

**National Advisory Council for  
Environmental Policy and Technology**

August 5, 2002

Governor Christine Todd Whitman  
Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20460

Dear Governor Whitman:

On behalf of the National Advisory Council for Environmental Policy and Technology (NACEPT), I am pleased to forward the Council's advice letter regarding the National Environmental Technology Competition. At the request of the U.S. EPA Office of Research and Development, NACEPT has reviewed EPA's preliminary plans for the creation of the National Environmental Technology Competition (NETC). As you are aware, the NETC is an FY2003 budget initiative designed to identify the most important technological needs of the future and reward those who create the innovations to meet them.

Let me first express my sincere appreciation for the efforts of the NACEPT NETC Workgroup members who spent many hours reviewing the NETC Preliminary Implementation Strategy and other pertinent documents, and further time discussing the program's important governmental and market implications. The Workgroup, chaired by Dan Watts of New Jersey Institute of Technology, was ably assisted in its efforts by the participation of the following experts:

- F. Henry Habicht II, CEO, Global Environment & Technology Foundation
- Harvey M. Bernstein, President and CEO, Civil Engineering Research Foundation
- Andrew Patterson, Partner, Environmental Business International
- Costis Torgas, President, Public Technology, Inc.
- David F. Stead, Executive Director, Energy & Environmental Capital Network
- Timothy C. Lindsey, Manager, Illinois Waste Management & Research Center
- Penelope Hansen, Senior Research Associate, SCG, Inc.

The advice accompanying this letter addresses the four questions posed to NACEPT by the ORD Charge on this issue (see Attachment 1), amplified by the NETC Preliminary Implementation Strategy document (Attachment 2), and modified by the information and issues raised in discussions with the experts listed above and EPA staff.

In closing, I would like to thank the EPA management and staff who worked very collegially with us on this project, Jay Benforado, Stephen Lingle, E. Timothy Oppelt, Walter Kovalick, Jr., Mark Joyce, and Sonia Altieri. And finally, let me express a note of thanks to my colleagues on the NACEPT Workgroup for their time and thoughtful contributions to this report:

- Dan Watts, New Jersey Institute of Technology (Chair)
- Randal Coburn, Empire State Development, Albany, NY
- Charles Jones, Commissioner of Douglas County, Lawrence, KS
- Marc Rogoff, HDR Engineering, Tampa, FL
- Richard Sustich, Metropolitan Water Reclamation District, Chicago, IL
- Patricia Wood, Georgia Pacific Corporation, Washington, DC

We look forward to future collaboration on NETC as it develops through the years and hope that its successful implementation by the Agency will assist in the proliferation of cost-effective environmental technologies in the United States and around the world.

Sincerely,

Dorothy Bowers  
Chair  
National Advisory Council for Environmental  
Policy and Technology

Enclosure

cc: Eileen McGinnis, Chief of Staff  
Paul Gilman, Assistant Administrator, ORD  
Jay Benforado, Deputy Associate Administrator, OPEI  
Peter Preuss, Director, National Center for Environmental Research, ORD  
Stephen Lingle, Director, Environmental Engineering Research Division,  
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Timothy Oppelt, Director, National Risk Management Research Laboratory  
Walter Kovalick, Director, Technology Innovations Office, OSWER  
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Gordon Schisler, Deputy Director, OCEM

**National Advisory Council for  
Environmental Policy and Technology (NACEPT)  
National Environmental Technology Competition Advice Letter**

**July 19, 2002**

The NACEPT NETC Workgroup, a subset of the Council, was formed at the request of EPA's Office of Research and Development (ORD) to review the National Environmental Technology Competition (NETC). The Workgroup convened four times between May and July 2002, three times by conference call and at a planning meeting on June 11-12, 2002, in Washington, DC. At the meeting, the members were joined by seven experts in various aspects of environmental technology (e.g., markets information, local government, industry, demonstration, program design) and a number of EPA managers and staff. The conversation ranged both broadly and deeply across the complex topic of technology development, financing, demonstration, testing, verification, marketing, diffusion, policy, and regulation. ORD presented the group with two documents, a Preliminary Implementation Strategy and a charge document that laid out specific questions to be answered by the Workgroup. Although the exchange of information and ideas was very broad, this summary captures the responses of the Workgroup members to the questions asked at the two day meeting which are highlighted below. A 40 page transcript of the two day meeting and copies of the briefing materials by the experts are available.

