ENVIRONMENT 2045:
Future Directions for Environmental Progress and EPA's Role

A project of American University in partnership with the EPA Alumni Association

Focus Group 4:
Science, Technology, and Information

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For almost 50 years, EPA has been a national and world leader in addressing the scientific and engineering challenges of protecting the environment and human health.[1]

1. Introduction and Background

The Environment 2045 project description states that "Science, technology, and data have been the cornerstones of environmental progress and all of EPA's work." Focus Group 4 (FG4) has been asked to "focus on specific issues of science that EPA will have to address, EPA's role as a trusted source on hazard, exposure and risk, how EPA should strengthen its science function generally, how EPA should leverage technology, how EPA can improve data collection and analysis and use information technology (including social media) to support all parties, how public trust in EPA's science can be enhanced, and how EPA can best harness research done outside the agency, including citizen science."

The members of FG4 (see Appendix A) include a cross-section of EPA alumni with extensive experience in science as practiced in both EPA's research and program offices, in technology development and deployment, in information management and technology, and in delivering technical assistance to states and other EPA partners. In addition to drawing on this experience, FG4 has relied on work done by the National Academy of Sciences, specifically the 2012 NAS report on the future of environmental science and the 1999 NAS report on sustainability.[2] We found that both reports continue to be widely relevant to the current situation. In addition, the 2017 NAS report on biotechnology[3] elucidates upcoming challenges related to the bio-economy.

Science is the bedrock that supports informed environmental decision-making. FG4 agrees wholeheartedly with the NAS conclusion that EPA's science, technology, and information (STI) functions have served the agency's regulatory programs well over the years. At the same time,

[1] Science for Environmental Protection: The Road Ahead, National Research Council, National Academies Press, Washington, D.C., 2012.
[2] Our Common Journey: A Transition Toward Sustainability, National Research Council (NRC), National Academies Press. Washington, DC., 1999.
[3] Preparing for Future Products of Biotechnology, National Research Council (NRC), National Academies Press. Washington, DC., 2017.

like the NAS, we believe that the combination of persistent old challenges and daunting new ones requires important, long-term changes in EPA STI activities, in the clients served by these functions, and in the organizational structure and processes relied on to plan and manage these functions.

We want to note some historical context. For many decades, the EPA Office of Research and Development research laboratories and EPA regional office analytical laboratories have played important roles in carrying out and in stimulating the state and industrial laboratories to carry out essential environmental monitoring activities and analytical services. Of critical importance have been the quality assurance/quality control procedures for providing data that meet national standards. For example, the subsurface soil/water monitoring at Love Canal, the detection and assessment of dioxin along highways in Missouri, and the cleaning up of PCB contamination in buildings in New York state were among the many early contributions of EPA to the advancement of science; and the need for future leadership in this realm by the agency is clear.

1.1. For discussion, FG4 puts forth this vision for 2045:

By 2045, EPA will continue to be a globally and nationally trusted leader and adviser in environmental STI. For example, as governmental and non-governmental players develop initiatives in emerging areas such as geoengineering for climate amelioration, industrial-scale activities in outer space, and synthetic biology, they will actively want to seek out EPA's input. EPA will have the expertise and capabilities to be a helpful partner and constructive advocate for the environment. EPA also will help to assure fair, open, and equitable access to environmental STI to the greatest possible extent.

Environmental right-to-know will have advanced to become the expected norm. All members of the public will have ready access to useful, understandable information about what is in their air, water, food, and products on a real-time basis and with reliable forecasts as well. Ubiquitous sensing will advance the ability to know all of the sources of contaminants and stressors and enable informed efforts to reduce and eliminate environmental hazards.

Transparency and clear communications will build understanding and confidence and a sense of teamwork rather than adversarial conflict. EPA will be recognized as a provider of environmental solutions, with the imposition of regulatory obligations and enforcement actions the failsafe mechanism that assures protection when markets fail to respond to open information.

The balance of this report presents our findings and conclusions in two parts: the first discusses the most pressing challenges facing EPA STI now and in the future, and the second presents our recommendations on the steps needed for EPA STI to address these challenges successfully. In this paper, we use the term "information" for brevity with the intent to encompass data, information, and knowledge.

2. Challenges Facing EPA STI:

This section presents Focus Group 4's judgment on the most important challenges facing EPA STI. Our findings are presented in two categories, which we have borrowed from the 2012 NAS report:

- Current and Persistent Challenges: Some longstanding and others more recent, these are challenges of which EPA is aware, but for which EPA has not yet developed appropriate solutions.

