and controls and performance evaluation sections. Preventive action is considered a method to eliminate the cause of an unintended event and should be incorporated into a holistic view of planning. For example, when installing an upgraded wastewater treatment plant, the organization should be able to demonstrate how this equipment will be maintained and operated to ensure effectiveness and adherence to compliance obligations. Evidence of a preventive maintenance (PM) system, an understanding of the basis for the

maintenance obligations (e.g., Original Equipment Manufacturer Operating & Maintenance Manual), and demonstrating evidence of adherence are ways to ensure preventive actions are in place.

The revised standard continues to require a procedure for emergency preparedness and response. However, other required procedures have been eliminated, including (1) environmental aspects procedure, (2) legal requirement procedures, (3) communication procedure, and (4) monitor and measure procedure. In the operational planning and control section of the standard, emphasis is now placed on process effectiveness. Procedures are a specific way to perform a process, but not the only way to adhere to a process. This gives flexibility to the organization in determining how to ensure process effectiveness while not ruling out that procedures may be the method of choice.

The term “documented information” replaces the terms “documentation”, “documents” and “records” from the 2004 version. Documented information refers to retention of records that demonstrate objective evidence of the EMS effectiveness and other relative supporting evidence (e.g., procedures). In addition, documented information may be maintained in multimedia formats including electronic storage.

Reducing Certification Operating Costs

While having a well-run EMS is a goal that is obvious to any environmental professional, organizations are not always keen to undertake additional certifications. The reasons are many and often include cost or uncertainty as to the benefits. The truth is, an organization doesn't need ISO 14001 to operate an effective EMS. That said, for organizations working under competitive government contracts, within certain industries, and/or whose customers place value on third-party certification of an EMS, certification is expected.

This is often evident in the prequalifying stage when bidding on contracts. Prequalification requirements can be extensive. While some bidding processes require ISO 14001, others may be satisfied with an organization's explanation of equivalency. One alternative that has more certainty than a self-stated equivalency is to obtain an “attestation” from a certifying body. An attestation is a formal document by the certifying body that states that the organization's EMS has been assessed and is essentially equivalent to the standard being evaluated. An attestation has a lower level of certainty than formal certification, since it doesn't require the ongoing audit rigor of certification, but a higher certainty than an organization's self-stated equivalency, since it is issued by an independent third party. The attestation is a middle ground and its value will depend on the organization evaluating the prequalification stage of the bidding process.

Multisite Certification

Organizations that have five or more sites and share a single EMS may be able to take advantage of a multisite certification. Rules for a multisite organization are described in the International Accreditation Forum (IAF) document, “IAF Mandatory Document for the Audit and Certification of a Management System Operated by a Multi-Site Organization.”

When an organization has multiple locations, it may pursue one certification that incorporates all sites, providing the context and scope adequately describe the various operations. These sites may be located around the world, but will need to be operating from a single EMS that is managed, for example, by a headquarters environment, health, and safety (HQ EH&S) organization.

Two of the benefits of multisite certificates are (1) cost savings and (2) management of a single system. Multisite certification may be applicable to organizations that have a complex structure. For example, a power generation company that manufactures, installs, services, and maybe even operates a power plant may have a multisite certificate.

One of the risks and common concerns with a multisite certification is that one site may impact the overall certification renewal. This is factually correct and the probability of this becoming reality is within the control of the organization. For example, an organization with a multisite certificate will have a multi-year audit schedule agreed upon with the certifying body. Organizations should work closely with their certifying bodies to ensure audits are scheduled well ahead of the certificate expiration date to minimize risk of an unresolved nonconformance and loss of certification across the whole organization.

Let's consider an example of the potential cost savings to be realized with a multisite organization. Assume you have an HQ EH&S organization that manages your single EMS system, you have 14 sites in your organization's portfolio, and that your certifying body thinks that these sites may be grouped together in a single context and scope. What might the cost savings look like?

There are many variables to consider, but the most common are (1) the labor rate for the certifying body's auditors (known as “day rate”); (2) the auditor's travel cost, including airfare, hotel, and meals; and (3) the complexity and size of the organization's sites. Below is a simplified example of benefits.

In the IAF MD 1:2018 document cited above, it describes the methodology for calculating the number of sites that will be audited annually for a multisite certification. The minimum number of sites is based on the formulas below and the number of sites to audit is generally rounded up.