*The following advice was presented to the NACEPT Council by Dan Watts, the Workgroup Chair, on July 19, 2002, and was subsequently approved by the Council.*

**Issue #1 – Approach.**

**Will the general approach outlined in the Preliminary Implementation Strategy achieve the Administrator's goal of fostering implementation of innovative, cost effective technologies in high priority problem areas?**

Throughout the discussions on NETC, both Workgroup members and experts were in agreement on two basic statements. First, as a program created specifically to speed the development and implementation of new, more cost-effective technologies to address high priority environmental problems, NETC must be focused on actions that facilitate marketplace acceptability, encourage technology investment or project funding, and advance technology diffusion. Participants focused the bulk of their discussion time on the complexities of the environmental marketplace, the difficulty in affecting its actions and reactions, and the need for NETC to structure its program to be a positive force within that marketplace. Without a realistic focus on market needs and opportunities, the program will not be successful. "Awards will not drive the market," as one participant stated, but a program designed to draw out technological innovation to meet specific long term environmental goals that are clearly articulated by the EPA may assist in improving the nation's overall environmental protection.

Second, the Workgroup understands that the NETC is only one of EPA's ongoing activities to bring new private sector developed technologies to bear on environmental problems and does not shoulder the entire burden of this challenge. From R&D support through Small Business Innovative Research (SBIR) grants, to performance verification by the Environmental Technology Verification (ETV) program, to a variety of individual research, regional, and program office activities, the Agency is actively engaged in facilitating private sector technology development. In addition, many states, local governments, non-governmental organizations (NGOs), associations, large industries, and small businesses are actively involved in other efforts aimed at the same end. While NETC alone will not be able to accomplish the Administrator's ambitious goals, it can be expected to make additional and important contributions to this process if focused and implemented correctly.

After reviewing the four step approach contained in the NETC Preliminary Implementation Strategy, the material presented by the experts, and the discussion among its members, the Workgroup recommended a slightly altered approach for the first step, or Technology Gaps Identification, portion of the program. We believe that this approach, combined with the core competition process presented in the Strategy, will offer the Agency an opportunity to be pro-active in the technology area without being prescriptive, and will allow the marketplace to do what it does best -- respond appropriately to clear market signals.

EPA is now engaged in a series of goal setting and strategic planning exercises that have already born significant fruit. The recently published innovation strategy, Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA, the NACEPT produced The Environmental Future: Emerging Challenges and Opportunities for EPA, the Clear Skies proposal, and several regulatory actions such as the diesel motor standards and arsenic in drinking water rules, all look toward the future in the form of goals to be attained over time. Many of these goals will be reached only through the broad diffusion of technologies that are now available but rarely used, or those that are in development but have not been brought to commercial-ready status, or those that have not even been invented yet. The NACEPT Council believes that the most important contribution that NETC can make to the increased implementation of outstanding innovative technologies, as they become available over time, is recognition of their potential contribution to attaining important national environmental goals to which the Agency has committed itself and the nation.

The Council also believes, however, that EPA should not be in the business of preselecting types of technologies that will be the most effective in achieving these goals. Once goals are clearly established, the research and development community and commercial marketplace are fully capable of responding to them with creativity and engineering excellence. Unfortunately, the experience of numerous states, tribes, cities, small towns, manufacturers, and large and small businesses has repeatedly shown that the marketplace can also produce technologies that do not perform as their vendors claim, or have operational problems that prevent their use, or have hidden costs that make them prohibitively expensive. While EPA is not in a position to predetermine the technologies that may be most effective in solving large

national environmental problems, it can make a contribution to the more rapid diffusion of these technologies and protection of the environment through evaluation and shining the spotlight of NETC on outstanding technologies.

The Council recommends, therefore, that the Agency pursue the following series of steps in carrying out the NETC program. Most of these steps are already contained in the NETC Preliminary Implementation Strategy. The process outlined below is thus a mixture of the Council's approach, the group's consensus on several policy and procedural issues on which ORD requested input on its charge document, and the process outlined in the NETC Strategy.

