PROCESS EVALUATION

Environmental Monitoring, Evaluation & Protection Program

Final Report

Prepared for

The New York State Energy Research and Development Authority

Carole Nemore Project Manager

Prepared by

Research Into Action, Inc.

P.O. Box 12312 Portland, Oregon 97212 503 / 287-9136

Principal Investigator: Jane S. Peters

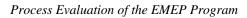
Report Authors: Dulane Moran Joe Van Clock Jun Suzuki

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ABSTRACT

This report summarizes the results of the process evaluation of the information transfer component of NYSERDA's Environmental Monitoring Evaluation and Protection Program (EMEP) which has been part of the **New York Energy \$mart**SM Program since 1999. EMEP supports research to increase the scientific understanding of the environmental effects of electricity generation. The evaluation relied on 36 in-depth interviews (4 with EMEP staff, 11 with Science and Program Advisory Group members, and 21 with EMEP-sponsored research scientists). In addition to the in-depth interviews, this evaluation report is informed by telephone surveys of 71 contacts who had attended an EMEP conference, and 76 program constituents. An additional 164 program constituents responded to an email survey about how they viewed research products and their overall familiarity with the products distributed by EMEP.

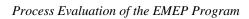
The process evaluation found that EMEP provides a unique funding opportunity for scientists who can link their research to broader public policy goals and that the program's structure encourages researchers to consider the policy implications of their work. EMEP's focus on linking science with policy sets the program apart from other organizations that fund similar research and leaves the program with two distinct audiences, scientists and policymakers. Both audiences view the program positively.

EMEP's research findings are relevant to scientists and considered of comparable quality to research findings produced by much larger, federal funding organizations. While it is difficult to attribute policy outcomes to any single piece of scientific research, contacts reported that policymakers are aware of EMEP's research, and advisors, researchers, and program staff members cited a variety of examples in which the program had played a role in policy formation.

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Finally, this evaluation research would not have been possible without the cooperation of Science and Program Advisory Group members, EMEP-sponsored researchers, conference attendees, and other constituents, all of whom ultimately create or consume scientific products like those distributed by the program.



Acknowledgements

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EXECUTIVE SUMMARY

The **New York Energy \$mart** Programs are funded by an electric distribution System Benefits Charge (SBC) paid by customers of Central Hudson Gas and Electric Corporation; Consolidated Edison Company of New York, Inc.; New York State Electric and Gas Corporation; National Grid; Orange and Rockland Utilities; and Rochester Gas and Electric Corporation. Programs are available to all electric distribution customers that pay into the SBC. The New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation established in 1975, administers the SBC funds.

In 2003, NYSERDA expanded its evaluation of the **New York Energy \$mart** Program, launching a large-scale assessment using specialized contractor teams to provide evaluation services. Research Into Action, Inc. has conducted process evaluations of the **New York Energy \$mart** programs since May 2003

The primary mission of NYSERDA's Environmental Monitoring, Evaluation & Protection (EMEP) program is to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options, and to provide a scientific technical foundation for formulating effective, equitable, energy-related environmental policies and resource management practices. EMEP seeks to identify information needs and research gaps related to electricity-related environmental issues relevant to New York.

1.1 THIS EVALUATION

In September 2009, Research Into Action and NYSERDA staff members developed a work plan to conduct a process evaluation focused on investigating the effectiveness of and perceived value of the information exchange component of the EMEP program. The process evaluation specifically sought to understand how EMEP information products are perceived and how they are used by several key contact populations. As part of this effort, the research team also sought to identify areas where EMEP could improve the access, usability, and/or relevance of the information products that flow from the program-sponsored research.

This evaluation draws on data collected from five populations that have come into contact with the EMEP program. In-depth interviews were conducted with key contacts expected to be most familiar with the program: program staff members, members of the program's two Advisory Groups, and researchers who had received funding from EMEP. Individuals known to have attended an EMEP conference and constituents listed on the program's primary contact list were also surveyed.

1.2 FINDINGS

The process evaluation found that EMEP provides a unique funding opportunity for scientists who can link their research to broader public policy goals and that the program's structure encourages researchers to consider the policy implications of their work. EMEP's focus on linking science with policy sets the program apart from other organizations that fund similar research and leaves the program with two distinct audiences, scientists and policymakers. Both audiences view the program positively.

There are several important areas where EMEP is meeting the expectations of its key contacts and providing value to the research community. Specifically, this evaluation research found:

• Widespread belief that the program is effective in bridging the communication gap between scientific research and policy decisions and that EMEP's focus on connecting scientific research to policy sets the program apart from other sources of research funding.

- The EMEP conference is valued for the opportunity to bring scientists and policy staff together to discuss the policy implications of scientific findings. The conference is considered unique for its focus on this goal.
- Scientific researchers value the funding opportunity—particularly those researchers whose work fits within EMEP's niche: those focusing on environmental issues within the State of New York.

EMEP's research findings are relevant to scientists and considered of comparable quality to research findings produced by much larger, federal funding organizations. While it is difficult to attribute policy outcomes to any single piece of scientific research, contacts reported that policymakers are aware of EMEP's research, and advisors, researchers, and program staff members cited a variety of examples in which the program had played a role in policy formation.

1.2.1 Researcher Satisfaction

Interviews with researchers revealed broad satisfaction with the quality of the project management and the respect for the commitment of those involved to ensure the funded research is of the highest quality and linked to public policy discussions.

Researchers also reported EMEP's project management approach is more structured than that of other funders and that the program has more stringent reporting requirements. In some cases, the quarterly status reports were considered burdensome to researchers because scientific research does not necessarily generate notable findings in a three-month period, especially early in a project. On the other hand, some researchers credited the program structure for fostering focused attention on a discrete research end. Ultimately, the solicitation's compatibility with research interests is more important than the administrative and reporting requirement burdens attached to funding.

1.2.2 Perception of Value

The cost/value analysis found that all of the products resulting from EMEP-funded research are valued in certain ways. Researchers displayed a clear preference for research presented in peer-reviewed journals (Figure ES-1); however, other key program contacts and non-research professionals reported finding value in all of the other products that flow from EMEP research, including the final reports.

A citation analysis completed by Thompson Reuters as part of this evaluation project found that articles referencing work sponsored by EMEP were cited 2,784 times between 1999 and 2009. It is important to note that the program-provided list used to generate the citation analysis contained 254 products, and that Thompson was able to match 154 of the 254 records in their Web of Science® database indicating that this analysis represents the *minimum level* intellectual reach of EMEP-sponsored research.

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¹ Peer-reviewed journals are academic journals that use a peer-review process in which a group of experts evaluates a submitted article. These reviewers decide whether to approve an article for publication, and may suggest changes for the author to address before an article is approved. Often, this review process is anonymous, with neither reviewer nor author aware of the other's identity.

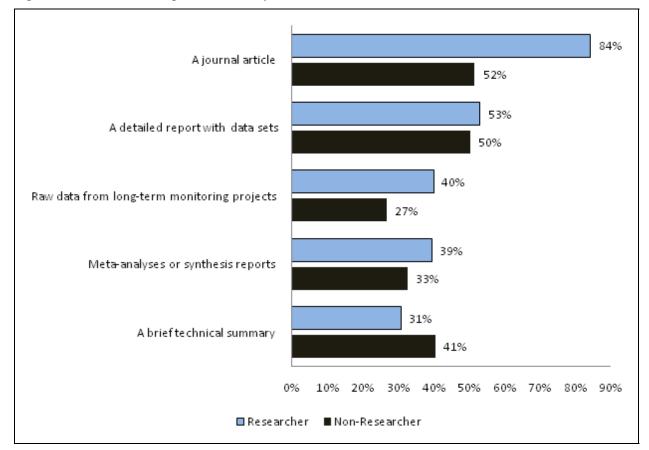


Figure ES-1: Relative Perception of Value by Status as Researcher and Non-Researcher

1.2.3 Appropriate Deliverables

EMEP's information products and outreach efforts target diverse audiences and meet the needs of each of these audiences. High-level policymakers and political staff members require succinct summaries of scientific information placed in a policy context. Government employees that write and defend environmental regulations require more detailed discussions of research projects and the limitations of these projects. Reaching the academic and scientific community requires that projects be referenced in peer-reviewed journals—the most credible information source for these stakeholders.

EMEP attempts to meet the diverse expectations of constituents by distributing information a variety of ways. Reports and conference information are posted on the program's website, newsletters and conference registration materials are provided through the postal service and through a listsery. The program often requires researchers to submit articles to peer-reviewed journals for publication, and, when appropriate opportunities arise, researchers also present the results of their work directly to decision-makers through workshops or testimony to legislative committees. The submittal of articles for publication in journals is clearly the best method for reaching the academic and scientific research community; however, this deliverable is the least controlled by the program. There is no assurance that articles submitted will be published or that the scope of the article will mirror NYSERDA's priorities.

1.2.4 Information on Cost

One of the tasks of this evaluation effort was to assess the cost and value associated with each of the program's research products. Value was estimated by analyzing qualitative and quantitative responses to questions about preference and importance (for example, Figure ES-1). Costs estimates were obtained

from the Scope of Work for the marketing subcontractor and from interviews with researchers required to meet the information transfer product expectations. One component of cost, the time and resources allocated by researchers to produce final reports, journal articles and conference presentations was not available from the research project Scopes of Work reviewed, since the costs are typically allocated to a person, not a task.

If it is important for the program to ensure that the reporting costs are not unnecessarily high, staff members may want to establish a process for capturing the estimated cost by task from proposals or Scopes of Work. Capturing this data, even if only for a year or two, could give program staff members better information about the portion of total research dollars requested that is allocated to meeting EMEP reporting requirements. This information could be used calculate an estimate of effort associated with the expected deliverables, and could illuminate any debate about expectations established for future projects.

1.3 CONCLUSIONS AND RECOMMENDATIONS

This evaluation revealed no major problems with the EMEP program. The conclusions and recommendations listed here represent potential opportunities for improvement to EMEP's outreach and information transfer goals, not areas of program failure.

1.3.1 Conclusion: Multiple methods of collaboration are needed to support outreach and information transfer goals.

Multiple methods of collaboration are needed for effective outreach. Interviews with researchers revealed that many value peer-to-peer contact as a preferred source of information. This contact can occur at conferences, by phone, or through e-mail communication. The scopes of work developed for each project list numerous research staff members in addition to the principal investigator and lead researchers. Outreach to researchers could be expanded by adding all research staff members on a project to the program's contact lists and listsery. These lists can be invited to events (including conferences and webinars) and sent links to documents on the EMEP website.

Recommendation:

Program staff members should focus on networking as an outreach activity and encourage others involved in the program to provide information about the program directly to their peers. EMEP staff members could facilitate this by making sure that these key program contacts know what the program has available and how to direct people to find it.

1.3.2 Conclusion: The final reports are important products and serve multiple purposes

The final reports remain an important deliverable for NYSERDA. While contacts from numerous organizations articulated the preeminence of publication in peer-reviewed journals for scientists, the final reports represent several aspects important for the effectiveness of EMEP.

Final reports are used by the outreach staff members and subcontractors to develop numerous other products, such as executive summaries, topical primers, technical summaries, meta-analyses, and project updates. As described in subsequent sections of this report, these products are important for communicating with the program's non-technical and policy audience. Final reports are also easily posted on the program's website and can be accessed for free by any interested party, as opposed to journal articles that are only available for a fee. Finally, these documents represent the core product NYSERDA is purchasing with its funding. They document the methodology and findings of a given project and indicate that project managers at NYSERDA are ensuring that SBC funds are well-spent.

Recommendation:

Continue to require that EMEP researchers submit a final report that is appropriate for the project, the scope of which will vary on a case by case basis.

1.3.3 Conclusion: Opportunities exist to clarify and streamline the review process associated with final reports.

While final reports are valuable for NYSERDA and inform other outreach efforts, they are not necessarily given the same credibility as peer-reviewed journals because the larger scientific community is not aware of the rigor of the review process that EMEP's final reports undergo. Although it is important to retain the quality of the final reports, the program may be able to reduce the burden placed on authoring scientists by clarifying or simplifying the review process associated with finalizing these documents. Defining expectations and describing the review process, particularly for researchers new to NYSERDA, will help ensure that researchers are prepared for the number and scope of comments and revisions.

Recommendation:

Consider strategies for simplifying the review process associated with finalizing reports when indicated by project characteristics. Material that has already been prepared for and published in a peer-reviewed journal or reports that are adding to information in previous reports could benefit from a more streamlined review process. Multi-disciplinary projects or those presenting entirely new information may require more substantive review.

Recommendation:

Regardless of the level of technical review or the number of reviewers, project managers should continue to be alert for opportunities to collect and summarize comments; to minimize the number of document revisions; and ensure that each successive review is providing marginal improvement sufficient to justify the time required of the researcher and NYSERDA staff.

1.3.4 Conclusion: Researchers do not differentiate between reports required for invoicing and reports required to track project findings.

While EMEP's reporting requirements are not turning researchers away from the program—compatibility with researcher interest is more important than the administrative requirements attached to the funding—researchers noted that projects may not generate sufficient findings to justify a quarterly report, especially early in the project. Staff members distinguish between quarterly reports with an administrative focus, designed to help the program ensure that a project is progressing at a pace consistent with its spending, and less frequent reports that describe the pace and findings of specific projects. Researchers unaccustomed to working as contractors stated that EMEP's quarterly reporting requirements can be burdensome.

Milestone reports, completed upon reaching pre-determined points in the research process, may be more intuitive for researchers than quarterly reports because these reports will contain a more technical focus than reports required for invoices.

Recommendation:

Define the purpose of quarterly reports and what NYSERDA expects these reports to contain and consider ways to facilitate the quarterly reporting process for researchers, recognizing that they may not be accustomed to tracking budgets and research progress in this way.

Recommendation:

Consider milestone reports and payments rather than quarterly reports if appropriate given the anticipated workflow associated with individual research projects.

1.3.5 Conclusion: Advisory Group members have differing views of their role and responsibilities.

EMEP draws on advice from two advisory groups in planning research and reviewing the results of projects the program funds. The eleven members of the Program Advisory Group represent state and local government agencies, advocacy organizations, and other research organizations. The seven members of the Science Advisory Group come from academic institutions and other research organizations.

Some advisors would like an expanded role in the program, while others sought a more defined role for advisory group members. As the program's research interests have expanded, it has become more difficult for advisors to possess expertise in every issue on which the program funds research.

The increasingly limited role of the advisory groups may result from the lack of a formal definition of the groups' roles. The advisory groups developed organically to meet the needs of the program and, thus, have no charter or other document specifying exactly what the advisory groups should or should not do. There is no formal definition on how the two advisory groups are expected to interact with each other and with other parts of the program in deciding which proposals to fund. The process for selecting new advisory group members may not be understood. Similarly, reasons for changes in the composition of the advisory groups are not transparent in all cases.

Recommendation:

Consider a facilitated meeting with advisors to create a statement of focus or mission and otherwise clarify their role and what the program expects of them.

Recommendation:

Clarify for advisors NYSERDA's expectations for dissemination of results, document review tasks, and promotion of EMEP efforts.

1.3.6 Conclusion: There are opportunities to improve constituent tracking.

The program currently maintains multiple lists with overlapping populations and duplicate records. For example, there are separate conference attendee lists for each of three conferences, with different mixtures of contact information (phone, email, address, affiliation). The past and current researchers list contains names and email addresses only. The list of 240 listserv recipients has no accompanying contact information.

Regardless of the challenges for evaluation research, the overall state of the contact lists indicate the program should consider combining the multiple lists into a single program contact database capable of tracking the extent to which contacts are associated with the program and the level of information they currently receive. The constituent mailing list is an important program resource that includes NYSERDA

staff members, advisory group members, government stakeholders, and researchers, as well as thousands of interested professionals.

Recommendation:

Improvements in constituent tracking would be valuable for implementing improvements to EMEP's overall outreach strategy. Program staff members should ensure that a comprehensive constituent tracking system to support the program's outreach effort is part of the current marketing database development process.

SECTION 2: INTRODUCTION

The **New York Energy \$mart** programs are funded by an electric distribution System Benefits Charge (SBC) paid by customers of Central Hudson Gas and Electric Corporation; Consolidated Edison Company of New York, Inc.; New York State Electric and Gas Corporation; National Grid; Orange and Rockland Utilities; and Rochester Gas and Electric Corporation. Programs are available to all electric distribution customers that pay into the SBC. The New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation established in 1975, administers the SBC funds.

In 2003, NYSERDA expanded its evaluation of the **New York Energy \$mart**SM Program, launching a large-scale assessment using specialized contractor teams to provide evaluation services. Research Into Action, Inc. has conducted process evaluations of the **New York Energy \$mart**SM programs since May 2003.

2.1 PROGRAM DESCRIPTION

The primary mission of the Environmental Monitoring, Evaluation & Protection (EMEP) program is to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options and provide a scientific technical foundation for formulating effective, equitable, energy related environmental policies and resource management practices. EMEP seeks to identify information needs and research gaps related to electricity-related environmental issues relevant to New York. EMEP initiatives build on past efforts and have evolved to support research in five primary areas:

- Ecosystem response to atmospheric deposition of sulfur, nitrogen, and mercury.
- Health and energy-related research on air quality, particulate matter, ozone, and co-pollutants.
- Regional climate change research, including impacts of climate change on New York, and mitigation and adaptation options for the state.
- Environmental impacts of alternative energy resources, including effects of wind turbines and tidal-energy production on wildlife.
- Crosscutting environmental science, technology, and policy projects, such as mitigating environmental impacts of electricity generation critical for fuel diversity.

The program is guided by two Advisory Groups: the Science Advisory Group (SAG) provides technical review, while the Program Advisory Group (PAG) influences the overall program focus and activities. The program maintains a robust science and policy communication component to deliver program findings to policymakers, scientists, and the public.

2.1.1 Program Strategies

The EMEP program relies on four primary strategies to achieve its mission.

Research planning. EMEP is guided by a five-year research plan developed after an extensive planning effort driven by NYSERDA and the New York Academy of Sciences. The current plan, completed in 2007, identifies and prioritizes key research areas through 2012. The plan is available to the public via the program's website.

Competitive solicitations and science/policy review. EMEP issues Program Opportunity Notices (PONs) for proposals to address research areas identified in the Research Plan. Proposed projects are reviewed and selected through a competitive process. SBC III goals for EMEP projects include issuing six to ten solicitations for research proposals and having 40 projects under contract simultaneously.

Collaborative research. EMEP seeks to organize and catalyze interdisciplinary and multi-institutional collaborative efforts expected to build research capability in New York. In SBC I, II and III, EMEP

successfully leveraged approximately an equal amount of research funds from other sources as the program itself has provided in order to help build a robust knowledge-based research infrastructure in the state (See Table 2-1, below).

Information exchange. Fostering the introduction of scientific findings into policy debates is also an important EMEP strategy. Information exchange activities include hosting workshops and conferences, publishing articles, providing technical reports and other publications, and hosting a web portal with information on a variety of research topics. The program also provides briefings to decision-makers about policy implications of research results.

2.2 PROGRAM FUNDING

Under SBC I and II (July 1, 1998 – June 30, 2006), EMEP provided \$21 million to researchers and leveraged an additional \$22 million from other organizations. This funding supported 46 research projects and resulted in more than 125 published peer-reviewed papers. EMEP research was cited 655 times in peer-reviewed journals.

The five-year SBCIII (July 1, 2006 – June 30, 2011) EMEP program budget is \$21.3 million, and EMEP is seeking to leverage an additional \$20 million from other organizations through NYSERDA's continuing collaboration with regional and national entities for pertinent research projects. As of December 31, 2009, 65 peer-reviewed articles or papers had been published as a result of SBC III EMEP-sponsored research, and nine briefings with policy-makers had occurred.

2.2.1 EMEP Program Research Areas

EMEP provides funding for research related to the environmental impacts of electricity generation and use. Since it began in 1999, the program has focused on three areas of scientific research: the ecological effects of deposition of sulfur, nitrogen and mercury from the atmosphere; air quality and the health effects of air pollution; as well as issues that crosscut environmental science, energy, technology and policy. In 2007, the program added two additional research areas: the effects of climate change on New York State and the environmental impacts of alternative energy.

As of August 1, 2009, EMEP had funded a total of 76 projects across these five research areas, providing a total of \$28.8 million in research funding (Table 2-1). The program encourages its researchers to leverage additional funding sources, which creates overall research project budgets that exceed EMEP's funding support. The following sections discuss each research area in more detail.

Table 2-1: Projects Funded by Research Area *

		Total for All Projects			Median Project Cost	
Research Area	Number of Projects	Total Cost	EMEP Funds	EMEP Portion	Total Cost	EMEP Funds
Ecological Effects of Deposition of Sulfur, Nitrogen, and Mercury	27	\$22,633,526	\$11,102,149	49%	\$357,714	\$240,124
Air Quality and Health Effects	27	\$26,475,250	\$12,712,171	48%	\$547,749	\$350,000
Climate Change in New York State	13	\$6,127,236	\$3,531,510	58%	\$350,500	\$250,000
Environmental Effects of Alternative Energy and Other Emerging Energy Options	4	\$ 651,851	\$514,247	79%	\$164,847	\$164,847
Projects Crosscutting Environmental Science, Energy, Technology, and Policy	5	\$1,397,982	\$985,226	70%	\$217,270	\$170,014
Total	76	\$57,285,845	\$28,845,303	50%	\$379,440	\$245,506

^{*} Source: EMEP Project Lists spreadsheet, created August 7, 2009. Data on total cost and EMEP contribution was not available for one project, in the area of Environmental Effects of Alternative Energy. This project is omitted from calculations of total and median costs.

2.2.2 Air Quality and Health Effects and Ecological Effects of Atmospheric Deposition

The program's long-term focus on the health effects of poor air quality and the ecological effects of atmospheric deposition is evident in the number of EMEP projects that have investigated these areas. EMEP's long-term monitoring efforts have also largely focused on these two topics, and, over the program's history, these ongoing projects have received a considerable portion of EMEP funding for air quality and atmospheric deposition research. The two largest projects in each research area have received approximately 40% of the program's funding in that area. The projects which EMEP funds in the areas of air quality and atmospheric deposition typically leverage more funding from other sources than projects in EMEP's other research areas. Nonetheless, four advisory group members reported air quality and health effects research is expensive, and two contacts specifically noted the insufficient funds available for projects in these topic areas limit the program's efforts.

2.2.3 Climate Change in New York State and Environmental Effects of Alternative Energy

The 2007 Research Plan added two new research areas, the effects of climate change in New York State and the environmental effects of alternative energy. While the program had funded research relevant to these areas previously, by defining climate change and alternative energy as distinct research areas, EMEP has been able to increase its focus in these areas. This is particularly noticeable in the area of climate change. While EMEP had funded six projects relevant to climate change before the 2007 research plan, the seven projects it has funded since were on average, nearly three times larger than those funded previously (Table 2-2).

Table 2-2: Climate Change Projects Funded by Timeframe

		Tota	l for All Projects	Average Per Project		
Timeframe	Number of Projects	Total Cost	EMEP Funds	EMEP Portion	Total Cost	EMEP Funds
Projects Funded Up To 2007 Research Plan	6	\$1,434,507	\$1,066,944	74%	\$239,085	\$177,824
Projects Funded After 2007 Research Plan	7	\$4,692,729	\$2,464,566	53%	\$ 670,390	\$352,081
Total	13	\$6,127,236	\$3,531,510	58%	\$471,326	\$271,655

Note: Data on projects funded up to 2007 Research Plan from 2007 Research Plan, Appendix 1. Data on projects funded after 2007 Research Plan from EMEP Project Lists Spreadsheet, created August 7, 2009.

EMEP's research efforts into the environmental effects of alternative energy sources remain relatively small, with records indicating that no projects have been funded in this area since 2007. Program staff members have planned to release a PON in the summer of 2010 soliciting proposals for research projects investigating the effects of alternative energy sources.

2.2.4 Projects Crosscutting Environmental Science, Energy, Technology, and Policy

The majority of the research projects EMEP funds fall into one of the four research areas discussed above; however, the program occasionally funds projects that overlap these categories. The program classifies projects that do not fit neatly into other research categories as crosscutting environmental science, energy, technology, and policy. EMEP's crosscutting research projects typically leverage a smaller amount of their overall funding from other sources than projects focused more narrowly on air quality, atmospheric deposition or climate change, which may indicate fewer funders focus on these issues in combination as does EMEP.

Table 2-3 displays the 16 funding opportunities for research projects and program outreach support that has been released by the program since it began in 1999.

Table 2-3: EMEP Funding Opportunities

Funding Opportunity	Year	Description
PON 444	1999	First Round of Instrumentation Projects
PON 446	1999	First Round of Environmental Research Projects
PON 497	1999	Second Round of Instrumentation Projects
PON 540	2000	Second Round of Environmental Research Projects
PON 586	2001	Third Round of Environmental Research Projects
PON 594	2002	Outreach Support
PON 682	2003	Fourth Round of Environmental Research Projects
PON 839	2004	Air Quality, Atmospheric Deposition, and Other
RFP 919	2005	NYC Urban Reforestation Pilot
PON 996	2006	Outreach Support
RFP 1038	2007	Post-Construction Wildlife Monitoring at Maple Ridge Wind Farm
PON 1141	2007	Acid Deposition and Mercury Research
PON 1179	2007	Air Quality Research
PON 1181	2008	Climate Change
PON 1292	2009	Acid Deposition, Mercury Research and Synthesis

2.3 METHODOLOGY

In September 2009, Research Into Action developed a work plan to conduct a process evaluation focused primarily on the information exchange component of the EMEP program. The evaluation was designed to assess how EMEP products are perceived and used by a several constituent populations, and to identify areas for improvement in access, usability, and relevance.

2.3.1 Populations

This evaluation draws on data collected from five distinct populations with varying levels of direct involvement with the EMEP program (Table 2-4). We conducted in-depth interviews with the three populations expected to be most familiar with the program: program staff members, members of two advisory groups, and researchers who had received funding from EMEP. These key contacts were interviewed in-depth about their direct experience with the program and perceptions of program effectiveness in its information transfer activities. In addition, we surveyed individuals who had attended EMEP conferences (conference attendees) and individuals on the program's mailing list (constituents).

Table 2-4: Populations Interviewed

Target Group		Estimated Population Size	Sample Size	Sampling Confidence/ Precision	Interview Timeframe
NYSERDA progra	m staff members	6	4	NA	October 2009
Advisory Groups	Program	11	6		October-December 2009
Members	Science	7*	5	NA	
EMEP Researchers		66	21	NA	November-December 2009; limited follow-up April-May 2010
Conference Attendees		530	71	90/10	January-February 2010
Master Mailing	E-Mail	1.522**	164	95/10	March-April 2010
List	Phone	1,522**	76	90/10	April 2010

^{*} One of the SAG members reported that he no longer was an active member of the group.