- Emerging and Future Challenges: These challenges, we believe, will arise from developments in science, the economy, and human society in the mid- to long term. Solving them will require capabilities in STI that are neither available to the agency now nor envisioned as future challenges for the agency. Some conceivably could also require new legislation, but that is a topic for another venue.

2.1. Current and Persistent Challenges

The 2012 NAS report points out that, despite the remarkable progress EPA has made in controlling many of the most obvious environmental hazards, the challenges remaining are "complex, affected by many interacting factors, and no less daunting." Paraphrasing the NAS, these challenges typically are difficult to define, unstable, and socially complex; they have no clear solution or end point; and they require cross-program and cross-disciplinary approaches. They often involve low-level exposures to multiple stressors, rather than the high-level exposures to individual stressors that have been the primary focus of EPA regulation. Specific persistent, near-term challenges include:

a. The exposures and risks arising from complex interactions among "the chemical, biological, and physical characteristics of an agent, the genetic and behavioral attributes of a host, and the physical and social characteristics of the environment…"
b. Poorly understood toxicity characteristics of many of the more than 70,000 chemicals that currently can be produced for commercial purposes, and particularly toxicity characteristics when some of these chemicals are in mixtures.
c. The pressures of population growth and climate change on America's aging waste water and water supply infrastructure, coupled with the persistent and unsolved problems of lead (Pb) exposure and the undefined exposures and risks of trace pollutants originating from prescription medicines and other biologically active substances.
d. Health effects of a large number of air pollutants attributable, in part, to human activity and, in part, to disturbances of the land/atmosphere interface.
e. The still-unresolved challenges of nutrient pollution and the impacts of the agricultural sector on water quality.
f. The unaddressed exposures and risks from industrial discharges and other point and nonpoint sources, including atmospheric pollution attributable to the energy and transportation sectors.
g. The advances in monitoring, biology, molecular science, and genetics that make it possible to identify pollutants in previously undetectable amounts, raising new questions about human and ecological exposures and risks.
h. Continuing and increasing leakage into the environment from waste disposal sites that were believed to have been adequately sealed and capped, along with new types of disposal challenges posed by the dramatic expansion within the plastics industry and the increased extraction, use, and disposal of rare earths and other previously unrecognized hazardous materials.

These problems require new approaches to measuring low levels of pollutants, monitoring long-term, extremely complex changes in the environment, and new modeling and other science and computational resources to comprehend much larger spatial and temporal scales, multiple pathways, larger databases, and more powerful analytics. Solutions to these problems may well require approaches quite different from the regulatory strategies EPA has relied on in the past. More about that in the next section on emerging and future challenges.

2.2. Emerging and Future Challenges

With a few exceptions, knowing for certain the specific challenges that will face EPA STI in the mid- to long-term future is not possible. It is possible, however, to discern the essential characteristics of these challenges by examining current trends in environmental STI and reviewing recent assessments of EPA's readiness for the future by knowledgeable experts. We have also drawn on our experience in these areas at EPA and elsewhere.

First, the few exceptions – the areas we are confident will pose major challenges to EPA STI in the mid- to long term include:

a. Climate change. The climate challenge is real now and will intensify going forward as greater quantities of greenhouse gases are emitted and accumulated in the Earth system. EPA must be an effective participant in what will be ongoing national and global processes for anticipating and responding to threats to the environment and human health arising from climate change. EPA should play a vital role in assisting Americans and the global community in finding solutions.
b. The "BioEconomy." Governments and private investors around the world are sufficiently convinced that the BioEconomy – the application of biology to produce energy and other products – has enough promise to warrant significant investments in its development. EPA will face a series of decisions on new chemicals, new industrial processes, and the systemic risks and exposures arising from the BioEconomy.
c. The revolution in molecular science, genetics, and bioinformatics and the "-omics" (genomics, proteomics, etc.). These advances are rapidly redefining major agricultural and industrial processes and products.
d. Urban sustainability. A growing percentage of the US population and economy is concentrated in urban areas, and all signs indicate that this trend will continue. The challenge for EPA STI will be to expand its focus beyond pollution control to the broader mission of ensuring the overall, long-term environmental, economic, and social sustainability of these urban areas.
e. Increasingly sensitive and affordable sensing technology of many types. If current trends continue, the general public will soon have access to technology for gathering and publishing environmental monitoring data at a resolution that may match or exceed that available from today's most sophisticated monitors. Also, the development of low-cost, small sensors coupled with the smartphone as a data collector, transmitter, and processor may herald a quantum advance in EPA's ability to determine exposure and a corresponding improvement in risk-assessment quality. The challenge is for EPA, governments at all levels, academia and NGOs, and the regulated community to anticipate this development, master the technology, and devise strategies to guide this development in useful and responsible directions.
f. Continuing explosive growth in computational and communications technology. This trend has already revolutionized STI collection and analysis, and it will continue to do so for the foreseeable future. The challenge to EPA is to stay abreast of technological developments or risk becoming a less capable regulator with diminishing relevance in national and global policy fora.

