Web Inventory Implementations in Pennsylvania - Reducing Burden, Increasing Quality, and Changing Business …the Other Things to Think About

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ABSTRACT

The Pennsylvania Department of Environmental Protection Bureau of Air Quality continues to pursue automated approaches to collecting and reporting emission inventory data. Over the past several years the Bureau has built a solid foundation for implementing Web-based and other automated emission inventory data management solutions. The prevailing goal of the solutions is to reduce burden on the regulated community and Bureau staff, increase efficiency and effectiveness of inventory management, and further ensure the quality of the Commonwealth's data.

The approach taken by the Bureau focuses on enhancing functions and tools used each day while maintaining an overall plan for expanding its capability for automated data collection and reporting in the future. The Bureau's initiatives include implementing an integrated Intranet-driven application for generating National Emission Inventory data sets, performing quality assurance functions, and producing ad hoc emission inventory-related management reports, as well as building tailored online and XML solutions for collection of data from the regulated community over the Web.

The Bureau's initiatives now have full momentum. However, history reflects the clearing of many technical and business-related challenges. The approach taken by BAQ is characterized by a "big picture" perspective, robust project planning, attention to lessons learned, open communication, and patience. This approach has yielded unique insights that are not always found with classic management and information technology planning guidance. These insights, although generated through a single agency's experience, may be valuable to other organizations that are considering, planning, or executing emission inventory automation projects.

INTRODUCTION

The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Air Quality (BAQ) continues to pursue many initiatives focused on electronic collection and reporting of emission inventory data. Over the past several years the Bureau has built a solid foundation for implementing Web-based and other automated data management solutions. The goal of the solutions is to reduce burden on the regulated community and Bureau staff, increase efficiency and effectiveness of inventory management, and further ensure the quality of the Commonwealth's emission inventory data.

The automation efforts specifically focus on supporting and refining day-to-day emission inventory requirements while maintaining an overall plan for future enhancement and expansion of data collection and reporting capabilities. Support to base requirements like the National Emission Inventory (NEI) include implementing an integrated Web application for generating NEI data sets, performing quality assurance, and producing ad hoc emission inventory-related management reports via the BAQ Intranet. Broader, longer-term efforts include the development of custom online and XML solutions for the collection and validation of inventory data from the regulated community via the Web. These electronic solutions parallel the current paper-driven process and reap the benefits of integration with the Bureau's existing Air Information Management System (AIMS) and the Department's web portal.

BAQ approaches their e-Inventory initiatives from a strategic perspective looking at the critical, long and short term needs of the Bureau, current and future goals, and the technology that is available to them. This overarching approach is augmented with practical flexibility, situational judgment, and patience. As individual projects are planned and executed, various technical and business-related challenges are always met. Many of the challenges are not encountered because of technical weakness, flawed technical approach, or management errors. Although these aspects are certainly involved and impacted, many of the issues are not readily identified or even controllable.

The benefits of automation, including burden reduction, process streamlining, quality improvement, and user access, are generally commonly held. The myriad of business and technical publications that provide guidance for electronic solution projects document the potential power of moving toward an increasing automated environment. Likewise, there is a wealth of information available to support the technical aspects of IT project planning and performance. Project management methodologies and technical approaches are readily available. Consultation by subject area experts is also available to support their use. What is often missing from these documents or guidelines are those things that are often assumed to be outside the bounds of project planning or too dynamic to capture.

Although reflecting only one agency's perspective, certain underlying, non-technical aspects of Pennsylvania's experience may serve as a "things to look for" overview for those organizations embarking on electronic reporting and management initiatives of their own. Or, for those organizations that have completed electronic reporting initiatives, these may be common points that could be further shared within the emission inventory community.

The highlighted considerations and/or challenges met by the BAQ Team will summarize some of the aspects that are too often unreal at the beginning of a project, but should be considered to help ensure the success of automation efforts. Although not intended to be an exhaustive technical checklist for IT implementations, it should provide a sense of the issues or considerations to be recognized as projects are planned and executed.

