



**PERFORMANCE MEASUREMENT  
GUIDANCE FOR COMPLIANCE AND  
ENFORCEMENT PRACTITIONERS**

**INECE EXPERT WORKING GROUP  
ON ENFORCEMENT AND  
COMPLIANCE INDICATORS**

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## FOREWORD

This guidance document is a product of the indicators project conducted by the International Network for Environmental Compliance and Enforcement (INECE). INECE is a partnership among government and non-government compliance and enforcement practitioners from over 100 countries, bringing together developed, transition and developing economies. Founded in 1989, INECE is a worldwide leader in developing networks for enforcement cooperation, strengthening capacity, and raising awareness to the importance of compliance and enforcement.

Participants at the Sixth Conference of the International Network for Environmental Compliance and Enforcement (San Jose, Costa Rica, April 15-19, 2002) called upon INECE to assist in developing environmental compliance and enforcement (ECE) indicators to better measure and manage compliance and enforcement programs. INECE is to develop uniform minimum criteria, in co-operation with its regional networks, and pilot test INECE ECE indicators. INECE through its Expert Working Group on ECE Indicators<sup>1</sup> plans to guide these activities with a view toward improving performance, public policy decisions, and environmental governance at the national, regional, and global levels, ultimately contributing to environmental improvements.

It is expected that this document will be revised and supplemented as agencies and other stakeholders gain more experience in using ECE indicators. Specifically, subsequent iterations of this or other guidance developed by INECE are likely to contain more examples from countries now only in the beginning stages of ECE indicators projects. Subsequent documents are also likely to focus more on the actual use of ECE indicators to manage and improve programs. Finally, this document focuses on national and sub-national ECE indicators and does not concentrate on international-level comparisons. This, too, will likely be addressed in subsequent documents after more experience is gained.

INECE expresses its sincerest gratitude to those who participated in the development of this guidance document. INECE offers special thanks and appreciation to the United States Environmental Protection Agency for its support in the development of this guidance document, and in particular to Michael Stahl, principal author of this document, for his leadership and vision, and to Robbi Farrell for her assistance.

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<sup>1</sup> The Expert Working Group members are Adriana Bianchi, World Bank Institute; Angela Bularga, Myriam Linster, and Krzysztof Michalak, OECD; Antonio Benjamin, Brazil; María Eugenia Di Paola, Argentina; Dave Pascoe and Rene Drolet, Environment Canada; Angélique van der Schraaf and Jo Gerardu, VROM (the Netherlands); Ladislav Miko, Czech Republic; Carolina Mauri, Costa Rica; Michael Stahl and Davis Jones, U.S. EPA; Kenneth Markowitz and Durwood Zaelke, INECE Secretariat.

INECE also wishes to thank the Organisation for Economic Cooperation and Development (OECD), the governments of Canada and the Netherlands, the World Bank Institute, and the members of the Expert Working Group for their invaluable contributions to this collaborative effort to inspire and help guide projects that create efficiencies in the way organizations foster compliance with environmental laws.

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## **I. INTRODUCTION**

### **A. Purpose and Context**

The purpose of this document is to provide guidance to environmental compliance and enforcement (ECE) practitioners for identifying, implementing and using ECE indicators. The guidance provided in this document is drawn from the experiences of countries at various stages of developing and using ECE indicators. The document was written to be useful to countries considering whether to develop indicators, those in the early or mid-term stages of an indicators effort, and those already using indicators to report to the public and make program management decisions.

Although this document was written for the purpose of assisting those involved in ECE programs, it can serve broader purposes as well. The best practices for identifying, implementing, and using performance indicators (described in Sections II, III, and IV of the document) and the benefits and barriers of performance measurement (described in Section V) apply to more than ECE programs. Staff and managers of environmental protection programs generally should also find the best practices relevant and useful, as would many personnel in a wide range of government programs.

### **B. What Are ECE Indicators?**

The word “indicator” is rooted in the Latin verb *indicare*, which means to indicate, make known, or point out. Most common definitions of “indicator” describe it as a person, thing, or device that measures, records, or declares something. Indicators can be thought of as pieces of information that provide evidence on matters of broader concern.

In this document, ECE indicators are concentrated on the performance of environmental enforcement and compliance programs. These indicators declare or make known information about operations of and results achieved by ECE programs, for the primary purpose of improving the effectiveness of such programs.

There is a significant body of knowledge and experience concerning broader environmental indicators – measurable pieces of information that inform us about the status of an area’s environmental health. Policy makers have used these indicators for years to communicate information about the state of the environment to the public.

The OECD member countries have agreed to use a framework for discussing environmental indicators known as the pressure-state-response model (see Figure 1). Under this model, indicators fall into three categories: indicators of environmental pressures (e.g., trends in air

emissions), indicators of environmental conditions (e.g., trends in ambient air quality), and indicators of societal response (e.g. air regulations). Indicators of societal responses show the extent to which society responds to environmental concerns. They refer to individual and collective actions and reactions, intended to mitigate or prevent environmental harm, remedy damage already inflicted, and preserve natural resources.