g. If other groups of experts were to list the most important future challenges facing EPA STI, their choices likely would differ from ours. However, their choices and ours would almost certainly share the same key characteristics and would call for most of the same changes by EPA to face these challenges successfully. These characteristics include:
h. More robust approaches to data gathering, combining datasets, analyzing data, modeling, and knowledge development, including cross-program and cross-discipline approaches to defining threats and designing solutions.
i. A commitment to staying at the leading edge of science by systematically anticipating challenges, supporting innovative solutions, taking the long view in tracking progress and taking corrective actions, all the while emphasizing collaboration within and outside the agency.
j. Systems-level tools and expertise which NAS defined as the capacity to analyze "complex scenarios, including life-cycle assessment; cumulative risk assessment; social, economic, behavioral, and decision sciences; and synthesis research." While not unknown to the agency, these are not among EPA's strengths and currently have no functional or organizational home.
k. Synthesizing scientific information, characterizing uncertainties, and integrating methods for tracking and assessing the outcomes of actions (that is, being accountable) into the decision-making process from the outset. Building confidence in the credibility and reliability of the environmental information used in decision-making.
l. Greatly increased computational resources readily accessible to EPA scientists and technologists throughout the agency, coupled with the analytic tools needed to address issues involving varying spatial and temporal scales, large data sets, and multi-disciplinary skills.

3. Recommendations for Meeting Those Challenges

The NAS 2012 report states that (as of 2012), "The foundation of EPA science is strong" but then goes on to say that action is needed to address "long-standing (and unresolved) environmental problems," to enhance the agency's "ability to recognize and respond to emerging challenges" and "link broader problem characterizations with solutions," and "to meet the needs of policy-makers and the American public." Drawing on our deliberations and on outside sources including the previously cited NAS reports, Focus Group 4 recommends the following actions. They should assist EPA in providing the STI support needed by its core regulatory functions, leading to and supporting the new functional capabilities and program strategies EPA will need to address the challenges it will face over the next quarter of a century. EPA should make informed choices about the roles it needs to play: where it needs to lead, where to follow, where to guide, where to influence, where to "cheerlead," etc. Whatever its role(s), EPA should be sensitive to the importance of all-of-society approaches in addressing problems that are of national, regional, and local significance, including approaches that address gender equity and the needs of underserved and disadvantaged populations.

3.1. Recommendation 1

Establish strong, accountable leadership for the science, technology, and information functions and capabilities at a higher level of EPA. This recommended high-level focal point need not have operational control over STI functions; rather, it would strive to ensure these functions address agency priorities, operate in an integrated, complementary manner, and achieve the level of excellence needed for EPA to exercise leadership in environmental policy on a national and global scale. The assistant-administrator level lacks sufficient clout to be fully effective to meet the needs. One option would entail the creation of a second deputy administrator slot for STI. While the other deputy continued to exercise chief operating officer responsibilities, the STI deputy would be able to focus on addressing environmental STI challenges and needs. Another option would be to strengthen the authority of the existing position of science advisor to the administrator to substantially increase its clout. The person who holds the focal point position should have strong professional STI credentials, and the position preferably should be career rather than political.