To help organize these thoughts, the concepts are grouped into three main areas: conceptions, initiation, and performance. In this context, conception is the phase of the project when management and staff first consider and strategically plan a project. Conception moves toward project initiation when the project is prepared for technical performance. Performance includes the project phases where work is started and managed toward completion of the solution. Some of the considerations may be unique to Pennsylvania and as such may not be universally applicable. Variables related to the sizes or organization of individual air quality programs, ability to achieve buy-in or organizational approval, procurement or resources allocation processes, and general project support may differ greatly within individual states. Regardless of state differences the aspects highlighted below should be considered, along with more technical steps, and tailored to individual organizations, situations, and needs.

BODY

Conception

Before any initiative begins some form of planning typically occurs. This conceptualization phase can be very streamlined or more detailed. Whatever the complexity is, certain planning aspects should be involved.

Strategic Planning

At the conception of a project, or even more generally as a good business practice, IT implementations should be part of longer term future planning. Detailed strategic plans covering topics like policy changes, data requirements, IT architecture, systems development, funding, staffing, and schedules should be drawn up by the organization. IT implementations may be a subset of larger plans, but the

important point is that prior planning and coordination take place. This detailed forethought will help ensure awareness of the project and focus on the effort.

The plans should be developed to include the immediate considerations of your organization as well as taking a broader view to include parent organization, State, and Federal-level plans. It may also be beneficial to include the plans associated with IT support organizations. This broader, externally focused information may reap long term benefits as these outside organizations often impact policies, funding, infrastructure, standards, and higher-level initiatives with which your effort must comply.

The upshot of building and maintaining mid or long term strategic plans is that your organization can work from a roadmap to the future. This will help set expectations, garner support, accumulate resources, and might reduce the need for more tactical adjustments during the performance of the project.

A significant part of the IT planning and management process, not far removed from any other business-related planning, is having a good understanding of the goals and priorities for the planned activities. Wrestling with the reality of what is really needed from the project versus the "nice to haves" is often a difficult endeavor. This practice includes delineation of what is planned (not hoped) to be gained from the project.

The process of setting priorities involves consideration of many potentially volatile factors. Priorities for a given IT project balance related, yet sometimes opposed, variables, including:

- political environment (e.g., who wants/doesn't want it)
- relative "payoff" (i.e., return on investment – both monetarily and technically)
- degree of visibility (e.g., what else might it be associated with)
- criticality to the business (e.g., is it supporting a mission critical process)
- technology to be applied (e.g., introducing new tools in lieu of existing infrastructure)
- project support (e.g., in-house development versus acquiring contractor support)

Working through these factors is critical because, even if they are avoided initially by stealthy planning, they are often realized later in the implementation. At that point, any issues that may arise can be extremely disruptive or even fatal to a project.

One aspect that may arise from setting priorities, particularly with complex or highly functional applications, is the concept of quality versus quantity. Priorities can be set to have as much of an application completed in a given timeframe with only basic features and support (e.g., documentation, help functions, reports, etc.). The system would be enhanced over time to reflect a full set of features and functionality ensuring immediate, short-term quantity from the project. On the other hand, the priority approach can be taken to support a more quality perspective. In this case, the application would be delivered over a longer period of time and/or in a modular manner. System components reflecting more highly evolved features and functions would be implemented from the onset, but the entire solution would be delivered over a longer time frame. The choice of direction is dependent upon the needs of the organization, available funding, and a host of other factors. There may not be a right or wrong answer to this, but the limitations and constraints of either direction must be recognized and communicated openly to avoid confusion and disappointment and to ensure success.

Developing and maintaining a firm understanding of what goes first, what goes second, and what is only a desire is essential to keeping the strategic plan and project tidy. Keeping the overall project priorities clear during planning will help ensure a solid foundation for development and implementation. The converse may result in projects that are initiated and then questioned, criticized, or even dismantled because of misplaced priorities.