1. The Council concurs that EPA should select the four major environmental problem areas defined in the EPA Innovation Strategy (greenhouse gas, smog, water quality protection and restoration, and water infrastructure) as the focus areas for NETC. These are indeed the most pressing and intractable environmental problems the nation faces and a reasonable focus for NETC (see discussion below on Issue #2).
2. The Agency should then adopt where already available, or develop if not now articulated, long term goals for each of the four areas, specifying, for example, numerical targets or percentage reduction amounts from a known baseline for specific pollutants within specific periods of time (others could focus on different goals such as cost effectiveness or efficiency measurements). The most recent example of a goal statement of this type would be the Clear Skies proposal for reducing SO<sub>2</sub>, NO<sub>x</sub>, and mercury by an average of 70% by 2020. EPA's newly developing Strategic Plan may provide an opportunity to consider such goals. In NETC competitions, EPA would seek "to honor those technologies that *make a substantial contribution* toward the achievement of these national environmental goals." It is important to note that no single technology is likely to enable the achievement of broad national environmental goals by itself. For this reason, honoring many technologies that make a substantial contribution is more effective in terms of real world environmental protection than waiting for the one "magic bullet" that may never come. Nor will it be necessary to wait until the goal year (2020 in the example above) for technologies to emerge that make a substantial contribution to the goal. Several are ready today in the smog area, for example, and may be expected to compete as soon as EPA announces its solicitation dates.
3. EPA may wish to work with stakeholders to develop suggested environmental problem areas within each national goal area to further focus solicitations on particularly pressing needs. The Council suggests that technologies of at least four generic categories are appropriate for awards, and thus should be included in award solicitations. In general, innovative technologies may fall into the areas of (a) monitoring or measuring devices (e.g., source, ambient, field monitors), (b) decision making tools (e.g., models, expert systems), (c) control technologies (e.g., pollutant removal systems), or (d) source management changes (e.g., raw material substitution, process redesign). In some areas, restoration technologies may be appropriate (e.g., sediment approaches for contaminated

streams, wetlands regeneration).

4. Twice a year, or at some other regular time interval selected by EPA, NETC would solicit commercial-ready technology award candidates. Solicitations should remain open to candidate technologies over time to allow new and improved technologies to continually flow into the program and the national spotlight and to prevent the freezing of innovation at certain levels of achievement.
5. It is imperative that technology selected by NETC actually “work” in both a technical and cost-effective manner. The Council strongly endorses the limiting of applications to those that have been tested through independent and quality assured methods such as those carried out by the ETV program (see discussion below on Issue #3). Peer review panels would then proceed with their review of application/data reports and make award recommendations to the NETC Awards Board. The Awards Board would evaluate the peer panel’s work, make their decisions, and recommend appropriate awards to assist the winning technologies in their diffusion and commercialization efforts (see discussion below on Issue #4).

One other alternative program structure to that presented in the Preliminary Implementation Strategy was discussed by the experts and Workgroup members at the meeting. The suggestion was made that EPA give grants to NGOs or other federal agencies that currently or prospectively conduct technology competitions in lieu of conducting competitions itself. The Workgroup does not recommend that EPA take this step at the present time.

## **Issue #2 – Environmental Technology Gaps Identification.**

**Is the Administrator’s recently published Innovation Strategy with its focus on the priority problem areas of greenhouse gasses, smog reduction, water quality protection and restoration, and water infrastructure a reasonable focus mechanism for NETC? How can EPA ensure that it has broad but substantive input from stakeholders on the priority technology needs in these or other categories?**

There was universal agreement that the four broad problem areas identified in the Innovation Strategy are important and reasonable categories for NETC to focus its attention on. All are multi-faceted, long-term issues, with numerous technology needs within each category. All are characterized by the need for thousands of small changes by all parts of society rather than the traditional large industry, large pollutant source focus; all require technologies that are cost-effective and broadly marketable. The Innovation Strategy itself is a product of a broad outside stakeholder and internal vetting process and it is reasonable to have NETC use this recently conducted work to serve as the basic focus structure for its efforts.

The discussion on the methodology to be used in the so-called “gaps identification process” began with an amplification of the process proposed in the Preliminary Implementation Strategy. EPA proposed four broad annual visioning processes (one in each Innovation Strategy area) that would be conducted by a balanced group of major stakeholders from all parts of that problem area to define specific technology needs for the Competition. The discussion of exactly how to conduct a gaps identification process resulted in a wide array of approaches and little initial agreement. The Workgroup subsequently reached agreement and endorses the approach described above in Issue #1, that the Agency establish ambitious, broad environmental goals for the future and identify problems within these goals where necessary to focus competitions, rather than the development of a technology gaps list. This will give the marketplace the signals and regulatory stability that is needed to facilitate technological innovation.