NA= Sampling confidence and precision was not estimated for the group.

Some individuals were members of multiple populations. We interviewed these contacts with the group that most clearly defined their affiliation role, and eliminated them from other lists. For example, an EMEP-funded researcher who had attended the program's conference and also was on the program's mailing list would have been contacted as a researcher rather than as a conference attendee or constituent.

The following sections present greater detail about each of the populations contacted.

Program Staff and Advisory Group Members

Interviews with EMEP program staff members and a contracted communication staff member from the Pace Energy and Climate Center focused on the program's structure and staff member experiences with program delivery, particularly the information exchange component.

Program staff members provided contact information for the 11 members of the PAG and eight members of the SAG. We completed 11 in-depth interviews with Advisory Groups' members. These interviews focused on their experiences with the program and their assessments of EMEP's impact in the science and policy communities (Table 2-5).

Table 2-5: Final Dispositions of Advisory Group Interviews

	PAG	SAG	Total		
Complete					
Complete	6	5	11		
Incomplete					
Left Message	4	2	6		
Wrong Number	1	0	1		
Declined	0	1	1		

^{**} The master mailing list contained phone numbers for 89% and email addresses for 70% of the population. We selected random samples of 497 contacts for the email survey and 400 contacts for the phone survey. The two constituent lists were mutually exclusive and randomly selected from a pool of individuals with valid contact information. For a more detailed description of our approach, see Section 6.

Interviews with Advisory Group members lasted between 25 and 45 minutes. In some cases, two evaluation team members interviewed a contact and combined their notes for analysis. In other cases, we recorded the interviews on tape and used these recordings to clarify the interviewers' notes. We entered interview notes into qualitative analysis software.

2.3.2 Researchers

Drawing on information gathered in staff members and advisory group interviews, we conducted interviews with researchers who had received funding from the EMEP program. These interviews focused on contacts' experiences conducting research through the program, their experiences with, and assessments of, efforts to link science to policy, and the types and sources of scientific information they seek out and use in their own work.

Program staff members provided the evaluation team with a list of 66 researchers who had received funding from the EMEP program. However, the list lacked contact information for many of the researchers or the company or institution with which they were affiliated. Using the information provided, the evaluation team searched the constituent mailing list and, in some cases the Internet, to gather the missing data. The evaluation team completed interviews with 21 of the 66 researchers (Table 2-6).²

Table 2-6: Final Disposition of Researcher Interviews

Outcome	Count
Complete	21
Incomplete	
Left Message	28
Quota Filled /Not contacted	14
Wrong Number/Contact Information No Longer Valid	3
Total	66

We also conducted brief follow-up interviews with 10 of these researchers in April and May 2010, to gather additional data regarding the time and effort required to produce various deliverables for the EMEP program.

Interviews with researchers were recorded, and audio recordings were used to enhance the interviewers' notes. As with staff members and advisory group members, notes from researcher interviews were analyzed using qualitative analysis software.

2.3.3 Conference Attendees

The evaluation team expected that contacts who had attended EMEP conferences would be relatively familiar with the program and the type of research products that flow from program funding. Working with NYSERDA staff members, the research team developed a survey instrument to identify the professional characteristics of conference attendees, to understand their experiences, and to document their satisfaction with the EMEP conferences they attended. EMEP staff members provided a list of contacts who had attended the EMEP conference in 2007 and/or 2009. After removing conference attendees who had received EMEP research funding (researchers) and NYSERDA staff members, we had

² While 34 interviews would have achieved a 90/10 level of confidence/precision in researcher interviews, the process evaluation team sought to achieve greater depth of data by pursuing more detailed interviews with a smaller number of contacts. Additionally, 34 completed interviews from a population of 66 would have required a response rate of greater than 50%.

a list of 530 unique contact names, including 451 contacts with valid phone numbers. From that group of 451, we randomly selected 280 individuals for survey fielding. Ultimately, the research team completed 71 surveys, a sample size that provides a $90\% \pm 10\%$ level of confidence/precision overall (Table 2-7).

Table 2-7: Final Disposition of Conference Attendee Survey

Outcome		Count	Percent
Complete	Complete	71	32%
Eligible but not completed, or eligibility unknown	Left Message	46	21%
	Refused	23	10%
	Call back required	13	6%
	Answering machine	34	15%
	No answer	6	3%
NotEligible	Disconnected	5	2%
	Fax	2	1%
	Person unknown	23	10%
Total		223	100%

2.3.4 **EMEP Constituents**

EMEP maintains a general mailing list for thousands of science, policy, and academic professionals—all of whom receive periodic mailings or other notifications about a variety of program-related activities. Although this group may be less involved with EMEP activities compared with other populations interviewed, they nonetheless expressed interest in the program and were added to the mailing list, and possibly include people likely to access the program's products and services in the future. We surveyed this population to assess the type of organizations these contacts represented, their roles, their familiarity with, and use of, EMEP products and services, and issues regarding information content or distribution.

EMEP staff members provided the evaluation team a contact list of 1,522 individuals who comprise EMEP's general mailing list and were not categorized with other population groups. Email addresses were available for 1,069 contacts, and 1,347 contacts had phone numbers. In order to most efficiently reach the greatest number of contacts while simultaneously reducing response bias, two modes of surveys were deployed – one by email and one by phone. The surveys had almost identical questions; however, the two survey strategies provided an opportunity to structure preference questions differently.

For the email survey, we sent invitations and survey link information to a sub-set of randomly selected contacts. Thirty- five invitations (7%) were returned as undeliverable, but the rest successfully reached addressees. We then launched the email survey on March 17, 2010 and closed it on April 2, 2010. During that period, we sent three reminder emails to those who had not previously completed the survey. Ultimately, 164 contacts completed the survey, with an overall response rate of 35%.

For the phone survey, we randomly selected 400 contact names from the pool of contacts who were not previously contacted. NYSERDA's subcontracted survey fielding firm, APPRISE, randomly selected 252 names from this list for initial phone survey. The telephone survey was launched on April 12, 2010, and closed on April 20, 2010. The overall response rate was 41%.³

³ Response rate of phone survey=complete/(total – not eligible)*100. Response rate of email survey equals complete/(total-undeliverable or bounced back)*100.

Table 2-8: Final Disposition of EMEP Constituent Survey

Outcome		Count	Percent
	Email		
Complete		164	33%
Opened invitation email, survey not started		59	12%
Opened invitation email, survey started		33	7%
Did not open invitation email		205	41%
Undeliverable or bounced back		35	7%
Total*		496	100%
	Phone		
Complete	Complete	76	30%
Eligible but not completed, or eligibility unknown	Left message/Voice mail	50	20%
	Refused	27	11%
	Call back required	19	8%
	No answer	8	3%
	Busy	4	2%
NotEligible	Disconnected number	24	10%
	Fax	2	1%
	Person unknown	39	15%
	Did not pass screening	3	1%
Total		252	100%

2.4 REPORT STRUCTURE

This introductory section is followed by section two, which describes the roles of the staff members and advisory groups and presents their perspectives on how the program selects, funds, and manages research projects. It also describes the areas of scientific research targeted by EMEP and the perspectives of these key program contacts regarding how the program's products influence policy. In section three, we discuss the program's outreach strategies and how key contacts prefer to obtain scientific information. Section four presents the results of a survey of EMEP conference attendees. Section five presents the results of survey activities focused on EMEP's constituents. Section six presents the results of a cost-value analysis. Finally, in section seven, we discuss the findings from this project and offer recommendations.

SECTION 3: PROGRAM EXPERIENCE

This section presents the results of interviews with EMEP staff members, Advisory Group members and EMEP-funded researchers.

3.1 PROGRAM STAFF

3.1.1 Roles and Responsibilities

Four project managers work under the EMEP program manager. Each project manager devotes at least a portion of his or her time to EMEP, and oversees research projects in a specified research area. In addition to their duties overseeing research projects, the project managers divide the program's administrative duties, including coordinating program outreach and planning EMEP's biannual conference. The program also contracts with an external outreach coordinator, who assists in the production of EMEP outreach materials. The outreach coordinator is responsible for planning portions of the EMEP conference, primarily by organizing the poster session and communicating with presenters.

Solicitations

EMEP project managers issue periodic competitive solicitations through PONs that request research likely to build on the existing body of knowledge and add information valuable to specific policy questions about the environmental effects of energy production on New York State. EMEP PONs have focused on the program's primary research topics, which could include acid deposition, mercury research, air quality, and resultant effects on human health and alternative energy impacts on the environment. PONs request that proposers include reporting and information transfer strategies in their projects. Generally, this task is described as presentations at meetings, quarterly reporting requirements, articles prepared for peer-reviewed journals, and a final technical report (referred to herein as "EMEP products").

Once a proposal is selected, EMEP staff members work with the principal investigator to determine the specific deliverables expected to flow from their work. A Scope of Work (SOW) is then developed, and the features of the information transfer and reporting expectations are negotiated and documented. In many cases, the information transfer product descriptions are developed from standard language used for all SOWs. In other cases, particularly when a project may not lend itself to detailed reports, other outreach materials are specified, and the reporting requirements are altered accordingly.

3.2 ADVISORY GROUPS

The EMEP program is guided by a Program Advisory Group (PAG) and a Science Advisory Group (SAG) that provide advice in setting the program's research priorities, evaluating proposals for funding, and reviewing research products.

The 11 members of the PAG include representatives from New York state agencies, including the Department of Public Service, the Department of Environmental Conservation (DEC), and the Department of Health, as well as representatives from the U.S. Environmental Protection Agency (EPA), non-profit groups, and advocacy organizations. The seven-member SAG includes representatives from universities, independent research institutes, consultants, and representatives from non-profit organizations. We interviewed six contacts from the PAG and five contacts from the SAG in November and December of 2009.

3.2.1 Role of Advisors

Members of both advisory groups described their role in the program in similar ways, although the two advisory groups differ slightly in their focus. Members of both advisory groups reported that they are

involved in helping the program determine its research priorities and monitor its progress. In addition, members of both groups reported that they had been involved in multiple aspects of the EMEP research planning process including: providing advice in formulating PONs and the researchers' scope of work; reviewing proposals submitted by researchers seeking funding; overseeing ongoing projects; and reviewing research reports.

According to advisory group members, the SAG carries out these functions with a focus on advancing scientific knowledge and ensuring the quality of the scientific work that EMEP funds, while the PAG focuses on the relevance of EMEP research in policymaking. In the case of evaluating proposals submitted in response to a PON, for example, one program advisor stated that the SAG would evaluate the proposals based on their scientific merit, while the PAG would recommend proposals based on their policy relevance. Illustrating the PAG's role in ensuring that research would be relevant to policymakers, another program advisor stated that, through his participation on the advisory group, his agency was "looking at where we can use NYSERDA to get the information to inform our decisions."

3.2.2 Member Perspectives

While advisory group contacts from both groups largely reported that advisory group members bring a broad base of knowledge and experience related to EMEP's research areas to the group, three advisors stated that the range of issues on which EMEP funds research limits the program's ability to include advisors with expertise in every research issue. According to one program advisor, while state and federal government agencies have one or more representatives on the PAG, these agencies are responsible for a range of issues that go beyond the expertise of the program advisors representing them. According to this contact, it would be nearly impossible to have representatives with expertise in all the issues that the EMEP program is currently involved in without creating a very large advisory group.

This program advisor and one science advisor stated the need for a broad base of expertise within the advisory groups had become more noticeable as the program expanded into research on climate change. Another science advisor suggested the program may not seek enough input on topics on which the advisory groups do not have expertise. This contact said, "I don't think they use the rest of the scientific community to the best of their advantage. They tend to look for advice within the science advisory group, and no matter how many people are on there, or how broad their knowledge is, there are going to be times when you have to go out and ask someone else." In addition, one program advisor and one science advisor suggested the advisory groups could benefit from more representation by advocacy groups or other organizations that represent interested sectors of the public.

Advisory groups typically meet with program staff members once a year to receive updates on program funding and ongoing projects, to discuss the program's progress, and to review overall research objectives. Both program and science advisors also stated that, when the program is issuing new PONs or creating a long-term research plan, they may have more frequent contact with the program through meetings, conference calls, and e-mails.

Advisory group contacts reported that their level of contact with the program varies relative to the funding cycle of EMEP research projects. However, the majority (seven of 11) of the advisors interviewed stated that the frequency of meetings had decreased since they had been involved with the program. Contacts stated that the program is no longer holding advisory group meetings in conjunction with the biannual conferences, and three advisors (one program advisor and two science advisors) reported that they feel less involved in the program now than they were several years ago.

Four advisory group members (two program advisors and two science advisors), all of whom had been involved with the program for at least five years, wanted the program to expand the role of the advisory groups. According to one science advisor, EMEP could take better advantage of advisory group members' expertise in ways that would be both valuable for the program and interesting for the advisors. This advisor suggested engaging advisors in the creation of synthesis reports that bring together findings from

multiple research projects in a single topic area—although he noted that the program may be able to leverage advisory group members' skills in other "creative" ways as well. One program advisor simply expressed a desire to be more involved in the work the advisory groups already carry out, including reviewing proposals and draft reports.

The other two advisors (one program advisor and one science advisor) advocating for an expanded role for the advisory groups stated that they would like the groups to play a larger role in program decision making and strategic guidance. According to this science advisor, "I think they need to get us more involved in respect to where the program should be going, what projects might or might not be funded, the quality of science, and having a sense of general direction formed by what the seven or eight of us are thinking." The program advisor also expressed desire for a greater role in decision making and elaborated that Program Advisory Group members could play a particularly important role in the program's efforts to reach out to policymakers, directing research toward policy-relevant topics, and providing outreach to their organizations to ensure that the research is being used.

The science advisor quoted above speculated that what he sees as the limited role of the advisory groups may be a result of the lack of a formal definition of the groups' roles. According to this contact, the role of the advisory groups developed organically to meet the needs of the program. There is no charter or other document specifying exactly what the advisory groups should or should not do. A program advisor also noted that there was no formal definition of the way that the advisory groups interact with each other and with other parts of the program in deciding which proposals to fund. This program advisor also stated that he did not understand the process for selecting new advisory group members and that reasons for changes in the composition of the advisory group were not transparent to him.

3.3 EMEP RESEARCHERS

In the fall of 2009, program staff members provided the evaluation team with a list of 66 researchers involved in projects that had received funding from the EMEP program.

3.3.1 Characteristics

A plurality of EMEP researchers come from educational institutions, while government agencies and consulting organizations make up the next largest groups (Table 3-1).

Table 3-1: Researchers by Organization Type

Organization Type	Number in Population	Percent of Population
Educational Institution	29	44%
Consulting Organization	13	20%
State Government Agency	8	12%
Federal Government Agency	6	9%
Research Organization	4	6%
Non-Profit Organization	3	5%
Industrial Company	2	3%
Other	1	2%
Total:	66	100%

Interview results confirm that a majority of the researchers primarily conduct research in their professional activities, regardless of the type of organization in which they work (Table 3-2). In addition to the projects they have conducted through EMEP, researchers reported they commonly look to federal

agencies as funding sources for their research, with the EPA and the Department of Energy as the two most commonly mentioned sources of federal agency funding.

Table 3-2: Researchers' Primary Activity

Primary Activity	Count
Active Research	14
Consulting	3
Management Related to Technology Development	2
Even Split Between Research and Teaching	1
Professional Organization	1
Total	21

A review of the list of EMEP research projects suggests that most of the researchers the EMEP program funds have relatively limited involvement with the program. While one researcher has been involved in five projects funded through the EMEP program, and three others have been involved in four projects, a majority of the researchers EMEP has funded (51 of 72, or 71%) were involved in a single project. However, the interview data suggest that EMEP researchers may have longer-term relationships with the program than the list of research projects indicates. Just over half of the researchers (11 of 21, or 52%) reported they had been involved in more than one project. In addition, five respondents reported that they had both successful and unsuccessful applications for funding, indicating that they are aware of program opportunities. Interview results suggest that EMEP research projects typically last between one and three years, although some of the researchers interviewed described projects, including long-term monitoring efforts that had lasted for six years or more.

3.4 KEY CONTACT PERSPECTIVES

3.4.1 The Research Planning Process

EMEP periodically produces a Multi-Year Research Plan that documents the research areas on which the program will focus and sets priorities for EMEP research. As noted above, members of both the program and science advisory groups view their contribution to this planning process as one of their primary roles with the program. In addition to the advisory groups, the program convenes working groups of external stakeholders with interest or expertise in each of the topic areas in which EMEP funds research. These working groups include representatives from state and federal government agencies, academia, consulting firms, industry and other organizations. Advisory group members and researchers who have received program funding also participate in the working groups.

3.4.2 Funding Solicitations

EMEP releases PONs to solicit research proposals in specific research areas. The PONs usually provide information about the total funding amount available in each research area, but do not specify the number of projects to be funded or set a funding limit for individual projects. The PONs divide each of the program's broad research interests into a series of targeted research areas, each of which includes a description of the gaps in existing research that the EMEP program seeks to fill and a list of activities that the program is interested in supporting in order to fill those gaps.

The majority of the researchers (13 of 21) reported EMEP's PONs typically make clear the types of research the program is interested in funding, and stated program staff members had been responsive to requests for additional clarification. One member of the SAG stated the clarity of the EMEP program's

funding solicitations sets the program apart from other funding organizations, saying, "The other thing that gets the science community excited is how they run their grant programs. I think they are pretty good about making clear 'this is the sort of stuff we are interested in supporting, send us a proposal."

However, four researchers reported EMEP's PONs were not always clear to them. While the 2007 Multi-Year Research Plan rates the urgency, importance, and expected time required to achieve results in targeted research areas, these priorities are not always presented in the PONs. Although the PONs provide links to the Multi-Year Research Plan, not explicitly including these priorities in the PON can cause uncertainty among researchers seeking to increase the likelihood their proposals will be accepted by matching them to program priorities. According to one researcher, "you see an area on the proposal and you want to apply for it, but maybe your chances are not very good because that is not a very high priority." All four of the researchers who reported that EMEP's PONs were not always clear stated they were uncertain of the relative priority of the targeted research areas and the potential research activities.

Even with the aforementioned uncertainty associated with program priorities, researchers largely reported they understand how EMEP evaluates their proposals (12 of 21 respondents). Elaborating on his response, one researcher stated that, in his experience, the program had been transparent regarding its funding decisions. In a similar statement, a second researcher noted that, while she had not been aware of the details of the selection process, she had a sense that the process had been fair. A third researcher reported the EMEP program's process for evaluating proposals, drawing on a group of expert reviewers, was similar to that of other research funding organizations. The four remaining contacts had not been involved in the proposal process or otherwise did not respond.

3.4.3 Managing Research

Comments by researchers about the EMEP program's approach to managing research projects fall into three general categories:

- Interaction with program staff members.
- The structure of EMEP research projects and how that structure differs from other organizations that fund similar research.
- EMEP's reporting requirements.

In addition to their comments in these three areas, researchers made a variety of other observations about EMEP's contract requirements and funding.

Interaction with Program Staff

Each project is assigned a project manager to act as the primary contact between researchers and the program. The researchers we interviewed were universally satisfied with their interaction with their project manager. According to contacts, program staff members are engaged in each research project and ensure that projects are designed to produce results that will be valuable to both the scientific and policy communities. According to one researcher, whose comments paralleled those of four others, program staff members "are really engaged in the program, they are very interested in making sure that their program has high impact, they are very good spokespeople representing their organization to the community."

When faced with a particularly large or complex project, EMEP convenes a special Project Advisory Committee (PAC) to assist the project manager in overseeing the project. Two of the researchers interviewed had worked with a PAC, and both reported that the committee had helped guide the direction of their projects. These researchers reported that the PAC had helped to ensure that their research would provide policy relevant information and that their reports would present information in a way that would be useful to policymakers. Two additional researchers reported that, while they had not worked with a PAC, the program included people in the project kickoff meeting that were able to provide specialized information that helped direct the project toward policy-relevant issues.

Structure of EMEP Projects

Interview findings suggest that, because of the way EMEP manages research, the project management is more highly structured than projects researchers conduct for other funding sources. EMEP requires researchers to clearly define their project before beginning their research and to commit to a set of deliverables that will result from the project. In contrast, contacts reported that other funding agencies require researchers to define an issue they will investigate, but not to commit to a distinct set of deliverables. As a result, one researcher said, the EMEP program is "stricter than other organizations in their guidelines and [requires] really sticking to the project as originally outlined."

The researchers interviewed reported mixed feelings regarding the level of structure that EMEP's research management process creates, noting that the program must balance structure with the flexibility to pursue unexpected findings. Contacts stated that clearly defining a research project and committing to a set of deliverables provides a clear sense of the project's goals, defines a path for the research to follow, and helps to ensure that the research produces useful findings. However, researchers also reported that EMEP's research management process limits their ability to pursue unexpected findings. According to one researcher, "you've got to leave a little bit of leeway for experimentation and moving into an area where you might come up with a surprising answer, and you might have to change your deliverables half way through a project because of that finding."

Comments by two researchers suggest that the program is achieving this balance. These contacts reported that program staff members were understanding of the need to make changes in ongoing research projects and that the program provided enough flexibility to ensure that researchers could adapt their projects as necessary to improve their scientific findings.

Reporting Requirements

Researchers reported that the EMEP program requires a higher level of reporting than other organizations that fund similar research, especially federal organizations. EMEP requires researchers to submit quarterly progress reports; however, contacts stated that other research funding organizations require only annual or semi-annual progress reports. In addition, researchers reported that other funders do not typically require fact sheets and final reports, as EMEP does. According to contacts, federal agencies that fund research are generally more interested in the academic journal articles that have resulted from the research that they fund.

Three researchers recognized that EMEP's more stringent reporting requirements stem from the program's efforts to link science to policy, with one of these researchers elaborating that EMEP is more oriented toward applied research than other funders and another saying that the reporting requirements depend on the goals of the agency. Four researchers specifically stated that quarterly status reports are too frequent. These researchers stated that, in most cases, their research did not generate sufficient findings in a single quarter to justify a report. According to one researcher, "research doesn't move in that kind of time segment...really, until you have gotten deep into the project, it is hard to write up something that is of substantial concrete value."

One researcher also noted that his university does not require that he track his time spent on research projects during the academic year. These findings suggest that researchers may not be accustomed to working as contractors, as they do for EMEP. As a result, researchers may require more guidance and support in understanding what EMEP requires, and does not require, in its quarterly reports.

Recognizing that research projects may not generate significant findings in a three-month period, program staff noted that the quarterly reports EMEP requires are largely administrative. According to staff, the reports are designed to ensure that research progress is on pace with spending.

Contract Requirements and Funding

In addition to their comments on interaction with program staff members, project structure, and reporting requirements, researchers raised several other issues related to the program's contract requirements and funding structure. Each of these comments were expressed by three or fewer contacts; however, they provide some insight into researcher perceptions of EMEP.

- EMEP's funding process makes it difficult to maintain stable, long-term research projects. One researcher stated that EMEP had funded his project in two year increments, but the program issues PONs for renewed funding every three years, creating a year-long gap in which EMEP funding is not available. A second researcher stated that, in his experience, money originally intended for research funding had been shifted to other areas as part of NYSERDA's budgeting process.
- The total amount of funding available is relatively small. While EMEP funding typically accounts for approximately half of the overall budget of the projects the program funds, three researchers reported the EMEP program generally awards relatively small amounts of money as compared to other funders. According to one of these researchers, EMEP "still hasn't fully understood what the cost of a significant research program is." Another researcher reported that the demand for the type of information that research funded by EMEP produces is not commensurate with the level of funding available to conduct that research, from EMEP and from other sources.
- There is room for improvement in contract management processes. Researchers' assessments of EMEP's contract-management process varied based on the researchers' interests and the types of organizations from which the researchers' typically sought funding. One researcher, who focuses on air quality issues, stated that EMEP's requirements were more complex than those of federal research-funding agencies, which generally pay grants up front, and which do not require researchers to submit invoices, or tie payments to the completion of deliverables. Another researcher, who focuses more directly on the environmental impacts of energy use and linking science to policy, reported EMEP's funding process was "more user friendly" than the process she had encountered when conducting a research project funded by the New Hampshire Public Utilities Commission.

3.4.4 Desirability of EMEP Funding

Researchers reported compatibility with their interests was a more important factor in determining the desirability of research funding than the administrative requirements associated with those funds. One researcher expressed this view explicitly, saying, "The number-one consideration is always whether the solicitation is relevant to what I am doing and whether I have a new idea for that area."

Sixteen of the researchers interviewed had received funding from other sources to conduct research projects not connected to the EMEP program, and the majority of these contacts stated EMEP funding is equally desirable to research funding from other organizations (Table 3-3). Echoing the researcher who asserted that the topical relevance of a solicitation is most important, these respondents largely reported funding for their research is difficult to obtain, and any source of funds is desirable.

Table 3-3: Desirability of EMEP Funding Compared to Other Sources

Desirability of Funding	Count (n=16)	
Equally Desirable to Other Sources	9	
More Desirable than Other Sources	4	
Less Desirable than Other Sources	3	

Respondents who reported EMEP funding is more desirable than funding from other sources stated EMEP's research focus parallels their own research interests to a greater extent than do the research interests of other organizations. Researchers who reported funding from EMEP was less desirable than funding from other sources cited the program's stringent reporting requirements compared to those required by federal agencies. However, consistent with contacts' assertions that the relevance of a solicitation to their work is most important, even researchers who reported EMEP funding is less desirable than funding from other sources emphasized they would submit proposals to the program in the future if there were a solicitation that matched their research interests.

3.5 EMEP AND SCIENTIFIC RESEARCH

Advisory group members report that the scientific community recognizes EMEP as a source of high-quality research. All of the science advisors interviewed believe that the program funds relevant research and resultant findings have advanced scientific knowledge within the program's focus areas. Although program advisors were generally more familiar with policymakers' use of EMEP research findings, two program advisors also reported the research is considered relevant and is well-regarded in the scientific community.

Three advisory group members reported publication of EMEP research findings in peer-reviewed journals is one indicator of the program's influence in the scientific community. According to one of these contacts, "I think most people would say the work they have funded has been necessary and it has been high quality. The standard metric in academic circles is where you have published and how often you have published, and the papers that come out of the projects they support go to good journals in a reasonably quick fashion."

Advisory group members also drew favorable comparisons between EMEP and much larger publicly-funded scientific research organizations. One advisory group member stated that, "The quality of the science is on par with [research funded by the U.S. Environmental Protection Agency (U.S. EPA) and National Institutes of Health], and the findings, the scientific results, are of top-notch quality."