Team

One aspect that is often spoken of during planning processes and is essential for ultimate success is the identification and involvement of a champion for the effort. Having a champion often helps ensure support for the project through facilitating the allocation of resources and establishing buy-in from the user and management communities. Although the champion is typically identified as a single person, in reality several champions may need to be identified throughout the organization. Depending upon the complexity of the organization and/or the project, champions within your own organization, at the management level and at the enterprise level may be necessary to reach essential groups or decision makers. In some cases, if the project is very high profile and impacts State policy, such as the use of electronic signature, a champion at the State administration level may be very powerful.

In any case, whether the project is supporting a limited community or whether it is has far-reaching boundaries, the champion must have the correct balance of IT, technical emission inventory/air quality, communication, and political skill. An individual that is respected by the user group, constituents, and the management chain will certainly help move a project to success. The absence of such a person is likely to predispose a project to difficulties, by opening the door for additional challenges that may otherwise be avoided.

Along similar lines, ensuring that the project has a strong supporting team also aids success. Although this initially sounds obvious, attention to this detail very early in the process will help ensure that the project gets off the ground and will ultimately be supported through completion. By formulating a true team environment that includes buy-in from immediate management, the users, in-house technical and IT staff, and potentially contractor support, a project can be pursued with confidence. Although all the individuals do not need to be actually assigned or fully active in the project, building a strong support network may be a key factor to getting the project started and implemented.

Funding and Resources

A key part of the strategic planning process and certainly a critical factor day-to-day is the identification of funding for the project. The identification and maintenance of financial resources may be the most difficult aspect of the job. Not only do you have to find a source and out compete other projects, but you then have to manage what you have effectively. Ensuring that a project is sufficiently funded to support the required scope before it starts is absolutely essential. In the case of smaller efforts the funding may be necessary for only a few months or a single fiscal year. For larger efforts, funding must be identified across many years and actually appropriated for the current year. Logically if a project is not funded it can't be performed. However, even a mild gap in funding once the project is underway can have a significant impact. If a project must wait for a reallocation of funds and a work stoppage results, not only will work not be completed but key staff and resources may be lost. For example, if your project uses contractor support and funding is disrupted, team members may need to be moved to other projects temporarily. Often, once funding is restored, these staff may no longer be available to return to the project.

Just as with project planning, management of the funding must be done precisely and effectively, but with enough flexibility to actually support the project and not hinder it. Again, this factor is largely dependant upon the organization, the rules for the use of the funding, and the contracts with which the money is associated. If your organization is fairly restrictive relative to how money can be spent (e.g., certain money can only support development, while other funds can only support training) knowing whether funding can be used between tasks or even projects may be very important. No project is completed as it was planned when the funding was initially allocated. Ensuring that you are not forced to tie funding to only a single effort or deliverable may be very important at the start of the project and once it is underway.

Funding issues during the performance of a project may result in delaying activities or even stopping work. Having to put a project on the shelf not only means that work isn't being completed, but may also impact buy-in from management and users. The loss of focus and credibility for the project is likely to be a serious hindrance to the project if it is restarted and even jeopardize the success of other related projects in the future.

For example, this need is often realized when a project is faced with an unexpected change due to enterprise initiatives and/or technical issues. Project activities, schedules, and funding can be impacted significantly if, during the course of otherwise planned implementation, the enterprise-level IT organization make an unforeseen switch in technology or if your project is suddenly tapped to be a centerpiece for an enterprise-level initiative. Whether the project now needs to purchase new software or it becomes a high profile production, the funding allocation is likely to be impacted. Even if you are able to change funding allocations or acquire additional resources, delays may be crippling. Having the flexibility to support changes and understanding any limitations before the first project meetings are held may mean the difference between success and failure.