### **Issue #3 – Technology Competition Process.**

**What is the level of data and information needed to assure that technologies selected for these prestigious EPA awards are truly the most effective available to address the nation’s priority environmental problems? Will the process outlined in the draft strategy document result in finding both the “best” and the most cost effective technologies? Is it too cumbersome? Too expensive? Unfair to small companies? Too demanding? Not demanding enough? Will it be a fair process for all vendors? Will it prevent the selection of ineffective technologies?**

All participants agreed that technologies selected by NETC must “work” in the sense that they must perform in the manner for which they are being honored. The public relations damage of technologies evaluated and honored by EPA that did not perform would go far beyond the failure of the individual technology or Agency embarrassment. An expert in technology financing stated that the environmental market is viewed as a loser by Wall Street precisely because highly touted technologies of the past, which were supposed to make their investors rich, did not do so, frequently because they did not work or were prohibitively expensive. He also stated that a highly visible technology failure would impact the entire environmental technology field, no matter which sector it was. While there was concern that high quality performance data packages addressing all of the pertinent criteria might prove expensive to acquire, there was agreement that such data are absolutely necessary to prevent failure. The Workgroup endorses independent ETV or ETV-like data packages as being the appropriate level for NETC competition input. Several members felt that performance data packages that were not produced by ETV should be quality reviewed by them to maintain a level playing field among contestants.

In addition, the Workgroup, continuing its emphasis on marketplace issues, felt that the criteria for awards, and even for evaluation, would have to contain a heavy emphasis on both the cost effectiveness and the market potential of each technology coming through the program. While these factors are difficult to analyze and evaluate, they will be critical to the effectiveness of the Competition in moving innovative technologies forward.

Finally, the peer review panel process outlined in the Preliminary Implementation Strategy appears to be an appropriate mechanism for the evaluation of technology candidates.

#### **Issue #4 – Awards and Actions to Foster Implementation.**

**Success for NETC will be defined as the actual implementation of selected technologies in appropriate situations across the country. How can the awards process be structured to foster this? What role should cash awards play? What other types of support for winning technologies can be used to overcome some of the barriers found in today's environmental marketplace to promote the use of these technologies?**

Almost all participants agreed that the primary measurement for the success of NETC will be actual use of the winning technologies, and through that use, actual improvement in the environment. This ultimate measure of success factor added considerable emphasis to the need discussed above to assure that winning technologies “really work.” There was concern expressed by an industry representative on the Workgroup, however, that “pressure” not be brought to bear on industry to use “NETC blessed technologies” because the need to use a wide variety of technological and other approaches differs markedly from one industrial facility to another. The site specificity of P2 approaches, particularly for large industrial facilities, has frequently been an issue for EPA and state sponsored programs in the technology assistance area. Technology assistance by government for this group must be very carefully crafted and conducted as a public/private partnership in order to be effective. P2 technology assistance to sectors characterized by numerous, small- and mid-sized businesses, however, is more generally transferable. In general, broad agreement was expressed that environmental effectiveness and actual use of winning technologies would have to be the ultimate measures of success.

The Workgroup agreed that the awards structure of the program needs to be very carefully designed to promote the marketability of the outstanding new technologies identified by NETC. In general, “honoring” the technology (shining the EPA spotlight, heavy publicity of the award, direct information to states, local governments, other potential customers, etc.) was seen to be a given and potentially helpful. The Workgroup felt strongly, however, that NETC planners need to give considerably more attention to awards design than indicated in the draft strategy document. Awards that assist in market creation and/or directly result in market penetration are the only kind of awards that should be considered. Several of the experts at the Workgroup meeting emphasized that each environmental marketplace is unique. Some market segments may not be amenable to new technology because the demand structure currently appears to be in decline (hazardous waste management, fixed based laboratory, and remediation technology, for example). Other market segments will be well situated to absorb new technologies because they are growing at a rapid rate (urban infrastructure of all kinds is a prime example), but will have other constraints such as cost, availability, or inherent conservatism (local governments must be risk averse because of the potential political backlash if new technologies fail). The attached Figure 1 shows the record of the last 30 years, while Figure 2 contains the latest environmental



industry 2010 forecast by Environmental Business International, clearly illustrating the macro trends over time in the various environmental marketplaces. Because the constraints to market penetration are different in each area, the awards must also be different to be effective. The Workgroup believes that EPA, in partnership with important public and private organizations in each market, must carefully design awards for each technology area to assist in the unique challenges that marketplace presents. These types of awards could range from barrier reduction (elimination or modification of regulations and/or outdated or prescriptive consensus codes), to state or local demonstration grants, to support of business plan development or other types of commercialization training either through direct funding to the winning developer or through support of state or local commercialization organizations, to outright purchase by interested federal agencies (including EPA itself). Several Workgroup members and experts stated that EPA, like other federal agencies such as the Department of Defense, should initiate discussions with Wall Street to promote investment in new and needed environmental technologies.

There was little or no support for direct cash awards, which were seen as being too small to be effective in commercializing technology. Cash awards were viewed as being tokens of appreciation at best that would make only small contributions to the real capital needs of technology developers. Workgroup members were in agreement, however, that financial awards could take many forms and could be linked to any number of activities to facilitate diffusion of the winning technology. Diffusion is the goal, and thus, the appropriate reward.