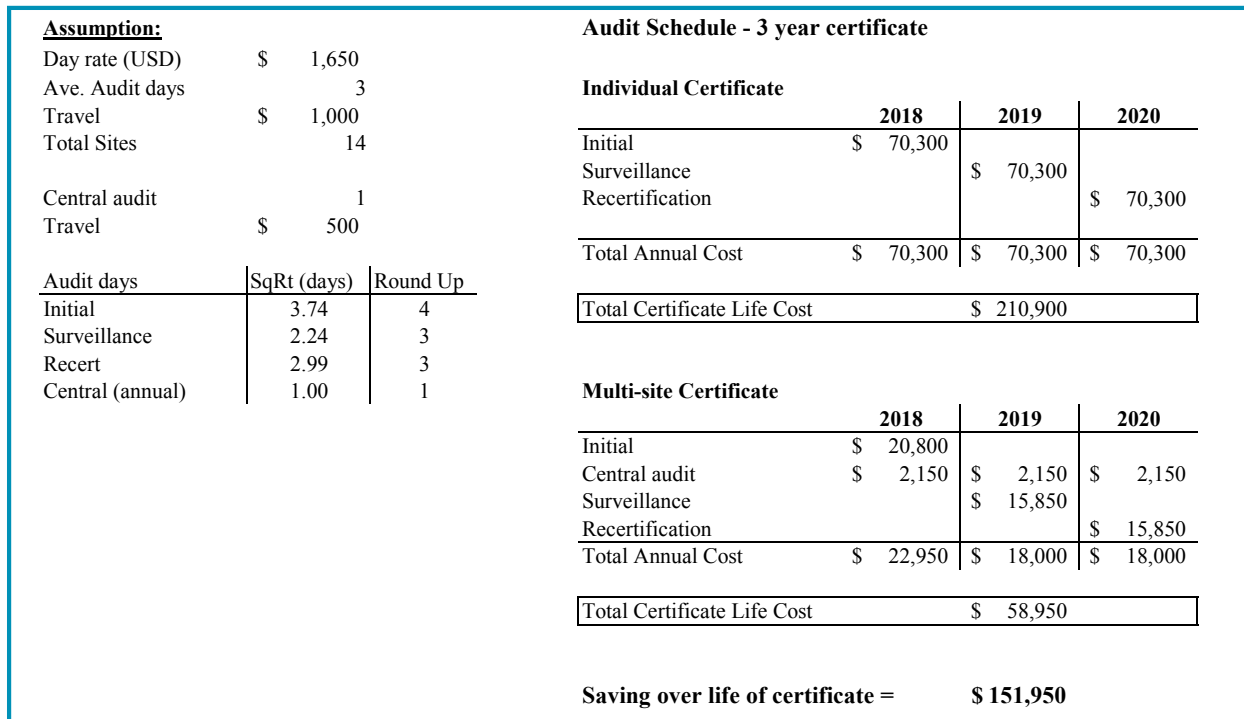


Figure 2. Cost Analysis – Individual vs. Multisite Certificate.

For example,

Initial Certification $Y = \sqrt{X}$
where X = # sites and Y = minimum # sites to be audited

Annual Surveillance $Y = 0.6\sqrt{X}$

Recertification $Y = 0.8\sqrt{X}$

For this example of a business with 14 sites and a three-year certification, the total certificate life cost for the multisite certification alternative is approximately US\$59,000, compared with the total cost for a single-site certification of US\$211,000 (see Figure 2). For organizations with fewer than five sites, the benefits are negligible. However, for those with five or more, the benefits increase with size.

Conclusion

Certifying bodies can assist organizations to realize the opportunities afforded by multisite certification. Organizations that aren't partnering with their certifying bodies in this regard may be missing out on leveraging the learnings and the ideas

that these organizations can bring to the table, including cost-savings and a simplified EMS through multisite certification.

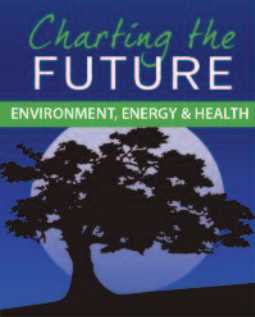
The deadline to recertify to the ISO14001:2015 Standard is rapidly approaching. If you miss the September 2018 recertification deadline, your organization will need to restart the process beginning with an initial audit. Certifying bodies have limited flexibility to extend expiring certificates. These bodies need to adhere to the IAF rules, as well as their own accreditation obligations.

While there are many minor changes to the revised standard, the overall concept of ensuring an effective environmental management system hasn't changed and there are numerous opportunities to better understand how to incorporate the latest requirements, including online training and consulting services from the certifying bodies. If your organization has five or more sites that are individually certified and you utilize a single EMS, you should consider talking with your certifying body to better understand the opportunity to leverage a multisite certification. But don't delay. **em**

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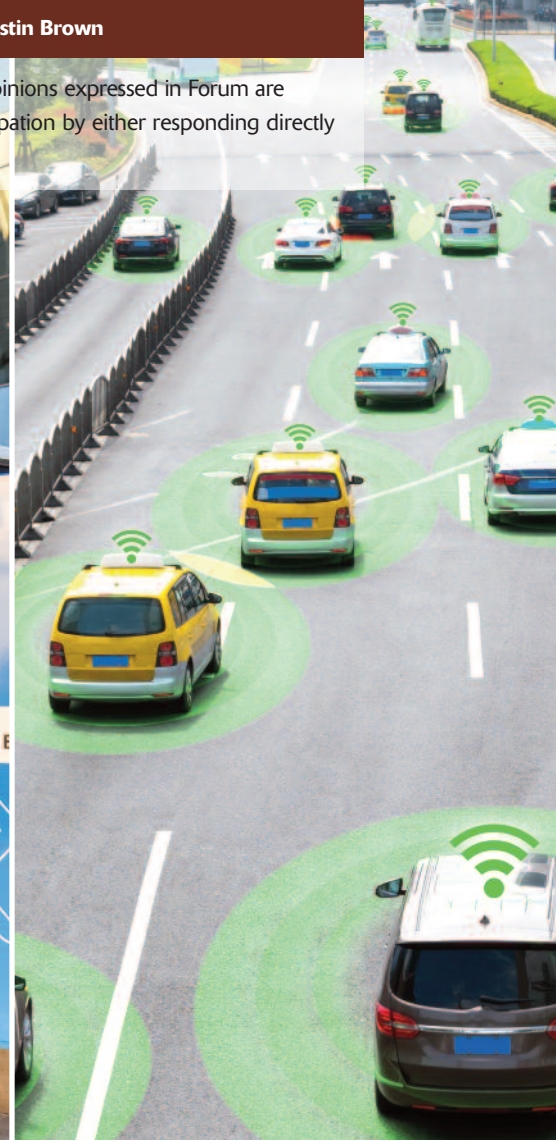