Contract Vehicles

If your project is to be supported through procurement, the requirements of the available contract vehicles may directly impact not only the ability to manage financial resources, but also the technical activities that may be performed. Again, this factor is directly related to the rules and resources available within an individual organization. For instance, your state may have streamlined procurement processes in place, but they may limit the amount of funding that can be applied and may have rules against continuing work across fiscal years. These vehicles may offer quick turnaround and simplified contract terms so the project can be initiated in a shorter period of time. In contrast, full competitive procurements may require detailed review and approval processes that take significant time to complete. However, these may allow for allocation of additional funding during the project period of performance, flexibility to modify the scope or content of work to be performed, and multi-year support. Knowledge and selection of the contract approach that best suits your organization and project may ease the performance of the project.

A good time to identify these funding and contracting limitations, as well as any technical constraints, may be during an internal contract/process review. If your organization requires new projects to be reviewed by management, IT staff, contracts, and possibly even State-level organizations prior to procurement or initiation, information about how the project resources and products are to be managed should be readily available and obtained prior to project commencement.

Although the degree of procedure and scrutiny may vary depending upon the State, it is generally a good idea to engage in some sort of review, even if you are not required to do so. Unless you already know all the details and requirements associated with acquiring support, working with management, contracts staff, IT operations, and even the legal department may help identify the best contract vehicle for your project. Their collective knowledge may help tailor the contract to best support your effort, determine whether the project can be performed internally or has to be competitively bid, raise awareness (and support) for your project, and help ensure that your project is a recognized initiative.

Statement of Work

Part of ensuring sufficient project support is the development of a mature statement of work (SOW) and/or request for proposal (RFP). Having a strong SOW, born from a strong, team-based strategic plan, will greatly assist in obtaining the necessary resources and will certainly get the project started in a well-focused manner. Having a document that communicates the following items will set a strong foundation for resource allocation, project planning, and overall performance.

- task definition and organization
- technical activities required

- required products
- project timelines/deadlines
- performance measures/acceptance criteria
- resources to be provided by you
- resources that must be provided by the support provider
- assumptions and constraints

Calling on the collective knowledge of subject area experts, whether IT staff, engineers, or contracts specialists, as well as lessons learned, is recommended to assist with building the SOW. Having these things documented adds credibility to the initiative, allows for easy planning, and increases the chances that your support will be focused efficiently and effectively. The absence of a good SOW, although affording potentially limitless flexibility, does not form a strong basis from which to plan or work and is likely to cause confusion and delay.

Project Initiation

The strength of your SOW is also a key factor as the project graduates from a concept to actually being initiated. Once the project has been initially defined, made it through the review and/or approval process, been funded, and the team identified and/or procured, the actual work can begin.

Kickoff and Communication

The first thing that has to be done is to focus the team on the tasks to be performed. If the project has moved rapidly from concept and planning to initiation this may feel redundant, particularly if you have involved the development team in the previous phases. However, whether this is the case or whether you are introducing a contractor team to the environment for the first time, moving through a strong kickoff is a powerful activity.

In reality there could be a few different kickoff-type meetings. The first should be performed within your organization. This meeting, or set of meetings, will bring together the internal project management, IT staff, technical staff, user group representatives, contract staff, and any other parties that will be involved with the project. The intent of this meeting is to make sure that everyone understands the focus and expected outcome of the project. More importantly this is the forum for ensuring that each party understands their role, timing, and requirements. This process helps open lines of communication and helps reduce the chance for unexpected surprises later in the project.

Another kickoff should be more technically focused and be performed by the project technical team. If you are working with a contractor this may be the first face-to-face meeting that they facilitate. It will give them an opportunity to introduce their team, explain the details of their approach (based on your SOW), the project schedule, and other key elements. It is also a good time to bi-laterally level expectations. The technical team can set their project assumptions and constraints and you can ensure that your goals are being met. It is a time for SOW refinement and project organization, both of which gives the project a fresh and effective start.