Finally, the Workgroup believes that within each technology category,

- “Finalists” (i.e., all those that fulfill basic performance, operations, and cost criteria) should be honored by receiving EPA awards as finalists, thus avoiding the stigma of being “losers”;
- Annual NETC winning awards should be reserved for truly outstanding, breakthrough technologies;
- The Awards Board should also always have available the option to award either multiple NETC winners or not to select any NETC winners.

## **Attachment 1**

### **ORD Charge to the National Advisory Council for Environmental Policy and Technology**

#### **Background:**

The President's FY '03 budget request to Congress includes a \$10 million initiative called the National Environmental Technology Competition (NETC). The NETC is a new public/private partnership to stimulate technology development in areas where gaps in environmental protection exist. The program seeks to recognize and reward the developers of innovative technologies that produce more effective and lower cost solutions to environmental problems. EPA will work with a broad spectrum of stakeholders to identify specific present and future environmental problems for which new technology may hold the key to cost-effective solutions. National solicitations will be announced in these areas seeking innovations and approaches that meet defined performance objectives, challenging the development community to create solutions for the twenty-first century. External panels of experts will judge these technologies, and the best will be honored with prestigious awards.

#### **Committee Charge:**

To establish a collaborative partnership with the National Advisory Council for Environmental Policy and Technology (NACEPT), ORD invites NACEPT to help us design the NETC, and to monitor its implementation and results. ORD seeks initial advice from NACEPT at the Council meeting scheduled for July 2002, and requests continued, periodic involvement as the program is developed and implemented. We understand that a workgroup consisting of a subset of the Council will be established prior to the July 2002 Council meeting. If NACEPT agrees to this partnership with ORD, we propose the following initial charge to the Council:

ORD requests that NACEPT review ORD's proposed approach to implementing the NETC. The document accompanying this charge, NETC: A Preliminary Implementation Strategy, spells out current thinking on the goals, operating principals, and process for the program. An EPA NETC Workgroup has reviewed this document and identified the issues found below as key decisions in shaping the NETC. Comments from NACEPT are welcome, however, on any aspect of the program objectives and design.

Objectives and approach: The NETC represents a new approach to stimulating technology development that leverages normal competitive market forces by providing clear targets of need that identify market opportunity, and by offering the additional incentive of national recognition and possible monetary rewards. This approach has not been used broadly. Will this approach achieve the goal of producing technologies that are more effective and offer lower cost solutions to environmental problems? Will it

stimulate technological development in areas where gaps in environmental protection exist? Will it create potential market opportunities in the future? What “stoppers” do we need to anticipate?

Environmental Technology Gaps Identification: EPA is planning to engage state and local government organizations, industry, and public interest groups through a series of meetings and workshops to receive input on the highest priority environmental problems needing new technological solutions. EPA’s research, program, and regional offices will be active participants in this process. Is this an appropriate approach to identifying gaps? Should NETC initially focus on the Agency’s priorities in its new Innovation Strategy (i.e., smog, greenhouse gases, water quality maintenance and restoration, and water infrastructure technologies) or be open from the beginning to any type of need? What criteria should be used to set priorities among individual technology types, e.g., risk, cost, potential to support emerging regulatory directions, etc.? Should challenges be broad difficult issues, e.g., replacing municipal infrastructure at a significantly reduced cost, or more reachable targeted challenges, e.g., a cheap, reliable monitor for VOCs to support emissions trading?

Technology Evaluation Process: EPA is planning to use external expert review panels to evaluate technology candidates. Special panels of experts will be convened depending on the technology category. A key issue is the level of performance information and data that the panels should have before them in order to evaluate the technologies. We are concerned that the program and the Agency would lose credibility if awards were made for technologies that ultimately proved to be ineffective. ORD believes that an independent performance evaluation, using standard protocols and data quality criteria is necessary. However, this would force responders to seek third party performance testing such as that provided by the Environmental Technology Verification (ETV) program, or equivalent processes. Does this place too much of a restriction on participation in the NETC program? If cost is an overriding issue in defining technology needs, how does EPA set cost criteria or cost protocols? Should we have stakeholders and partners do it?

Type of awards: EPA sees the awards as serving two principal purposes – an incentive to encourage technology developers to produce new technologies in targeted gap areas, and a way to help overcome certain barriers to commercialization found in the environmental marketplace. Honorary awards, e.g., the “2003 Presidential Award for Environmental Technology Innovation”, have been considered a given. The desirability of providing monetary awards, whether modest, e.g., \$25 -100 K, or larger, is less clear. Does NACEPT believe such awards would increase response to the competitions? Would they add to the visibility of the program and the technologies honored by it or provide other benefits? Are there negatives to providing cash awards? Are there large company/small company issues? What other types of monetary benefits should be considered? For example, support for early field application or support for state and local organizations to assist in technology implementation?