Environmental compliance and enforcement (ECE) indicators are an example of societal response indicators. As with indicators of environmental expenditures, taxes and subsidies, price structures, market shares of environmentally friendly goods and services, and pollution abatement rates, they reflect societal responses to the environmental conditions identified. Performance indicators for ECE programs, or for any government program, describe a level of activity or commitment made by government, and a set of results which contribute to an important social goal such as reducing or preventing environmental pollution.

 *For examples of ECE indicators, see Table 4 on page 14.*

### C. Definitions of Key Terms

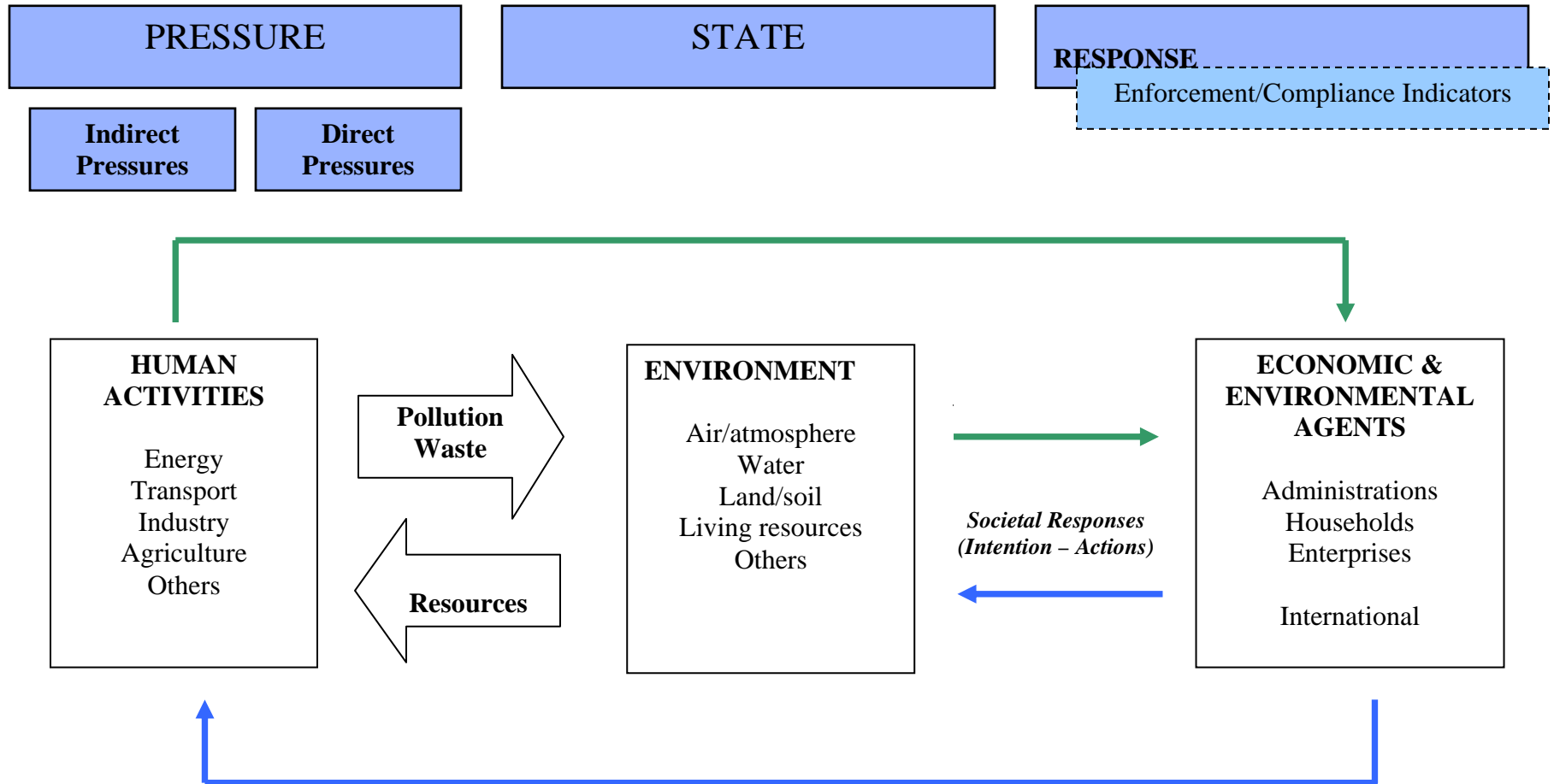
Before an in-depth discussion of ECE indicators can occur, clear definitions of some key terms are essential.

**Compliance** -- The OECD defines compliance as the behavior response to regulatory requirements. Similarly, Environment Canada defines compliance as a state of conformity with the law. Hence, compliance indicators include those measurable pieces of information that inform about regulatees' behavior response to regulatory requirements such that they conform to laws and regulations.