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3 Revolutions in Transportation

Following on from the focus of last month's topic on transportation and the 48th Annual A&WMA Critical Review by Dr. H. Christopher Frey, Drs. Dan Sperling and Austin Brown offer their perspective on the future of transportation, based on the book lead-authored by Dr. Sperling: *Three Revolutions: Steering Automated, Shared, and Electric Vehicles to a Better Future* (Island Press, 2018).

We love cars. Or at least we love the freedom, flexibility, convenience, and comfort they offer. Cars provide great benefits, which is why they are popular. But they also impose huge costs on society in the forms of pollution, congestion, safety risks, and infrastructure construction and maintenance. Our transportation problems are exacerbated by the fact that the United States has fallen behind much of the rest of the world in providing affordable, fast, and reliable public transportation, resulting in more traffic congestion and disadvantaging those unable to buy and drive cars.

These downsides have long been acknowledged but not vigorously addressed because there were so few solutions. Now new services and technologies are at hand, with the potential to disrupt the status quo. The signs are all around us: Zipcar, Lyft, Uber, microtransit companies like Chariot and Via, dockless bikes and scooters, plug-in electric vehicles (EVs) from almost every major automaker,¹ hydrogen fuel-cell vehicles, and partially automated cars. Taken together, these innovations represent the “3 Revolutions” of electric, pooled, and automated vehicles.²

The 3 Revolutions can support a radically improved transportation system for all—if we play our cards right.³ Electrification, pooling, and automation are progressing in distinct ways. But they are linked in that they offer profound opportunities for positive change, as well as a risk of unintended consequences.^{4,5} Understanding how the 3 Revolutions are unfolding provides the insight needed to ensure that we realize the positive outcomes while avoiding undesired consequences.

Electrification

The modern advent of EVs followed decades of increasing research and development on batteries and power electronics.⁶ A major EV milestone came in 2008 when Tesla launched its electric sports car, rocking the automotive world and proving that even high-end, high-performance vehicles could be electrified. Tesla followed up on this success in 2012, when it revealed its sleek and powerful Model S sedan. In 2010, Nissan introduced its Leaf, the first mass-market electric vehicle in almost 100 years. General Motors followed quickly with its plug-in hybrid Volt. Observing these impressive technological advances and seeking tools to address climate change, California rejuvenated its Zero Emissions Vehicle (ZEV) mandate in 2012, requiring automakers to ramp-up electric vehicle sales to roughly 15 percent market penetration by 2025. Nine other states embraced this same mandate, leading more and more Americans to switch to pure battery EVs, plug-in hybrid vehicles that combine batteries and combustion engines, and fuel cell EVs that run on hydrogen.

Electrification is also on the rise outside of the United States. Although global EV market penetration is still under 2 percent in 2018, it is much larger in some individual markets. Norway, for instance, saw market penetration of light-duty EVs approach 40 percent in 2017. EV sales in China soared to nearly a million in 2017,⁷ double the previous year. Today, every major automaker in the world is investing massively in EVs. More than 40 different models are sold in the United States, and more are available elsewhere.



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Experts expect a continued shift from conventional vehicles to EVs over the long term,^{8,9} but the pace of change depends on technological development, sustained policy commitment, and shifts in consumer behavior. Recent progress in EVs has been driven, in part, by battery costs dropping faster than anticipated. Countries like Norway and China have positioned themselves as EV leaders by implementing massive subsidies and other aggressive policies. Outreach is also key.¹⁰ In California, EVs captured 5 percent of the new car market in 2017, but given the incentives and other supports offered by the state, it was surprising that sales weren't higher. Increasing consumer education and buy-in will be necessary to achieve EV goals in California and elsewhere.

sharing a ride with other passengers, and accept a short detour to pick up and drop off those passengers. Pooling quickly gained steam. In 2016, only a year after the introduction of Lyft Line and UberPool, about half of users in San Francisco hailed a ride with their Pooled service (though many were not actually matched with other riders).¹¹

The question now is how much further pooling can go. Shared rides has proved popular for those already using ridehailing apps, but single-passenger trips in privately owned vehicles still account for most of car-based travel. The small and dwindling¹² number of conventional carpoolers (i.e., people sharing rides outside of a designated service) in the United States, even given the inducement of carpool lanes in



Shared rides has proved popular for those already using ridehailing apps, but single-passenger trips in privately owned vehicles still account for most of car-based travel.