In addition to producing research of comparable quality to that produced by federal agencies, advisory group members and EMEP researchers reported that EMEP's connections to these agencies further advance the reach of the program's findings within the scientific community. According to one researcher, "If you talk to people at EPA about...climate change, air pollution, mercury contamination, I think they feel like NYSERDA's program is a major contributor to the national program...and ...if the EMEP program would go away, it would leave a huge hole in the national research program."

Contacts expressed positive views of scientists' awareness of, and attitudes toward, EMEP, but also identified two factors that may limit the program's ability to achieve a broader influence. First, one program advisor and one researcher noted in some cases that EMEP funds research projects that will provide policy-relevant findings, but may not advance the cutting edge of scientific research. According to this researcher, the results of this type of research are often not as widely disseminated within the scientific community, limiting the exposure these projects bring for EMEP. Second, two science advisors, both of whom stated their primary expertise was in the field of air quality, reported EMEP research typically does not produce what one called "earth shattering" findings. Instead, these contacts stated, like

most scientific research, EMEP findings build on existing research to add incrementally to the knowledge base. While, this type of research is valuable, the two science advisors asserted incremental research does not attract broad attention in the way findings that bring about a greater shift in the understanding of environmental issues might.

3.5.1 Unique Aspects of the EMEP Program

In addition to providing a general assessment of EMEP's effect on the scientific community, interviews with researchers and advisory group members identified other characteristics that set the EMEP program apart from other organizations that fund scientific research.

Focus on New York State

In open-ended responses, a large majority of the advisory group members (eight of 11) and six (of 21) researchers mentioned EMEP's focus on New York State is unique among organizations that fund similar types of scientific research.

Most of these contacts see the program's focus on New York as an asset. Four advisory group members and three researchers elaborated that EMEP's focus on research within New York had drawn scientific attention to issues within New York that may have statewide significance. In addition, two researchers reported the program's focus on New York allows for more detailed study of environmental issues within New York than federal funding sources alone could achieve. For this reason, one researcher reported he had cited EMEP as an example for other states seeking to promote science and technology development within their state. A third researcher, whose EMEP research focused on his company's efforts to develop alternative energy technologies, reported his company is in New York because of NYSERDA. According to EMEP's PONs, the program considers how many members of the research team are located in New York when evaluating research proposals.

Contacts also noted that EMEP's focus on New York has certain drawbacks, primarily in terms of the program's visibility. While six advisors noted that EMEP is well known within New York, the three advisors who do not view the program's New York focus as an asset stated that scientists outside the New York region may not be aware of the program. These advisors also noted that EMEP's focus on state-specific issues could limit the number of researchers that respond to the program's solicitations. However, one researcher stated that EMEP's connection to federal research funding agencies extends the reach of the program, and an advisory group member stated that scientists in other places likely find journal articles presenting EMEP-sponsored research findings even if they are unaware of the funding source.

Connections to Policymakers and Organizations

Contacts reported that EMEP's focus on connecting scientific research to policy sets the program apart from other research funding sources. Seven researchers noted that the program's focus on policy-relevant research is unique in that the program both encourages researchers to consider the policy implications of their work and provides researchers with opportunities to interact with policymakers and regulators for whom their work might be relevant. Two researchers specifically noted that this had shifted the way they think about their work.

Contacts reported that EMEP facilitates contact between researchers and policymakers by creating opportunities for researchers to present their findings to policymakers and by involving policymakers and regulators in the research process. One researcher stated that EMEP's connections to the New York State DEC had facilitated collaboration with DEC and had allowed him to include measurements in his research that would have been impossible without that collaboration. Another stated that because the program had included policymakers in the research planning process, his research was focused on the issues important to policy considerations.

Research Focus

While advisory group members spoke about EMEP's research efforts more broadly, in open-ended responses, six researchers cited specific examples of areas in which EMEP fills important gaps in the existing research. Researchers stated EMEP had provided them the opportunity to pursue research for which they could not have found other funding, a finding that applied across EMEP research areas in which the contacts had worked. One researcher stated that few funders focus on the ecological impacts of energy production, and another reported that the crosscutting research project in which he had been involved was a unique opportunity. A third researcher elaborated that research into the environmental effects of atmospheric deposition is largely "neglected outside of New York State."

Two researchers also noted EMEP's support for ongoing, long-term monitoring projects is unique among organizations that fund similar types of research. One contact stated that while other funders value long-term monitoring capabilities, they are unlikely to support long-term monitoring projects unless the researchers commit to producing short-term results. However, short-term results may require researchers to add elements to the study that, in the researcher's view, distract from the long-term monitoring effort. According to contacts, EMEP imposes fewer requirements that long-term monitoring projects produce short-term results than other funders.

3.5.2 Influence of EMEP Funding on Research Carried Out

A plurality of researchers reported that EMEP funding had allowed them to complete projects more quickly or on a larger scale than they otherwise would have (Table 3-4). This finding is consistent with the program's desire for leveraged funding, since the program is rarely able to provide all of the funding a research project requires. Three researchers reported that the increased capacity EMEP funding provided to their projects was particularly significant. One stated that EMEP funding allowed her to expand a research project to include New York, when it otherwise would have focused on other areas. In addition, the two researchers stated that EMEP funding had allowed them to complete research related to their businesses and to bring their products to market more quickly, giving them an advantage over their competition.

Outcome	Count (n=21)
Similar research done on a smaller scale or over a longer timeframe	9
No research project done	4
Research done with a different focus	3
No change to existing research project	1
Don't know/No Response	4

Researchers stating that they would not have been able to complete their research project, or they would have done research with a different focus if EMEP funding had not been available, were asked to elaborate on their responses. Their comments were similar, and indicate that EMEP's research focus and the program's prioritization of New York state made it unlikely they would have found other funding. Not all EMEP projects have substantial co-funding. Four of these seven researchers had been part of project that had received more than 70% of their funding from EMEP. While EMEP projects typically receive funding from other sources, other research funders' goals may differ from those of EMEP. As a result, research conducted for these organizations alone may differ in focus from research on similar topics conducted through the EMEP program. Illustrating this point, one contact stated EMEP funding allowed him to focus more upon the areas in which he is an expert.

3.5.3 EMEP Research as a Base for Further Scientific Investigation

Two-thirds of the researchers interviewed (14 of 21) reported that they had expanded upon the work done for EMEP. These researchers included those who had referred to their EMEP research in subsequent work or anticipated doing so (eight contacts), and those who had broadened the scope of the EMEP-funded project itself (six contacts).

Researchers who had broadened the scope of their EMEP-funded projects reported combining EMEP research with research from other sources to allow for comparison between different locations. This expansion allows researchers to examine issues in a way that is not possible drawing on research from only one funding source.

Researchers who referred to their EMEP-funded research in subsequent projects reported that EMEP projects had contributed to a larger portfolio of research efforts, conducted in pursuit of their scientific interests. In addition, three researchers said they had applied modeling tools or other data analysis techniques developed as part of their EMEP research to later projects. According to one researcher, "I don't structure or plan my research around programs. I plan it more around the science, and so my research has led me to the point where I need to address this area...so I look to find a program where I can find support to pursue that."

Five researchers indicated that EMEP had played an important role in their portfolio of research efforts, and had helped them launch their careers. One of these contacts elaborated that, because of the program's unique focus, EMEP researchers face less competition for graduate fellowships and other research funding from the program than from federal funders like the U.S. EPA.

3.6 INFLUENCE ON POLICY

As noted above, researchers reported that EMEP is unique among research funding organizations in its focus on generating research findings relevant to policy. However, the program's focus on linking science to policy extends beyond its selection of research topics. Contacts were aware that the program reaches out to policymakers to ensure that relevant findings are communicated to the appropriate decision makers.

Both researchers and advisory group members stated the program's biennial conference is important for program outreach to policymakers and noted that the program may also invite policymakers to additional presentations of research findings. According to these contacts, these venues allow the program to focus on providing scientific information in a way policymakers understand. In addition to this periodic contact with policymakers, advisory group members stated that the program maintains ongoing relationships with policy and regulatory agencies such as the U.S. EPA and the New York DEC.

3.6.1 Staff and Advisor Assessments of Program Influence on Policy

While it is difficult to measure the impact of scientific research on policy outcomes, contacts reported EMEP is successful in providing policymakers and regulators with information relevant to their work. Advisory group members reported that policymakers that are focused on issues related to EMEP's research areas are aware of the program and view it as a resource. Contacts also stated that policymakers see EMEP-sponsored research as high-quality and unbiased.

Interview results suggest EMEP effectively informs policymakers about relevant research findings; however, contacts stated that it is difficult to measure the influence of a particular piece of scientific research. In most cases, scientific research incrementally adds to a base of knowledge; studies rarely produce results unrelated to the results of other research. Advisory group members also noted that research is only one of the factors policymakers consider in decision-making.

Despite the difficulty of connecting scientific research with policy outcomes, program staff members, researchers, and advisory group members provided examples of how the program has affected policy. According to contacts, EMEP funded research:

- Provided scientific background to inform communications from the New York State Department of Health. In particular, EMEP-funded research into levels of mercury in fish in the Adirondacks influenced the department's decisions regarding when to issue advisories to fishermen.
- Contributed to the formation of a new emissions factor database, in collaboration with research from the Department of Energy and other organizations.
- Informed the U.S. EPA's efforts to set standards for air pollutants in protected ecosystems.
- Played a role in the New York State Work Group for Carbon Sequestration's discussion of regulations regarding carbon sequestration. EMEP-funded researchers are involved in the group.
- Is "laying the groundwork for" New York State's Climate Action Council, which will include researchers that have received funding from the program.
- Informed legislation in New York State to address a widespread problem of mercury pollution.
- Assisted in litigation against upwind emissions sources outside of New York.
- Informed briefings researchers have given to policy and regulatory agencies including the New York State DEC, the U.S. EPA, the U.S. Forest Service, and the U.S. Parks Service.
- Has been cited in a report by the National Acid Precipitation Assessment Program that documents
 policy-relevant science related to the effects of acid deposition on ecosystems. The report will be
 submitted to Congress.
- Is part of a U.S. EPA long-term monitoring project⁴ that tracks levels of atmospheric deposition and offers an assessment of the effects of the Clean Air Act. According to program staff members, in 2009, this U.S. EPA program used one of EMEP's reports as a case study.

3.6.2 Suggestions for Improving the Link Between Science and Policy

Contacts recommended a variety of ways to effectively communicate scientific research to policymakers, many of which are already part of EMEP's outreach efforts. Program staff and members of both advisory groups offered specific areas in which the program might improve outreach to policymakers.

Researchers specifically noted that an individual's role within a policy organization determines the type of scientific information that individual will seek. Researchers reported that some individuals within policy organizations, including government agency researchers, seek very detailed scientific information like that contained in peer-reviewed journal articles and research reports. However, contacts stated that individuals more closely involved in the formation of policy generally seek scientific information that meets three criteria:

- Clear presentation of outcomes and implications: Researchers reported that policymakers seek scientific information that identifies the most important issues and suggests clear outcomes that would result from various potential actions, including the magnitude of those outcomes in terms of the number of people affected or the scale of environmental effects.
- *Objectivity:* Researchers and advisory group members reported that policymakers often must make decisions on issues for which a great deal of scientific uncertainty exists. Furthermore, contacts stated that many of these issues are politically controversial, and advocates for both sides

⁴ Temporally Integrated Monitoring of Ecosystems/Long Term Monitoring

of the issue provide policymakers with a wide range of information. As a result, contacts suggested policymakers would benefit from scientific analysis that presents the environmental costs and benefits of various policy options without advocating for a single option.

• *Non-technical presentation of summary information:* Contacts stated that policymakers are typically not interested in in-depth descriptions of research methodology or detailed data sets. Instead, researchers reported that policymakers are more interested in shorter summaries that focus on the results of the research.

Two researchers also suggested that closer, direct communication between scientists and policymakers, of the type that EMEP seeks to provide, would increase the extent to which science is able to influence policy. One researcher suggested that policymakers are most likely to consider scientific research in their decision making when they were involved with forming the research question, and other contacts reported that research designed to answer specific, policy-relevant questions can be particularly useful for policymakers. However, two contacts stated that the structure of most scientific research organizations limits communication between researchers and policymakers. According to these researchers, while EMEP emphasizes these efforts, scientific research organizations generally do not reward scientists' outreach efforts and research budgets typically do not include funding for this type of outreach.

In addition to these general comments, staff members and advisory group members offered more specific suggestions for ways EMEP could better reach policymakers. First, one program staff member expressed a desire for greater dialog in the program's communications with policymakers. According to this staff member, greater feedback from policymakers would allow the program to better identify and meet policymakers' needs.

Suggestions by advisory group members largely focused on ways EMEP could expand its outreach to policy organizations. One advisor reported different individuals within policy organizations may be concerned with a very wide range of issues and suggested EMEP should ensure it is reaching all of the individuals for whom program sponsored research might be relevant. Another advisor argued that the program should reach out to a wider range of organizations in New York, such as the Department of Public Service and the Department of Health.⁵ A third advisor stated that the program could increase its exposure among policymakers outside New York by presenting research findings in conferences and other national meetings to a greater extent than it already does.

3.7 SUMMARY

EMEP's focus on linking science with policy sets the program apart from other organizations that fund similar research and leaves the program with two distinct audiences, scientists and policymakers. Researchers and advisory groups' members report that both audiences view the program positively.

Key program contacts reported that EMEP's research findings are relevant to scientists and considered of comparable quality to research findings produced by much larger, federal funding organizations. Researcher and advisory group member comments also suggest that EMEP research fills gaps in the scientific knowledge base. Contacts reported that the combination of areas in which the program focuses is unique, and researchers reported they would have been unlikely to find funding for similar research from other sources.

Contacts also reported that EMEP effectively reaches out to policymakers. While it is difficult to attribute policy outcomes to any single piece of scientific research, contacts reported that policymakers are aware

⁵ The program may indeed already engage multiple organizations in New York, including the DPS and the DOH, but this contact may either be unaware of this activity or believe it should occur on a larger scale.

of EMEP's research, and advisors, researchers, and program staff members cited a variety of examples in which the program had played a role in policy formation.

Advisory group members are involved at various stages of EMEP's research funding process. Advisors contribute to the funding solicitations the program issues, assist the program in evaluating research proposals, advise ongoing research projects when requested, and review final reports. While these roles have developed organically as the program has evolved, some advisors would like an expanded role in the program, while others want the program to clearly define their roles as members of their respective advisory groups. As the program's research interests have expanded, it has become more difficult for advisors to possess expertise in every issue on which the program funds research. While the process of forming long term research plans and the Project Advisory Committees formed to oversee large projects draw on input from outside experts, the program may need to turn to outside experts for advice to a greater extent in the future.

Researchers were largely satisfied with their interaction with EMEP. They found the program's funding solicitations were clear and evaluated fairly, although some contacts expressed a desire for the PONs to more clearly state the priority given to various targeted research areas, information that is available in the Multi-Year Research Plan. PONs provide hotlinks directing researchers to the Multi-Year Research Plans and list a program contact available to answer questions. Nonetheless, PONs do not explicitly list the priority given to targeted research areas, information researchers seek in their efforts to effectively target their proposals.

Researchers also reported EMEP's program managers are engaged in the projects that the program funds. Researchers stated EMEP's project management approach is more structured than that of other funders. This structured approach helps to ensure findings from EMEP-funded research will be relevant to policymakers, but risks limiting scientific exploration. So far, it appears EMEP has achieved an effective balance in this regard.

Consistent with EMEP's structured approach to project management, the program has more stringent reporting requirements than other funders. Researchers, many of whom work full time for academic institutions, may not be accustomed acting as contractors and may require more assistance in understanding what EMEP requires, and does not require, in its quarterly reports.

SECTION 4: PROGRAM OUTREACH

This section focuses on the EMEP program's outreach strategies, ways that the program's audiences currently receive information from EMEP, how those audiences would prefer to receive information from the program, and any particularly effective outreach strategies undertaken by other organizations that fund similar types of research. While this section focuses on the EMEP program's outreach strategies in general, Section 5 goes into detail on the uses and benefits of each of the outreach products that the EMEP program produces.

4.1 OUTREACH STRATEGIES

4.1.1 Program Outreach Activities

EMEP outreach activities occur in several ways. Program staff members are responsible for formal outreach activities and develop project collateral, but rely on key program contacts (including advisory group members, researchers, and conference attendees) to contribute to the program's reach by disseminating the results of research.

Outreach Activities Carried Out by Program Staff

Program staff members reported that outreach is important because of the program's goal of linking scientific research with public policy. EMEP outreach activities include the biannual EMEP conference, the program website, and a variety of project-specific and promotional materials including project summaries, executive summaries, and brochures. EMEP also maintains a mailing list, which is used to disseminate information about recently completed projects, PONs, and upcoming conferences. Program staff members attend conferences focused on topics relevant to EMEP's research to network and, at times, make announcements about upcoming EMEP events.

EMEP's outreach activities and products target different sectors with a variety of needs. Reflecting on the variety of communications goals associated with the program, staff members differed in their assessments of the most effective outreach activities. One program staff member cited the EMEP conference as a successful outreach activity, stating that the event is well attended and provides an opportunity to present information on a variety of levels, reaching audiences with diverse backgrounds. Another contact stated the program's fact sheets are a valuable outreach tool because they are portable and written in accessible language. A third contact stated that the program's website is an important outreach tool because the internet is rapidly becoming the primary source of information for EMEP's audiences.

Technical writers assist the program in summarizing final reports into two-page fact sheets that could be used in a variety of ways, both online and in hard copy. In addition, NYSERDA's marketing department is currently seeking proposals for graphic design services that will assist the EMEP program. Improvements to the EMEP website are also expected.

Outreach Activities Carried Out by Advisory Group Members

Advisory group members are expected to support program outreach by disseminating research findings through their professional networks. One member of the PAG noted that informing others within their own organizations is an important way program advisors contribute to the program's efforts to link science to policy. All but one of the PAG representatives interviewed reported that they disseminate EMEP research products to others within their organization or refer people in their organization to EMEP products when appropriate.

SAG members approach disseminating program information differently than PAG members. Only two (of five) science advisors reported that they disseminate, or would disseminate, EMEP research products. However, when science advisors do disseminate information, they tend to reach a broader audience.

Unlike program advisors, who reported primarily disseminating EMEP products to people within their organizations, science advisors report disseminating products to colleagues in other organizations as well as their own. Three science advisors stated that they did not see disseminating EMEP research as part of their role as advisors; however, one reported doing so anyway, and another mentioned this could be a useful way to expand his role as a science advisor.

Outreach Activities Carried Out by Researchers

Researchers were not asked about their efforts to disseminate EMEP research products specifically. Rather, they were asked more generally about the frequency with which they provide information about scientific research to others. Researchers doing so in a variety of ways and to a variety of audiences reported providing scientific information to both co-workers and researchers at other organizations with research interests similar to their own. Contacts also reported disseminating scientific information as part of collaborative research efforts in which a researcher may serve as a subject matter expert on a larger research team. However, researchers reported that they will disseminate information about especially interesting research findings more widely, both within and outside of their organizations (Table 4-1).

Audience	Often	Sometimes	Rarely	Total*
Co-Workers	12	5	1	18
Colleagues at Other Organizations	11	6	2	19
Conference Attendees	7	12	0	19
Students	6	6	7	19
Website Visitors	6	4	8	18
List Serve	0	5	13	18
Blog Audience	0	0	18	18

^{*} Due to interview time constraints, not all respondents were asked each question.

Researchers reported they are least likely to disseminate scientific information through websites, listservs and blogs. However, interview results revealed two distinct approaches to posting research materials on the internet and suggest that this method of research dissemination may increase in popularity. Four researchers stated that their organizations regularly post findings on the organization's website. In contrast, three researchers reported maintaining personal websites to showcase their research and accomplishments. Two additional researchers stated that they were considering creating personal websites to display their research in this way. Regarding listservs, the researchers interviewed largely stated that they are more likely to receive information over listservs than they are to send information to a list.

4.2 CURRENT AND PREFERRED SOURCES OF INFORMATION

4.2.1 Advisory Group Preferences

Advisory group members most commonly reported receiving information from EMEP through e-mail and that e-mail is their preferred method to receive this information (Table 4-2).

Table 4-2: Advisory Group Members' Current and Preferred Sources of Program Information (N=11, Multiple Responses Allowed)

Information Source	Current Source of Program Information	Preferred Source for Scientific Information
E-Mail	6	7
Printed Reports or Other Hard-Copy Materials	5	2
Website	3	1
Other	3	4

Interview results suggest that some advisory group members find limited use for the printed copies of final reports the program sends them. Two contacts noted that they generally do not read these hard-copy reports, and one elaborated that he would instead search the program website when he is seeking specific information. Only two of the advisory group members interviewed reported that they prefer to receive scientific information in printed documents, although one of these contacts stated that he may not need a full, printed report if a shorter document were available providing a summary and information about finding further information.

Advisory group contacts listed several other sources of program information, including the EMEP conference, yearly advisory group meetings, program newsletters, and direct contact with EMEP staff members and researchers. Two advisory group members also reported they prefer direct contact with staff members and researchers as a source of scientific information. Additional preferred sources of scientific information classified as "other" include in-person presentations of research findings (like those that occur at conferences), and academic journal articles. In emphasizing the importance of academic journals as a source of scientific information, one science advisory group member said, "I wouldn't expect an EPA program to send me a newsletter describing all the great research that they fund, in the same way I wouldn't expect that from EMEP. I would expect to discover the research supported by EMEP in scientific journals."

Science advisors and researchers may not look to funding agencies as sources of information. If this is a role EMEP wants to emphasize, the program will have to define these activities and commit resources to building the reference and search functions of the website to make it an easy and attractive option for those seeking information about these topics.

4.2.2 Researcher Preferences

Sources of Information

Most EMEP researchers (18 of 21 contacts) reported that they were aware of program-sponsored research beyond the specific project in which they were involved. Over 60% (13 of 21) also reported that research generated by other EMEP projects had been useful in their work. In elaborating on their responses, three contacts reported tracking EMEP's wider research to keep up with projects happening in their field or to put their own work in a broader context. Researchers most commonly reported they had learned about other EMEP projects through reports and fact sheets the program produces and through the EMEP conference (Table 4-3).

Table 4-3: How Researchers Became Aware of Other EMEP Projects (N=18, Multiple Responses Allowed)

Information Source	Number of Researchers
EMEP Reports and Fact Sheets	7
EMEP Conference	5
E-Mail	4
Academic Journal Articles	2
Conversation with Peers	2
Monitoring Data	1

Only two researchers reported learning of other EMEP research projects through peer-reviewed journals. However, four researchers stated that, if they were to cite EMEP research in their own work, they would likely seek a citation from a peer-reviewed journal rather than from an EMEP final report. Explaining his reluctance to cite EMEP final reports, one contact stated that the scientific community does not know about the rigor of the peer review process that EMEP reports undergo, and academic journals are more widely accepted as a valid source.

Researchers reported they track research completed in their field primarily through academic journals and attending conferences (Table 4-4). These findings are consistent with reported methods of tracking EMEP research. Several contacts reported conferences play a particularly important role in their efforts to track ongoing research projects. One contact explained that, because of delays associated with the peer review process, research may be completed long before journal articles are published. Contacts also noted that conferences are valuable both for the formal presentations and for the opportunity to network with colleagues.

Table 4-4: How Researcher Track Scientific Information (N=21, Multiple Responses Allowed)

Information Source	Track Completed Research	Track Ongoing Research
Academic Journals	16	5
Conferences and Networking	14	15
Database Searches	6	3
Listservs	2	1
Websites and E-Mail Communications	1	3

Methods of Receiving Information

Researchers reported peer-to-peer contact, either in person (usually at conferences), or by phone or e-mail, is their most preferred source for scientific information (Table 4-5). Researchers also prefer conferences as a way to track ongoing research. And conferences and other person-to-person interaction are also the preferred ways to disseminate scientific information. Explaining his preference for personal contacts, one respondent said, "You can cut through a lot when you just ask the appropriate person a direct question, rather than spending hours plodding through a whole bunch of stuff."

Table 4-5: Count of Researchers Rating Sources of Scientific Information Based on Preference

	"1" or "2"	"3"	"4" or "5"
Communication Method	Least Preferred		Most Preferred
Conversations with Peers	0	1	17
Personal Phone or E-Mail Contact	0	2	16
Standard Web Page	7	4	7
List Serve	6	6	6
Conference Hand Out	5	8	5
Printed Material Delivered by Mail	9	4	5
Webcast	7	8	3
Blog	8	7	3
Popular Press	9	7	2

Researchers rated popular press, blogs, and printed materials delivered by mail as their least preferred sources of scientific information. Two contacts elaborated that unsolicited printed materials or those not relevant to their interests were inconvenient. Regarding blogs, another researcher reported that there were few blogs relevant to his research, but that, if they existed, or were more active, he might turn to blogs more frequently.

4.3 EFFECTIVE OUTREACH STRATEGIES OF OTHER ORGANIZATIONS

4.3.1 Strategies for Disseminating Scientific Information

Advisory group members were asked to identify both organizations they most commonly turn to for unbiased scientific information and organizations considered most accessible. Five organizations appeared on both lists; the U.S. EPA, the California Air Resources Board, the Health Effects Institute, the Hubbard Brook Research Foundation, and the National Science Foundation.

Elaborating on their responses, advisory group members described particularly effective strategies for disseminating scientific information that some of these organizations carry out.

- U.S. EPA: Three advisors noted that, as a federal government organization, the U.S. EPA goes to a great deal of effort to ensure that the information it produces is publically available. One advisor compared the EPA's research products to academic journal articles, which often require a subscription to a paid database for access. However, two other advisors stated that the size of the U.S. EPA's research programs and the large number of websites that the organization maintains can make it difficult to find specific information.
- California Air Resources Board (CARB): Respondents drew parallels between EMEP and the CARB, noting that CARB is also a state-level program. According one advisor, CARB, like EMEP, benefits from the number and quality of universities in their respective states, which helps them attract well-known researchers despite both programs' relatively narrow geographic focus.
- Health Effects Institute (HEI): Respondents also cited similarities between EMEP and HEI in terms of the research products that each organization produces and the ways they make the results of their research available. Like EMEP, HEI produces final research reports and distributes those reports and other information on its website. Advisory group members expressed very positive views of HEI, with one stating that, in his field, HEI is considered the "gold standard" for

unbiased scientific information. Another speculated that EMEP may have modeled some of its processes after HEI's work.

4.3.2 Strategies for Linking Science with Public Policy

Two advisory group members stated that, to some extent, all research organizations seek to produce findings relevant to public policy. Two advisory group members pointed out that many organizations avoid direct efforts to link their research to public policy, fearing that research directly addressing policy issues may be perceived as politically biased. According to one of these advisors, "Linking science and policy is always a tricky thing. Some people think one should not try because that process in itself makes you biased."