This recommended focal point would:

- Lead an EPA-wide process for setting priorities in agency STI, planning investments in these functions, and assessing their performance. This process should be collaborative in nature involving all elements of the agency as well as states, tribes, the regulated community, and outside experts whenever possible. It should take place perhaps every five years to allow for the time needed to assess progress, to digest long-term forecasts of emerging threats and external conditions, to make considered and stable investment decisions, and to consult with all stakeholders.
- Review the recommendations made by outside advisory groups, including but not limited to the National Academies, the National Advisory Council for Environmental Policy and Technology, the Science Advisory Board, the Clean Air Scientific Advisory Committee, the FIFRA Scientific Advisory Panel, the TSCA Science Advisory Committee on Chemicals, ORD's Board of Scientific Counselors, and the Tribal Science Council and assist agency senior leadership in making decisions about actions to respond to recommendations.
- Consult, where appropriate, with international entities on STI research and technological solutions. Maintain awareness of relevant bilateral and international science and research agreements; global and regional research collaborations; multilateral treaties, conventions and compacts; global foundations' and philanthropies' initiatives; and relevant United Nations Specialized Agencies. Benchmark EPA STI against leading practices of other major environmental entities.
- Assess progress annually and speak for the STI functions in the annual budget process as a complement to the views of the operational heads of these functions.
- Conduct annual "scanning sessions" like those conducted by ORD in the past involving representatives of all of EPA's STI communities to detect emerging developments and consider which deserve EPA's attention. The purpose of this process would be to ensure that EPA is not caught unaware by, for example, the emergence of ubiquitous, mobile, affordable, and increasingly capable sensor technologies, fracking, additive manufacturing (3D printing), the molecular revolution, and other science and technologies with environmental implications.
- Initiate and oversee agency-wide training and technical assistance to ensure the acquisition and quality control of essential skills such as systems analysis, multi-disciplinary problem definition and characterization, forecasting and "big data" analysis, and social sciences that must be present throughout the agency to enable the cross-program approaches essential to EPA's future.

- Promote the establishment of, and lead EPA's participation in, a federal government-wide process for setting priorities for environmental STI, for assigning and coordinating the contributions of individual departments and agencies, and for presenting and defending federal environmental STI plans and budgets. Ideally, this process would be led by the Science Advisor to the President, the White House Office of Science and Technology Policy, and the Council on Environmental Quality.

The EPA leadership function would include oversight of, but not operational responsibility for, executing the recommendations presented below.

3.2. Recommendation 2

Build forecasting and modeling capabilities at two levels in EPA – a central capacity and organization that serves EPA leadership in setting priorities and anticipating new threats on a national and global scale; and at lower levels, to serve specialized needs of HQ and regional programs. EPA already uses advanced modeling methods in some science and program areas; the approach taken to expanding this capability for use in forecasting applications throughout the agency should be part of an agency-wide plan to make modeling and forecasting accessible throughout the agency.

3.3. Recommendation 3

Prioritize information provision as a risk reduction strategy. Programs such as the Toxics Release Inventory and AirNow have demonstrated the power of providing useful environmental information to the public as a tool for environmental progress. Other programs including Energy Star and Safer Choice have demonstrated the potential of information to encourage environmentally beneficial choices by consumers and manufacturers. EPA should expand the use of information to drive environmental results, including a "Right-toKnow 2.0" enterprise to harness the sensing and computational revolutions to provide timely, useful information about environmental conditions and forecasts. Thanks to ubiquitous sensing and citizen science, interested consumers will have increased capability to track what is in their air, water, food, and consumer products. An example is the ResourceWatch program developed by the World Resources Institute to provide trusted and timely data to the public. EPA should be an engaged participant and partner in steering the process and communicating about environmental risks. EPA should commit by words and actions to open data, open source software (especially models), and open science.

3.4. Recommendation 4

Invest in the computational resources necessary to support high-level and widespread use of monitoring, forecasting, and modeling tools in EPA. Provide the staff resources to assist inexperienced practitioners. Assure that the resources are available to partners and are open to the greatest extent possible.

3.5. Recommendation 5

Invest in tools development and propagation of technology. Advances in science, information technology, materials development, and computational technology typically are accompanied by the emergence of new tools for performing EPA's work in cooperation with state and tribal partners and the regulated community. EPA needs a focused ability to identify and, when necessary, invest in developing cutting-edge science and technology to provide tools needed by environmental practitioners and the regulated community, as well as the academic sector and

NGOs. Finally, consideration should be given to establishing a DARPA- or In-Q-Tel-like entity to explore promising but speculative new science and technology developments relevant to the environment (usually in partnership with others). The aim would be to fill in key gaps not addressed by other endeavors.