Pooling

Pooling refers to encouraging vehicles to carry more than one passenger with an overarching goal of achieving more efficient use of vehicle capacity. Successful pooling reduces vehicle use while increasing mobility (passenger miles traveled). Pooling can also expand transportation options for lower-income, elderly, disabled, and other populations lacking the means or ability to drive their own private vehicles.

Smartphones have been the great enabler of shared mobility. Lyft and Uber were the first major companies to offer smartphone-enabled rides on demand. When these companies launched—Lyft in 2012, Uber in 2013—they were essentially glorified taxi services. They offered lower costs and greater convenience than regular taxis and were innovative in bringing the sharing and gig economies to ridehailing, but stuck to the conventional taxi model of passenger pick-ups and drop-offs. It didn't take long, though, before ridehailing expanded to pooling.

The introduction of Lyft Line in 2014 was game changing for pooling. Lyft Line enabled two or more strangers going in the same direction to easily share the trip. Uber quickly followed with its own version of ridesharing, UberPool. In both services, riders pay about two-thirds the normal price in exchange for

most major metropolitan areas, indicates that there are many obstacles that must still be identified and addressed for pooling to become widespread.

Pooling in new mobility services also depends on the companies ensuring the safety (both real and perceived) of users, who may be leery of the idea of sharing a ride with a stranger. The enormous benefits of pooling make it a prime candidate for public and private leadership, especially at the local level.

Automation

The third revolution, automation, is just beginning, at least when it comes to fully driverless cars (also known as autonomous vehicles, or AVs). Full automation is poised to be transformative and disruptive for many industries, including automakers, rental cars, infrastructure providers, and transit operators.

AVs once seemed like they belonged in some distant sci-fi future. First featured in the General Motors exhibit at the 1939 New York World's Fair and then demonstrated in the real world with General Motors and Honda cars in 1997, they are now nearing commercialization. In 2010, Google announced it had a car safely self-driving around the San Francisco Bay Area, with no special roadside infrastructure or city retrofitting.

Most new cars in Europe, the United States, Korea, and Japan are already partially automated. One common capability is adaptive cruise control, which allows the car to adjust its speed based on the speed of the car in front. Another is emergency braking, which allows the car to assume brake control when it detects an imminent crash. A third is lane-keeping and blind-spot assistance, meaning that the car alerts the driver when it is crossing a lane without a turn signal on or when another car is in the driver's blind spot. All of these features have been in commercially sold cars for several years.

Given how quickly partial automation has come to the mass market, it's easy to think that AVs are just around the corner. But in major transitions like this, success often requires more than technology. Several recent high-profile incidents have shaken the nascent public perception of highly-automated vehicles.¹³ Getting AVs on the road requires new regulation around vehicle certification, licensing, and liability; corporate restructuring as businesses figure out how to adapt to an AV era; and public debates¹⁴ over cybersecurity and ethical choices embedded in AV algorithms.

The Road Ahead

There is much uncertainty regarding how the 3 Revolutions will play out. Experts are confident that most cars will eventually become electrified and automated. With the right policies in place, pooling could become ubiquitous as well. Combining these three developments would make car-based travel far less expensive. Studies suggest that the cost of car-based travel could drop to as little as US\$0.15 per passenger per

mile from over US\$0.50 today for a single-occupant gasoline car.^{2,15} AVs also lower the time cost of car-based travel, since passengers can work, sleep, eat, converse, and so on while en route from point A to point B. This value of this time saving could be great, but it could also have adverse "rebound effects." If car-based travel becomes much cheaper and more pleasant, there is a risk of car usage skyrocketing—and with it, energy consumption and congestion—thereby offsetting many positive effects of the 3 Revolutions.

Expanding pooling is one solution to this potential problem, and one that will also help bring low-cost travel to disadvantaged populations. However, we have a ways to go before pooling accounts for more than a small fraction of total car trips. The dominant "shared vehicle" in 2017 was still Uber and Lyft cars carrying one passenger at a time. Discounted app-based pooling systems like Lyft Line and UberPool can flourish in cities, but don't work as well outside dense urban areas. The upshot is that the mere availability of pooling services doesn't guarantee their widespread use. Additional incentives may be necessary. Another important question is how to support AV integration into pooling. Google, Tesla, and Ford have all said they intend to put the first AVs into fleets for shared services, but legal and regulatory uncertainty about topics like liability and insurance may impede their ability to do so soon.

Resolving legal, regulatory, and policy uncertainty is also key to realizing safety benefits that automated vehicles can offer. Robot cars will—eventually, if not immediately—be far safer



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than cars operated by humans. They won't drink and drive, get tired or distracted, and will have lightning reflexes. They can also learn from not just their own travel data, but from data collected by a growing, connected fleet of learning and sensing vehicles. Shifting to a driverless society could save as many as 30,000 lives per year in the United States and avoid millions of injuries. But if the transition from partially automated to fully driverless cars is delayed by safety regulators and governments (or anxious consumers), then we may not see changes in safety outcomes for many, many decades. Moreover, there is a risk that transportation-related deaths and injuries could increase if the transition is incomplete. As cars become equipped with more automated capabilities, human drivers pay less attention to what is happening on the road and so are unprepared to intervene in case of an emergency.