Advisory group members listed a variety of organizations that had been effective in drawing links between science and policy (Table 4-6). However, one advisor noted that other prominent organizations that fund research similar to EMEP, such as the U.S. EPA and the CARB, are more closely related to regulation than EMEP.

Table 4-6: Organizations Listed as Most Effective i	in Linking Science to Policy (Multiple Responses Allowed)

Organization	Listed as Effective in Linking Science to Policy
U.S. EPA	4
California Air Resources Board (CARB)	2
National Academy of Science	2
Other	4

Advisory group members most commonly cited the U.S. EPA as an organization effective in linking scientific research to public policy, with one member elaborating that the U.S. EPA's research program is focused on finding applicable solutions to questions related to policy or regulatory issues. However, three advisory group members noted that part of the U.S. EPA's success in linking scientific research to public policy comes from the agency's role as both a research funding organization and a regulatory agency. According to one advisor, "the reason for the [U.S.] EPA's success in linking science to policy is that they are their own client." Two advisors cited similar reasons in discussing the effectiveness of the CARB.

Two advisory group members also cited the National Academy of Sciences for its effectiveness in linking scientific research with public policy. One contact believed this was because of the organization's reputation for unbiased research. This advisor stated the National Academy of Sciences was effective, even when their findings are controversial, because their audiences "know they are above the fray and they are going to make the best call on policy, or sometimes not even make a call." According to this advisor, the National Academy of Science has more prestige among his colleagues than EMEP, the U.S. EPA, or CARB, but publishes reports less frequently and on a narrower range of issues.

Other organizations that advisors cited as particularly effective in linking science to public policy include the Health Effects Institute and the website www.realclimate.org. According to its homepage, www.realclimate.org seeks to provide scientific context related to climate issues in formats that are useful to journalists and the general public. In addition, one advisor stated that organizations like the Ecological Society of America, which employs lobbyists to bring scientific information to policymakers, are effective in linking scientific research with public policy.

4.4 PROFESSIONAL ORGANIZATIONS

Advisory group members and researchers reported membership in a wide range of professional organizations. One advisory group member reported belonging to six professional organizations, and a researcher reported belonging to eight, although majorities of both groups (6 of 11 advisors, 16 of 21 researchers) belong to between one and three organizations. The Air and Waste Management Association (A&WMA) and the American Geophysical Union (AGU) were among the five organizations to which the largest number of science advisors, program advisors, and researchers belong. Appendix B provides additional detail about the professional organizations listed by EMEP's constituent groups.

When asked for examples of organizations with effective communication strategies, advisory group members cited the A&WMA (two mentions) and the American Association for the Advancement of Science (AAAS; one mention) as professional organizations that convey information to their members in particularly effective ways. According to advisors, both organizations produce magazines directed toward a broad audience. The A&WMA publishes *EM*, a magazine targeted toward environmental managers, while the AAAS publishes *Science Magazine*. In addition the American Chemical Society was cited for providing members with a weekly newsletter that helps them stay informed.

4.5 SUMMARY

EMEP's outreach efforts target diverse audiences, ranging from high-level policymakers to technically-oriented researchers. While program staff members carry out a range of outreach activities targeted at these audiences, the program's advisory group members and program-funded researchers play a dual role in program outreach. These populations both receive information from EMEP and disseminate that information through their professional networks. Program advisors reported actively disseminating EMEP research to others in their organizations and noted this contributes to the program's efforts to link science and policy. Science advisors were less likely to disseminate EMEP research, but those who do so reported disseminating research findings widely.

Researchers reported using information from EMEP to monitor ongoing research in their field or to provide context to their own work. However, while researchers primarily use academic journals to monitor completed research in their fields, contacts are not always aware of the funding source for research findings presented in journal articles. Instead, researchers reported they most frequently learn about EMEP research through the reports and fact sheets the program produces. Researchers also reported learning about EMEP research through the program's conference, a finding consistent with both their preferred methods of tracking ongoing research and of receiving scientific information generally.

5.1 PURPOSE

EMEP hosts a biannual conference in Albany, New York. This conference provides researchers a chance to present the findings of their work. It also provides the scientific and policy communities a forum in which they can ask each other questions and make new professional connections. The research team expected that contacts who had attended the EMEP conference would be relatively familiar with the program and the type of research products that flow from program funding.

5.2 METHODOLOGY

EMEP staff members provided the research team with a list of contact names that had attended the EMEP conference in 2007, 2009, or both years. This list was cross-checked against other contact lists to identify and remove NYSERDA staff members, advisory group members and EMEP-funded researchers, all of whom were contacted through other survey efforts. After removing these populations, we were left with 451 unique contact names with valid phone numbers.

Working with NYSERDA staff members, the research team developed a survey instrument designed to identify the professional characteristics of conference attendees, understand their experiences, and document their satisfaction with the EMEP conferences they attended. We also sought to explore how attendees gather and disseminate information in their professional lives, and document their perspectives on EMEP products and services.

A list of 280 randomly selected individuals was provided to Apprise for survey fielding. Phone surveys occurred between January 27, 2010 and February 8, 2010. Ultimately, 71 surveys were completed, a sample size sufficiently large enough to provide $90\% \pm 10\%$ level of confidence/precision overall. Survey calls lasted approximately 20 minutes, and the final response rate was 36%.

5.3 RESULTS

Throughout the discussion below, tables that present results of questions in which multiple responses were allowed show count, as well as percent, but do not show total. Counts represent the number of respondents who selected the item, and percents represent portions of the respondents who selected the item, out of the number of respondents who were asked of the question.

5.3.1 Characteristics of Conference Attendees

About half of the conference attendees reported they are employees of municipal, state, or federal government agencies (Table 5-1). Respondents were also commonly employed by universities and colleges located in the state of New York (28%) and private or non-profit research and consulting firms (13%). Slightly more than half of the attendees (54%) reported being engaged in policy development as their primary professional responsibility, and survey results suggest that conference attendees are generally experienced in their field. A large portion of the attendees (48%) indicated they have more than 20 years of experience in their field, while a small portion (24%) reported having fewer than eight years of experience.

Table 5-1: Characteristics of Conference Attendee Respondents

Type of Organizations	Count	Percent
Government Agency	35	49%
Institute of Higher Education	20	28%
Research or Consulting Firm	9	13%
Other	7	10%
Total	71	100%

To explore differences in perspective on, or experience with, the EMEP conference and EMEP products, we categorized contacts as "policy" and "non-policy" professionals. We counted them as policy professionals if they reported that their work involves either "developing policy or regulations," "advocating for a specific constituency or environmental topic," or serving as an "elected or political official." Slightly more than half of the respondents indicated they are policy professionals (54%). We also studied responses according to the quantity of professional experience contacts reported.

We subsequently analyzed results to check for statistically discernable differences between those categorized as policy or non-policy and those with more, or less, than 20 years of experience in their field.

Half of the respondents reported the EMEP conference they attended in 2007 or 2009 was the first they had attended (52%).

Table 5-2: Characteristics of Conference Attendee Contacts

Primary Professional Responsibility (N=71)	Count	Percent
Policy	38	54%
Non-policy	33	46%
Number of Years in the Field (N=71)		
8 years or less	17	24%
9 – 19 years	20	28%
20 years or more	34	48%
Repeat Attendants (N=69)		
First time	36	52%
Repeat attendant	33	48%

Interviewers listed several research topics of interest to the EMEP program and asked contacts to indicate topic areas in which they regularly monitor developments. Climate change (79%) and air quality and emissions (73%) were the most commonly reported topics of interest, followed by alternative energy (58%), health effects (56%) and acid rain and associated deposition (55%). Almost half of the respondents (48%) indicated monitoring other topic areas. Policy professionals reported interest in two areas – regulation of utilities and alternative energy – significantly more often than non-policy professionals (p<.05).

Table 5-3: Topics of Interest (Multiple Responses Allowed)

		Policy nals (n=33)		licy nals (n=38)		otal =71)
Topic	N	%	N	%	N	%
Climate Change	24	73%	32	84%	56	79%
Air Quality or Particulates and Emissions	26	79%	26	68%	52	73%
Alternative Energy	13	39%	28	74%	41	58%
Health Effects	18	55%	22	58%	40	56%
Acid Rain and Associated Deposition	20	61%	19	50%	39	55%
Regulation of Utilities	7	21%	21	55%	28	39%
Watershed Health	16	48%	11	29%	27	38%
Fisheries	9	27%	11	29%	20	28%
Other Topics	13	39%	21	55%	34	48%

5.3.2 EMEP Conferences

We asked the 35 contacts who attended the 2009 conference how they were informed of the EMEP conference, assuming that memories would be less reliable for the 2007 conference. Contacts most commonly reported they had received an email notification from EMEP (34%). In contrast, only one contact cited the website as his source of awareness of the event (Table 5-4).

Table 5-4: Source of Information about EMEP Conference (Multiple Responses Allowed)

Source	Count (n=35)	Percent
Email notice	12	34%
Word of mouth	6	17%
Invited to speak/present	6	17%
Brochure from NYSERDA	5	14%
Directed by organization (or NYSERDA)	3	9%
EMEP website	1	3%
Other	4	11%

Contacts were provided a list of possible reasons for attending EMEP conferences and asked to rate each reason on a one-to-five scale, where one is "not at all important" and five is "very important."

Table 5-5: Why Contacts Attended EMEP Conferences (n=71)

	"1" or "2"	"3"	"4" or "5"
Reason	Not Important		Very Important
Seeing scientific presentations	4%	6%	90%
Having opportunity to interact with researchers and policymakers in a single event	8%	7%	85%
Learning about other research topics	6%	20%	75%
Identifying policy implications from research	8%	30%	62%
Scoping new research or planning projects with colleagues	23%	24%	54%
Pursuing networking opportunities	14%	34%	52%
Meeting with funders or potential funders	58%	15%	27%
Augmenting a job search	89%	6%	6%

Contacts primarily attend the EMEP conference to gather information and network. The highest rated reasons were: "seeing scientific presentations," "interacting with researchers and policymakers in a single event," and "learning about other research topics."

Policy professionals attend the EMEP conference in order to gain insight into the *policy* implications of scientific research, while others attend the conference primarily to gather general scientific information. Policy professionals were significantly more likely than those categorized as non-policy to report that "identifying policy implications from research" was an important reason for attending the conference, while non-policy professionals were significantly more likely to report that "learning about other research topics" and "seeing scientific presentations" were important reasons for attending (p<.05).

A large majority of contacts (58 of 71, or 82%) reported that they subsequently pursued additional information about topics presented at the conference. The most common reasons for doing so were to learn more about a topic, augment their own work, or verify the information received. Many of these respondents also cited the information in their own work or reiterated information obtained during the conference to others.

Table 5-6: Reasons for Pursuing Additional Information (Multiple Responses Allowed)

Reason	Count (n=58)	Percent
To learn more about the topic	57	98%
To augment my own work	54	93%
To verify what I had heard	34	59%
To cite the information in another work	28	48%
To send the information to someone else	28	48%
To use the information in coursework	10	17%

5.3.3 Outreach Activities

We asked contacts how often they provide information about scientific research to others. Their responses indicate that they are constantly interacting with colleagues both inside and outside of their organizations about scientific information and research findings. Ninety-six percent of conference attendees reported

regularly providing scientific information to colleagues within their organizations. Disseminating scientific information to people outside of their organizations was also common (70-83% reported "sometimes" or "often" providing information to outside colleagues, researchers, policy analysts, and through conferences they attend). Reported instances of cross-organizational dialogue occurred more among non-policy professionals than policy professionals (p<.05). Listserv or blogs were the least frequently used methods for disseminating scientific information, but these methods are significantly more favored by the respondents who are in earlier stage in their career, those with less than 20 years of experience (p<.05).

Table 5-7: How Often Conference Attendees Report Providing Information

Audience or Destination of Scientific Information	Never/Rarely	Sometimes/Often	Total (n=71)
Colleagues or co-worker inside organization	4%	96%	100%
Colleagues outside organization	17%	83%	100%
Researchers at other organizations	20%	80%	100%
Policy analyst at other organizations	28%	72%	100%
Conference attendees	30%	70%	100%
Students	44%	56%	100%
Webmaster for posting on organization's website	49%	51%	100%
Listserv recipients	68%	32%	100%
Blog audience	96%	4%	100%

5.3.4 Preferred source of information

Over 40% of conference attendee contacts report searching for scientific information daily, followed by 39% that report doing so "a few times a week." We found no difference between the rates at which policy and non-policy contacts report searching for scientific information.

Table 5-8: Searching for Scientific Information: Frequency

Frequency	Count	Percent
Daily	29	41%
A few times a week	28	39%
A few times a month	12	17%
A few times a year	2	3%
Total	71	100%

Contacts were asked how likely they were to use each of several search *methods* when searching for scientific information. Internet search engines, government agency websites, and academic databases were the most likely sources of information. Policy professionals reported they would be likely to use government agency websites and advocacy websites at significantly higher rates than non-policy professionals (p<.05).

Analysis of "other" verbatim responses revealed that many respondents rely on their network of other researchers and policymakers (internal, as well as external, to their organizations) when they search for scientific information. Others reported using specific scientific journals that they personally trust or to

which they subscribe in order to search for scientific information. Non-policy professionals reported higher likelihood of using "other" sources compared with policy professionals (p<.05).

Table 5-9: Source of Scientific Information (n=71)

	1 or 2	3	4 or 5			
Search Methods	Very Unlike	Very Unlikely		Very Unlikely Very Likely		Total
Internet searches (Google, Google Scholar)	7%	8%	85%	100%		
Government or agency websites (e.g., EPA, NIH, NESCAUM)	6%	23%	72%	100%		
Academic databases (used to search peer-reviewed journal)	20%	25%	55%	100%		
Institutional library	30%	28%	42%	100%		
Independent research clearinghouse	37%	27%	37%	100%		
Conference proceedings	25%	46%	28%	100%		
Advocacy website	63%	17%	20%	100%		
Other sources (n=25)	4%	16%	80%	100%		

Conference attendees were then presented with a list of sources and asked how likely each source was to provide the *level of detail* they require when searching for information about scientific research. Journal articles emerged as the source most likely to provide the level of detail they require, followed by detailed reports with data sets, brief technical summary reports, and meta-analyses or synthesis reports. Non-policy professionals rated journal articles as significantly more likely to provide the level of detail they seek compared with policy professionals (p<.05).

Table 5-10: Level of Detail Sought (n=71)

	1 or 2	3	4 or 5	
Level of Detail	Very Unlikely		Very Likely	Total
A journal article on the topic	6%	15%	79%	100%
A detailed report with data sets	14%	24%	62%	100%
A brief technical summary of a research project	14%	25%	61%	100%
Meta analysis or synthesis reports organizing or summarizing multiple projects on one topic	20%	31%	49%	100%
Descriptions of methodology and statistical methods employed	30%	25%	45%	100%
Conference presentations or networking opportunities	18%	44%	38%	100%
Data from long-term monitoring project that is available without any analysis	35%	30%	35%	100%
Newspaper or magazine article	43%	39%	19%	100%

Finally, we presented several methods of receiving information and asked contacts which were most preferred. Electronic methods emerged as the most preferred ways of receiving scientific information. Obtaining information through listservs, email, and electronic newsletters was preferred by almost 40%, while information obtained through standard websites was preferred by 32% (Table 5-11). All of the print sources combined made up the remaining 28% of respondent preferences.

Table 5-11: Most Preferred Method of Receiving Scientific Information

Method	Count	Percent
Via listserv, email, e-newsletter	28	39%
Standard webpage	23	32%
Journal publication	6	8%
Printed material delivered by mail	5	7%
Hand outs at conferences	2	3%
Newspaper, magazine articles	2	3%
Other	5	7%
Total	71	100%

Verbatim survey responses suggest that sources of scientific information that researchers and policymakers rely on often overlap. Research scientists commonly suggested that translation of scientific findings into policy terms or promotion of communication between scientists and policymakers including face-to-face contacts would increase the role of research in policy decisions. For their part, policymaker respondents commonly reported that developing non-technical summaries that are easily accessed by policymakers would facilitate their policy development work.

5.3.5 Use of EMEP Resources

Conference attendees were asked about their use of a variety of EMEP-provided information resources.

Website

Sixty-one percent of respondents reported they had accessed the EMEP website in the last six months. A majority of those reported visiting the website multiple times.

Table 5-12: Use of EMEP Website

	Count	Percent
Accessed EMEP website in the last 6 months?		
Yes	43	61%
No	28	39%
TOTAL	71	100%
How many times? (N=43)		
Once	7	16%
2-5 times	26	60%
6 – 10 times	5	12%
More than 10 times	5	12%
Total	43	100%

Email Announcements

Twenty-nine (41%) of conference attendee contacts reported that they are on the EMEP listserv. Respondents with less experience in their field (eight years or less) are significantly less likely to be on the EMEP listserv than professionals with more years of experiences (p<.05). A majority of the EMEP

listserv recipients reported they received multiple emails from the program in the past six months. All who have received emails from EMEP reported they read the emails. Only one reported use of EMEP listserv to post information in the last six months.

Table 5-13: Use of Email

	Count	Percent
Are you on the EMEP listsery?		
Yes	29	41%
No	32	45%
Don't know	10	14%
Total	71	100%
How many times received email from EMEP in the last 6 months?		
Once	3	11%
2 – 5 times	18	67%
6 – 10 times	5	19%
More than 10 times	1	4%
Total	27	100%

5.3.6 EMEP Research

We assessed whether the respondents are aware of EMEP-sponsored research other than that presented at the conference they attended. Thirty percent indicated they are aware of such research.

Some examples provided to describe these researches were deposition, climate change, alternative energy, air quality, energy efficiency, future funding trends and opportunities, and crosscutting themes.

Table 5-14: Awareness of Other EMEP Research

Aware	Count	Percent
Yes	21	30%
No	50	70%
Total	71	100%

5.3.7 Professional Organizations

Table 5-15 provides a list of the top seven professional organizations of which the respondents reported they are members, as well as frequency of mention.

Table 5-15: Professional Organizations and Affiliations

Organization	Count
American Geophysical Union (AGU)	5
Air and Waste Management Association (A&WMA)	3
American Association for Aerosol Research (AAAR)	3
American Chemical Society (ACS)	3
American Fisheries Society (AFS)	3
American Society for Microbiology (ASME)	3
International Society for Environmental Epidemiology (ISEE)	2

Eleven respondents commented that the professional organizations they belong to convey information in a uniquely effective way. Provision of frequent newsletters to their members was repeatedly mentioned as an effective communication method

5.4 SUMMARY

A majority of EMEP conference attendees are senior staff affiliated with government agencies and institutions of higher education. Issues of climate change and air quality are the most commonly reported topics of interest.

Contacts primarily attend the EMEP conference to gather information and network. A large majority reported that they subsequently pursued additional information about topics presented at the conference to learn more about the topic and to verify the information. Many said they cited the information in their own work.

A majority of the contacts reported that searching for scientific information is almost a daily activity. Internet search engines, government agency websites, and academic databases were the most likely sources of information. Many respondents also reported that they rely on their network of other researchers and policymakers when they search for scientific information. Journal articles, detailed report with data sets, and brief technical summary of research projects were reported to be most likely sources that provide the level of detail they require.

More than half of the contacts reported their recent use of EMEP website. Less than half of the contacts said they are on the EMEP listserv.

6.1 PURPOSE

EMEP maintains a general mailing list that includes thousands of research professionals, educators, consultants, government agency contacts, advocacy groups, and other interested parties—all of whom receive periodic mailings or other notifications about a variety of program-related activities. Although this group may be less involved with EMEP activities compared with the other population groups presented in this report (EMEP staff members, advisory groups, EMEP funded researchers, and EMEP conference attendees), they are the program's broader audience, and are a group likely to consume the products and services of the program in the future. This population was surveyed so that we might assess the type of organizations represented, the role of the contact, familiarity with, and the use of, EMEP products and services, and remaining gaps in both the content and method of information distributed.

6.2 METHODOLOGY

EMEP staff members provided the evaluation team with a list of contact names from the program's general mailing list. After removing overlapping populations (staff members, researchers, advisory group members and conference attendees), the research team was left with a list of 1,522 individuals on EMEP's general mailing list. Email addresses were available for 1,069 contacts, and 1,347 contacts had phone numbers. Two modes of surveys were deployed – one through email and another conducted by phone. The surveys had almost identical questions. In some cases, the two survey strategies required questions be structured differently (for example, phone surveys allow interviewers to probe for additional information, while email surveys provide an opportunity to rank competing responses).

For the email survey, invitations were sent to 497 randomly selected contacts with an email address. Thirty- five invitations (7%) were returned as undeliverable. The email survey was launched on March 17, 2010, and closed on April 2, 2010. Three reminder emails were sent to those who had not completed the survey at that point. Ultimately, 164 contacts completed the survey, with an overall response rate of 35%.

For the phone survey, we selected 400 random contact names from the remaining pool of contacts not selected for the email version. The telephone survey was launched on April 12, 2010, and closed on April 20, 2010, and was conducted by the NYSERDA survey subcontractor, Apprise. Apprise completed 76 interviews, making an average of five attempts per telephone number to complete the surveys and by using the fewest contacts possible in order to counteract non-response bias. The overall response rate was 42%.

6.3 RESULTS

Wherever possible, we combined the response data from the two samples. We also compared the responses given by email survey respondents and by phone survey respondents, and found that some characteristics of email and phone respondents are different. When this is the case, the difference is reported. In any case, where the responses are not comparable because of differences in how the questions were asked, the results from the two surveys are reported separately.

6.3.1 Characteristics of EMEP "Constituents"

Constituents are more diverse than the conference attendees – a smaller portion are from government agencies (35%), and a greater portion (19%) are from commercial and industrial firms, advocacy organizations, utilities, or Energy Service Companies (ESCOs). Overall, more than 60% of the EMEP constituents are from two primary types of organizations: government agencies (35%) and institutions of higher education (27%). Research and consulting firms are the next most commonly reported type of organization (18%). Among these firms, energy or environmental engineering and policy-focused consulting were the most commonly reported types of consulting practices.

Although both samples were randomly drawn from the population, a larger proportion of phone survey respondents came from government agencies (41%) and a smaller proportion from education institutions (20%), as compared with the email survey (33% from government agency and 30% from educational institutions).

Table 6-1: Characteristics of EMEP "Constituents"

Type of Organizations	Email (N=169)	Phone (N=76)	Total (N=245)
Government agency	33%	41%	35%
Institute of higher education	30%	20%	27%
Research and consulting firm	17%	20%	18%
Commercial/industrial firm	7%	7%	7%
Advocacy organization	6%	4%	5%
Electric, water, or gas utility	4%	5%	4%
Energy service company	2%	0%	1%
Other	2%	4%	2%
Total	100%	100%	100%

A majority of EMEP constituents reported having more than 20 years of experience. Only 5% reported having fewer than eight years in their field.

Table 6-2: Experience

Number of Years in this Field	Count	Percent
8 years or less	12	5%
9 – 19 years	61	25%
20 years or more	172	70%
TOTAL	245	100%

Constituents were asked about the type of activity in which they spent most of their time. The most common job responsibility reported overall was active research (38%). Twenty-one percent reported being primarily engaged in administrative or managerial tasks, 16% said they perform policy development or analysis, and 12% reported spending most of their time in education. Phone survey respondents were more likely to indicate that active research is their primary professional responsibility (47%), compared with email survey respondents (34%).

Table 6-3: Primary Responsibility

Primary Professional Responsibility	Email (N=169)	Phone (N=76)	Total (N=245)
Active research, monitoring and testing	34%	47%	38%
Administrative, managerial	23%	17%	21%
Policy development or analysis	17%	15%	16%
Education	12%	12%	12%
Development or enforcement of regulations	6%	5%	6%
Engineering	4%	1%	3%
Advocacy, watchdog	2%	1%	2%
Other	4%	1%	3%
Total	100%	100%	100%

Constituents were asked about the scientific topics in which they regularly monitor developments as part of their professional responsibilities. Email respondents were asked to select up to three topics; while phone respondents rated each option as it was read to them. The options were read in random order, and the contacts were allowed to select as many topics as they wanted. Table 6-4 shows the ranking by interest of email respondents and phone respondents.

EMEP constituents cited, "energy-related science and policy," "climate change," and "air quality" as their top three areas of interest. "Other" scientific topics mentioned included water quality, energy-related technologies, and solid or hazardous waste.

Table 6-4: Ranking of Scientific Topics of Interest

	Rank		
Topics Tracked Most Closely	Email (N=169)	Phone (N=76)	
Energy-related science and policy	1	3	
Climate change	2	1	
Air quality	3	2	
Environmental impacts of alternative energy sources	4	4	
Atmospheric deposition and ecosystem health	5	5	
Human health effects of atmospheric pollution	6	6	
Carbon sequestration	7	5	
Emissions modeling	9	7	
Other topics	8	5	

6.3.2 Familiarity with NYSERDA and EMEP

Constituents were asked about their familiarity with NYSERDA and EMEP. Almost all (98%) of EMEP constituents recognized the "New York State Energy Research and Development Authority" or "NYSERDA." Seventy-seven percent of constituents reported they had heard of "Environmental Monitoring, Evaluation, and Protection Program" or "EMEP." This demonstrates a relatively high level of awareness, considering that some contacts may have been placed on the mailing list after an otherwise

limited encounter with the program, or even been added to the list without their knowledge. Less than half of EMEP constituents (45%) reported they had ever accessed the website. Of those that had ever visited the website, only 11% reported visiting more than six times per year.

Table 6-5: Familiarity with and Use of NYSERDA and EMEP (N=245)

Status	Count	Percent
Awareness of NYSERDA	240	98%
Awareness of EMEP	188	77%
Have accessed the EMEP website	112	46%
How often have you accessed the EMEP website?		
Less than once a year	28	26%
1 – 5 times per year	67	63%
6 – 10 times per year	7	6%
More than 11 times per year	5	5%
Total	107	100%

6.3.3 Use of Scientific Information

To inform the broader research effort of this process evaluation, we sought to understand how EMEP constituents typically find and use scientific information.

For both survey cohorts, using internet search engines, government agencies' website, and academic databases emerged as the top three most commonly turned to sources of scientific information. E-mail respondents, who were asked to select the three sources they most commonly turn to, cited these sources most frequently; and phone respondents, who were asked to rate each source on a one-to-five scale, also rated these sources most highly. Conference proceedings and institutional libraries are secondary source of information for most of the respondents. A small proportion of respondents reported considering advocacy websites or independent research clearinghouses as important information sources. In the email survey, almost none of the researchers selected these sources among the three they most frequently use when searching for scientific information.