3.6. Recommendation 6

Expand the capacity to deliver technical assistance including providing scientific knowledge and methods, technology and tools, training, and at times, hands-on application assistance. This capacity should consist of a central focal point and one or more centers of expertise across the nation. The goal should be to make technical assistance a standard tool available to EPA and its partners including states, tribes, and local communities. Technical assistance specialists should work with the regulated community and non-governmental entities. For example, technical assistance may further regulatory compliance and pollution prevention. This capability and the processes for planning, executing, and assessing the results should be coordinated with the agency's science and information functions to ensure that these central functions are linked with the needs of and solutions being devised by front-line practitioners. Also, strengthened capabilities should enhance EPA's standing as a strong voice in legal confrontations over responsibility and liability for environmental issues.

EPA technical assistance has long been highly valued by states, tribes, and other recipients, and an opportunity for the agency to deliver services of direct value – contrasting with EPA sometimes imposing painful and expensive obligations. Although reportedly important in EPA's early days when the emphasis was on building state capacity and assisting industry to adopt new control technologies, technical assistance has not been seen as a consistent and essential part of EPA's work for some time. There are some exceptions -- the emergency response and recent EEnterprise programs, and individual initiatives from time to time by some programs and regions. However, technical assistance has no organizational focal point and is seldom mentioned as an important skill set for EPA scientists, technologists, and data experts. This is a missed opportunity.

In enhancing technical assistance as an important mission of EPA, consideration should be given, at least initially, to adopting the E-Enterprise program as the preferred method for dealing with states and tribes, and possibly other entities including the regulated community. EEnterprise has achieved a high degree of success in delivering technical assistance to states and, increasingly, tribes, largely but not exclusively in information technology, much of it drawing on expertise within the states themselves. This model is highly valued by states and tribes, who serve as co-directors along with EPA, and has already devised workable solutions to some of the more intractable legal and other relationship issues inherent in providing technical assistance. (See Appendix C for more information on the E-Enterprise program.)

3.7. Recommendation 7

EPA should champion and participate in the creation of comprehensive environmental monitoring systems that provide long-term and real-time data about environmental conditions at all feasible spatial and temporal scales, using data from other agencies and sources wherever possible and building new networks where necessary. This monitoring capability is critical for three reasons: first, EPA needs reliable, scientifically valid longitudinal data to detect and investigate emerging trends in conditions relevant to the environment and human health; second, EPA's credibility as a policy and science leader requires that it be well informed and a source of reliable data about current conditions and emerging threats; and third, achieving sustainability requires a robust capability to measure and track environmental conditions and enable making effective course adjustments where needed. These networks should be designed to generate the data necessary to conduct trends analysis in order to track what is happening in the Nation's waters, air and soil. EPA should partner with other Federal agencies, other levels of government, academia, NGOs, citizen scientists, the international community, and the private sector for this effort. Leadership will be needed at the White House level. Existing initiatives such as the Group on Earth Observations' (GEO) Global Earth Observation System of Systems should be leveraged as forerunners.

3.8. Recommendation 8

Enhance EPA's human resources in STI. Specifically, EPA should:

- Build staff capacity in the central science and information offices and in all agency programs and regions in the following high priority areas: interdisciplinary and systems approaches to problem identification, characterization, and solution; modeling, forecasting, and large-scale computing; biological sciences including molecular/"-omics;" the social sciences and communications; decision science; and technology development and transfer.
- Reinvigorate EPA's core science skills with special emphasis on biology, toxicology, chemistry, exposure science and risk assessment, monitoring techniques, and statistics. ORD in particular needs to be strengthened in terms of both skilled experts and expanded mandates for participation in core EPA regulatory activities.
- Build and maintain a community of people throughout EPA who are skilled at and committed to systems methods of problem definition and solution, in applying cross-discipline, cross program approaches, and in addressing uncertainty in decision-making. Do this by conducting agency-wide training and certification, creating a venue and process for regular exchanges between central and program staffs, and issuing guidelines and policies for this activity.
- Strengthen the agency's social science capabilities in the science and operating program offices by hiring more behavioral and decision scientists and drawing on research and expertise from outside EPA when necessary.
- Obtain the compensation authority needed to attract and keep national and international experts in essential disciplines in science, technology, and information. • Establish a mentorship program that transfers knowledge to new employees before more experienced employees retire, in order not to lose the Agency's institutional memory.

3.9. Recommendation 9

Establish "mid-course" milestones for meeting the challenges facing environmental STI. Specific mid-course milestones should be set for our recommendations, which emphasize building staff capacity, launching new ventures, and modifying or refocusing the assignment of responsibilities within EPA's organization. Implementing recommendations takes time and experimentation, and the milestones should not be too specific or short-term. We suggest 2030 as a target date for EPA to show measurable, across-the-board progress, and urge that an effort be made to define mid-course milestones by 2020.