Public and private institutions must work together to successfully merge electrification, pooling, and automation. Perhaps the single most critical step is creating travel options that are safer, more convenient, more comfortable, and cheaper than driving a personal vehicle. When this happens, people will be motivated to give up their cars, setting us on a path to better, more sustainable transportation.

Simultaneously, governments must implement a policy

framework that clearly addresses outstanding issues related to the 3 Revolutions, while remaining flexible enough to respond to new innovations. The framework should ensure prices of different transportation modes reflect impacts on societally relevant factors like congestion and pollution. For instance, governments could subsidize shared and electric travel, particularly at peak travel hours. The framework should also provide for greater investment in public transit or transit-like services that take cars off the road and expand equitable access to quality transportation. Other policies are needed to repurpose infrastructure that will become obsolete (e.g., gas stations unneeded by EVs or street signals unneeded by AVs) and develop new infrastructure that will become necessary (e.g., EV charging stations and sensors that can communicate wirelessly with computer-controlled cars), and to reform road and transit financing to reflect the needs of a new transportation era.

Transformation is coming to transportation. We must now decide how to respond. We can cross our fingers and hope that the future turns out well. Or we can apply our best thinking to make sure it does. By taking proactive steps now, we can harness vehicle electrification, pooling, and automation, to create better cities, a livable planet, and a future that serves us all. **em**

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by William H. Haak

Regulatory Roundup highlights key changes to the U.S. regulatory landscape.

In April and May 2018, U.S. President Donald Trump and U.S. Environmental Protection Agency (EPA) Administrator Scott Pruitt released details concerning a slew of new initiatives aimed at dramatically changing the way that EPA approaches its responsibilities with respect to the foundation of the U.S. Clean Air Act: the National Ambient Air Quality Standards (NAAQS). Unlike previous efforts by the Trump Administration to reshape environmental policy largely through targeted reversal of Obama-Era policies, these initiatives speak in loftier terms about broader changes to the way that EPA approaches the NAAQS and, fundamentally, the nation's ambient air quality.

Administrator Pruitt's May 9, 2018, memorandum, entitled "Back-to-Basics Process for Reviewing National Ambient Air Quality Standards"¹ comes on the heels of Trump's memorandum, "Presidential Memorandum for the Administrator of the Environmental Protection Agency on Promoting Domestic Manufacturing and Job Creation,"² dated April 12, 2018. In that memorandum, Trump directed Administrator Pruitt "to

take specific actions to ensure efficient and cost-effective implementation of the NAAQS program." The memorandum goes on to state that the President's directions are intended to ensure EPA's adherence to its "core missions" of protecting the environment and improving air quality, while "reducing unnecessary impediments to new manufacturing and business expansion essential for a growing economy."

Although many of the aspirational statements in both memoranda (e.g., more closely adhering to statutory deadlines, improving efficiency in the process, and timely processing of "exceptional event demonstrations") are seemingly without controversy, several of the principles outlined in each suggest potentially divisive departures from past EPA practices (and possibly the statutory language of the Clean Air Act) that require a closer look. These include a renewed emphasis on assessing the economic impact of NAAQS revisions and, focus on both "international emissions" and "background concentration levels" of criteria pollutants and their impact on attaining and maintaining the NAAQS.

On Closer Inspection...

Administrator Pruitt's repeated mention of the economic impacts of attainment and maintenance of the NAAQS raises the possibility of a longer term strategic play on the part of the Trump Administration and EPA. Section 109(b)(1) of the U.S. Clean Air Act (42 U.S.C. §7409(b)(1)) directs the EPA Administrator to establish (and/or revise) the NAAQS to such levels that are "requisite to protect the public health" with an "adequate margin of safety". Courts have long held that the agency is foreclosed from considering the economic costs associated with setting NAAQS for criteria pollutants (see, e.g., *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457 (2001)). While the Pruitt memorandum appears to recognize this restriction, the repeated emphasis on gathering economic impact data to "provide important policy context" suggests the possibility that this issue may find itself before the U.S. Supreme Court again some time in the near future.

There are several ways that the Trump Administration and EPA could (directly or indirectly) force the issue back to the courts. The first and most overt way would be for Pruitt to explicitly invoke economic costs as a justification for not adopting a more stringent NAAQS when presented with relevant scientific information that would support a NAAQS revision. While this seems unlikely, it is within the realm of possibility—and the addition of Justice Neil Gorsuch to the Supreme Court could yield a different outcome from the Court's holding in *Whitman*, given that Section 109(b)(1) is actually silent on the question of EPA's ability to consider economic costs in a NAAQS context.

Administrator Pruitt's efforts to generate NAAQS-related economic data is more likely designed to educate the public, stakeholders, and Congress about the perceived "real" costs of incrementally cleaner air, including such things as higher fuel prices, higher utility costs, and higher consumer good costs (as manufacturers pass-through the costs of regulatory compliance). While the Supreme Court's interpretation of Section 109(b)(1) of the Clean Air Act currently prevents EPA from considering economic impacts, calling renewed attention to these costs could lead voters to push their elected representatives to amend the Clean Air Act to revise the way the NAAQS are set. Given that 28 years have passed since the Clean Air Act was last amended (while only 13 years passed between the 1977 amendments and the 1990 amendments), perhaps the time is right for Congress to step in.