The third kickoff is not directly related to your organization, but you should make sure that it occurs. If your project is working with a support contractor, you should ensure that their team performs their own internal kickoff meeting. This is almost identical to your internal meeting and is focused on achieving the same goal – opening communication and ensuring understanding of individual roles and responsibilities. The performance of this meeting often helps avoid contractual, invoicing, staffing, infrastructure, and other issues that may hinder your contractor from working efficiently and effectively.

The start of the project is likely to be characterized by a host of other meetings. Although the tendency is to jump directly into development, resisting that urge and ensuring effective communication from the onset will be the key to success. Apart from the kickoff meetings, or perhaps integrated with them,

should be some forum for the technical team to meet with the intended users and management. This does not necessarily need to be formal or even always a physical meeting, but some means of communication will be key to maintaining buy-in from the people that will use the final product and ensure that you have what you need to get the project done.

Coordination with other Agency projects may be very important. If you are in a large and/or active organization, your project may be one of several initiatives that are underway or being planned. Working with enterprise-level organizations or other offices that have projects of their own may help to accomplish many important points, including potential sharing of resources, integrating with higher-level initiatives, promoting your own efforts, and generally maintaining awareness of what else is going on. Failure to coordinate with other projects may introduce mid-stream changes to your project if the other projects introduce new required standards, processes, infrastructure, etc.

Planning and Requirements

With the initial, introductory focus meeting completed and the necessary lines of communication open and functioning, the foundation is set for the technical activities to begin. The first activity should be the completion of a detailed work plan. This plan should detail what products are to be created, what assumptions and constraints will impact the project, what the schedule is, and what resources (staff and infrastructure) will be applied. Although this information may be included in the initial planning documents, the SOW, or the contractor proposal, the landscape often changes during the project kickoff efforts. Whether or not changes have been introduced through the initial meetings, it is a good idea to have well-detailed work plans to follow throughout the project. It is important to realize that plans are living documents that need to be managed and will change during the life of the project.

Assuming that your IT project is following some form of lifecycle management approach, the first technical activity will be requirements gathering. Spending time and resources on this facet of system development can be critical to success and certainly support an efficient development effort. Making sure that the technical team fully understands the system and functional requirements is essential.

Often, if a project is perceived to be simple or if the team has completed a similar solution in the past, the tendency may be to by-pass or minimize this part of the lifecycle. Even if it seems like requirements collection (or even detailed design) is not necessary, following the process often identifies new components and helps focus the development by providing structure, a basis for testing, and essential system documentation.

During requirements gathering activities, the technical architecture will be identified. Whether your project is introducing new technology or working within an existing framework, knowing the enterprise-level architecture is always beneficial. If you are able, if not required, to work within the existing architecture, your project may be able to integrate with and reuse infrastructure that is already in place (and paid for and tested by other projects). This can certainly ease resource burdens and possibly accelerate the development effort. On the other hand, if the environment does not support your unique needs, is in transition, or is unstable, it may actually cause issues that must be worked around.

It is equally important that you don't get shackled to enterprise-level technical instability or the use of old or inappropriate technology. By maintaining a strong set of technical requirements for your project and performing the necessary prior planning to support your needs, you should identify, build around, and implement tools and technology that best suit your application. This may mean introducing new pieces into the existing infrastructure or maybe eliminating some tools that are currently employed, but if it rationally meets your true requirements then it may need to be done.

This does not mean that you have to introduce the newest or shiniest technology. In fact, staying a generation back and using time tested products and approaches may be the best way to go. But

changing technology, though often a challenge may be necessary and understanding the environment will always yield strong benefits.

Similarly, if your solution is to be deployed and used outside of your own organization (e.g., by the public, Regional offices, etc.), defining and working with the capabilities of the external environment is also very important. It is not a safe assumption that all the users have access to the same technology that you do, or for that matter even have access to a computer. Maintaining a user-based focus throughout the project is essential. Understanding and working with the actual capabilities will help eliminate building a product that will not ultimately work for those that need it.