- **Compliance assurance** -- This is defined as the application of all available tools to achieve compliance and includes compliance promotion, compliance monitoring and enforcement.
- **Compliance monitoring** is the collection and analysis of information on compliance status (through pre-inspection and inspection reviews, ambient and emission monitoring, when needed, and other kinds of data gathering).
- **Compliance promotion** is any activity that facilitates or encourages voluntary compliance with environmental requirements.
- **Enforcement** can be defined as the set of actions that governments or others take to correct or halt behavior that fails to conform with environmental requirements.

**Inputs** -- Inputs include time, staff, funding, materials, equipment and the like that contribute to an activity. While of limited usefulness in and of themselves, they speak to the government's commitment and are important components for determining efficiency and return on investment. When considered together with outcomes, inputs can be used to determine the level of effort.

Figure 1. OECD Pressure-State-Response Model



required to achieve an outcome. Managers can use this information to analyze efficiency in their programs.

**Outputs** -- Outputs are activities, events, services and products that reach a regulatee. Examples include the number of inspections performed, the number of compliance assistance workshops provided, and the number of enforcement cases issued. These indicators demonstrate a level of effort toward an outcome, but they do not indicate the degree to which the outcome is achieved.

**Outcomes** -- Outcome indicators measure the results of an agency's outputs, and are generally divided into two categories: **intermediate** and **final outcomes**.

- **Intermediate outcome indicators** measure progress toward a final outcome, such as a change in behavior or other results that contribute to the end outcome. An example of an intermediate outcome of an inspection would be a change in facility management practices.

*✍ Further discussion about the benefits of intermediate outcomes can be found at page 13.*

- **Final outcome indicators** measure the ultimate result the program is designed to achieve, such as an improvement in ambient air quality or a reduction in the number of people living in areas in which pollutant standards were exceeded. When final outcome indicators are designed with the program's goals and objectives in mind, they should enable managers and others to determine whether the program's activities, or outputs, are achieving those goals.

*✍ A discussion about the limitations of output indicators and the need for outcome measures can be found at page 13.*

#### **D. Target Audiences for this Guidance Document**

This document provides definitions, best practices, and examples useful for anyone involved in developing or using ECE indicators. The document should be helpful to various audiences, including:

##### ***Staff and managers of ECE programs***

Indicators can be used by staff and managers of ECE programs to support an appropriate assessment framework for improving program performance. In particular, managers are considered a primary audience for the guidance since they can use ECE indicators to monitor operations, adjust strategies, allocate or redirect appropriate resources (both human and financial) to increase program impact, and enhance accountability to stakeholders and the public.

### ***Senior policymakers in environmental agencies***

Policymakers can use indicators to lead and direct their ECE programs toward performance-based management. Agency leaders can use the guidance to focus ECE programs on a more analytic and effective form of management.

### ***Legislators and budget officers***

Indicators are essential for legislators and budget officers to understand how they can get a full account of the effectiveness and efficiency of ECE programs. By requiring such programs to use performance indicators, legislators and budget officers can make better informed decisions about resource allocation.

### ***Public interest and environmental advocates***

Public interest and environmental advocacy groups can use indicators to ensure ECE programs are accountable to the public and are carrying out their mission. Representatives of non-governmental organizations (NGOs) can be a force in driving ECE programs to develop and use performance indicators.

### ***Staff of International Organizations***

International organizations can use ECE indicators as an additional performance tool when designing, monitoring, and evaluating environmental projects and programs they support.

## **E. Why Are ECE Indicators Important?**

Program managers are among the primary users of ECE indicators. Until recently, managers commonly measured program performance in terms of activity counts, or outputs, such as the number of inspections conducted and the number of enforcement cases initiated. Though outputs alone give some sense of enforcement presence and are relatively easy to measure, they do not enable analyses of the extent to which a program is achieving its goals. By identifying, designing and using more meaningful ECE indicators, managers and others can evaluate and communicate to others how well these programs respond to priority environmental problems. More specifically, program managers can use ECE indicators for three major purposes:

### ***Monitoring program operations***

ECE indicators can help to ensure that personnel and resources are used appropriately to accomplish the agency's goals. This type of analysis could compare inputs and outputs; for example, how many activities of various kinds are conducted within a given period of time with a given amount of resources. Examples include the number of inspections conducted annually and the number of enforcement warnings and charges issued per year.

### *Enhancing accountability*

ECE indicators can enhance the accountability of environmental compliance and enforcement programs that report results to central budget authorities, legislative bodies, environmental constituency groups, and the general public. Since there are multiple audiences, it is often necessary to use multiple indicators to provide a full account of program performance. Input-related indicators identify the allocation of financial and human resources. Output-related indicators show the extent of activities carried out. Outcome-related indicators show the results achieved or the effects of the activities.