With respect to the international transport of criteria pollutants and background concentrations of pollutants, the President's April 2018 memorandum directs EPA to look beyond domestic stationary and mobile sources of air contaminants in determining whether areas of the country are to be subjected to the more stringent provisions of the Clean Air Act that are applicable to nonattainment areas. In terms of international, transboundary emissions, Section 179B of the Clean Air Act (42 U.S.C. §7509a entitled "International Border Areas") allows states to offer proof that monitored NAAQS exceedances are caused by emissions emanating from outside of the United States. Although Section 179B has historically been used predominantly by border states (as the title to the section none too subtly suggests) alleging adverse impacts caused by emissions originating in both Mexico and Canada, the Trump Administration has now made it clear that it expects EPA to entertain 179B arguments from any state—and that impacts from emissions emanating anywhere in the world (Asia is specifically mentioned) may be alleged.

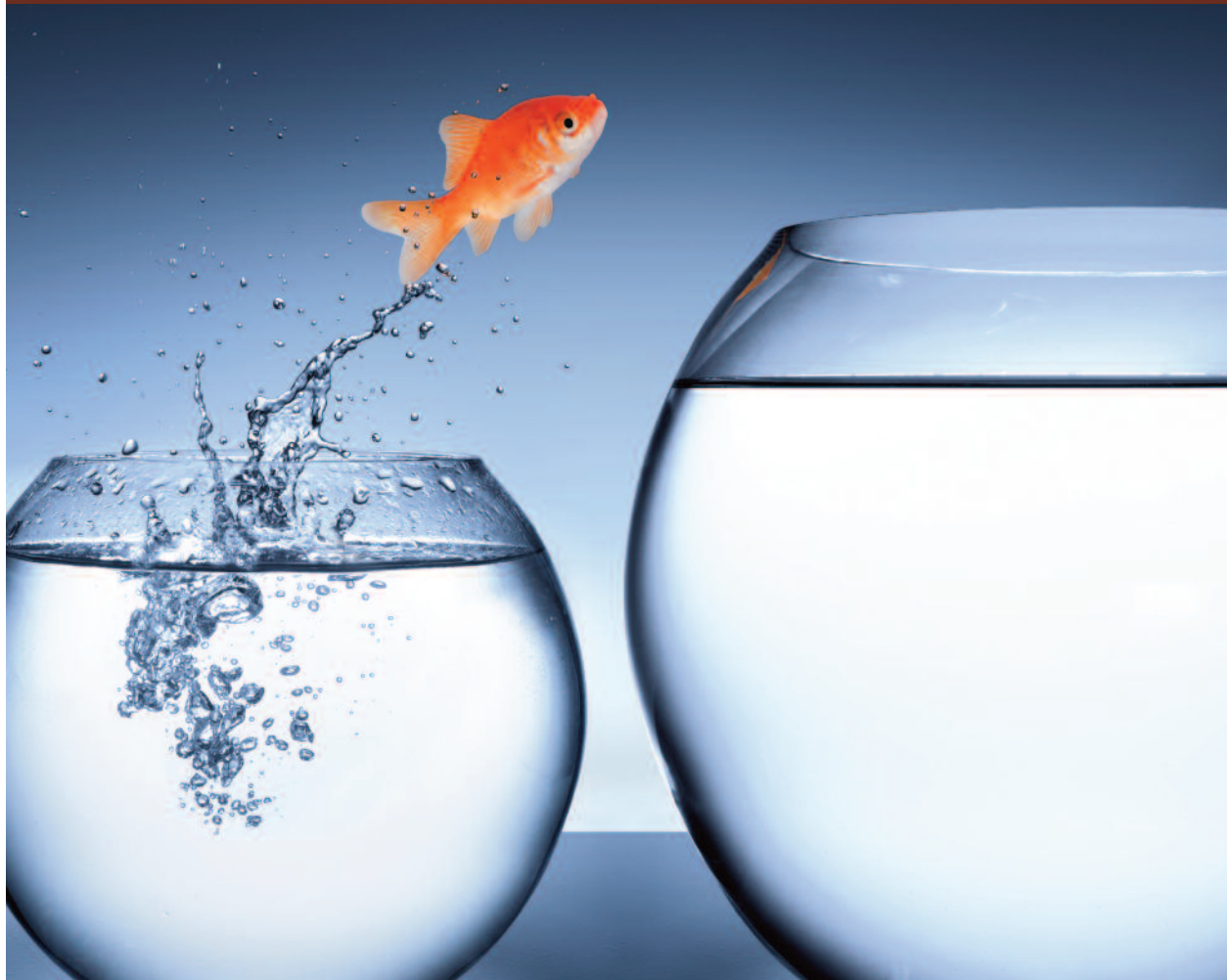
How might adverse impacts from far-off global sources be proven to EPA's satisfaction? Emissions modeling seems to be the only logical answer—though it is entirely unclear how a state or EPA might get access to sufficient foreign source data to populate a meaningful emissions model. Somewhat ironically, the President's memorandum also speaks at length about the need for EPA to significantly curtail the use of emissions modeling at both the regional/state level and the facility level.