Table 6-6: Source of Scientific Information Used

	Email * (n=169)		Phone ** (n=76)	
Source	Count	Percent	Count	Percent
Internet search (Google, Google Scholar)	135	80%	68	89%
Government or agency websites (such as EPA, NIH, NESCAUM)	134	80%	53	70%
Academic databases (used to search peer-reviewed journals)	88	52%	40	53%
Conference proceedings	41	24%	19	25%
Institutional library	35	21%	30	39%
Advocacy websites	21	13%	7	9%
Independent research clearinghouse (Health Effects Institute or similar)	16	10%	14	19%

- * Email survey respondents were allowed to select up to three sources they use. Count represents the number of respondents who selected the source. The denominator of the percent is 169.
- ** Phone survey respondents were asked to rate each source using 1-5 point scale, where one is 'very unlikely' and five is 'very likely' to turn to when looking for scientific information. The count and percent shows those provided rating of 4 or 5 interpreting them as 'likely' responses.

Constituents were asked to consider six types of research products in order to evaluate their preference for the various ways scientific information can be delivered. Email survey respondents were asked to rank each product in order of the product's value to the respondent and their work. Phone survey respondents were asked to rate how likely they were to seek out each product when searching scientific information. Phone survey respondents used a five-point scale, where one means "very unlikely" and five means "very likely" to seek a product.

Table 6-7 presents the portion of each population segment that ranked each product as highly valuable. For the email respondents, this means that they ranked it first or second in an on-line ranking exercise. For phone survey respondents, a highly valuable ranking means that the product was rated a "4" or a "5" on a five-point scale. Academic journal articles and detailed reports are considered valuable to both groups, while executive non-technical summaries are considered highly valuable only to non-researcher respondents.

The type of work in which constituents are engaged appears to influence their perception of the value of different research products. This distinction is particularly clear in the case of executive summaries or other non-technical research summaries. While these research products were among the lowest-rated by researchers, non-researchers rated them higher, citing non-technical summaries among the most valuable research products. The two groups also differed in their rating of the value of academic journal articles, with researchers providing higher ratings to these products. Both groups considered detailed reports that include findings, datasets, and methodology to be valuable research products.

Table 6-7: Research Products by Value Ranking

	Researchers Rating Highly Valuable		
Product	Email Respondents	Phone Respondents	
Academic journal articles	87%	78%	
Detailed reports (including findings, datasets, methodology)	43%	69%	
Data from long-term monitoring projects	28%	63%	
Synthesis reports or meta- analysis summarizing multiple research projects on a single topic	23%	56%	
Short technical summaries of ongoing research projects	11%	50%	
Executive summaries or other non-technical summaries of findings	8%	31%	
	Non-Researchers Rating Highly Valuable		
Product	Email Respondents	Phone Respondents	
Executive summaries or other non-technical summaries of findings	48%	57%	
Detailed reports (including findings, datasets, methodology)	42%	57%	
Academic journal articles	38%	62%	
Short technical summaries of ongoing research projects	31%	40%	
Synthesis reports or meta- analysis summarizing multiple research projects on a single topic	25%	44%	
Data from long-term monitoring projects	16%	50%	

^{*} Email survey respondents were asked to rank six different research products by order of value of each of the product to them and their work. N=53 for researchers, and N=111 for non-researchers.

6.3.4 Methods of Disseminating and Receiving Scientific Information

We also investigated the methods of dissemination and receipt of scientific information most preferred by EMEP constituents.

Constituents were asked how they typically provided scientific information to others. Of those who reported disseminating scientific information (78%), the most preferred method was via email—either emailing content directly or embedding links to relevant websites. A majority of constituents also reported directing peers to information sources through personal conversation (72%). Another common method was to identify the information in peer-reviewed journals (57%). Though researchers are significantly more likely to use publish information in journals (81%), 40% of non-researchers also reported disseminating information through journal publications.

^{**} Phone survey respondents were asked to rate each research product using 1-5 point scale where one is 'very unlikely' and five is 'very likely' to look for when looking for scientific information. N=32 for researchers, and N=42 for non-researchers.

Table 6-8: How Constituents Disseminate Scientific Information to Others (N=193)

Method of Dissemination	Count	Percent *
Email report or web link to peers	159	83%
Verbally direct peers to an information to an information source	138	72%
Publish in a peer-reviewed journal	110	57%
Educate advocacy organizations	68	35%
Testify to governmental representatives	61	32%
Incorporate results into classes	59	31%
Host a webinar	23	12%
Publish in website	20	10%
Presenting at conference	17	9%
Other	15	8%

^{*} Respondents were allowed to select multiple dissemination methods. Count represents the number of respondents who selected each of the dissemination method. The denominator is the 193 who said they have ever disseminated scientific information about research findings or research product availability.

We asked constituents about their preference for receiving scientific information. Receiving information provided on standard web pages was preferred most commonly. Receiving information internally from colleagues and through professional associations or industry newsletters was also useful by most of the phone respondents. Other preferred methods varied widely.

Table 6-9: Method of Receiving Scientific Information

	Email * (n=169)		Phone ** (n=76)	
Method	Count	Percent *	Count	Percent *
Information provided on standard web pages	128	76%	44	58%
Information distributed via listserv	59	35%	23	30%
Professional association or industry newsletters	58	34%	35	46%
Colleagues, meetings or trainings internal to your organization	56	33%	44	58%
Reading newspaper or magazine articles	45	27%	21	28%
Printed materials delivered by mail	42	25%	26	34%
Participating in webinars or webcasts	37	22%	27	36%
Handouts obtained at conferences	26	15%	30	39%
Reading blogs or posts from credible sources	16	9%	15	20%

^{*} Email survey respondents were allowed to select up to three methods. Count represents the number of respondents who selected each of the method. The denominator of the percent is 169.

6.3.5 Anticipation of Areas for Future Scientific Innovation

Constituents were asked to speculate where they anticipate the greatest amount of scientific innovation will occur over the next decade. Table 6-10 ranks the scientific areas mentioned by email and phone

^{**} Phone survey respondents were asked to rate each source using 1-5 point scale where one is 'least useful' and five is 'most useful' method of receiving scientific information. The count and percent shows those provided rating of 4 or 5 interpreting them as 'useful' responses.

respondents. For both groups, the top five areas that constituents believe have the greatest potential for scientific innovation were identical. The top three being "energy-related science and policy," "climate change," and "environmental impacts of alternative energy sources."

Table 6-10: Areas of Future Scientific Innovation

	Rank		
Topic	Email * (N=169)	Phone ** (N=76)	
Energy-related science and policy	1	1	
Climate change	2	2	
Environmental impacts of alternative energy sources	3	3	
Carbon sequestration	4	4	
Human health effects of atmospheric pollution	5	5	
Air quality	6	7	
Emissions modeling	7	8	
Atmospheric deposition and ecosystem health	8	6	
Water quality	9	7	

^{*} Email respondents were allowed to select up to three topics that were presented.

6.3.6 Professional Organizations

Finally, constituents were asked about the professional organizations to which they belong. Table 6-11 lists the top ten professional organizations mentioned and how frequently each was mentioned.

Table 6-11: Professional Organizations Membership

Organization	Count
American Geophysical Union (AGU)	34
Air And Waste Management Association (A&WMA)	30
American Association For The Advancement Of Science (AAAS)	21
American Chemical Society (ACS)	18
American Association For Aerosol Research (AAAR)	15
Ecological Society Of America (ESA)	16
American Meteorological Society (AMS)	14
Soil Science Society Of America (SSSA)	10
American Society Of Civil Engineers (ASCE)	12
Association Of Energy Engineers (AEE)	9

Note: More than 100 professional organizations' names were provided, but they were mentioned only once. A full list of organizations mentioned is shown in the Appendix B.

Constituents were then asked if they were aware of any organizations that seem to provide information in a particularly effective manner. Table 6-12 shows a list of professional organizations that were reported more than three times along with frequencies of mentions.

^{**} Phone respondents were asked this question in an open-ended format immediately following the question that asked topics of interest as part of their professional responsibility (Table 3.4).

Table 6-12: Professional Organizations Reported Effective in Providing Information

Organization	Count
American Institute of Biological Science (AIBS)	8
American College of Epidemiology (ACS)	4
American Geophysical Union (AGU)	4
American Meteorological Society (AMS)	3
American Society Of Materials (ASM)	3
Ecological Society of America (ESA)	3
Hubbard Brook Research Foundation (HBRF)	3
US Forest Service	3
American Public Works Association (APWA)	3
EureAlert	3

Constituents reported a variety of reasons for considering these organizations effective. The most frequently cited reason was that the information provided is well-targeted and highly relevant to their work, and contains high quality content (32%). EMEP constituents also provided positive comments about organizations they believe make information easily accessible to members (19%). Providing frequent updates to members is also considered an effective strategy (as reported by 16%). Other areas mentioned were well-organized information that is readily searchable, covering a wide range of topics or providing an exhaustive list of things that can be used as references, delivering up-to-date information, providing conference opportunities, simple and concise presentation of information, providing summaries or synthesis, or providing unbiased scientific information.

Table 6-13: Effective Communication Strategies of Other Member Organizations

	Count	Percent *
High quality and relevance of content	20	24%
Ease of access to information and availability	12	14%
Frequent communication and update of information	10	12%
Ease of search, well organized information	8	9%
Using multiple methods of communication (email, paper, meeting, etc.)	6	7%
Breadth of coverage, reference	5	6%
Hold meetings/conferences	5	6%
Timely and up-to-date information delivery	4	5%
Information presented simply, clearly, and concisely	4	5%
Summaries, synthesis	4	5%
Objective, unbiased information	3	4%

^{*} The questions were asked in an open-ended format, and the responses were later coded. A total of 85 responses were asked of this question; therefore, the denominator of the percentage is 85.

6.4 **SUMMARY**

EMEP constituents are diverse. Although the majority of the constituents are senior staff affiliated with different f government agencies and institutions of higher education, a greater total portion are from other types of organizations, such as commercial and industrial firms, advocacy organizations, utilities, or ESCOs. The three most commonly reported scientific topics of interest are energy-related science and policy, climate change, and air quality. Less than half of the constituent respondents reported that their primary job responsibility is active research.

Although almost all the constituent contacts were aware of NYSERDA, a quarter had not heard of EMEP and less than half reported they have visited EMEP website. Of those that had visited EMEP website, few reported frequent use.

Internet search engines, government agencies' websites, and academic databases emerged as the top three most used sources of scientific information. Types of research products that are preferred are influence by the type of work in which constituents are engaged. Though academic journal articles and detailed reports are considered valuable to researchers, as well as non-research professionals, executive non-technical summaries are considered highly valuable only to non-researchers.

The most preferred method of disseminating scientific information was via email. A majority of constituents also reported they direct peers to information sources through personal conversation. As methods of receiving scientific information, information provided on standard web pages was preferred most commonly.

Constituents provided names of professional organizations with which they are affiliated and comments on how some of these organizations effectively communicate with their members. Commonly reported elements of effective communication were well-targeted and highly relevant contents of information provided to their members, and information that was easily accessible to members.

The top three areas constituents believe to have the greatest potential for scientific innovation were energy-related science and policy, climate change, and environmental impacts of alternative energy sources.

SECTION 7: COST/VALUE ANALYSIS

As part of this process evaluation, the research team proposed to work with EMEP staff members to develop cost estimates for each product type by obtaining data on the cost of each product from program records for the past three to five years. We found this information was not available. Therefore, this section presents the findings from several proxy measures of cost, including: a review of a sub-set of scopes of work; cost estimates from the communication subcontractor; and information from interviews with EMEP-funded researchers. It also presents the findings of value from the responses of several surveyed populations.

7.1 ESTIMATING "COST"

Without firm information about cost estimates for each EMEP research product, the process evaluation team sought information about cost from program scopes of work and through conversations with EMEP researchers. In some cases, we were able to obtain firm estimates of cost. When this was not possible, we used an expanded concept of cost: descriptions of the overall time and effort to create each product.

7.2 SCOPE OF WORK REVIEW

We reviewed the scopes of work and associated budgets of 17 projects completed by researchers we had previously interviewed. The reviewed scopes of work were associated with projects in each of EMEP's research areas, with the exception of crosscutting projects. In each case, we sought to identify how (or if) reporting tasks were accounted for in project budgets and if they varied by project.

We found the reporting requirements varied by project to some extent; however, there are several common products:

Status

• **Progress Reports.** These include annual reports, quarterly reports, and, occasionally, monthly reports. The annual reports are defined as approximately ten pages and replace the fall quarterly report. The quarterly reports summarize project actions or findings and document the status of each task. These reports are used to support project invoices if the two are submitted together.

Reports

- **Final Reports.** These contain "all data, information, analysis and findings pertinent" to the agreement. The final reports are expected to describe the project thoroughly and present a complete discussion of test results, data analysis, limitations of the study, research needs or data gaps, conclusions, and policy implications.
- **Executive Summary.** An executive summary is expected to be written for readers who have some degree of technical knowledge, but no particular expertise in the specific area. It is intended to be distributed to a large readership, including policy analysts. The executive summary is expected to underscore policy implications of the findings, highlight areas warranting additional research, and identify limitations of the study.
- **Summary Paper.** A summary paper is expected to be 8-12 pages and translates the findings into interesting, understandable, and appealing language accessible to a broad audience—including policy analysts, policymakers, and the interested general public. This product is expected to have language similar to that found in the New York Times Science section.

Other products

- **Peer-Reviewed Publications.** The scopes of work typically require at least two manuscripts be submitted to peer-reviewed publications.
- **Web-Accessible Study Database.** Researchers are expected to provide an electronic data file for the study that can be linked to the NYSERDA website.
- **Meetings and Presentations.** Researchers are expected to present the results of their work (todate, if the project is not complete) at the bi-annual conference, and attend meetings as arranged by EMEP staff members.

7.2.1 Cost estimates

Obtaining clear cost estimates from reviewing scopes of work is challenging because the budget sheets do not map to the tasks as described in the final scope. Instead of providing an estimated cost per task, the budget sheets list the total number of hours expected per person over the entire project. For example, a researcher could be listed as responsible for field supervision, synthesis, integration, and reporting with no corresponding cost estimate for each task.

Additionally, the cost to produce a given product is highly variable and depends on several factors that may, or may not, be within the control of the project manager. Research replicating other studies or expanding on existing reports is likely to result in findings that are simpler to write up because much of the report framework exists in previously published work. Even where this is not the case, the cost of producing each product depends on the complexity of the data, the level of analysis required, and the order in which the products are generated. The final report description as presented in the SOWs is extensive and includes:

- A thorough description of the project
- All data, information, analysis, and findings resulting from the project
- The presentation of test results, data analysis, and limitations of the study
- Identification of future research needs or data gaps
- Presentation of conclusions and policy implications

In light of these requirements, the final report is potentially the source of information behind other deliverables. If this report is created first, the executive summary, summary paper, and articles for peer-reviewed journals could be a matter of assembly or focus.

7.2.2 Perceptions of Reporting Burden

To understand the time and effort required to produce EMEP deliverables, in addition to reviewing scopes of work, the research team conducted short follow-up interviews with ten previously interviewed researchers. These contacts described their approach to meeting their reporting requirements. According to these researchers, the time required to produce both peer-reviewed journal articles and EMEP final reports varies by project. The scope of the project determines the time required to produce each deliverable and dictates the level of analysis required to complete the writing process. This is true for both peer-reviewed products and the final reports produced for NYSERDA. Contacts described the peer-review process itself as frequently leading to additional analysis: "In reality, when you write an article, you are writing your thoughts. Then you find something you should have done and you go back. It's a more interactive process than just finishing work and writing it up." Several contacts also noted the specific formatting requirements of one organization or another create time-consuming production tasks.

The variation in project size and scope prevented researchers from providing concrete estimates of the time required to produce EMEP deliverables. Instead, contacts offered ranges of time. In some cases, these ranges were quite large; however, there were clusters of responses for each product.

It appears the order in which researchers produce deliverables influences the amount of time each deliverable requires. While one program staff member reported EMEP encourages researchers to complete their final report before writing peer-reviewed journal articles, seven of the ten researchers recontacted reported completing peer-reviewed journal articles first, often as soon as sufficient findings are available.

Final Reports

Researchers reported EMEP final reports typically take less time to produce than peer-reviewed journal articles. Estimates of the time required to produce a final report ranged from 20 hours to eight weeks. Five of the seven researchers who had produced final reports for EMEP reported the documents require less than three weeks to produce. The range of time required for peer-reviewed journal articles was similarly wide. Researchers estimated requiring anywhere from 10 hours to 12 weeks to produce a peer-reviewed journal article; however, the majority of researchers (six of the ten) reported requiring between two and five weeks.

Researchers reported drawing on material already published in peer-reviewed journals reduces the amount of time required to produce a final report for EMEP. According to one researcher, "Journal articles form the backbone of the final report, with some connections and transitions." Another reported waiting for journal articles to be published before writing his final report because citing peer-reviewed articles increases the credibility of his final reports. A third researcher reported that other deliverables, including progress reports, facilitate the process of writing a final report. He also noted milestone reports, completed upon reaching a set point in the research project, are more useful in this regard than administratively focused monthly or quarterly reports.

Despite researchers' reports that final reports typically take less time to produce than peer-reviewed journal articles and that earlier deliverables inform the reports, half of the researchers contacted in follow-up interviews reported they had underestimated the amount of time and resources required to produce final reports in the process of creating a research budget. As noted in section 3.4.3, EMEP requires more depth in its final reports than other research funders, who may simply accept a series of references to journal articles. According to one researcher, "I think people that have some experience with NYSERDA are a little bit more careful about writing in time for performing some of those [reporting] activities. Originally, I hadn't really done that, but I try to be a little more proactive about identifying the time it takes to produce some of those things."

In addition to final reports and journal articles, EMEP typically requires researchers to provide an executive summary or some other type of non-technical summary of their findings. Researchers reported these documents require relatively little time to produce, especially with other research products available from which to draw. In some cases, contacts reported these documents may take several weeks to produce, while others reported completing summary documents in less than one day. The majority of the researchers (six of ten) reported summary documents take less than one week to complete.

7.2.3 Production Costs

We obtained cost information about communication products from estimates provided by program staff members, from a review of Scopes of Work and a sample of project budgets. These cost estimates do not include EMEP staff members' time or materials costs. Nevertheless, they offer a glimpse of the effort to produce each product after the data are reported by the researchers.

Table 7-1: Cost Estimates [Obtained from Review of Sample Scopes of Work]

Product	Estimated Cost
Conference Organization	\$52,581 (Excluding venue costs)
Project Updates (Updating Existing)	\$2,000
Project Updates (Creating New)	\$4,000
Newsletters	\$11,000
Topic Primers	Vary (\$16,000 - \$32,000)
Technical Editing: Final Reports*	\$3,500 (~60 hours)
Peer-Reviewed Journal Articles: Publication Cost	\$170 per page

^{*} As noted above, full cost estimates for final reports were not available from the information provided in project scopes of work and associated budget sheets.

7.3 ESTIMATING "VALUE"

With limited estimates of cost assigned to EMEP-generated products and minimal familiarity with the specific products produced by the program, the research team identified proxy measures for value. These measures included the results of an institutional citation analysis conducted by Thompson Reuters, estimates of value from surveys, and qualitative discussions with key program contacts about the relative value of different types of products.

7.3.1 Thompson Reuters Findings⁶

EMEP provided a list of 254 known research products to Thompson Reuters in one of five topical areas: air quality; ecosystems; climate change; crosscutting research; and other publications. The Thompson Reuters Web of Science® search process matched 154 of these research products to the publications tracked by Thompson. These 154 publications were cited over 2,700 times. The 100 products that do not show up in the database are either: not published yet (under review); published in a non-peer-reviewed source (such as graduate theses or conference proceedings); or were published in a journal outside of Thompson's search parameters. Therefore, these results should be considered the *minimum level* intellectual reach attributed to EMEP.

7-4

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⁶ A full presentation of the results of the Institutional Citation Report can be found in Appendix A.

Source Papers cited 2,784 times in Citing Papers

Citing Papers subsequently cited 19,724 times

Figure 7-1: Intellectual Reach of EMEP Funding as Matched to Web of Science®

The database also allows users to identify the number of articles published each year. Figure 7-2 shows EMEP articles were cited most frequently in 2003 and 2004 with over 1/3 of all EMEP-article citations happening in those two years.

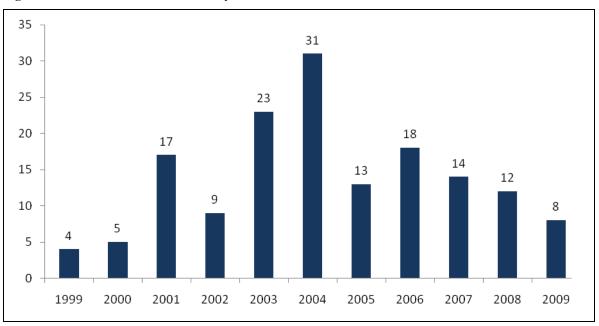


Figure 7-2: Number of Articles Cited by Publication Year

From 1999-2009, EMEP articles were cited over 2,700 times in the Web of Science database, with the largest increases happening from 2002-2003 and 2003-2004. This corresponds with the significantly

larger numbers of articles published in 2003 and 2004. While there appears to be fewer and fewer citations in recent years, this should be expected—the more recent the publication date, the less time there has been for citation.

7.3.2 Value Estimates from Survey Populations

As presented in Sections 4 and 5, each surveyed population was asked to rate the value of several types of research products.

7.3.3 Value Estimates based on Status as Researcher

Figure 7-3 presents the results of these value rankings across three surveys: one of conference attendees and two surveys targeting EMEP constituents. For each product, Figure 7-3 provides the portion of those indicating this product was valuable. Aside from the clear preference for journal articles among research professionals, it is notable that most of the other options are preferred at somewhat similar rates.

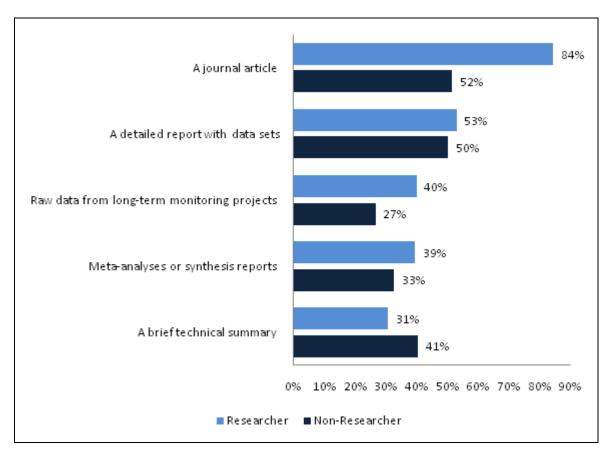


Figure 7-3: Assessment of Value Across Surveyed Populations*

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^{*} Weighted percentages account for the different population sizes of the three survey efforts.

⁷ "Value" in Figure 7-3 is calculated by determining the portion of each population that rated the product a "4" or a "5" on a 5-point scale or (in the case of the email population) ranked the product first or second in an on-line ranking exercise.

Not included in this graph are the products that were asked only of one population. After the conference attendee survey, three products were dropped (newspaper or magazine articles; conference presentations or networking opportunities; and descriptions of methodology), and one was added (non-technical executive summaries). While not presented below, it should be noted that non-technical executive summaries were valued substantially higher by non-researchers (51%) than researchers (15%) among constituents surveyed.

7.3.4 Value Estimates by Topic of Interest

We also attempted to identify any preferences in product types that might reflect association with a specific topic area. Figure 7-4 presents the same assessment of value as Figure 7-3, except organized by topical interest instead of status as a researcher.

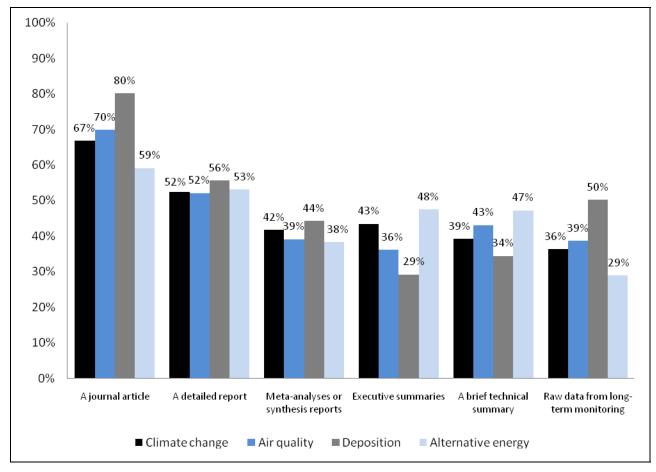


Figure 7-4: Value of Product by Topic Interest:

In reviewing Figure 7-4, it is important to understand that affiliation with a specific topic area was self-selected and not defined for each respondent. Thus, we cannot confirm that respondents were defining each topic identically. Also, given the differences visible in Figure 7-3, the proportion of researchers in each topic area could affect the overall value of a specific product.

7.4 KEY CONTACT ASSESSMENT OF VALUE BY PRODUCT

Key program contacts include program staff members, advisory group members and EMEP-funded researchers. Their perspectives on the value of each of the products EMEP supports are discussed below.

These findings are drawn from the full interviews conducted with 21 researchers and 11 advisory group members.

7.4.1 Peer-Reviewed Journals

Peer-reviewed journals are a preeminent source of scientific information for the scientific community, particularly for academic researchers. Twelve contacts reported scientists primarily turn to academic journals to gather information about scientific research and to identify important citations for their own work.

Journals are widely recognized as credible sources within the scientific community because of the review process that journal articles undergo prior to publication. Journal articles are easily accessible to the scientific community, so interested readers can trace information cited from journal articles back to other sources. In addition to the credibility and accessibility of journal articles, three contacts noted the structure of academic institutions contributes to the importance of academic publications among scientists.

- "As an academic, I get my brownie points for writing peer-reviewed papers, and peer-reviewed papers want peer-reviewed references. That's part of the way the game is played."
- "If you want to survive in an academic environment, you have to publish in the peer-reviewed journals."

Despite the prominent role peer-reviewed journal articles play in the scientific community, contacts cited drawbacks to depending only on journal articles to disseminate research. First, two contacts (one program advisor, one researcher) reported journal articles may not reach policymakers, especially those who do not have a technical, scientific background. Second, one researcher reported journal articles typically do not present all of the data on which their findings are based and stated, at times, he has had to seek additional information beyond what is reported in a paper. Another researcher reported, even when taken together, multiple journal articles based on a single project may not provide a cohesive summary of the larger project.