When taken together, inputs, outputs and outcomes relate a given amount of resource allocation to a number of enforcement cases settled and the corresponding reduction in pollution (e.g. kilograms of pollution reduced). These indicators can also be valuable as an internal tool to motivate program staff and managers and to recognize and celebrate accomplishments.

### *Assessing program performance*

ECE indicators help program managers learn what is working and what is not working and determine what needs to be done differently to achieve desired outcomes. For many, this is the primary purpose and most important reason to invest in development and use of performance indicators. For example, managers can compare outputs (number of inspections) with outcomes (compliance rates) to examine whether more inspections lead to greater compliance. Similarly, comparing the number of inspections by sector with corresponding changes in compliance rates can help management identify sectors in which inspections have the greatest impact. Managers can look for patterns and relationships between activities and results, and make improvements where necessary. Cost-effectiveness of programs can also be examined by combining data about funds and personnel resources expended to produce certain activities or results. When used in this way, ECE indicators are an invaluable management tool.

## **F. Three-Stage Model**

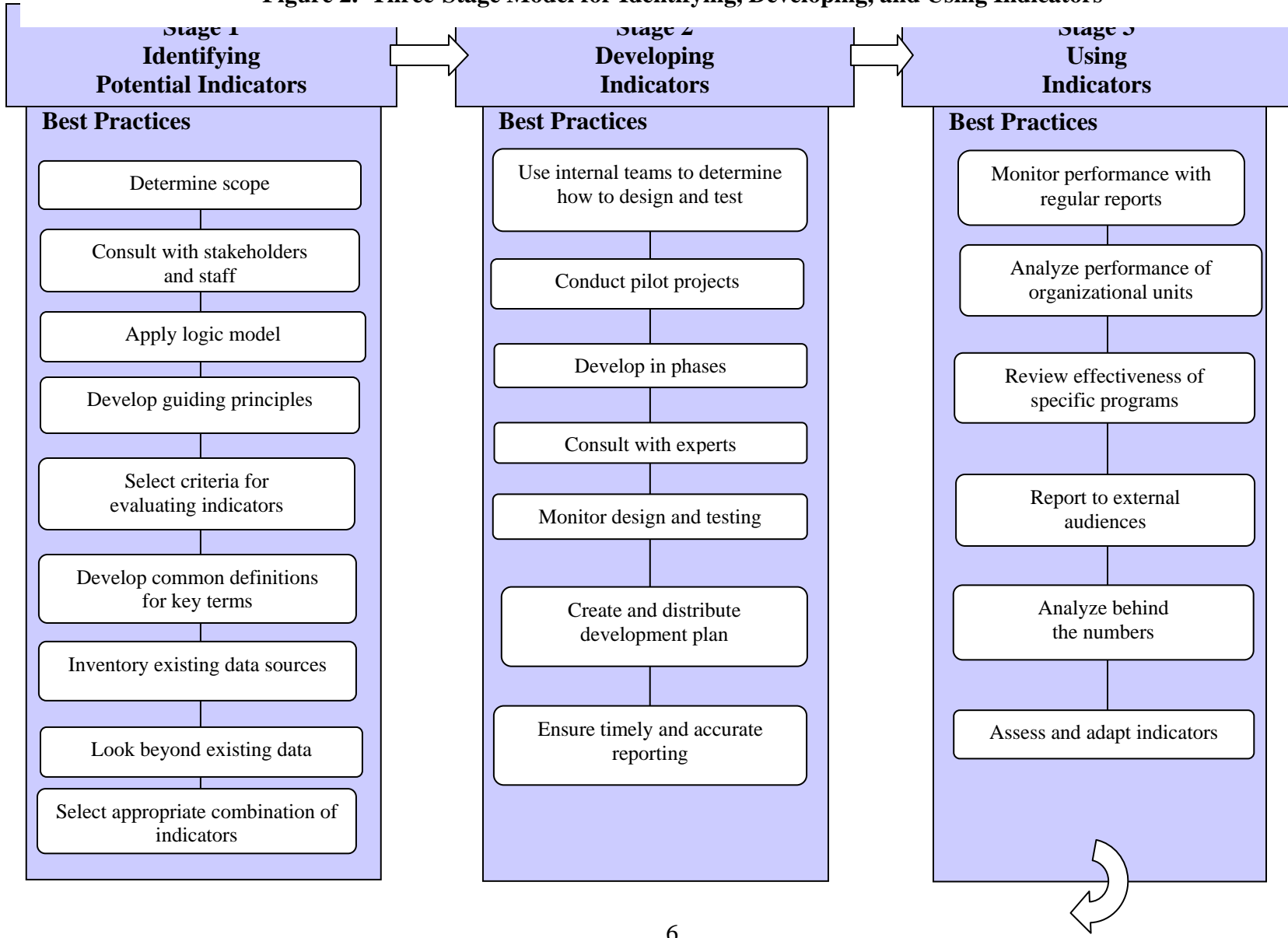
The guidance is organized around an integrated system comprised of three stages or steps: identifying potential indicators and selecting an appropriate combination; developing indicators through designing and testing; and using the indicators to improve program performance and enhance accountability to stakeholders. For each of these stages, best practices are presented. This three-stage model is summarized in Figure 2.