Finally, as to background concentrations of criteria pollutants, both the President's memorandum and Administrator Pruitt's memorandum imply that the NAAQS may have advanced to the point where it is no longer possible to distinguish anthropogenic stationary and mobile source emissions from naturally occurring background levels of contaminants in the ambient air. This opens another door for states to argue that further air regulations are unnecessary because the presence of criteria pollutants in the ambient air is beyond their control through stricter state implementation plans. While some states may pursue this argument, other states may not be politically inclined to do so. In order to maintain a competitive balance, the states who "opt-out" of pointing fingers overseas and/or at Mother Nature may be forced to sue EPA—an all too common occurrence since early 2017. **em**

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Purposeful Transition

by Alison Stidworthy

Transitioning laterally, and not so laterally, to a more desirable career opportunity can be both challenging and rewarding.

Over the past five years, I have made the move from math teacher to air inspector, with many transitions along the way. My unique journey has taught me many things, including goal-setting, flexibility, persistence, and confidence. Each transition brought its own challenges, and the path was not always clear, but I was determined. After all, if you don't try, you automatically lose! And finally, two months ago, I began my desired job in air quality. I could not have been happier.

My first transition was from teacher to student when I went to graduate school. This required developing a good deal of confidence, which did not come naturally to me. I went from being the ruler of my classroom castle to an amateur apprentice, with a lot of catching up to do. My second transition was

from student to employee, when I got a job in site remediation at the New Jersey Department of Environmental Protection (NJDEP). This required flexibility, as it was not in line with my area of study. My most recent transition was from ground to air when I attained my current position as an air inspector. This was achieved through persistence. At each turn, I experienced many layers of purpose and function. These layers included learning the overall objective of the position, the procedures of job tasks, and developing relationships with coworkers.

I began my job at the NJDEP two years ago in the area of publicly funded site remediation. I describe it as Superfund at the state level. My role was that of site manager for cases like dry cleaners and gas stations with soil and groundwater

contamination. As a recent meteorology graduate, I knew nothing about the ground, so I had a lot to learn about geology, soil content, groundwater flow, and ground contaminants. I first focused on the overall purpose and procedure of the work: protecting people and the environment from contamination by doing X, Y, and Z. It was meaningful work, but I found myself impatient with the process, wanting to skip ahead to the cleanup.

I found that learning the rules and regulations that we implement was a bit like reading a dictionary, only everything is in acronyms, which also go by any number of nifty names, and to add to the fun, half my coworkers used different terms that allude to the *old* rules from 20 years ago. However, I learned the method and importance of these rules and regulations, a skill and perspective I have carried with me to my current position. My former life as a teacher gave me the confidence to join the DEP's Training Committee, which enabled me to learn so much more about site remediation, and gave me the opportunity to develop many relationships.

When I left teaching five years ago, I set a goal to pursue a career in atmospheric science. Now that I was through graduate school and working at the NJDEP, that goal remained. I continued to network (including through A&WMA), ask questions, and seek out opportunities, even though I was working in another position. And you know what? It worked! Along came an opening, and I transferred from site remediation to air compliance and enforcement. Networking does not

equate to job seeking. Rather, it is about meeting people. You never know when networking will lead you to something you need or want, or how you can be helpful to someone else. In my case, meeting some inspectors on a volunteer cleanup day ultimately led to the job I now have.

My transition to my current position has been going very well. I brought all that I learned from my other transitions and immediately applied it here. I get to inspect many different types of facilities, while learning the air regulations that we enforce. I'm meeting and getting to know people. I'm laughing at their jokes and noticing how they approach their jobs. I ask a lot of questions. My regrets of questions not asked at grad school and in my first job have led me to be bold in asking questions now. I'm embracing the lengthy and confusing rules and regulations, because in my previous job I learned how they are the backbone of all that we do. I take notes, try things on my own, and am willing to be corrected.

If you find yourself in a transition, or seeking one, I would encourage you find ways to use your skill set from other areas of your life and apply it in new ways on the job. Utilize the A&WMA community to talk with people who work in other areas, whether or not they do what you think you want to do. Finally, be persistent, yet flexible, in your goals, and be confident in your abilities. As my favorite band sings: "I hope you won't give up what's moving you inside" (*Sunny Days*, Jars of Clay). **em**

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YP Perspective is a regular column organized by A&WMA's Young Professional Advisory Council (YPAC, <http://www.awma.org/yp>). YPAC strives to effectively engage professionals within the Association by developing services and activities to meet the needs of today's young professionals (YPs). A YP is defined by the Association as being 35 years of age or younger. Each YP is encouraged to get involved with the Association, whether within their local Chapter or Section or within the Association's four Councils (Education Council, Technical Council, Sections and Chapters Council, and YPAC). YPs interested in getting involved may contact YPAC for more information on current volunteer and leadership opportunities. **Call for Submissions:** If you have a topic you would like to see YPs discuss, e-mail: Christopher Whitehead at cwhitehead@trinityconsultants.com.



We invite readers to share their opinions on recent *EM* topics and articles, as well as wider environmental issues for publication on the *Letters* page. *EM* encourages your participation by either responding directly to this topic or addressing another issue of interest to you. E-mail: em@awma.org.