4. Appendices

4.1. Appendix A: Members of Focus Group 4

Focus Group 4 authors consist of ten environmental professionals with roughly 300 years of diverse experience with EPA and the federal government. They are all now retired from EPA after serving in a broad variety of management and scientific positions in EPA Headquarters, Regional Offices, and Research and Development. In alphabetical order they are as follows, with one or more of their EPA positions listed in parentheses:

Name	Experience
Penelope Fenner-Crisp (FG leader)	HQ OW, Pollution Prevention and Toxics, Pesticide Programs and Chemical Safety and Pollution Prevention (22 years)
Dave Friedman	Former senior advisor to Agency management on monitoring issues; director of SW-846 testing methods program; played strong part in Agency efforts to address emergency preparedness issues and rationalize the Agency's various measurement methods programs. Current Technical Advisor to commercial environmental laboratory trade association (ACIL)
Ed Hanley	DAA-OARM (12 years), CIO (3 years) Administrators Office (5 years)
Barry Nussbaum	HQ: Air Office (Mobile Sources), HQ: Office of Environmental Information, Chief Statistician
George Schewe	NOAA on assignment to EPA, Research Triangle Park, Office of Air Quality Planning & Standards, Source Receptor Analysis Branch, Model Applications Section (5 years)) Rita Shoeny (HQ, Water (Office of Science and Technology), ORD (National Center for Environmental Assessment and Office of Science Policy)
Glenn Schweitzer	Director, Office of Toxic Substances, EPA (1973-1977). Senior Research Associate, Cornell University (1978-1979). Director, Division of Water Resources, Office of Research and Development, EPA (1979). Director of Environmental Monitoring Systems Laboratory—Las Vegas, Office of Research and Development, EPA (1980-1985)
Mark Segal	HQ Office of Pollution Prevention and Toxics science support). Senior Microbiologist. Co-chair, Algae Working Group of the Biomass Research and Development Board (2012-2017). Member, Interagency Biotechnology Working Group (2016-2017). Member, Interagency Metabolic Engineering Working Group (1997-2007)
William Sonntag	Office of Reinvention (1997-1999). Office of Environmental Information (1999-2011). Office of International and Tribal Affairs (2011-2015). Group on Earth Observations Secretariat, Geneva, Switzerland) (2016-2018). Currently, Research Affiliate, MIT Media Lab Space Enabled Program)
Steve Young	HQ, OARM, OEI, and OTS/OPPT. Senior Advisor in OEI. Information technology, management, and policy (32 years)

Additional insights were provided by Derry Allen and John Reeder.

4.2. Appendix B: Bibliography

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4.3. Appendix C: EPA's E-Enterprise Program for the Environment

[EPA website text below accessed at: https://www.epa.gov/e-enterprise/about-e-enterpriseenvironment]

"E-Enterprise for the Environment puts into practice cooperative federalism for environmental co-regulators. Through a shared governance model, environmental leaders at EPA, States, and Tribes use E-Enterprise to deliver better results, often with lower costs and less burden, for the benefit of the public, the regulated community and government agencies.

More than 45 years after the creation of the EPA and the enactment of a broad set of federal environmental protection laws that states, territories, and tribes may be authorized to implement within their jurisdictions, the various levels of government have developed complementary areas of expertise. By recognizing the advances that these co-regulators have made in the implementation of environmental programs, E-Enterprise seeks to capture and combine the best of all the capabilities and resources. These include the capacity for shared governance, necessary to provide streamlined processes, trusted information, and enhanced productivity for the national environmental enterprise.

Our Vision:

- Modernize Business Processes: Improve regulations by streamlining and updating the implementation of environmental programs.
- Enhance Services to Users: Reduce transaction costs and burdens for the regulated community by leveraging technologies, such as promoting electronic reporting and permitting, online portals and business practices, training and assistance, and other tools (see E-Enterprise projects)
- Advance Shared Governance among U.S EPA, States and Tribes: Transform the way environmental programs are implemented through collaboration and shared governance (see Shared Governance page)

Using a shared governance model to streamline business processes and leverage technology enables the nation’s environmental protection enterprise to be more informed, timely and productive. Results include, improved health and environmental outcomes, while supporting local jobs and communities, as well as fostering greater trust among the regulated community, the public, and co-regulators by improving data integrity and communication.”