Although this document is built upon indicators currently in use in specific countries, it does not advocate on behalf of individual indicators or a uniform set or system of indicators. Instead, it provides practical advice about steps and practices that can be adapted for use by countries, agencies or programs so they can design indicators that meet their own needs and recognize their own constraints.

The best practices are presented in Section II on identifying indicators, Section III on developing indicators, and in Section IV on using indicators. Benefits and barriers associated with development and use of indicators are discussed in Section V. Appendices to the document

provide practical information about stakeholder consultation, types of data useful for periodic reports, and sources of additional ideas about performance indicators.

Figure 2. Three-Stage Model for Identifying, Developing, and Using Indicators



## II. STAGE 1: IDENTIFYING POTENTIAL INDICATORS

The practices described below for identifying indicators are based on the experience of national environmental enforcement and compliance programs from around the world. While all of these practices are highly recommended, they are best viewed as a menu from which national programs can choose practices appropriate for their specific situation. The practices should not necessarily be used as a step-by-step process.

### A. Determine the Scope of the Indicators


A fundamental issue that needs to be resolved at the beginning of any effort to develop indicators is the scope of the effort. Two questions need to be answered to determine the scope:

- Will the indicators be **comprehensive** (that is, will they cover all the legal and regulatory frameworks and programs for which the agency is responsible) or **focused** (covering only a specific law or requirement, industry sector, geographic area or non-compliance pattern)?
- Will the indicators be **national** (that is, covering the national compliance and enforcement program) or **sub-national** (covering a program at the regional/district, state or local/ municipal level)?

#### *Comprehensive National Indicators*

To assess the overall effectiveness and improve management of the national environmental agency's program to ensure compliance with environmental requirements in all federal statutes and regulations, indicators will need to be comprehensive and national.

Developing a set of comprehensive national indicators is very complex, since it involves many persons, multiple agencies, collection of data from many sources, and may require implementation of a national data system.

 *The U.S. EPA has developed a system of comprehensive national compliance and enforcement indicators. For more information about EPA's ECE indicators, see <http://www.epa.gov/compliance/planning/results/index.html>*

#### *Comprehensive Sub-National Indicators*

To assess the overall effectiveness and improve management of the compliance and enforcement program of a regional or district office of the national environmental agency, a state or provincial agency, or a local or municipal agency, indicators will need to be comprehensive and sub-national.

This type of effort has the advantage of being a more manageable size than a comprehensive national effort. Developing a comprehensive set of indicators at a regional, state or local level

can often provide a means of testing a system of indicators that can later be applied to the national program.

### ***Focused National Indicators***

This type of effort is necessary when a national environmental agency wants to assess the effectiveness and improve management of a focused national initiative to address a specific noncompliance pattern or environmental risk.

Focused national indicators might be developed for an inspection and enforcement initiative to improve compliance among the petroleum refining industry, a targeted enforcement initiative to improve compliance with all air pollution requirements, or a strategy that integrates incentive and enforcement to reduce emissions of a specific pollutant into water bodies.

This type of effort is also a more manageable size than the comprehensive national effort because it focuses on a specific component or piece of the national program. For a focused national effort it is often advisable to develop indicators that are short-term and specifically tailored for the initiative being measured, rather than develop permanent long-term indicators that would be necessary for a comprehensive national set of indicators.

 ***Environment Canada has developed a set of focused national ECE indicators. For more information about Environment Canada's indicators, see [http://www.ec.gc.ca/soer-ree/English/Indicator\\_series/default.cfm](http://www.ec.gc.ca/soer-ree/English/Indicator_series/default.cfm)***

### ***Focused Sub-National Indicators***

To assess the effectiveness and improve management of a focused initiative to address a specific non-compliance pattern or environmental risk at the regional, provincial/state, or local/municipal agency, use focused sub-national indicators.

This type of indicator might be developed for a regional or state effort to use inspections and enforcement to control deforestation, or a municipal initiative to combine assistance followed by enforcement actions to limit illegal dumping of waste on the land.

Focused sub-national indicators are generally short-term and specifically tailored for the initiative. Developing and using such indicators can provide a very useful learning experience for developing comprehensive national indicators at a later time.

## **B. Engage Stakeholders**

Because the target audience for ECE indicators is diverse and comprises a multitude of perspectives, consultation with all stakeholder groups is key to success in identifying, designing, and implementing indicators. Early engagement with the users – both internal to the organization as well as external groups – will provide invaluable information to help define the scope of measures and priority information needs. Stakeholder input helps to ensure that

measures will be accepted as legitimate indicators of program performance, and will have the best chance of meeting the needs of all interested parties. Stakeholder participation may also help identify all expected uses for the measures, and highlight the need to collect new or different data than that already available.