GMO Article Causes Concern

As I sat down to read the first edition of *EM Plus*, I did so with great anticipation. However, as I read the *Forum* article, entitled "The Impact of GMOs on the Environment...", my enthusiasm quickly turned to concern and then disappointment.

With the article coming from A&WMA, which I have been a member of since the late 1980s, I was shocked to read such a biased, inaccurate article. While I realize the *Forum* is simply that and A&WMA clearly states that the content does not reflect A&WMA policy, I have come to expect a much higher standard of conduct.

It is clear throughout the article that the authors try to paint Genetically Modified Organisms (GMOs) as harmful to human health, and did so in a manner that does a disservice to readers searching for factual information on the subject. For instance, in the paragraph entitled, "Superbugs and Superweeds," the authors discuss Bt crops that produce toxins that kill harmful insects. The authors conveniently ignore that this process reduces pesticide use and instead

state that Monsanto's herbicide (Roundup) usage increased tenfold between 1996 and 2012.

The introduction of Bt cotton has reduced pesticide applications in the Imperial Valley for pink bollworm from 7-8 in a growing season to 0. Now, with Bt cotton, the release of sterile pink bollworm moths, and mandatory host-free periods, pink bollworm has not been found in the Imperial Valley since 2012, and the U.S. Department of Agriculture (USDA) is on the verge of declaring that pest has been eradicated. This simply would not have happened without Bt cotton.

Similarly, pesticide use on cotton in India and China has been greatly reduced due to Bt cotton. According to one study,¹ the introduction of Bt cotton in India has "reduced 172 million kg less pesticide...". Additionally, decreased pesticide use has had the beneficial effect of increasing the population of natural predators and beneficial insects such as ladybugs, chrysopa, and spiders, which effectively control cotton aphids. Another study² found that worldwide crop biotechnology has reduced spraying of crop protection chemicals overall by 619 kilograms from 1996 to 2015.

Members in the News

A&WMA congratulates Fellow Member **William M. (Bill) Auberle, P.E., BCEE**, who was awarded a Doctor of Humane Letters degree from Northern Arizona University at commencement ceremonies on May 11. Dr. Auberle provided the 2018 commencement address to more than 12,000 graduates, faculty, and friends.

Dr. Auberle joined the Association as a student member in 1967 and has served as a committee chair, board member, and vice president during his long and active service. In addition to his recognition as an A&WMA Fellow, Dr. Auberle received the Lyman A. Ripperton Environmental Educator Award in 2010.

Dr. Auberle's 50-plus-year career includes environmental engineering, management, and education. He continues to serve as Professor Emeritus and Principal at EN3 Professionals LLC in Flagstaff, AZ. More information: www.nau.edu and www.en3llc.com.

Share Your Good News

A&WMA thanks our many long-time and active members. The Association would be unable to continue to provide our slate of programming and educational offerings without the continued support of our members. We relish the opportunity to salute members' professional achievements both inside and outside the Association. To share the good news, please send your newsworthy announcements and achievements to em@awma.org.

As for the misinterpreted data regarding Roundup usage, the authors failed to fully analyze the question of overall herbicide usage. In fact, many growers have switched to Roundup from other herbicides because of the availability of Roundup resistant crops. Further, the use of herbicide resistant crops has led to reduced tillage and tractor trips in the field, resulting in substantially less particulate matter emissions from soil disturbance and combustion emissions.

In my opinion, the world has benefitted from the introduction of GMOs and I am not the only who thinks this. Consider the following comments from a highly regarded scientist who stated, "...but much research on the subject comes from the European Commission, the administrative body of the E.U., which cannot be so easily dismissed as an industry tool. The European Commission has funded 130 research projects,

carried out by more than 500 independent teams, on the safety of GM crops. None of those studies found any special risks from GM crops."³

The bottom line is that A&WMA has published an inaccurate article and this error must be rectified immediately. Further, A&WMA must get back to doing what it does best: report the facts on the critical issues challenging our planet and those who live and work here.

Sincerely,
 Roger A. Isom
 President/CEO
 California Cotton Ginners and Growers Association
 (CCGGA; ccgga.org)

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Editor's Note: All articles are subject to review before being accepted for publication. In this case, "The Impact of GMOs on the Environment and Human Health" by Stephanie Austin and Dr. Gulnihal Ozbay, followed our normal review process. A&WMA's core purpose is to be a neutral forum for information exchange to improve environmental decisions. We strongly encourage additional articles on this topic as valuable contributions to our members' understanding of a complex issue. If you are interested in submitting an article to *EM* on this or another topic, please read our general guidelines for authors at www.awma.org/emguidelines.



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The ALS laboratory in Simi Valley, CA, for example, is a nationally recognized 22,000-ft² air testing laboratory specializing in the analysis of ambient and indoor air, soil vapor, subslab soil gas, landfill gas, and biogas. The Simi Valley laboratory provides analytical support for applications, such as ambient air, remediation, landfills, soil vapor extraction, site characterization, indoor air quality, wastewater treatment plants, fence-line ambient and residential monitoring, and U.S. government projects (including the U.S. Department of Defense, U.S. Navy, and U.S. Air Force).

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