Past or future accomplishments: Should this program be prospective only (new technologies not yet developed or in the earliest stages of commercialization) or should it also recognize past technology achievements? For example, a competition could seek companies who had been exemplary in adopting innovative technologies and achieving outstanding environmental results or cost savings. One option being considered is to partner with the Department of Commerce through the National Medal of Technology competition, which recognizes past accomplishments.

How many winners: Should we try to identify only the “best” in each technology category, or make multiple awards to all technologies that the review panels believe meet certain criteria? How should we deal with technologies that are good, but not best? Can we name one or two winners in a category, without producing a significant number of “losers” that still have good technology? And how do we deal with technologies that are clearly superior in performance, but significantly more expensive than their alternatives? This can also have a time dimension; for example, a technology gap may be addressed by a particular single or group of approaches now and by other, perhaps superior technologies that may appear within the next few years. Should competitions remain open for new innovations in the future or be one time events? Is having multiple winners or time scales either confusing or diluting to the program?

Success factors: How should we measure the effectiveness of this program and how will others judge its success? Possible criteria include the extent to which results are produced, e.g., the number of successfully developed technologies, the number of implementations of award winning technologies, improved environmental performance measures, and the quality of the process, e.g. fairness, inclusiveness, broad stakeholder participation, effective state partnerships. Are there others that should be considered?

## Attachment 2

# **The National Environmental Technology Competition NETC**

## **A Preliminary Implementation Strategy April 2002**

*" The goal of EPA's NETC program is to help recognize and reward innovative technologies that produce more effective and lower cost solutions to environmental problems and to stimulate development where major technology gaps exist. This competition builds public-private partnerships, fosters technological innovation through competition and promotes the development of new, cost-effective technologies that address some of our most pressing environmental challenges. "*

*Governor Christine Todd Whitman  
EPA Administrator  
February 2002*

The National Environmental Technology Competition (NETC), a FY2003 Presidential initiative, has been created to stimulate the flow of American technological innovation toward the invention and deployment of new technologies to better protect the environment. The program will result in annual Presidential awards to those technology developers who produce the best innovations to address environmental problems for which the country does not now have adequate solutions. The clear identification of technology gaps that exist today and those that are likely to exist in the future is an important part of the Competition mandate. Therefore, two broad goals are fundamental to NETC which seeks to:

- Stimulate private sector technology development where gaps in environmental protection exist, and
- Recognize and reward innovative technologies that produce more effective and lower cost solutions to environmental problems.

This paper offers an early view of the goals, operating principles, and procedures that are expected to be used in the execution of the program. One of the most important aspects of the NETC articulated by Governor Whitman, however, is that it will be conducted as a public-private partnership. As the partnerships between EPA and the diverse groups described below are formulated and put into practice, the operational specifics of the program will evolve and change. Many of the aspects of NETC laid out in this paper are open to discussion and modification. Readers are encouraged to comment.

## **Operating Principles**

The following five principles are basic to the conduct of the entire NETC program and structure most of the processes that will be used to carry it out.

1. The NETC will operate as a public/private partnership in its major functions, seeking input and participation from a broad spectrum of individuals and organizations with knowledge about both the needs of the environment and the innovative technologies that can meet them.
2. The NETC will utilize existing resources and priority setting processes within EPA to rapidly and efficiently put in place the infrastructure necessary to assist its new partnerships in (1) identifying technology gaps or needs, (2) establishing criteria for technologies to meet those needs, and (3) evaluating commercial ready technologies submitted by the private sector for award consideration.
3. The NETC will develop its list of technology needs through an ongoing process of identification and refinement, seeking input from state and local governments, technology buyers in both the public and private sectors, academic and technical environmental experts, and from all parts of the Environmental Protection Agency.
4. The NETC will establish selection criteria for needed technologies that take into consideration all pertinent facets of technological performance including the ability to reduce, prevent or measure pollution, multi-media impacts, capital and operating costs, reliability and practicality of operation, and any other aspects that are deemed to be important by stakeholders.
5. The NETC will select commercial ready technologies for awards based upon independently derived, high quality data to assure fairness to all developers and to the technology using and buying public who will look to this award program for guidance.