Table 7-2: Key Contacts: Assessment of Value—Journal Articles

Type of Product	Valued For:	Value Limited By:
Journal Article	Status as preeminent information source for scientists, especially academic researchers	Focus of article; may present a subset of findings or reflect the specific focus of researcher interest
	 Undisputed credibility among scientists Availability; widely available to academic researchers through data base searches Consistency with reward structure of research organizations; researcher performance is often evaluated based on journal publications 	Limited data presented; even multiple articles stemming from a single project may not present a cohesive summary of the project as a whole Lack of access among non-academics; generally requires paid database subscription Too detailed for policymakers without technical scientific expertise
	,	Research funding source is not always clear to readers

7.4.2 Final Reports

There is disagreement among key program contacts about the value of the Final Reports. Final reports are considered useful for individuals within regulatory agencies because they provide the level of detail

required by regulatory staff members. Two researchers, both of whom used EMEP research to inform product development efforts, reported seeking Final Reports as a preferred source of scientific information. One stated specifically that these reports provide a higher level of detail than other sources of scientific information, and the other stated that final reports are more quickly and easily available than other sources.

Researchers are less likely to turn to publically produced and freely available reports. Nonetheless, researchers stated that, in some situations, these reports are useful. Three researchers specifically stated that subject matter is more important than the format in determining the usefulness of a specific research product. One advisory group member and two researchers reported final reports are useful in situations in which they need greater depth of information than that presented in journal articles.

Those skeptical of the value of EMEP's final reports stated the reports are used relatively little within the scientific community, where journal articles are a more prevalent source of scientific information. One researcher noted that the peer-review process for EMEP's final reports is not widely recognized, while two other contacts stated that EMEP's final reports are not as easily accessible to academics as scientific journal articles.

Table 7-3: Key	Contacts: A	Assessment of	Value—	-Final Report
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Type of Product	Valued For:	Value Limited By:
Detailed Report/Final Report	Level of detail particularly valuable for regulatory staff members	Level of detail is considered too much for policy staff members
	 Project details presented can supplement data presented in journal articles Availability; can be found for free Clearly attributes the source of research funding 	Lack of use within scientific community Credibility within scientific community; peer review process less recognized

7.4.3 "Raw" or Un-Analyzed Data from Long-Term Monitoring Projects

The usefulness of monitoring data depends on the type of work that individual researchers carry out. Ten (of 21) researchers reported using monitoring data, largely to develop new statistical methods and other analysis tools or as a basis for comparison against other data that they had collected, while five (of 21) researchers reported their work does not require them to draw on monitoring data.

Table 7-4: Key Contacts: Assessment of Value—Long-Term Monitoring Data

Type of Product	Valued For:	Value Limited By:
Long-Term Monitoring Data	Development of new analytical tools Comparison against other data	 Focus of individual researcher; not all contacts draw on monitoring data Credibility of source (potentially) Availability; potential conflict with research institutions seeking to maintain control of data

7.4.4 Meta-Analyses and Topical Primers

EMEP produces topical primers, which bring together findings from multiple research projects to provide an overview of a broad scientific research area. These topical primers are similar to the synthesis reports and meta-analyses that other organizations publish. Both researchers and advisory group members

considered this type of report valuable. Advisory group members asserted producing topical primers provides EMEP with an opportunity to expand its influence in terms of both science and policy.

One program advisor stated policymakers need scientific information that integrates the results of multiple studies, saying "no one study is going to lead to a policy decision on its own." Similarly, a science advisor stated, because the results of research projects are likely to be incremental, synthesis reports may have a larger impact on the broader scientific literature than findings from individual projects.

Table 7-5: Key Contacts: Assessment of Value—Meta Analyses

Type of Product	Valued For:	Value Limited By:
Topical Primers/Meta-Analyses	Policy relevance; policy making takes into account results of multiple studies	Not considered widely available to researchers
	Scoping research; help to identify information sources relevant to a researcher's interests	
	Providing context to research findings	

7.4.5 Executive Summaries

Shorter, non-technical summaries play an important role in communicating the results of scientific research to policymakers. One program advisor and two researchers stated that in order to communicate scientific findings effectively to higher-level policy decision makers, findings should be presented in a relatively brief document that acknowledges the limitations of the findings, lists the information sources on which they are based, and focuses on the policy implications, where appropriate. Contacts stated that the executive summaries that EMEP produces are effective.

Table 7-6: Key Contacts: Assessment of Value—Executive Summaries

Type of Product	Valued For:	Value Limited By:
Executive Summaries	Clear communication of research findings to policymakers	Limited detail; unlikely to be cited in academic research
	Allow scientists to track research outside field of expertise	
	Allow scientists to determine whether to pursue further information	

7.4.6 Project Updates

Project Update factsheets are considered an important outreach tool for the program, and staff members reported the program had received positive feedback on its Project Updates. Project Updates are targeted toward policy analysts or other staff members in policy organizations who would have a basic understanding of a scientific issue, but not technical expertise.

Table 7-7: Key Contacts: Assessment of Value—Project Updates

Type of Product	Valued For:	Value Limited By:
Project Updates	 Informing policy staff members; especially policy analysts, with a basic understanding of the issue Scoping research; may be used early 	Level of detail; unlikely to be cited in academic research
	in a research project to gather information on a new topic	

7.4.7 Conferences

While conference proceedings are rarely cited, key program contacts reported regularly attending conferences and valuing the information obtained. From a scientific perspective, conference presentations are suspect because they are so often based on preliminary results that are subject to change. EMEP's conference is considered particularly effective in informing both researchers and policymakers about the program's research.

Table 7-8: Key Contacts: Assessment of Value—Conferences

Type of Product	Valued For:	Value Limited By:
Conferences	Source of information about ongoing and recently completed research	Credibility; review process is less rigorous than that for journal articles
	Bringing together researchers and policymakers	Uncertainty; results presented may be preliminary and subject to
	Informing researchers about other EMEP projects	modification

7.5 SUMMARY OF COST/VALUE DISCUSSION

A fundamental difficulty encountered in efforts to describe both the cost and the value of research products is that costs vary by product and by project, and value depends on accessibility (both physically and intellectually) and by the needs of the end-user. Without knowledge of these variables, it is impossible to say what the true cost or value of the intellectual products is, on an "average" basis.

Aside from a preference for peer-reviewed journals among researchers, no clear preference for other products emerged from an analysis of survey data. Considering the estimates of cost and time required, preparing final reports does not appear to represent a substantial burden for researchers. Rather, researchers may be less engaged in the process of creating final reports than in producing peer-reviewed publications. Researchers typically prepare final reports at the end of their project work, after completing peer-reviewed publications, which are more valuable to academic faculty because of how faculty members' performance is assessed within their own institution.

The cost or burden associated with meeting documentation requirements depends upon numerous factors: the extent to which the material being analyzed and presented can be incorporated into existing documents; the complexity of analysis; and the goals of the author. The cost of producing the final report might be perceived as higher to research faculty who prioritize publishing in peer-reviewed journals as a way to further their careers, communicate with their peers, and augment their reputation. On the other hand, the value of this same document could be high to a government employee without easy access to peer-reviewed journals, or who needs detailed analysis to support regulatory changes.

SECTION 8: CONCLUSIONS AND RECOMMENDATIONS

This process evaluation focused on investigating the effectiveness of and perceived value of the information exchange component of the EMEP program. The process evaluation specifically sought to understand how EMEP products are perceived and how they are used by several constituent populations. As part of this effort, the research team also sought to identify areas where EMEP could improve the access, usability, and/or relevance of the information products that flow from the program-sponsored research.

8.1 FINDINGS

The process evaluation found that EMEP provides a unique funding opportunity for scientists who can link their research to broader public policy goals and that the program's structure encourages researchers to consider the policy implications of their work. EMEP's focus on linking science with policy sets the program apart from other organizations that fund similar research and leaves the program with two distinct audiences, scientists and policymakers. Both audiences view the program positively.

There are several important areas where EMEP is meeting the expectations of its key contacts and providing value to the research community. Specifically, this evaluation research found:

- Widespread belief that the program is effective in bridging the communication gap between scientific research and policy decisions and that EMEP's focus on connecting scientific research to policy sets the program apart from other sources of research funding.
- The EMEP conference is valued for the opportunity to bring scientists and policy staff together to discuss the policy implications of scientific findings. The conference is considered unique for its focus on this goal.
- Scientific researchers value the funding opportunity—particularly those researchers whose work fits within EMEP's niche: those focusing on environmental issues within the State of New York.

EMEP's research findings are relevant to scientists and considered of comparable quality to research findings produced by much larger, federal funding organizations. While it is difficult to attribute policy outcomes to any single piece of scientific research, contacts reported that policymakers are aware of EMEP's research, and advisors, researchers, and program staff members cited a variety of examples in which the program had played a role in policy formation.

8.1.1 Researcher Satisfaction

Interviews with researchers revealed broad satisfaction with the quality of the project management and the respect for the commitment of those involved to ensure the funded research is of the highest quality and linked to public policy discussions.

Researchers also reported EMEP's project management approach is more structured than that of other funders and that the program has more stringent reporting requirements. In some cases, the quarterly status reports were considered burdensome to researchers because scientific research does not necessarily generate notable findings in a three-month period, especially early in a project. On the other hand, some researchers credited the program structure for fostering focused attention on a discrete research end. Ultimately, the solicitation's compatibility with research interests is more important than the administrative and reporting requirement burdens attached to funding.

8.1.2 Perception of Value

The cost/value analysis found that all of the products resulting from EMEP-funded research are valued in certain ways. Researchers displayed a clear preference for research presented in peer-reviewed journals⁸ (Figure ES-1); however, other key program contacts and non-research professionals reported finding value in all of the other products that flow from EMEP research, including the final reports.

A citation analysis completed by Thompson Reuters as part of this evaluation project found that articles referencing work sponsored by EMEP were cited 2,784 times between 1999 and 2009. It is important to note that the program-provided list used to generate the citation analysis contained 254 products, and that Thompson was able to match 154 of the 254 records in their Web of Science[®] database indicating that this analysis represents the *minimum level* intellectual reach of EMEP-sponsored research.

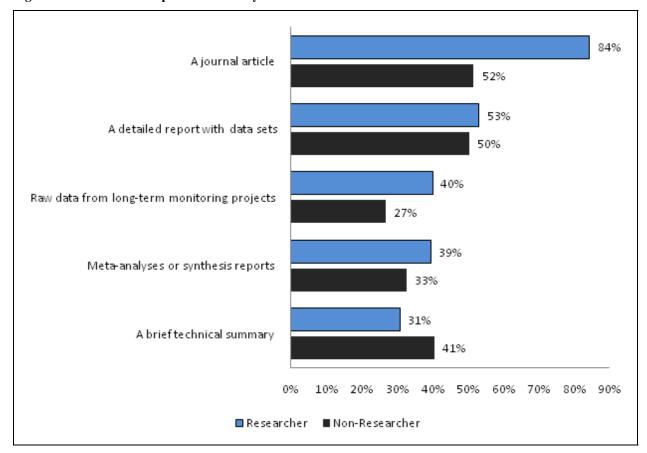


Figure 8-1: Relative Perception of Value by Status as Researcher and Non-Researcher

8.1.3 Appropriate Deliverables

EMEP's information products and outreach efforts target diverse audiences and meet the needs of each of these audiences. High-level policymakers and political staff members require succinct summaries of scientific information placed in a policy context. Government employees that write and defend

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⁸ Peer-reviewed journals are academic journals that use a peer-review process in which a group of experts evaluates a submitted article. These reviewers decide whether to approve an article for publication, and may suggest changes for the author to address before an article is approved. Often, this review process is anonymous, with neither reviewer nor author aware of the other's identity.

environmental regulations require more detailed discussions of research projects and the limitations of these projects. Reaching the academic and scientific community requires that projects be referenced in peer-reviewed journals—the most credible information source for these stakeholders.

EMEP attempts to meet the diverse expectations of constituents by distributing information a variety of ways. Reports and conference information are posted on the program's website, newsletters and conference registration materials are provided through the postal service and through a listsery. The program often requires researchers to submit articles to peer-reviewed journals for publication, and, when appropriate opportunities arise, researchers also present the results of their work directly to decision-makers through workshops or testimony to legislative committees. The submittal of articles for publication in journals is clearly the best method for reaching the academic and scientific research community; however, this deliverable is the least controlled by the program. There is no assurance that articles submitted will be published or that the scope of the article will mirror NYSERDA's priorities.

8.1.4 Information on Cost

One of the tasks of this evaluation effort was to assess the cost and value associated with each of the program's research products. Value was estimated by analyzing qualitative and quantitative responses to questions about preference and importance (for example, Figure ES-1). Costs estimates were obtained from the Scope of Work for the marketing subcontractor and from interviews with researchers required to meet the information transfer product expectations. One component of cost, the time and resources allocated by researchers to produce final reports, journal articles and conference presentations was not available from the research project Scopes of Work reviewed, since the costs are typically allocated to a person, not a task.

If it is important for the program to ensure that the reporting costs are not unnecessarily high, staff members may want to establish a process for capturing the estimated cost by task from proposals or Scopes of Work. Capturing this data, even if only for a year or two, could give program staff members better information about the portion of total research dollars requested that is allocated to meeting EMEP reporting requirements. This information could be used calculate an estimate of effort associated with the expected deliverables, and could illuminate any debate about expectations established for future projects.

8.2 CONCLUSIONS AND RECOMMENDATIONS

This evaluation revealed no major problems with the EMEP program. The conclusions and recommendations listed here represent potential opportunities for improvement to EMEP's outreach and information transfer goals, not areas of program failure.

8.2.1 Conclusion: Multiple methods of collaboration support outreach and information transfer goals.

Multiple methods of collaboration are needed for effective outreach. Interviews with researchers revealed that many value peer-to-peer contact as a preferred source of information. This contact can occur at conferences, by phone, or through e-mail communication. The scopes of work developed for each project list numerous research staff members in addition to the principal investigator and lead researchers. Outreach to researchers could be expanded by adding all research staff members on a project to the program's contact lists and listsery. These lists can be invited to events (including conferences and webinars) and sent links to documents on the EMEP website.

Recommendation:

Program staff members should focus on networking as an outreach activity and encourage others involved in the program to provide information about the program directly to their peers. EMEP

staff members could facilitate this by making sure that these key program contacts know what the program has available and how to direct people to find it.

8.2.2 Conclusion: The final reports are important products and serve multiple purposes

The final reports remain an important deliverable for NYSERDA. While contacts from numerous organizations articulated the preeminence of publication in peer-reviewed journals for scientists, the final reports represent several aspects important for the effectiveness of EMEP.

Final reports are used by the outreach staff members and subcontractors to develop numerous other products, such as executive summaries, topical primers, technical summaries, meta-analyses, and project updates. As described in subsequent sections of this report, these products are important for communicating with the program's non-technical and policy audience. Final reports are also easily posted on the program's website and can be accessed for free by any interested party, as opposed to journal articles that are only available for a fee. Finally, these documents represent the core product NYSERDA is purchasing with its funding. They document the methodology and findings of a given project and indicate that project managers at NYSERDA are ensuring that SBC funds are well-spent.

Recommendation:

Continue to require that EMEP researchers submit a final report that is appropriate for the project, the scope of which will vary on a case by case basis.

8.2.3 Conclusion: Opportunities exist to clarify and streamline the review process associated with final reports.

While final reports are valuable for NYSERDA and inform other outreach efforts, they are not necessarily given the same credibility as peer-reviewed journals because the larger scientific community is not aware of the rigor of the review process that EMEP's final reports undergo. Although it is important to retain the quality of the final reports, the program may be able to reduce the burden placed on authoring scientists by clarifying or simplifying the review process associated with finalizing these documents. Defining expectations and describing the review process, particularly for researchers new to NYSERDA, will help ensure that researchers are prepared for the number and scope of comments and revisions.

Recommendation:

Consider strategies for simplifying the review process associated with finalizing reports when indicated by project characteristics. Material that has already been prepared for and published in a peer-reviewed journal or reports that are adding to information in previous reports could benefit from a more streamlined review process. Multi-disciplinary projects or those presenting entirely new information may require more substantive review.

Recommendation:

Regardless of the level of technical review or the number of reviewers, project managers should continue to be alert for opportunities to collect and summarize comments; to minimize the number of document revisions; and ensure that each successive review is providing marginal improvement sufficient to justify the time required of the researcher and NYSERDA staff.

8.2.4 Conclusion: Researchers do not differentiate between reports required for invoicing and reports required to track project findings.

While EMEP's reporting requirements are not turning researchers away from the program—compatibility with researcher interest is more important than the administrative requirements attached to the funding—researchers noted that projects may not generate sufficient findings to justify a quarterly report, especially early in the project. Staff members distinguish between quarterly reports with an administrative focus, designed to help the program ensure that a project is progressing at a pace consistent with its spending, and less frequent reports that describe the pace and findings of specific projects. Researchers unaccustomed to working as contractors stated that EMEP's quarterly reporting requirements can be burdensome.

Milestone reports, completed upon reaching pre-determined points in the research process, may be more intuitive for researchers than quarterly reports because these reports will contain a more technical focus than reports required for invoices.

Recommendation:

Define the purpose of quarterly reports and what NYSERDA expects these reports to contain and consider ways to facilitate the quarterly reporting process for researchers, recognizing that they may not be accustomed to tracking budgets and research progress in this way.

Recommendation:

Consider milestone reports and payments rather than quarterly reports if appropriate given the anticipated workflow associated with individual research projects.

8.2.5 Conclusion: Advisory Group members have differing views of their role and responsibilities.

EMEP draws on advice from two advisory groups in planning research and reviewing the results of projects the program funds. The eleven members of the Program Advisory Group represent state and local government agencies, advocacy organizations, and other research organizations. The seven members of the Science Advisory Group come from academic institutions and other research organizations.

Some advisors would like an expanded role in the program, while others sought a more defined role for advisory group members. As the program's research interests have expanded, it has become more difficult for advisors to possess expertise in every issue on which the program funds research.

The increasingly limited role of the advisory groups may result from the lack of a formal definition of the groups' roles. The advisory groups developed organically to meet the needs of the program and, thus, have no charter or other document specifying exactly what the advisory groups should or should not do. There is no formal definition on how the two advisory groups are expected to interact with each other and with other parts of the program in deciding which proposals to fund. The process for selecting new advisory group members may not be understood. Similarly, reasons for changes in the composition of the advisory groups are not transparent in all cases.

Recommendation:

Consider a facilitated meeting with advisors to create a statement of focus or mission and otherwise clarify their role and what the program expects of them.

Recommendation:

Clarify for advisors NYSERDA's expectations for dissemination of results, document review tasks, and promotion of EMEP efforts.

8.2.6 Conclusion: There are opportunities to improve constituent tracking.

The program currently maintains multiple lists with overlapping populations and duplicate records. For example, there are separate conference attendee lists for each of three conferences, with different mixtures of contact information (phone, email, address, affiliation). The past and current researchers list contains names and email addresses only. The list of 240 listserv recipients has no accompanying contact information.

Regardless of the challenges for evaluation research, the overall state of the contact lists indicate the program should consider combining the multiple lists into a single program contact database capable of tracking the extent to which contacts are associated with the program and the level of information they currently receive. The constituent mailing list is an important program resource that includes NYSERDA staff members, advisory group members, government stakeholders, and researchers, as well as thousands of interested professionals.

Recommendation:

Improvements in constituent tracking would be valuable for implementing improvements to EMEP's overall outreach strategy. Program staff members should ensure that a comprehensive constituent tracking system to support the program's outreach effort is part of the current marketing database development process.

APPENDIX A: THOMPSON REUTERS: WEB OF SCIENCE®

As part of this EMEP process evaluation, NYSERDA contracted with Thompson Reuters (Thompson) to update the Institutional Citation Report (ICR) produced for the program in 2006. At that time, Thompson identified 98 matched papers in its dataset, covering program years 1999-2006. Updating the ICR involved updating the citation information for the original records and adding projects completed since 2006.

Using its Web of Science[®] bibliographic database, Thompson algorithmically matches the records of EMEP authors with articles in the Web of Science. Thompson does not guarantee a 100% match rate. Citation counts were created for matched projects up to December 31, 2009.

Obtaining an ICR allows EMEP to document if and how the research findings supported by the program are being communicated. EMEP staff would like to confirm that program-sponsored projects are being cited in academic journals as a way of (1) documenting the performance of research through citation metrics, (2) evaluate the outcomes of funding decisions, and (3) identify opportunities for future collaboration or information transfer. In response to this request, Thompson provided a copy of a customized database created for NYSERDA to the process evaluation team. This database documents the results of the Web of Science[®] analysis.

THOMPSON REUTERS DATABASE

EMEP provided a product list to Thompson for each of five topical areas: air quality; ecosystems; climate change; crosscutting research; and other types of publications. The program-provided list contained 254 products. Thompson was able to match 154 of the 254 records in their Web of Science[®] database (Table A-1). The 100 products not listed in the Thompson Database are likely either not published yet (under review), appear in a non-peer-reviewed publication (graduate theses or conference proceedings), or were published in a journal outside of Thompson's scope. Therefore, the analysis below demonstrates the *minimum level intellectual reach of EMEP-sponsored research*.

Table A-1:	Comparison	of EMEP	Records to	Thompson	Search Results

Category	NYSERDA List of Products	Thompson Database Match
Air Quality	116	64
Ecosystems	100	60
Climate Change	2	1
Crosscutting	13	6
Other	23	23
Total	254	154

Findings

The 154 EMEP-funded papers matched in the Web of Science Database search are called *source papers*. These *source papers*, attributed to 376 authors, were cited 2,784 times between 1999 and 2009. The 2,784 citations appear in *citing papers*. These *citing papers* were in turn cited 19,724 times (Figure 7-1: Intellectual Reach of EMEP Funding as Matched to Web of Science).

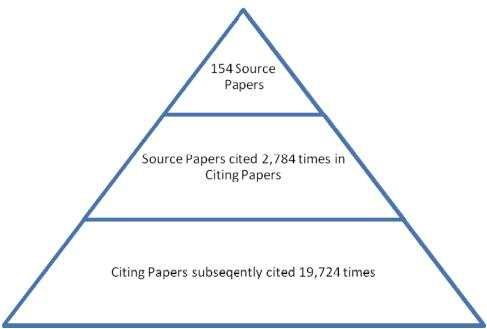


Figure A-1: Intellectual Reach of EMEP Funding as Matched to Web of Science®

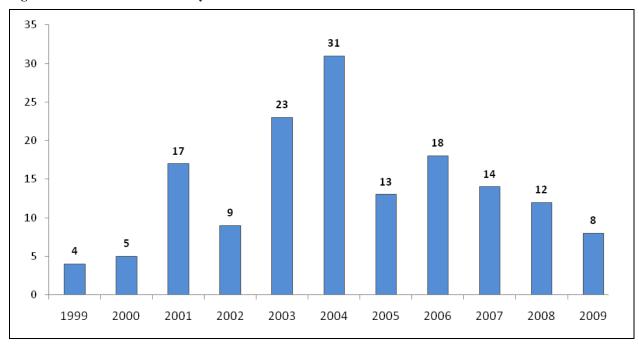
An ICR results in several other measures of reach or success. The first measure is called a *C-Index*. A C-Index communicates the actual citations relative to expected citations. EMEP-funded papers appear to be cited more than expected, as demonstrated by the C-Index value of 1.74. A value of 1.0 would indicate that the EMEP funded papers were cited at the same rate as other papers in the *Web of Science*® database. Over 92% of EMEP funded papers have been cited at least once. The second measure of intellectual reach is an *H-Index*. An H-Index is a statistic that reflects the number of papers cited at least that many times. The 154 matched EMEP source papers earned an H-Index of 29—meaning that 29 of the source papers were cited at least 29 times each. The H-Index has several features that limit its usefulness to the EMEP program. The H-index is expected to measure both the quality and sustainability of scientific output associated with a researcher or a group of researchers; however expected H-Index values differ for researchers in different fields because of differing citation conventions. H-Index values are typically used to assess suitability for tenure or professorship, and should be used to compare scientists at similar career stages because the index is confounded by the *academic age* of the researcher.

Table A-2: Summary Analytics

Analytical Statistics			
Statistic	Definition	Result	
Average Cites	Total number of citations divided by number of source papers	18.08	
Median Citations	Half of the source papers received fewer citations, half received more	12.5	
H-Index	The number of papers (N) in a given dataset having N or more citations.	29	
C-Index	The sum of all actual citations divided by the sum of expected citations	1.74	
Percentage cited	The portion of source papers cited at least one time	92.21	

The ICR also identifies the number of articles published each year. Figure A-2 shows that EMEP articles were cited most frequently in 2003 and 2004 with over 1/3 of all EMEP article citations happening in those two years.

Figure A-2: Number of Articles by Publication Year



From 1999-2009, EMEP articles were cited over 2,700 times in the Web of Science database with the largest increases happening from 2002-2003 and 2003-2004. This corresponds with the significantly larger numbers of articles published in 2003 and 2004. While there appears to be fewer and fewer citations in recent years, this should be expected — the more recent the publication date, the less time there has been for citation (see Figure A-3).

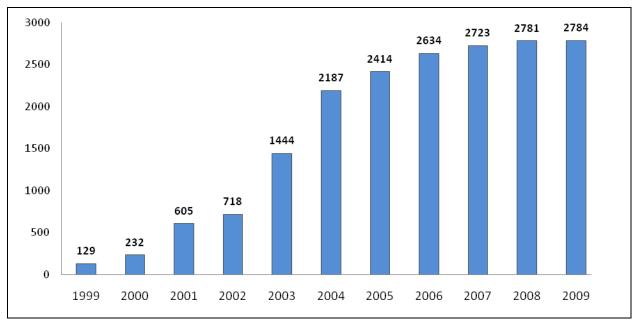


Figure A-3: Cumulative Number of Citations by Publication Year

The 154 source papers appeared in 43 different journals. However, two-thirds of the source papers appear in nine of the 43 journals (Table A-3).

Table A-3: Journals Publishing EMEP-Funded Project Citations—by Frequency

Journal	Papers	Cumulative Papers	Cumulative Percent
Atmospheric Environment	26	26	17%
Environmental Science and Technology	16	42	27%
Journal of Air and Waste Management Associations	15	57	37%
Aerosol Science and Technology	10	67	44%
Hydrological Processes	10	77	50%
Environmental Pollution	8	85	55%
Journal of Geophysical Research-Atmospheres	8	93	60%
Water Air and Soil Pollution	5	98	64%
Bulletin of the American Meteorological Society	3	101	66%

Overall, the list of articles is matched more directly to environmental science and ecological research than energy. Very little of the research *as it is described in the database* pertains directly to energy. An analysis of the 25 fields or disciplines associated with EMEP-funded articles reveals that "Energy and Fuels" had only one associated paper. The field associated with the largest number of papers is "Environmental Sciences" followed by "Meteorology and Atmospheric Sciences" (see Table A-4).