*✍ For a set of questions that can be used to guide discussions with stakeholders, see Appendix A.*

Through thorough and systematic consultation with the full range of stakeholders, much can be learned about which indicators are most meaningful, how various audiences will use indicators, and how indicators can contribute to effective program management. The table below summarizes the many ways in which ECE indicators can be used by various stakeholders.

**Table 1. Stakeholders and Uses for ECE Indicators**

<b>Stakeholder</b>	<b>How Indicators Can Be Used</b>
Government policymakers, legislators, oversight agencies	Assess progress in achieving goals, targets, standards Assess effectiveness of existing policies and instruments Identify priorities for future policy, legislation Assess program efficiency Assess costs and benefits of regulatory framework Inform budget process
Regulators	Assess effectiveness of regulations in achieving goals Identify future priorities for regulation and enforcement
Subnational/territorial authorities	Assess compliance rates by industry sector Identify implications of outcomes for planning decisions
International organizations	Assess progress in achieving international goals, targets, standards Compare progress on international goals across countries Assess program efficiencies
Industry	Compare compliance rates across sectors Assess own compliance within a sector
Environmental groups	Assess effectiveness of ECE programs Assess compliance rates in a locality Undertake citizen-based enforcement actions
General public	Understand risks to health and well-being in their locality Assure transparency and effectiveness of government

It should also be noted that efforts to identify, develop, and use ECE indicators sometimes originate from initiatives by NGOs, academia, or private sector associations. Such groups can be the starting point or catalyst for the development of ECE indicators, strongly advocating that government agencies adopt performance indicators, and working with agencies to ensure progress.


### C. Apply Logic Model

A logic model can be a useful tool for identifying performance indicators. Logic models graphically depict the relationships between resources invested, activities undertaken and the results of those activities. It should clearly demonstrate a results chain from activities to outcomes, and serve as a “road map” of how the program will achieve its goals.

The key to using a logic model is to follow logically linked stages of the program: inputs, outputs, reach, intermediate outcomes, and final outcomes. For purposes of identifying meaningful ECE indicators, the logic model can elucidate what outputs and outcomes need to be measured. If insufficient resources are available to yield the desired outcomes at the scope intended, the scope may be reduced or outcomes modified to match available resources.

**Table 2. Sample Logic Model for ECE Programs**

<b>Inputs</b> <i>resources</i>	<b>Outputs</b> <i>activities</i>	<b>Intermediate Outcome</b> <i>behavior change</i>	<b>Final Outcome</b> <i>environmental impact</i>
Personnel	Inspections conducted	Greater understanding of how to comply	Reduced pollution emissions
Funds for salaries, contracts, IT, etc.	Enforcement actions taken Fines assessed and collected	Improved environmental management practices Increased compliance	Improved ambient water quality Reduced contaminant burden in wildlife species

 *To learn more about using logic models, see Additional Resources, Appendix E of this guide.*

### D. Develop Guiding Principles

Discussions with external stakeholders and program managers and staff will often yield ideas that are broader than suggestions about specific indicators. The discussions will also capture general principles that can be used to guide the identification of indicators. These principles are valuable feedback from important audiences, and should be taken into account in the development and use of indicators. In developing its own principles, EPA drew from stakeholder input, consultation with experts and practitioners, and a literature review.

 *Examples of guiding principles can be found at Appendix B.*

## E. Select Criteria for Evaluating Potential Indicators

After external stakeholders and program managers and staff have identified potential indicators, those indicators will need to be evaluated to determine whether they should be implemented. A set of criteria should be used for this evaluation. The discussions with stakeholders can be very useful for identifying such criteria. Table 3 provides an example of selection criteria developed by the U.S. Environmental Protection Agency.


**Table 3. ECE Indicators Selection Criteria Used by U.S. EPA**

<b>Criterion</b>	<b>Description</b>
Relevant	Is relevant to goals, objectives, and priorities of the agency and to the needs of external stakeholders
Transparent	Promotes understanding and enlightens users about program performance
Credible	Is based on data that is complete and accurate
Functional	Encourages programs and personnel to engage in effective and constructive behavior and activities
Feasible	The cost of implementing and maintaining a measure does not outweigh its value to the program
Comprehensive	Addresses the important operational aspects of program performance

In applying these criteria to potential indicators it will often be necessary to compare the relevance and importance of the information produced by a potential indicator against the feasibility or cost of implementing that indicator. For example, industry representatives suggested that U.S. EPA should count the instances when companies or facilities voluntarily implement environmental management systems, and that this could be an indicator of industry commitment to environmental compliance. Though EPA felt this information could be valuable, the discussions about implementation of the indicator quickly identified that there would be difficult and costly reporting and data quality problems. The indicator was then dropped from further consideration. This tension between the value of an indicator versus its cost of implementation may come up often in evaluation of potential indicators.