## **Public - Private Partnerships.**

Over the last decade, public-private partnerships have become increasingly common mechanisms to carry out programmatic activities that utilize private sector cost reduction and profit motivations to achieve publicly defined goals. This has been especially true in the environmental technology area in which the public goal of monitoring, decreasing, or controlling pollutants is virtually impossible to achieve without the active participation of the private sector. Bringing new technologies into the marketplace where they can be purchased and used to protect the environment involves many players. All of the groups found below would be considered primary participants and customers for the NETC.

- Public sector agencies at the federal, state, and local level, including regulators, researchers, permitors, enforcers, and technology system purchasers.
- Private sector technology developers, the testing, research and development organizations

that support them, and the associations that both represent and inform them on government requirements and marketplace trends.

- Private sector technology purchasers, the consulting and financial advisors employed by them for direction and facilitation, and the associations that both represent and inform them on government requirements and cost parameters.
- A myriad of other non-governmental organizations (NGOs), academic institutions, and not-for-profit organizations of every type and purpose who play an increasing role in the facilitation of new environmental innovations.

Public-private partnerships are used to facilitate the achievement of at least the following objectives in developing and executing a new program such as the NETC:

- Gaining up front participation, definition, clarity, and buy-in to the goals and objectives of the program by those who must ultimately carry out important roles in making the goals into reality.
- Communicating information about the program to the various communities (e.g., air pollution control state regulators and technology vendors) that will have to become motivated to participate in order to make the program happen.
- Communicating information from widely divergent viewpoints on the real world opportunities and constraints that can make or prevent the program from achieving success.
- Leveraging both human and financial resources from multiple sources to get the job done more thoroughly, quickly, and effectively.
- And, in the end, communicating about the new and breakthrough technologies that are identified and spotlighted by the NETC awards.

Mechanisms for effective partnering are numerous and may be contractual or voluntary in nature. Both are effective in their appropriate place. Voluntary contributions such as self-supported participation in stakeholder groups and expert review of technical documents make significant contributions and save substantial amounts of money for the program. Financial support could be given to organizations such as the Environmental Council of the States (ECOS), the International City Managers Association (ICMA), or other consortia of state, local, and private entities. Some organizations may simply agree to participate. NETC has already requested and received the support of the National Advisory Council for Environmental Policy and Technology (NACEPT), which has formed a workgroup to assist the program in formulating its initial design and working through the many issues that must be decided as the program is implemented. The EPA Science Advisory Board (SAB) will be requested to review the program in the future. All of these mechanisms may be used by NETC, as appropriate.

Finally, it is very important to assure that the goals and operating principles of the program are clearly defined and clearly conveyed to all participants before any partnerships are started. These important touchstones are returned to again and again as partners work together. Since every participant will have a slightly different motivation for his or her participation, a clear and definitive statement of what the program is and, by inference, is not aimed at achieving is critical. One of the major purposes of this Preliminary Implementation Strategy is to provide

that understanding to potential NETC partners.

## **Program Process**

As presently envisioned, the Competition process will consist of four major steps. First, technology gaps will be identified in each of four priority areas. Evaluation and testing criteria will then be established for each technology. Solicitation and evaluation of submitted technologies will be conducted by independent panels resulting in a list of recommended finalists. And finally, a National Environmental Technology Awards Board will make the selection of award recipients. Each of these steps will be characterized by the participation of important groups both inside and outside government. The first and last steps will be conducted through new partnership activities and the second and third by existing EPA partnership programs.

Step 1 - Determine National Environmental Technology Gaps. One of the most important products of the NETC will be the public identification of environmental technology gaps that the country now has or is expected to have in the future. The analysis and listing of these gaps will evolve over time and serve as an information resource for all technology developers, whether they choose to enter the competition or not. This list will be created through input from stakeholders across society, but particularly from the EPA program and regional offices, the states, local government, consulting groups, and the technology-buying public and private sector. In order to leverage priority setting activities already underway in the agency, EPA will structure the initial list based upon its recently issued, Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA.<sup>1</sup> This document lays out a broad direction and mandate for innovative activity and stipulates four priority problem areas for particular attention. These are greenhouse gas, smog, water quality maintenance and restoration, and water infrastructure. The use of these categories is consistent with NETC's commitment to focus on technologies that solve problems rather than those that are narrowly defined to regulatory areas. To begin the gaps identification process, EPA, after conducting appropriate background studies, will seek broad input through partnerships with organizations such as ECOS, ICMA, NACO, the Civil Engineering Research Foundation, and others. With these state, local, and private sector partners, EPA, represented by appropriate program office, regional, and research staff, will hold a series of four workshops focused on each of the four identified sectors. These workshops will result in an initial identification of technology gaps and priorities that will be sent to the Administrator for her review and public announcement. They can then be used in 2003 and 2004 to structure the rest of the NETC process. It is planned that the four partnerships will remain in existence and meet annually to review the state of the technology. Each annual meeting will result in recommendations for refinement of the evolving gaps list for each area. Other areas of concentration may be selected by EPA in the future if circumstances indicate that this is appropriate.