Table A-4: Articles by Thompson Reuters' Field

Field	Papers	Rank
Environmental Sciences	106	1
Meteorology and Environmental Sciences	62	2
Engineering, Environmental	33	3
Water Resources	18	4
Engineering, Mechanical	11	5
Ecology	10	6
Geosciences, Multidisciplinary	5	7
Geochemistry	5	7
Toxicology	4	9
Plant Sciences	4	9
Forestry	3	11
Public, Environmental, Occupation Health	2	12
Biodiversity Conservations	2	12
Limnology	2	12
Engineering, Chemical	2	12
Soil Science	2	12
Oceanography	2	12
Biology	1	19
Chemistry, applied	1	19
Energy and Fuels	1	19
Physics, Atomic, Molecular and Chemical	1	19
Chemistry, Analytical	1	19
Computer Sciences, Interdisciplinary Applications	1	19
Mechanics	1	19

APPENDIX B: LIST OF PROFESSIONAL ORGANIZATIONS

Contacts from each of the surveyed populations were asked to name any professional organizations to which they belong. Across the four populations (advisory group members, researchers, conference attendees and constituents), the 343 contacts cited a total of 193 organizations. Table B-1 lists the organizations most commonly cited with all the populations taken together. Nineteen organizations received mention by six or more contacts.

Table B-1: Most Commonly Cited Professional Organizations

Organization	Total
American Geophysical Union	49
American Association for the Advancement of Science	26
American Chemical Society	25
American Association for Aerosol Research	24
American Meteorological Society	21
Ecological Society of America	21
Soil Science Society of America	14
American Society of Civil Engineers	13
Air and Waste Management Association	12
American Society of Heating, Refrigeration, and Air Conditioning Engineers	9
Association of Energy Engineers	9
Water Environment Federation	8
American Waterworks Association	7
International Society of Exposure Science	7
American Institute of Chemical Engineers	6
American Society for Microbiology	6
American Society of Mammalogists	6
Society of American Foresters	6
Society of Environmental Toxicology And Chemistry	6

In addition to the organizations cited above, 50 organizations were cited by between two and five contacts. These organizations are listed in Table B-2.

Table B-2: Additional Professional Organizations

Organization	Total
American Wind Energy Association	5
Association of Environmental Engineering and Science Professors	5
International Society for Environmental Epidemiology	5
U.S. Green Building Council	5
American Conference of Governmental Industrial Hygienists	4
American Planning Association	4
Institute of Electrical and Electronics Engineers	4
Society of Automotive Engineers	4
American Ceramics Society	3
American Fisheries Society	3
American Physical Society	3
American Society of Agronomy	3
American Society of Engineering Education	3
American Society of Mechanical Engineers	3
American Water Resources Association	3
Association of American Geographers	3
Coastal & Estuarine Research Federation	3
Geological Society of America	3
National Society of Professional Engineers	3
New York Academy of Sciences	3
New York Water Environment Association	3
Project Management Institute	3
Solar Energy Industry Association	3
The Wildlife Society	3
Transportation Research Board	3
Adirondack Research Consortium	2
Albany Society of Engineers	2
American Association of Petroleum Geologists	2
American College of Epidemiology	2
American Economics Association	2
American Public Works Association	2
American Society For Photogrammetry and Remote Sensing	2
American Society for Testing and Materials International	2
American Society Limnology and Oceanography	2
American Society of Agricultural Business Engineers	2

Organization	Total
American Society of Landscape Architects	2
American Thoracic Society	2
Business Council of New York State	2
Entomological Society of America	2
International Association for Landscape Ecology	2
New York State Society of Professional Engineers	2
North American Lake Management Society	2
Sigma Xi (The Scientific Research Society)	2
Society for American Archeologists	2
Society for Conservation Biology	2
Society for Mining Metallurgy and Exploration	2
Society for Risk Analysis	2
Society of American Military Engineers	2
Solid Waste Association of North America	2

The following organizations were each cited by only one contact:

Agronomic Engineers

Alliance for Clean Energy New York

American Academy of Environmental Engineers

American Academy of Sciences

American Association for Advancement of Science

American Association of Radon Scientists and Technologists

American Association of State Climatologists

American Chemistry Association

American Concrete Institute

American Cultural Resources Association

American Engineering Geologists

American Institute for Biological Sciences

American Institute for Medical and Biological Engineering

American Institute of Architects

American Institute of Certified Planners

American Library Association

American National Standards Institute

American Petroleum Institute

American Physiological Society

American Psychological Association

American Public Health Association

American Society for Healthcare Engineering

American Society of Engineering Management

American Society of Professional Foresters

Aquacultural Engineering Society

Association of Environmental and Resource Economists

Association of Environmental Health Sciences

Association of Facility Engineers

Bio-Integral Resource Center

Biophysical Society

British Ecological Society

Building Performance Contractors Association

Bureau of Engineer Auditors

Business Networking International

Canadian Institute of Forestry

Center for Economic Growth

Certified Crop Advisors

Chauqua Rural Public Wastewater Operators Association

Clay Minerals Society

Council of New York Cooperatives and Condominiums

Council on Ionizing Radiation

Environmental Design Research Association

Environmental Management System Auditors

European Respiratory Society

Finger Lakes Water Works Association

Forest Engineering Research Institute of Canada

Forest Guild

Geosynthetic Research Institute

Gesellschaft Fur Aerosolforschung

Groundwater Monitoring

Health Physics Society

Hudson River Environmental Society

Independent Power Alliance of New York

Institute of Industrial Engineers

Institute of Transportation Engineers

International Association for Ecology

International Association for Great Lakes Research Society

International Association for Impact Assessment

International Association of Public Participation

International Association of Water Quality

International Automotive Technicians' Network

International Building Performance Simulation Association

International Ecological Economics Society

International Microelectronics and Packaging Society

International Precious Metals Institute

International Society for Analysis

International Society for Indoor Air Quality and Climate

International Society of Environmental Bioindicators

International Society of Limnologists

International Water Association

Maine Association of Professional Soil Scientists

Materials Research Society

Michigan Society of Professional Engineers

Mid Atlantic Regional Air Management Association

Midwest Renewable Energy Association

National Academy of Sciences

National Aquacultural Association

National Association of Clean Water Agencies

Process Evaluation of the EMEP Program

National Association of Home Builders

National Association of Regulatory Utility Commissions

National Association of Science Writers

National Association of the Remodeling Industry

National Atmospheric Deposition Program

National Audubon Society

National Governors Association

National Hydropower Association

National Pollution Prevention Roundtable

National Research Council

National Wildlife Federation

New England Association of Environmental Biologists

New England St Lawrence Valley Geographical Society

New England Water Environment Association

New York Conference of Mayors

New York Rural Water Association

New York Society of Professional Engineers

New York State Association for Reduction, Reuse & Recycling

New York State Association for Solid Waste Management

New York State Association of Transportation Engineers

New York State Outdoor Education Association

North American Benthological Society

North American Ornithological Council

Northeast Aquatic Plant Management Society

Northeast Recycling Council

Ocean Renewable Energy Coalition

Optical Society of America

Organization of Biological Field Stations

Silver Users Association

Society for Biomaterials

Society for the Study of Amphibians and Reptiles

Society of Motion Picture and Television Engineers

Society of Petroleum Engineers

Society of Risk Analysis

Society of Toxicology

Society of Wetland Scientists

Society of Women Engineers

Soil and Water Conservation Society

Source Evaluation Society

Technology Alliance of Central New York

Tree Ring Society

Water Environment Association

Water Research Foundation

World Aquacultural Society

World Future Society

Society for Epidemiology Research

ADVISORY GROUP INTERVIEW GUIDE

- 1. How long have you been on the EMEP Science Advisory Group?
- 2. How would you describe your role as a Science Advisor?
 - a. What are your primary responsibilities?
 - b. How do you meet with other advisory group members? (Frequency, location)
 - c. Has that changed during the time you have been involved?
- 3. How would you describe the composition of the Advisory group? (What types of organizations are represented? Are there gaps in experience or perspective? Are there organizations that should be represented, but aren't?)
- 4. Broadly, how would you describe the influence of the program within the science community?
- 5. What about the policy community, how would you assess EMEP's influence among policy makers?
- 6. In your experience, to what extent are other SAG: scientists aware of EMEP?
 - a. How is the program perceived?
- 7. Have you ever heard comments or otherwise received information from the larger research community about the usefulness of EMEP products?
 - a. If so, in what context? (Through conversations, reading articles, presentations, other conferences, etc?)
 - b. Can you describe the tenor or content of these comments?
- 8. What about the accessibility of EMEP products? Do people seem to know what is available, where to find it?
- 9. Are there specific products that seem to get more attention than others?
 - a. Is this because of the content (a specific topic)?
 - b. Is it ever because of the format (the level of detail, content, etc)?
 - c. Is it because of availability (easy access, location, or form)?
- 10. In thinking about the EMEP products that you've seen released, can you think of topic that seemed to get the most attention? [Which was it? Why do you think it received so much attention? What type of product was it (a project summary, technical report, fact sheet, email... something else?)]
 - a. Are there *other reports* that come to mind that: [Received a great deal of attention? *Or* Seemed to be used more than others? What type of product was it? (technical report, fact sheet, project summary)]

- 11. Can you think of any reports that you thought were really important that did not seem to get used as much as you expected or thought was warranted?
- 12. We are interested in any ideas you might have for:
 - a. Improving the reach of the program?
 - b. Improving the usability of EMEP products?
- 13. What other types of organizations produce similar information?
- 14. Do other organizations that disseminate scientific research the way EMEP does?
 - a. If yes, what organizations?
- 15. Among your colleagues:
 - a. What organizations do people most commonly turn to for unbiased scientific information?
 - b. What organizations are considered most accessible?
- 16. Are there other "objective" organizations that strive to link scientific research with public policy decisions?
- 17. Are there other organizations that seem to be particularly effective in bridging the science/ policy gap?
- 18. How do you receive technical information from EMEP?
- 19. Do you receive similar information from other organizations?
 - a. If so, how?
- 20. Do you ever disseminate EMEP products?
 - a. To whom?
 - b. In what circumstances? [All the time? Only when the findings are directly relevant to your organization? To other organizations?]
- 21. How do prefer to receive information like that provided by EMEP?
 - a. Standard web page
 - b. Listserv
 - c. Printed materials
 - d. Webcasts
 - e. Blogs
 - f. Some other way?
- 22. Do you belong to any professional organizations?
 - a. If yes: to what professional organizations do you belong?
 - b. Do any of these organizations convey information to you in a particularly effective manner?
 - c. If so, what makes it effective?
- 23. In your opinion, are there ways EMEP could further leverage the outreach capacity of Advisory Group members?

EMEP RESEARCHERS

<i>EMEP</i>	researchers are expected to be quite familiar with the work of EMEP and are likely to have
	areas of scientific interest. Interviews will focus on their interaction with EMEP, their
	ions of the relevance of their EMEP research and resulting products, and how these products are
used by	their respective organizations or professions.
Name:	Title:
Date:	Interviewer:
Introd	
the Env NYSEI conven	ny name is I'm with Research Into Action. We are conducting an evaluation of ironmental Monitoring, Evaluation, and Protection program (also known as EMEP) for LDA. I'd like to talk with you about your involvement and experiences with EMEP. Is this a ent time for you to talk, or would you prefer to schedule another time? [PROCEED OR DULE APPOINTMENT AS APPROPRIATE. IT WILL TAKE 30-40 MINUTES IF THEY ASK.
Call Ba	ck Number: 866-395-4642
	According to our records, you work for [X organization]. Is that correct? [IF ORGANIZATION TYPE IS UNKNOWN OR UNCLEAR, ASK TO CLARIFY. IF RESEARCHER HAS MOVED TO A NEW ORG, NOTE AND UPDATE RECORD.]
2.	On what type of activity do you spend most of your time? [DO NOT READ, PROBE TO CODE AS MANY AS MENTIONED, BUT CLARIFY PRIMARY AREA OF EFFORT AND NOTE THAT.]
	a. Active research
	b. Education
	c. Policy development
	d. Advocacy
	e. Administrative/managerial
	f. Development of new regulations
	g. Enforcement of existing regulations

- **3.** What areas of scientific research do you track most closely? [DO NOT READ. PROBE TO CODE, OR USE AS PROMPT IF UNCLEAR. MULTIPLE RESPONSES ALLOWED. IF NECESSARY, CLARIFY PRIMARY TOPIC OF FOCUS. NOTE: WE ARE NOT SURE IF THESE ARE THE BEST CATEGORIES, IF THEY ARE UNCLEAR, REDUNDANT OR IF SOMETHING IS MISSING, PLEASE LET ME KNOW.
 - a. Climate change
 - b. Air quality/particulates and emissions
 - c. Acid rain/deposition
 - d. Health effects
 - e. Watershed health/water quality
 - f. Fisheries

g.	Alternative energy
h.	Other:

- 4. Can you tell me a bit about the work you have done with EMEP...how many times they've applied, how many projects awarded, are any completed...?
- 5. [IF UNCLEAR IN Q4] Do you have an ongoing relationship with the program?
 - a. If so, in what way?
- 6. Did you work with an Advisory Committee on any of your projects with EMEP?
 - a. If so, did you find the committee helpful?
 - b. If so, in what way?

EMEP Processes

- 7. In your experience with funding solicitations, is EMEP clear about the types of research it is interested in funding and the criteria by which proposals will be evaluated?
 - a. Did you have to seek clarification on any item when preparing your proposal?
- 8. Did you understand how your proposal would be evaluated by EMEP?
- 9. In what ways, if any, is EMEP's process of *managing research* projects different from other organizations?
- 10. When you consider potential funding opportunities to support your research, is EMEP funding more desirable, less desirable, or about as desirable as funding that might be available from other organizations?
 - a. Why do you say that?
- 11. What other organizations have you applied for or received funding from?

Value of EMEP Funding and Products

- 12. If EMEP funding had not been available, would your work have changed? [Probe: Would you have:
 - a) Found funding from another source to do similar work?
 - b) Done similar work on a smaller scale?
 - c) Done research with a different focus?
 - d) Not done a research project at all?
- 13. In what ways, if any, have you expanded upon the work done through EMEP?
- 14. Are there, or have there been, specific opportunities to link your research to public policy?
 - a. If so, what are/were those opportunities? [IF NOT ADDRESSED ABOVE]

- b. How did this(ese) opportunity(ies) emerge?
- c. Are you aware of any outcomes from this(ese) event?

When you look for scientific information, there are a variety of sources you can turn to.

- 15. Using a one-to-five scale where one is highly unlikely and five is very likely, when you look for scientific information how likely are you to turn to:
 - a. Academic databases (for Peer reviewed journals)
 - b. Government or Agency websites (such as EPA, NIH, NESCAUM)
 - c. Independent research clearinghouse, advocacy websites,
 - d. Proceedings from past conferences (CD-Rom, Web source)
 - e. Internet search (such as Google or Google Scholar)
 - f. Institutional library (building or on-line)

When you look for scientific information, there are many types of data you might look for...

- 16. Using a one-to-five scale where one is highly unlikely and five is very likely, when you look for scientific information how likely are you to look to:
 - a. A peer reviewed journal article for scientific information?
 - b. How likely are you to look for a brief technical summary of a research project for scientific information?
 - i. Under what circumstances do you look for these?
 - c. What about conference presentations or networking opportunities, how likely are you to look to these events for scientific information?
 - i. When might you seek out conferences or networking?
 - d. How likely are you to seek detailed data sets or access to unanalyzed data from monitoring projects?
 - i. Under what circumstances is access to detailed data valuable?
 - e. And what about descriptions of methodology and statistical methods—how likely are you to look for those?
 - i. When might you look for this type of information?
 - f. How likely are you to seek meta-analyses or synthesis reports that organize or summarize multiple projects on one topic?
 - i. (if appropriate) Why do you say that?
- 17. How do you track the research completed by others in your field?

- a. What about on-going research or projects in process... how do you track those?
- 18. Are you familiar with any EMEP research products presenting data on projects other than the ones in which you were involved?
 - a. If so, which ones, and how did you become aware of them?
 - b. Have you used them in any way?

Comparison of EMEP Research with Other Research

- 19. In thinking about how often you provide information about scientific research to others,
 - a. Could you tell me how often you provide information to your *co-workers?* Would you say you provide information to them often, sometimes, or rarely?
 - b. And what about *students*? Would you say you provide information to them often, sometimes or rarely?
 - c. And colleagues or researchers at other organizations...
 - d. A blog audience...
 - e. What about *listserv recipients*...
 - f. Conference attendees?
 - g. A webmaster (for posting)...

 h. Capture Other if need
--

20.	Do the final reports you produce for NYSERDA present different information or consolidate
	information in a way that articles published in peer reviewed journals do not?

- 21. In your experience, are NYSERDA's final reports available before or after peer reviewed journal articles on the same research are published?
 - a. If so, is speed ever a consideration? When might this be important? [PROBE LENGTH OF TIME TO PUBLISH... INCLUDING EDITING, PEER REVIEW]

EMEP and Public Policy

- 22. What type of information seems to be most valuable to government agencies?
 - a. [If not addressed above] What formats or level of detail seem to be most valuable?
- 23. In your opinion, what could science do better to inform policy decisions?
 - a. Are there any types of research products and materials you feel EMEP should devote more resources to in order to get information in the right hands at the right time to inform policy?
 - b. Are there any types of research products and materials that seem less important?

Final Questions

- 24. Do you belong to any professional organizations? If so, which ones? [DO NOT READ. WE ARE BUILDING A LIST, PROBE TO CODE OR ADD OTHERS AS APPROPRIATE.]
 - a. Air and Waste Management Association (A&WMA)
 - b. American Association for Aerosol Research (AAAR)
 - c. American Association for the Advancement of Science (AAAS)
 - d. American Chemical Society (ACS)
 - e. American Geophysical Union (AGU)
 - f. American Meteorological Society (AMS)
 - g. American Society of Limnology and Oceanography (ASLO)
 - h. American Society of Mechanical Engineers (ASME)
 - i. Ecological Society of America (ESA)
 - j. International Society for Environmental Epidemiology (ISEE)
 - k. International Society of Exposure Science (ISES)
 - 1. Society for Neuroscience (SfN)
 - m. Society of Wetland Scientists (SWS)

n.	Other:	

- 25. Using a 1-5 scale, where one is least preferred, and five is most preferred, how do you prefer to obtain information about new scientific research?
 - a. Information found on a standard web page
 - b. Information distributed via listservs
 - c. Printed materials delivered by mail
 - d. Hand-outs obtained at conferences
 - e. Participating in webcasts

f.	Reading blogs or posts from credible sources (if preferred: such as:	

- g. Reading newspaper or magazine articles (if preferred: which periodicals: _____)
- h. Conversations with peers
- i. Personal email or phone communication
- 26. What has been the best thing about your experience as an EMEP researcher?
- 27. Is there anything about working with EMEP that should be changed?
- 28. Do you have any other thoughts or comments you'd like to share about your experience with EMEP?

THANK YOU!

EMEP Researcher Follow-Up on Reporting Requirements

Hello, my name is ______. I'm calling from Research Into Action. We spoke with you last December about your experience conducting research through NYSERDA's EMEP program. In the course of preparing our report we realized we still didn't have a good understanding of the how the deliverables are determined and the level of effort required on your part. So, I'd like to ask you a couple more questions about this. We just have a few questions that will probably take about 10 minutes to answer. Is this a good time, or would you prefer to schedule something more convenient?

First,

- 1. Were you involved in preparing proposals submitted in response to a PON from EMEP? [If No, skip to Q2, if Yes ask:]
 - a. In preparing a proposal, how do you budget for reporting requirements or document preparation?
 - b. Were you involved in negotiating the number and type of deliverables you would produce in the process of forming the scope of work for your EMEP project?
 - c. If yes: how did that work?

If not clear from above,

i. Do you have any rules of thumb about the amount of time or money required to produce deliverables like reports and journal articles?

If yes:

- ii. In practice, how closely do these rules of thumb and/or estimates map to the time required to produce deliverables for EMEP? Does that vary for other research funders?
- 2. Thinking about your EMEP-sponsored project, can you estimate the number of hours required to produce:
 - a. Final reports?
 - b. A peer reviewed journal article
 - c. Non-technical overviews or summary papers
- 3. We'd like to understand how the document development typically occurs... Can you describe the order in which you commonly do things? By this I mean, at what point in a project do you begin work on the final report? [during data collection, during analysis, when all analysis, statistical extrapolation, and results integration are complete, some other time?]
 - a. What about journal articles do you start those at a different point in a project? Do you do those before a final report is finished?
 - b. Do the deliverables you produce first inform those that you produce later? Does this make later deliverables easier to produce?

Thank you again for your time! Before I let you go...

4. Is there anything else you think we should consider as we try to understand the relative level of effort and the associated cost linked to producing these deliverables?

EMEP CONFERENCE ATTENDEES

Screener

Hello. [ASK FOR NAME ON SAMPLE. When person answers or if gatekeeper asks why you are calling – READ:]

This is (INTERVIEWER) from Braun Research calling for (NAME). I'm calling on behalf of NYSERDA's Environmental Monitoring, Evaluation, and Protection program, also known as EMEP (PRON: "EEmehp"). We are conducting some research to assess the EMEP program, and as part of that research, we are contacting people who have attended the EMEP conference. I'd like to ask you some questions about how you obtain and use scientific information like that which was presented at the conference. All of your responses will be kept confidential. We will only report results in the aggregate and will not allow information to be attributed to any specific respondent.

IF NECESSARY: My questions should take 15-20 minutes.

A. PARTICIPANT CHARACTERISTICS

A1. First, I'd like to understand the type of organization	n you work for. How would you describe your
organization? Would you say it's primarily a/an	[READ LIST]

- 01 Institute of Higher Education
- 02 Government Agency
- 03 Consulting Firm
- 04 Advocacy Organization
- 05 Commercial or Industrial Firm
- 06 Electric, Gas, or Water Utility
- 07 Something else______ [RECORD VERBATIM]
- 96 REFUSED
- 97 DON'T KNOW

A2. What is your title? _	[RECORD VEF	RBATIM]
---------------------------	-------------	---------

- 96 REFUSED
- 97 DON'T KNOW
- A3. I'm going to read you a list of activities. For each one, please tell me whether or not you do this activity as part of your professional responsibilities. First, do you [INSERT ITEM]: [ROTATE ITEMS]
 - a. Conduct research?
 - b. Teach?
 - c. Develop policy or regulations?
 - d. Enforce existing regulations?
 - e. Advocate for a specific constituency or environmental topic?
 - f. Are you an elected official or a political staff person?

- 01 YES
- 02 NO
- 96 REFUSED
- 97 DON'T KNOW
- A4. What are your PRIMARY professional responsibilities or activities? [RECORD VERBATIM]
- A5. Now, I'm going to list several research topics, please tell me whether or not you regularly monitor developments in each topic as part of your professional responsibilities? [READ, IF NECESSARY: These are broad scientific topics that you may, or may not, follow as part of your job. We'd like to know if you track any of these topics on a regular basis. For example, you might read journal articles, follow new research, or otherwise keep current with policy changes.] First, do you monitor developments in [INSERT ITEM]: ROTATE ITEMS (a-h)
 - a. Climate change?
 - b. Air quality or particulates and emissions?
 - c. Acid rain and associated deposition?
 - d. Health effects?
 - e. Watershed health?
 - f. Fisheries?
 - g. Regulation of utilities?
 - h. Alternative energy?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW
 - i. Is there any other research topic you regularly monitor as part of your professional responsibilities?
 - 01 YES _____[RECORD VERBATIM]
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

B. EMEP CONFERENCES

READ: I have a few questions about your experience at EMEP conferences.

B1. How many EMEP conferences have you attended?

NUMBER OF CONFERENCES ATTENDED

96 REFUSED

97 DON'T KNOW

[IF SAMPLE VARIABLE "YEAR"=2009, ASK B2, ELSE SKIP TO B3]

B2. According to our records, you attended the 2009 EMEP Conference. How did you hear about the 2009 Conference? [DO NOT READ. MARK ALL THAT APPLY.]

- 01 WORD OF MOUTH
- 02 EMAIL NOTICE
- 03 SAW IT ON WEBSITE
- 04 BROCHURE FROM NYSERDA
- 05 DIRECTED TO GO (BY ORGANIZATION OR BY NYSERDA)
- 06 OTHER (SPECIFY)
- 96 REFUSED
- 97 DON'T KNOW
- 98 Did not attend 2009
- B3. I'm going to list several reasons why you might attend an EMEP conference. On a one-to-five scale where one is not at all important and five is very important, how important was each in your decision to attend? How important was [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: One a one-to-five scale where one is not at all important and five is very important, how important was this in your consideration to attend the EMEP conference?]

- a. Pursuing networking opportunities?
- b. Seeing scientific presentations?
- c. Identifying policy implications from research?
- d. Meeting with funders or potential funders?
- e. Scoping new research or planning projects with colleagues?
- f. Learning about other research topics?
- g. Having the opportunity to interact with researchers and policy makers in a single venue?
- h. Augmenting a job search?
 - 01 ONE NOT AT ALL IMPORTANT
 - 02 TWO
 - 03 THREE
 - 04 FOUR
 - 05 FIVE VERY IMPORTANT
 - 96 REFUSED
 - 97 DON'T KNOW
- B4. I'm going to list topics that are typically addressed at an EMEP conference. Using a scale of one-to-five with one meaning "*Not Important*" and five meaning "*Very Important*," please rate the following topics' relative level of importance to your work. How important is [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five with one meaning "Not Important" and five meaning "Very Important," how important is this topic to your work?]

- a. Climate change?
- b. Air quality?
- c. Ecosystem health and deposition?
- d. Human health effects?
- e. Energy-related science and policy?
- f. Emissions modeling?
- g. Carbon sequestration?
- h. Alternative energy impacts?

- 01 ONE NOT IMPORTANT
- 02 TWO
- 03 THREE
- 04 FOUR
- 05 FIVE VERY IMPORTANT
- 96 REFUSED
- 97 DON'T KNOW
- B5. Since the conference, have you pursued additional information about any of these topics or others discussed at the EMEP conference?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[IF B5=01, ASK B6, ELSE SKIP TO B7]:

B6. I'm going to list several reasons you might have pursued this information. For each, please tell me if this was a reason you pursued the topic after the EMEP conference or not. Did you pursue additional information [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: Was this a factor in your decision to pursue additional information about what you had learned at the EMEP conference?]