## F. Develop Common Definitions for Key Terms

The importance of having a clear set of definitions at the beginning of any effort to develop indicators cannot be overstated. Defining key terms that will be used in discussions with stakeholders provides a framework for organizing ideas, and allows agency managers and external stakeholders to see how potential indicators might be used to improve management of the program.

 *Definitions of key terms can be found in Section I. These definitions can be used or modified by ECE programs as they identify, design and implement indicators.*

Of particular importance is the distinction between output and outcome. As ideas for potential indicators are suggested by stakeholders, clear definitions can be used to categorize indicators

and determine whether the set of indicators suggested provides an appropriate mix of outcomes and outputs.

### **G. Inventory Existing Data Sources**

A key step for identifying environmental compliance and enforcement indicators is to assess the existing data available to support indicators. Is data being collected that can be the basis for useful indicators? Is the data current, or the result of a study or survey that is out-of-date or no longer conducted? Is there an existing data system that collects timely and accurate data? Can it be enhanced to accommodate new indicators? For example, if data is being collected about enforcement actions issued by regional or district offices and by the national program, such data should provide basic output indicators that can be valuable in monitoring operations. Collection of enforcement action data might also be expanded to begin gathering information about results from enforcement actions (that is, pollutant reductions), thereby providing intermediate outcome indicators.

### **H. Look Beyond Existing Data**

One potential pitfall in the identification of indicators is to consider as feasible only those indicators which can be supported by data that is currently available. Many important potential indicators will not be identified or given due consideration if the search for indicators is constrained by using only existing data. If performance indicators have not been used in the past, existing data will likely be limited to activities or outputs. Measuring outcomes, however, will likely require setting up a process for collecting new data.

### **I. Select an Appropriate Combination of Indicators**

In selecting indicators it is critical to strike an appropriate balance between outputs and outcomes. A mix of output and outcome indicators will be necessary to serve the purposes of external stakeholders and program managers and staff. Further, using output and outcome indicators can allow patterns to be identified regarding what types of outputs produce the most effective outcomes. As greater understanding of these patterns is gained, program strategies can be adjusted accordingly.

Although output indicators provide basic information to program managers and provide a sense of “enforcement presence” to regulated industries and the public, output indicators have several limitations. First, they do not measure the environmental results achieved by program activities. Though they may provide insight about the number of enforcement cases taken over a period time, they do not tell program personnel or the public whether these cases reduced pollution emissions, improved facility environmental management practices, or returned the facility to full compliance. Second, output indicators reveal very little about the state of compliance. They do not tell us what percentage of the regulated universe is in compliance or what the level of compliance is in key segments of that universe. Third, output indicators say little about progress toward achieving environmental goals or addressing particular environmental problems. Knowing the number of inspections or enforcement actions does not indicate whether the

agency’s mission is being achieved, or whether a strategy to address a particular environmental problem has been successful.

In identifying and implementing environmental compliance and enforcement indicators, it should be recognized that intermediate outcomes can be a source of very valuable indicators. In fact, intermediate outcomes should be emphasized when developing and implementing indicators. The advantage of intermediate outcomes is that they are often directly caused by the activities and outputs of the program – there is no ambiguity about the causal link between the enforcement actions and the resulting pollutant reduction, for example. Unfortunately, many efforts to develop indicators falter when they focus only on outputs and end outcomes. This is because there is often at best only a very weak link between the government activity and an improvement in an environmental condition. Also, measuring changes in end outcomes can be very expensive, the end outcomes may take years to appear, and improvements in end outcomes such as air or water quality can be influenced by many factors beyond the scope of government activity. For all these reasons, intermediate outcomes should receive appropriate consideration in any effort to develop indicators.

At the end of its process for identifying potential indicators, the U.S. EPA selected a set of indicators for implementation. Those indicators are listed in Table 4.

**Table 4. Sample Output and Outcome Indicators for ECE Programs**

<b>Indicator Type</b>	<b>Indicator</b>
Outputs	Number of inspections and investigations conducted
	Number of civil and criminal enforcement actions
	Number of facilities/entities reached through compliance assistance efforts
	Number of training courses and other capacity building efforts provided to ECE programs at sub-national levels
Outcomes	Amount of pollutants reduced through enforcement actions
	Amount of soil removed, gallons of groundwater treated via enforcement actions
	Monetary value of pollution control projects required by enforcement actions
	Number of entities seeking compliance assistance from ECE program
	Actions taken as a result of assistance from ECE program
	Rate of recidivism among significant violators and average time to return to compliance
	Statistically valid compliance rates for key regulated populations

### **III. STAGE 2: DEVELOPING INDICATORS**

The development of indicators through designing and testing is a critical step that may be overlooked in the rush to begin using indicators sooner rather than later. This is the time to define accurate and reliable performance indicators in detail, pilot test them and correct mistakes before reporting indicator data to the public or using it to assess and improve performance. As mentioned in the previous section on identifying indicators, the practices described below are best viewed as a menu from which to choose rather than a step-by-step process.