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<sup>1</sup> Readers are encouraged to review this document, which has been widely vetted throughout the Agency. The four problem areas identified are very broad and will require a wide variety of both existing and new technologies to address their many causes and effects.



Step 2 - Determine the Technology Evaluation Criteria for Each Gap Area. Once the lists of technology gaps are enumerated and prioritized by EPA and the partnerships described in Step1, the Agency will seek input from the existing stakeholder groups and expert technology panels formed to assist the Environmental Technology Verification Program (ETV) to establish technology criteria.<sup>2</sup> ETV stakeholder groups consist of federal, state and local regulators and permittees, technology developers and purchasers, consulting engineers, academic, professional, and trade associations, technology exporters and financial entities for examples). These groups give broad input on the performance needs of the individual environmental marketplace. After performance needs are identified, ETV technical panels, made up of technical specialists in the particular technology area being verified, are formed to convert these performance needs into detailed testing and quality assurance protocols. ETV now has stakeholder groups and expert technical panels operating in all of the four areas discussed above. These partnerships have as a part of their mandate:

- The formulation of specific factors that need to be known about technologies in order to determine their technical performance, practicality, and ability to be implemented. These may include control or measurement of regulated and non-regulated pollutants, operation and maintenance factors such as energy use, reliability, labor intensivity, and cost information of all types. Cost is expected to be a particularly prominent factor in NETC.
- The type and range of test procedures needed to substantiate performance,
- The data quality assurance levels needed to substantiate the tests.

The establishment of the three types of criteria described above for each technology gap area will allow NETC to stipulate the particular types and quality of data and information to be contained in technology solicitations and submittals. Technology developers will understand from the beginning what will be expected from the technology in terms of performance and what will be required in data packages submitted for Competition awards.

Step 3 - Solicit and Evaluate Technologies in Each Gap Area.<sup>3</sup> Once priorities are set and evaluation criteria are determined for technology categories selected, EPA will issue competitive solicitation announcements. Allowed response time may vary from a few months to a year or more, and may include more than one response deadline to accommodate technologies in different stages of development. Technical Review Panels will be established to review and evaluate the responses to each competition. In keeping with the second principle of utilizing existing EPA capability to rapidly implement the NETC program, ORD will build on the existing peer review process and infrastructure used for its current competitive solicitations to conduct

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<sup>2</sup> The Agency may choose to use other standards and test procedure design organizations in instances in which ETV does not have coverage or capacity.

<sup>3</sup> The first competitions of the program will start with this step to enable EPA to pilot its awardee selection process while the gap and technology criteria processes are put in place. In the first year, EPA will select one or two well known gap areas on which to focus awards selection.

these evaluations. Review panels will be comprised of national experts for each environmental technology area. The Technical Review Panels will evaluate all submitted technology data, analysis, and information packages using the criteria established in Step 2. They will then recommend all technologies that meet the established criteria to the National Environmental Technology Awards Board as NETC Finalists. Each submitted technology will receive a written evaluation from the Technical Review Panel whether it becomes a Finalist in the Competition or not. All Finalists will receive recognition.

Step 4 - Select National Environmental Technology Competition Winners. The NETC proposes to create a separate National Environmental Technology Awards Board to be composed of six to ten distinguished national figures representing both the public (a governor or mayor, for example) and private (corporation president or major academic figure) sectors. They will review and evaluate the recommendations of the individual Technical Review Panels, and make final award recommendations (multiple awards are expected) to the Administrator. The Awards Board will seek truly outstanding, break-thru technologies that are believed to significantly advance the nation toward solving the identified environmental challenges. Presidential NETC awards would be presented by the Administrator and widely publicized. In addition to the recognition and honor bestowed by these awards, additional award possibilities, both monetary and non-monetary are under consideration. These could include facilitated permitting assistance, state grant support, regional field demonstrations, cash prizes, or a combination of the above, as appropriate.

### **Measures of Success**

NETC will ultimately be judged by several factors.

- The vision and clear thinking of a gaps process that engages all sectors of the environmental community and identifies the legitimate technological needs of the 21<sup>st</sup> Century.
- The definition of clear and comprehensive criteria and test procedures for each technology gap area identified.
- A fair technology solicitation and selection process that produces legitimate Competition Finalists and then identifies the “best of the best” as the ultimate awardees.
- And finally, the number of deployments of these technologies over a five year period after award and the extent of increased environmental protection gained because of them.