- a. To verify what you had heard?
- b. To learn more about the topic?
- c. To augment your own work?
- d. To cite the information in other work?
- e. To send the information to someone else?
- f. To use the information in coursework (as teacher or student)?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

C. SCIENTIFIC/INFORMATION SOURCES

C1. I have a few questions about how you provide and obtain scientific information. In thinking about how often you *provide information* about scientific research to others, how often do you provide information to [INSERT ITEM]. Do you provide information to them often, sometimes, rarely, or never? [ROTATE ITEMS]

[READ, IF NECESSARY: In thinking about how often you provide information about scientific research to others, how often do you provide information to...]

- a. Your colleagues or co-workers inside your organization?
- b. Your colleagues outside your organization?
- c. Students?

- d. Researchers at other organizations?
- e. Policy analysts at other organizations?
- f. A blog audience?
- g. Listserv recipients?
- h. Conference attendees (through presentations or proceedings at conferences you attend)?
- i. A webmaster (for posting on your organization's website)?
 - 01 OFTEN
 - 02 SOMETIMES
 - 03 RARELY
 - 04 NEVER
 - 96 REFUSED
 - 97 DON'T KNOW
- C2. How often would you say that you look for scientific information to inform your work? [READ ANSWER CHOICES]
 - 01 Daily
 - 02 A few times a week
 - 03 A few times a month
 - 04 A few times a year
 - 96 REFUSED
 - 97 DON'T KNOW
- C3. When you look for scientific information to inform your work, there are a <u>variety of sources</u> you can turn to. Using a one-to-five scale, where one is *very unlikely* and five is *very likely*, when you look for scientific information, how likely are you to turn to [INSERT ITEM]: ROTATE ITEMS (a-g) [READ, IF NECESSARY: On a scale of one-to-five, where one is *very unlikely* and five is *very likely*, when you look for scientific information, how likely are you to turn to...]
 - a. Academic databases (used to search peer reviewed journals)
 - b. Government or Agency websites (such as EPA, NIH, NESCAUM)
 - c. Independent research clearinghouse (Health Effects Institute or similar)
 - d. Advocacy websites
 - e. Conference proceedings
 - f. Internet search (such as Google or Google Scholar)
 - g. Institutional library
 - h. are there any other sources you turn to for scientific information? ______[RECORD VERBATIM]
 - 01 ONE VERY UNLIKELY
 - 02 TWO
 - 03 THREE
 - 04 FOUR
 - 05 FIVE VERY LIKELY
 - 96 REFUSED
 - 97 DON'T KNOW

C4. When you look for scientific information to inform your work, there are *many types of data, with different levels of detail,* any of which you might look for. Using a one-to-five scale, where one is *very unlikely* and five is *very likely*, when you look for scientific information, how likely are you to look for [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five, where one is *very unlikely* and five is *very likely*, when you look for scientific information, how likely are you to look for...]

- a. A journal article on the topic?
- b. A detailed report with data sets?
- c. Data from long-term monitoring projects that is available without any analysis?
- d. Meta-analyses or synthesis reports organizing or summarizing multiple projects on one topic?
- e. Descriptions of methodology and statistical methods employed?
- f. A brief technical summary of a research project?
- g. Conference presentations or networking opportunities?
- h. Newspaper or magazine article?
 - 01 ONE VERY UNLIKELY
 - 02 TWO
 - 03 THREE
 - 04 FOUR
 - 05 FIVE VERY LIKELY
 - 96 REFUSED
 - 97 DON'T KNOW

1	ypes of scientific information (including research products) do policy [RECORD VERBATIM]
[ASK C6 IF A3c≠01; AND A	3e≠01; AND A3f≠01; ELSE SKIP TO C7]
•	research organizations increase the role of research in policy decisions? CORD VERBATIM]
[ASK C7 IF A3c=01; OR A3	e=01; OR A3f=01; ELSE SKIP TO C8]
C7. How could the information	n generated by scientific research be made more useful to you?
[RECO	ORD VERBATIM]
C8. In the past six months hav	e you accessed the EMEP website?

96 REFUSED

01 YES 02 NO

97 DON'T KNOW

[ASK C9 IF C8=01; ELSE SKIP TO C10]

C11a. Can you estimate how many? (leave it open - probe to code). Would you say... [READ LIST]

- 01 One
- 02 Two to five to five times
- 03 Six to ten times

- 04 More than ten times
- 05 If needed Verbatim:
- 96 REFUSED
- 97 DON'T KNOW
- C9. Are you on the EMEP listsery?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[ASK C11 IF C10=01, ELSE SKIP TO C13]

- C10. In the past six months, have you received e-mail from EMEP?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[ASK C11a AND C11b IF C11=01,; ELSE SKIP TO C12]

- C11b. Can you estimate how many? (leave it open probe to code). Would you say... [READ LIST]
 - 06 One two to five to five times Six to ten times
 - 07 More than ten times If needed Verbatim:
 - 98 REFUSED
 - 99 DON'T KNOW
- C11c. Do you read the e-mails you receive from EMEP?
 - 01 YES (include "sometimes"? or should this be a separate category
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[IF C10=01, ELSE SKIP TO C13]

- C11. In the past six months have you posted any information to the EMEP listsery?
 - 01 YES
 - 02 NO
 - 07 DON'T KNOW
 - 08 REFUSED

[ASK C12a IF C12=01, ELSE SKIP TO C13]

- C12a. How often? Would you say... [READ LIST]
 - 01 Less than once a month
 - 02 One to five times a month
 - 03 Six to ten times a month
 - 04 More than ten times a month
 - 96 REFUSED

97 DON'T KNOW

C12. We'd like to get a sense of the best way to provide important findings or information to people like you. In thinking about the various ways you receive information right now, I'd like you to think about the usefulness of various strategies for providing scientific information? Using a one-to-five scale, where one is *least useful*, and five is *most useful*, how useful is [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five, where one is *least useful*, and five is *most useful*, how useful is this vehicle for providing scientific information?]

- a. Information provided on a standard web page?
- b. Information distributed via listservs?
- c. Printed materials delivered by mail
- d. Hand-outs obtained at conferences
- e. Participating in webcasts
- f. Reading blogs or posts from credible sources
- g. Reading newspaper or magazine articles
- h. Are there any other ways in which you like to get scientific information that I have not mentioned? ______[RECORD VERBATIM]
 - 01 ONE LEAST USEFUL
 - 02 TWO
 - 03 THREE
 - 04 FOUR
 - 05 FIVE MOST USEFUL
 - 96 REFUSED
 - 97 DON'T KNOW
- i. Which of these ways of receiving information do you most prefer? _____[RECORD VERBATIM]
 - 01 INFORMATION PROVIDED ON A STANDARD WEB PAGE
 - 02 INFORMATION DISTRIBUTED VIA LIST SERVS
 - 03 PRINTED MATERIALS DELIVERED BY MAIL
 - 04 HAND-OUTS OBTAINED AT CONFERENCES
 - 05 PARTICIPATING IN WEBCASTS
 - 06 READING BLOGS OR POSTS FROM CREDIBLE SOURCES
 - 07 READING NEWSPAPER OR MAGAZINE ARTICLES
 - 08 [INSERT C13h ANSWER]
 - 09 OTHER (SPECIFY)
 - 96 REFUSED
 - 97 DON'T KNOW

D. EMEP RESEARCH

presen 01 02 96	ou aware of any EMEP sponsored research other than what you may have heard about or seen ted at the conference you attended? YES NO REFUSED DON'T KNOW
[ASK D1A	A IF D1=01, ELSE SKIP TO D2]
96	vou give me an example?[RECORD VERBATIM] REFUSED DON'T KNOW
01 02 96	u belong to any professional organizations? YES NO REFUSED DON'T KNOW
D2a. Whi	A IF D2=01, ELSE SKIP TO D3] ich ones?[RECORD VERBATIM] REFUSED DON'T KNOW
D2b. Do a 01 02 96	any of the organizations you belong to convey information in a uniquely effective way? YES NO REFUSED DON'T KNOW
D2c. Wha	C IF D2b=01 ELSE SKIP TO D3] at is it that makes their communication effective? [RECORD VERBATIM] REFUSED DON'T KNOW
you'd 01 02 96	are all my questions, is there anything you didn't get a chance to say, or any other comments like to make? YES[RECORD VERBATIM] NO REFUSED (same as "no" here.) DON'T KNOW (same as "no" here)

THANK YOU!

PUBLIC SURVEY EMAIL

Questions about you and your organization...

Q1.	Which of the following best describes the type of organization you work for?
	☐ Institute of Higher Education
	☐ Government Agency
	☐ Consulting > What type of consulting?
	☐ Advocacy Organization > On what topics?
	☐ Commercial or Industrial Firm
	☐ Electric, Water, or Gas Utility
	☐ Media Organization > What type of media?
	□ Other > specify
Q2.	In which of the following areas do you spend most of your time?
	☐ Active research
	☐ Monitoring or testing
	□ Education
	□ Policy development or analysis
	☐ Advocacy, watchdog
	☐ Administrative or managerial
	☐ Development of new law or regulation
	☐ Enforcement of existing regulations
	□ Other > specify
	□ Don't know
	(End of Page 1)

We have a few questions that will help us map the scientific topics most closely followed now, and understand emerging topics. For each of the next two questions, we'd like you to mark up to three items.

Q3. Please indicate which of the following topics you track most closely? Please mark up to three topics.

	☐ Climate change
	☐ Air quality
	☐ Atmospheric deposition and ecosystem health
	☐ Human health effects of atmospheric pollution
	☐ Energy-related science and policy
	☐ Emissions modeling
	☐ Carbon sequestration
	☐ Environmental impacts of alternative energy sources
	□ Other > specify
Q4.	In which of the following areas do you anticipate that the greatest amount of scientific innovation will occur over the next decade? Please mark up to three topics. Climate change Air quality Atmospheric deposition and ecosystem health Human health effects of air pollution Energy-related science and policy Emissions modeling Carbon sequestration Environmental impacts of alternative energy sources Other > specify (End of Page 2)
Q5.	Prior to receiving this survey, had you heard of the New York State Energy Research and Development Authority (NYSERDA)? □ Yes □ No
Q6.	Prior to receiving this survey, had you heard of Environmental Monitoring, Evaluation, and Protection program (EMEP)? ☐ Yes ☐ No
	(End of Page 3)

We are interested in how you typically find and use scientific information...

☐ Academic databases (used to search peer reviewed							
☐ Academic databases (used to search peer reviewed journals)							
☐ Government or Agency websites (such as EPA, NIH, NESCAUM)							
☐ Independent research clearinghouse (Health Effects Institute or similar)							
☐ Advocacy websites							
☐ Conference proceedings							
$\hfill\Box$ Internet search (such as Google or Google Scholar	r)						
☐ Institutional library							
the number "6" indicates the product with the lowest							
RANK	1 -4	21	21	441-	541.	C41.	
	1st	2nd	3rd	4th	5th	6th	
Academic journal articles							
Academic journal articles Detailed reports including findings, datasets and descriptions of methodology like those produced by							
Academic journal articles Detailed reports including findings, datasets and descriptions of methodology like those produced by government organizations Synthesis reports or meta-analyses summarizing multiple							
Academic journal articles Detailed reports including findings, datasets and descriptions of methodology like those produced by government organizations Synthesis reports or meta-analyses summarizing multiple research projects on a single topic Executive summaries or other non-technical summaries of							
Academic journal articles Detailed reports including findings, datasets and descriptions of methodology like those produced by government organizations Synthesis reports or meta-analyses summarizing multiple research projects on a single topic Executive summaries or other non-technical summaries of research findings Short technical summaries of ongoing research projects							

Q7. Which of the following sources do you actually use? Please mark up to three sources you turn to

availability? = No; >>>> Skip to Page 6: Which of the following ways of receiving information about scientific research do you most prefer? Please mark <u>up to three</u> methods you most prefer.

(End of Page 4)

Advanced Branch: Q9 Do you ever disseminate information about research findings or research product

Q10. H	ow do you typically provide scientific information to others? [Check all that apply]
	☐ Email report or web link to peers
[☐ Verbally direct peers to an information source (through conversation)
[☐ Incorporate results into classes
[☐ Publish in a peer-reviewed journal
[☐ Host a webinar
[☐ Testify to governmental representatives
[☐ Educate advocacy organizations
[Other > specify
	(End of Page 5)
	ke to get a sense for how professionals like you prefer to receive information about
ımport	ant findings
-	Which of the following ways of receiving information about scientific research do you most refer? Please mark up to three methods you most prefer.
[☐ Information provided on standard web pages
[☐ Information distributed via listserv
[☐ Printed materials delivered by mail
[☐ Handouts obtained at conferences
[☐ Reading blogs or posts from credible sources
[Reading newspaper or magazine articles
	Professional association or industry newsletters
[Colleagues, meetings or trainings internal to your organization
	Participating in webinars or webcasts
Q12. H	ow many years have you worked in your current field?
[□ 8 years or less
[□ 9 - 19 years
	□ 20 years or more
	□ Don't know

Q13. Do you belong to any professional organizations?

\square No
Advanced Branch: Q13 Do you belong to any professional organizations? = No; >>>> Skip to Page 9: Have you ever accessed the EMEP website?
(End of Page 6)
Q14. Please check all the professional organizations that you belong to.
☐ Air and Waste Management Association (A&WMA)
☐ American Association for Aerosol Research (AAAR)
☐ American Association for the Advancement of Science (AAAS)
☐ American College of Epidemiology (ACS)
□ American Fisheries Society (AFS)
☐ American Geophysical Union (AGU)
☐ American Meteorological Society (AMS)
☐ American Society for Microbiology (ASME)
☐ Ecological Society of America (ESA)
☐ International Society for Environmental Epidemiology (ISEE)
☐ International Society of Exposure Science (ISES)
☐ Soil Science Society of America (SSSA)
☐ Other organization 1 > specify
☐ Other organization 2 > specify
☐ Other organization 3 > specify
Q15. Are there any scientific organizations that seem to provide information in a particularly effective manner?
\Box Yes
\square No
Advanced Branch: Q15 Are there any scientific organizations that seem to provide information in a particularly effective manner? = No; >>>> Skip to Page 9: Have you ever accessed the EMEP website?
(End of Page 7)
Q15a.Which organizations?

Proce	ss Evaluation of the EMEP Program	Appendix C: Survey Instruments
	-	
O16	What is it that makes it effective?	
Q 10.		
	(End of Page 8)	
Q17.	Have you ever accessed the EMEP website?	
	□ Yes	
	nced Branch: Q17 Have you ever accessed the EMEP website? = No; ey Submitted	>>>> Skip to End Page:
	(End of Page 9)	
Q18.	How often?	
	☐ Less than once a year	
	☐ Once a year	
	☐ 2-5 times per year	
	☐ 6-10 times per year	
	☐ 11-15 times per year	
	☐ More than 16 times per year	
	□ Don't know	

Thank you for your participation in this survey! Please click on "submit" to record your responses.

EMEP CONSTITUENTS

Hello. [ASK FOR NAME ON SAMPLE. WHEN PERSON ANSWERS OR IF GATEKEEPER ASKS WHY YOU ARE CALLING – READ:]

This is (INTERVIEWER) from Braun Research calling for (NAME). I'm calling on behalf of the New York State Energy Research and Development Authority (also known as NYSERDA). We are conducting a survey to assess the Environmental Monitoring, Evaluation, and Protection Program, also known as EMEP (PRON: "EE-mehp"). As part of that research, I'd like to ask you some questions about how you obtain and use scientific information.

[READ IF NECESSARY: My questions should only take about 5-10minutes.]

[READ IF NECESSARY: NYSERDA's analysis will only use summary level data and will not allow information to be attributed to any specific respondent. Your responses to this survey will be kept confidential to the extent permitted by law.]

- S1. {Interviewer: DO NOT READ Is (NAME) completing the survey?}
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[READ S2 if S1≠01, ELSE SKIP TO A1]

[IF RESPONDENT DECLINES OR INDICATES THAT THEY ARE NOT THE APPROPRIATE CONTACT – READ:]

- S2. Is there someone else there that produces or consumes scientific research that would be more appropriate for us to talk to?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[READ S3 IF S2=01, YES. ELSE, RECORD CALL STATUS IN CALL RECORD.]

S3. Can you	give me that person's name, phon	ne number, and position title?
01	YES	[RECORD NAME, PHONE NUMBER, AND POSITION
	TITLE]	
95	OTHER	[RECORD VERBATIM]
96	REFUSED	
97	DON'T KNOW	

[CALL BACK TO CONDUCT SURVEY WITH PERSON LISTED IN S3. RECORD CHANGE OF NAME IN CALL RECORD]

A. PARTICIPANT CHARACTERISTICS

1		. T:	T 1			-14			: 4:	
ı	KEADI	FIRST	i nave	some α	illestions	anour	vou ana	vour	organizatio	m
					0.0000000		,	,	O1501111	

A6.	How would you describe your organization? I'm going to read you a list and would like you to tell	me
	which ONE best describes the type of organization you work for. Would you say it's primarily an	
	[READ LIST. ACCEPT ONE RESPONSE ONLY.]	

- 08 Institute of Higher Education
- 09 Government Agency
- 10 Consulting Firm
- 11 Advocacy Organization
- 12 Commercial or Industrial Firm
- 13 Electric, Water, or Gas Utility
- 14 Media Organization
- 15 Something else_____ [RECORD VERBATIM]
- 98 REFUSED
- 99 DON'T KNOW

[READ A1a IF A1=03, CONSULTING FIRM, ELSE SKIP TO A1b]

A1a. What type of consulting firm? _____ [RECORD VERBATIM]

[READ A1b IF A1=04, ADVOCACY ORGANIZATION, ELSE SKIP TO A1c]

A1b. On what topics is your organization focused? _____ [RECORD VERBATIM]

[READ A1c IF A1=07, MEDIA ORGANIZATION, ELSE SKIP TO A2]

A1c. What type of media? _____ [RECORD VERBATIM]

- A7. I'm going to read you a list of different types of work. For each, please tell me whether or not you spend a significant amount of time doing this as part of your professional activities. Do you work in... [INSERT ITEM]: ROTATE ITEMS (a-h)
 - a. Active Research?
 - b. Monitoring or testing?
 - c. Education?
 - d. Policy development or analysis?
 - e. Advocacy?
 - f. Administrative or managerial tasks?
 - g. Development of new law or regulation?
 - h. Enforcement of existing regulations?
 - 01 YES
 - 02 NO
 - 97 REFUSED
 - 98 DON'T KNOW

professiona time doing (re anything else that you spend a <u>significant</u> amount of time doing as part of your activities? [READ IF NECESSARY: What else do you spend a significant amount of as part of your professional responsibilities?] 11 YES [RECORD VERBATIM] 12 NO 15 REFUSED
[SKIP TO A3	8 DON'T KNOW IF A2a≠01 AND A2b≠01 AND A2c≠01 AND A2d≠01 AND A2e≠01 AND A2f≠01 AND A2h≠01 AND A2i≠01]
	ich activity do you spend most of your time? [INSERT RESPONSES TO A2a-i THAT YES] [READ ANSWER CHOICES IF NECESSARY. SELECT ONE RESPONSE
01	Active Research
02	Monitoring or testing
	Education
04	Policy development or analysis
05	Advocacy
06	Administrative or managerial tasks
	Development of new law or regulation
08	Enforcement of existing regulations
09	[INSERT VERBATIM RESPONSE FROM A2i.]
96	REFUSED
97	DON'T KNOW
responsibil this area as ITEM]: RC g. Cli h. Aii i. Ati j. Hu k. En l. En m. Ca n. En	going read you a list of topics that you may or may not follow as part of your professional ities. For each one, please tell me whether or not you regularly monitor developments in part of your professional responsibilities. First, do you monitor developments in [INSERT DTATE ITEMS (a-h) mate change? requality? mospheric deposition and ecosystem health? man health effects of atmospheric pollution? ergy-related science and policy? hissions modeling? rbon sequestration? vironmental impacts of alternative energy sources? 03 YES 04 NO 98 REFUSED 99 DON'T KNOW
	e any other topic or area that you regularly monitor as part of your professional ities? [READ IF NECESSARY: What else do you regularly monitor?]
	S[RECORD VERBATIM]

- 02 NO
- 96 REFUSED
- 97 DON'T KNOW
- A9. Thinking about these or other research topics, in which research areas do you anticipate that the greatest amount of scientific innovation will occur over the next decade? [DO NOT READ. PROBE TO CODE. MARK ALL THAT APPLY.]
 - 01 CLIMATE CHANGE
 - 02 AIR QUALITY
 - 03 ATMOSPHERIC DEPOSITION AND ECOSYSTEM HEALTH
 - 04 HUMAN HEALTH EFFECTS OF ATMOSPHERIC POLLUTION
 - 05 ENERGY-RELATED SCIENCE AND POLICY
 - 06 EMISSIONGS MODELING
 - 07 CARBON SEQUESTRATION
 - 08 ENVIRONMENTAL IMPACTS OF ALTERNATIVE ENERGY SOURCES
 - 09 [INSERT A3i RESPONSE]
 - 55 OTHER (SPECIFY)
 - 56 REFUSED
 - 57 DON'T KNOW
- A10. Prior to this survey, had you heard of the New York State Energy Research and Development Authority, also known as NYSERDA?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW
- A11. Prior to this survey, had you heard of the Environmental Monitoring, Evaluation, and Protection program, also known as EMEP?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

B. SCIENTIFIC INFORMATION

[READ]: I have a few questions about how you typically find and use scientific information.

B7. When you look for scientific information to inform your work, there are a <u>variety of sources</u> you can turn to. Using a one-to-five scale where one is <u>very unlikely</u> and five is <u>very likely</u>, when you look for scientific information how likely are you to turn to [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five, where one is <u>very unlikely</u> and five is <u>very likely</u>, when you look for scientific information, how likely are you to turn to...]

- i. Academic databases (used to search peer reviewed journals)?
- j. Government or Agency websites (such as EPA, NIH, NESCAUM)?
- k. Independent research clearinghouse (Health Effects Institute or similar)?

- 1. Advocacy websites?
- m. Conference proceedings?
- n. Internet search (such as Google or Google Scholar)?
- o. Institutional libraries?
 - 06 ONE VERY UNLIKELY
 - 07 TWO
 - 08 THREE
 - 09 FOUR
 - 10 FIVE VERY LIKELY
 - 98 REFUSED
 - 99 DON'T KNOW
- B8. When you look for scientific information to inform your work, there are <u>many types of data, with different levels of detail</u>, any of which you might look for. Using a one-to-five scale where one is <u>very unlikely</u> and five is <u>very likely</u>, when you look for scientific information how likely are you to look for [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five, where one is <u>very unlikely</u> and five is <u>very likely</u>, when you look for scientific information how likely are you to look for...]

- i. Academic journal articles?
- j. Detailed reports including findings, datasets, and descriptions of methodology like those produced by government organizations?
- k. Synthesis reports or meta-analyses summarizing multiple research projects on a single topic?
- 1. Executive summaries or other non-technical summaries of research findings?
- m. Short technical summaries of ongoing research projects?
- n. Data from long-term monitoring projects?
 - 06 ONE VERY UNLIKELY
 - 07 TWO
 - 08 THREE
 - 09 FOUR
 - 10 FIVE VERY LIKELY
 - 98 REFUSED
 - 99 DON'T KNOW
- B9. Do you ever disseminate information about research findings or research product availability?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

[ASK B4 IF B3=01, YES, ELSE SKIP TO B5]

- B10. I'm going to read a list of ways you could disseminate information and would like you to tell me whether or not you use this method to provide scientific information to others. Do you... [INSERT ITEM]: ROTATE ITEMS (a-g)
 - a. Email reports or web links to peers?
 - b. Verbally direct peers to an information source (through conversation)?
 - c. Incorporate results into classes?
 - d. Publish your findings or the results of your research in a peer-reviewed journal?
 - e. Host webinars?
 - f. Testify to governmental representatives?
 - g. Educate advocacy organizations?
 - 01 YES
 - 02 NO
 - 96 REFUSED
 - 97 DON'T KNOW

B4h. Is there any other method you use to provide scientific information to others?

[READ IF NECESSARY: What else do you use to provide scientific information to others?]

- 01 YES [RECORD VERBATIM]
- 02 NO
- 96 REFUSED
- 97 DON'T KNOW
- B11. We'd like to get a sense of the best way to provide important findings or information to people like you. In thinking about the various ways you receive information right now, I'd like you to think about the usefulness of various strategies for providing scientific information. Using a one-to-five scale, where one is <u>least useful</u>, and five is <u>most useful</u>, how useful is [INSERT ITEM]: ROTATE ITEMS

[READ IF NECESSARY: On a scale of one-to-five, where one is <u>least useful</u>, and five is <u>most useful</u>, how useful is this vehicle for receiving scientific information?]

- a. Information provided on standard web pages?
- b. Information distributed via listsery?
- c. Printed materials delivered by mail?
- d. Handouts obtained at conferences?
- e. Reading blogs or posts from credible sources?
- f. Reading newspaper or magazine articles?
- g. Professional association or industry newsletters?
- h. Colleagues, meetings, or training internal to your organization?
- i. Participating in webinars or webcasts?
 - 06 ONE LEAST USEFUL
 - 07 TWO
 - 08 THREE
 - 09 FOUR
 - 10 FIVE MOST USEFUL
 - 98 REFUSED
 - 99 DON'T KNOW

B12. How many years have you worked in your current field? $01 \le 8 \text{ YEARS}$ 02 9-19 YEARS $03 \geq 20 \text{ YEARS}$ 96 REFUSED 97 DON'T KNOW B13. Do you belong to any professional organizations? 03 YES 04 NO 98 REFUSED 99 DON'T KNOW [ASK B7a if B7=01, YES, ELSE SKIP TO B7b] B7a. Which ones? [RECORD VERBATIM] 96 REFUSED 97 DON'T KNOW [ASK B7b if B7=01, YES, ELSE SKIP TO B8] B7b. Do any of the organizations you belong to convey information in a uniquely effective way? a. YES b. NO 96 REFUSED 97 DON'T KNOW [ASK B7c if B7b=01, YES, ELSE SKIP TO B8] B7c. What is it that makes their communication effective? __ [RECORD VERBATIM] 96 REFUSED 97 DON'T KNOW Have you ever accessed the EMEP website? [READ IF NECESSARY: EMEP is NYSERDA's Environmental Monitoring, Evaluation, and Protection Program.] 01 YES 02 NO 96 DON'T KNOW 97 REFUSED [ASK B8a IF B8=01, YES, ELSE END SURVEY] B8a. How often do you access the website? Would you say... [READ LIST] 01 Less than once a year 02 2 to 5 times per year 03 6 to 10 times per year 04 11 to 15 times per year 05 More than 16 times per year 96 REFUSED

97 DON'T KNOW

Those are all my questions. Thank you very much for your time!