Documentation

Finally, one overarching activity that needs to be started at or even before the first technical meetings are held is upholding a focus on documentation. Documentation, whether it includes meeting minutes, requirements documents, test plans, or user guidance, should not be overlooked or be an after-thought. It should be set as a priority within the SOW, during team identification/selection, and during project kickoff meetings. If your project is following a defined lifecycle management approach, certain application documentation should be mandatory, including requirements documents, detailed designs, test plans/scenarios, etc. Depending upon your organization's standards and/or the size and complexity of your initiative, additional documentation requirements in support of quality assurance, configuration management, or other process-driven management approaches may also be necessary.

In any case, it is always a good idea to set agendas for meetings, follow up with minutes, capture all issues and decisions, and formalize status meetings, reports, and any other communication that impacts project participants or the implementation itself. These communications can be official or informal documents, emails, or notes, as long as the information is documented and maintained. Although documentation may be viewed as an administrative burden, at the end of the project, when the solution is deployed, all the documentation will provide necessary history as the system is maintained or enhanced. If the project is delayed, the documentation will provide an essential starting point for the next round of effort. In any case, the information will be used by you, management, and technical staff.

Project Performance

There are many "soft" activities that can be done while the project is in the conceptual phase and during initiation. Although the points highlighted above are generalized and may not capture all the possibilities or realities for your organization, they are all points to be observed as you move toward full execution of your project. Once project performance has been initiated, the considerations highlighted during project planning and initiation remain pertinent.

Maintaining Plans

During project performance, the technical aspects of your project come into direct focus. The tools you are using, your development approach, the programming languages employed, etc. are of utmost importance. This is the time where the technical details contained in the project SOW, work plans, requirements documents, and other artifacts are brought to life by the technical team. As the team works with the plans and documents, challenges will naturally arise with the technical aspects of the project. However, it will be the management issues that will create the most project chaos.

One important tenant is to stick to the plans that were set. This is based on the assumption that the plans were workable at the onset and that they were not simply bureaucratic paper chases. Assuming that they were driven by serious consideration, they should be managed as such. It is absolutely essential that the plans are managed to maintain focus on the work being performed, the parties involved, the project timelines, and allocation of resources. The ongoing maintenance of the project plans, or related documents, should also capture potential weaknesses, or risks, within the project and how they will be mitigated or resolved.

The hardest balance to maintain is the degree of flexibility that must be accepted versus rigidly sustaining the original plans. For example, one of the biggest areas for failure, or at least budget and schedule busting, is when "scope creep" or insertion of new requirements occurs. This is often a case of the requirements being collected and the application being built and then, during requirements review, testing or demonstration, some new functionality is identified. The judgment and prioritization of the new work must be immediately and decisively assessed. The inclusion of new requirements may significantly impact work already performed or plans for new work, but may, in fact, be necessary. The ability to be flexible (to a point) is always necessary. The understanding that things are going to arise during the life of a project is important. It is the decisions that you make about them that are pivotal.

Oversight

The primary management function during execution, beyond the active management of plans, budgets, schedules, and overall performance, is basic vigilance. Maintaining full awareness of the environment around you will aid significantly with the successful management of your project and its actual performance.

As a manager and as a team, it is important to be aware of changes at the enterprise-level that may impact the project. Decisions taking place, if you detect them, often are never seen by a project until it is too late. One day you are working along according to plan, the next day you are brought into a meeting, and by that afternoon your entire technical approach has been redefined due to an enterprise-level architecture change. Issues related to unforeseen hardware or software changes, modifications to standards, application migrations, server instability, and even staffing changes at the enterprise-level might greatly impact your project. Although these decisions and changes may ultimately be dictated to you and all the other projects using enterprise resources, it is important that you, or someone on the team, remain engaged and in open communication with parent and/or associated organizations so that the changes can be identified as soon as possible and the appropriate adjustments made.

Along similar lines, but typically much closer to home, are changes to the "business" requirements. Maintaining awareness of changes to data or processing alterations can also significantly impact a project. For example, tools that are developed to support the NEI input format Version 2.0 are going to require modification to support Version 3.0. This is a change to data requirements that may impact or generate a project. The implementation of the Consolidated Emission Reporting Rule may change the way data is collected and managed in a State, which might impact the way day-to-day business is performed. Awareness of changes emanating from internal sources, the department, the State, or the Federal government should all be identified and assessed for their impact early upon their arrival.

Another set of changes that must be monitored is related to the organization itself. Loss of key team members, a champion, members of management, and even trading partners can have a significant impact. With every project, institutional knowledge grows quickly. Regardless of the amount of documentation and delegation of responsibility, information naturally collects with individuals. If that person is lost from the project, there is a hole that can equate to significant relearning, integration of new personalities and agendas, and variations in technical skill.

Tied to this may be trading partner issues. Although at the onset of a project every effort is made to select trading partners (if required) that provide the necessary capabilities to support the project, issues naturally arise. Loss of resources, including staff and technical capabilities, can impact the effectiveness of their involvement or even their involvement at all. The loss or handicapping of a trading partner, particularly if you have a limited number can seriously slow or even end a project. Staying in constant communication with multiple individuals within the trading partner organization can help foresee challenges that may arise.

Similar issues related to contractor support, if your project requires it, are also real. Changes to key staff members, technical capabilities, or even key processes can harm your project. Sufficient management reporting should be set up in the planning and procurement phases of the project to provide open communication and forums for highlighting such issues. However, because they are often "bad news" the reality of the situation may not be fully known. It is important to open and maintain communication with not only the contractor's technical staff and management, but with individuals at various levels within the organization. Like working with the trading partner, this will afford you with a wider perspective of what the environment is, both for good and bad.

Finally, although not necessarily the most import thing to keep watch over, and certainly the one thing that is hardest to react to, is the reduction in funding or financial resource issues in general. Staying in tune with your organization's budget so that you maintain a good idea of what changes may be occurring outside of the project is key. If you are asked to cut your project budget or are unable to access funds needed for future phases, the impacts can be staggering and even end the initiative. Getting and maintaining the necessary level of funding for your project, particularly if it spans more than one year, may be the most difficult aspect to control.

CONCLUSION

As the arena of State and Federal emission inventory continues to evolve, the Bureau's ability to succeed is insured by lessons from the past, a practical set of priorities for automation, and a focused and flexible vision for the future. By realizing that challenges are inherent to any project and recognizing a set of underlying considerations derived from their experience and continually maintaining priorities, the Bureau and its partners are realizing a streamlined emission inventory process and better, more usable data.

If you, or your organization can embrace these concepts along with the technical aspects of IT projects and the business areas that it will support, you may be able to avoid some project pitfalls. Although the ideas outlined above are not a checklist for success, they are offered as suggestions of some things that are often overlooked or unforeseen. It does come from the perspective of a single State and a specific set of emission inventory-related initiatives, but many of the points are very common and are seen every day. Many of us who have studied how to successfully execute an IT project have heard many of these before. They are, from experience, real. Not all will apply to your efforts, depending upon the organization, but many will. They may seem like common-sense tenants, but add competition for funding and resources, bureaucracy, new ideas and technology and a lot of lessons learned quickly evolve.

KEY WORDS

architecture
burden reduction
business critical
champion
configuration management
Consolidated Emission Reporting Rule
contract vehicle
documentation
Environmental Protection Agency
financial planning
funding
information technology
kickoff
lessons learned
National Emission Inventory
organization goals
political environment
procurement process
project priorities
quality
quality assurance
request for proposal
requirements
return on investment
statement of work
strategic plan
subject matter expert
team planning
technology
user guidance
visibility
work plan