#### **A. Use Internal Teams to Determine How to Design and Test**

One approach for completing the design is to develop teams within the organization to define the selected indicators in precise detail, review relevant data already available, develop information collection and reporting processes as needed, and establish a schedule for testing and implementing the indicators. These work groups can be very useful in identifying and overcoming barriers to effective implementation. They will have the added benefit of involving staff and increasing their sense of ownership of the new indicators.

#### **B. Conduct Pilot Projects**

The use of pilot projects to develop environmental compliance and enforcement indicators is highly recommended. Pilot projects provide a period of time for indicators to be developed and tested before being implemented fully. During this period, data can be analyzed, indicators can be refined or adjusted, and mistakes can be corrected. Pilot projects can be designed to test indicators on a small scale (for example, a focused sub-national project as described above), and can then be expanded and applied on a larger scale (for example, a comprehensive national project). Pilot projects are most helpful when there is a concerted effort to identify the lessons learned from the project at its conclusion.

#### **C. Develop in Phases**

For environmental compliance and enforcement programs developing multiple new indicators, it is advisable to implement in phases over a reasonable period of time. Although this may mean that the full set of indicators is not available in the immediate future, the time spent developing them produces more accurate information and spreads the burden over a more manageable period of time.

#### **D. Consult with Experts**

When sufficient internal expertise does not exist, agencies should not hesitate to bring in outside experts to fill in knowledge gaps when developing performance indicators. This can be particularly helpful when developing complex measures, such as statistically valid compliance rates. Experts in sampling, statistical analysis, and performance-based management of public programs can provide useful assistance. They can help determine whether potential indicators meet the criteria set forth in Section II.E. (page 11) above.

### **E. Monitor the Design and Testing**

Developing a new indicator or set of indicators requires ongoing management attention to ensure that the appropriate data is collected, that it is collected in an efficient manner, and that the indicators provide the understanding of program performance anticipated. Monitoring these tools can also help determine whether certain indicators need to be dropped from or added to the implementation effort.

### **F. Create and Disseminate a Development Plan**

It is important that a plan is developed that describes the tasks to be completed to implement new indicators, and provides a schedule of deadlines for completion of the tasks. The plan should also clearly spell out the uses for the new indicators. The plan should be disseminated to program managers and staff, and to external stakeholders as appropriate.

### **G. Ensure Timely and Accurate Reporting**

Reporting of data, especially data to support new indicators, by internal or external parties will need to be reinforced through multiple communication mechanisms on an ongoing basis. Steps will also need to be taken to ensure the quality of the data (e.g., random data audits, sampling and verification of specific data fields) through a continuous program of quality control. One of the most effective ways of ensuring timely and accurate reporting is for senior managers to demonstrate that they are using indicators to make decisions about program strategy and resource allocation.

## IV. STAGE 3: USING INDICATORS

Performance indicators can serve many purposes. Public management literature suggests a wide variety of uses for performance indicators by public sector programs and organizations. Among the most common uses are:


- Support strategic and other long-term planning efforts
- Improve program effectiveness
- Identify performance problems and needed corrections
- Provide data for in-depth program evaluations
- Communicate with public and enhance accountability
- Help make operational and resource allocation requests
- Formulate and justify budget requests
- Motivate personnel to make program improvements

Performance indicators that can be used for all, most, or even some of these purposes can be of great benefit to a program or agency.

For environmental compliance and enforcement programs, there are at least four ways to use performance indicators. These practices are highly recommended, but are best viewed as a menu from which to choose, rather than a step-by-step process.

### A. Monitor Performance with Regular Reports

A monthly or quarterly report on performance indicators can be provided to program managers and staff. These reports can provide a current account of performance in producing key outputs and outcomes. Such reports can be organized to break out data for a program as a whole, or for various program components. In addition to data about performance indicators for the current year, the reports should also provide data about performance in the previously completed fiscal/calendar year to provide a benchmark.

 *Appendix C provides examples of the types of data that can be included in a monthly or quarterly report.*

### B. Analyze Performance of Organizational Units

Data from indicators can be organized to provide a current report of performance by a particular organizational unit, such as a regional or provincial office of a national agency. These reports could contain data about performance in the current fiscal/calendar year, three-year trends on key outputs and outcomes, and comparisons to performance of other regional offices. Such reports can lead to identification of specific program management and performance issues that might need to be addressed by managers of the organizational unit.

### **C. Review Effectiveness of Specific Programs**

Data from indicators can be used to review the effectiveness of particular programs (e.g., compliance with clean water laws or requirements). Studies of the effectiveness of specific programs could be organized around six performance-based questions that provide a framework for analysis. The six questions are:

- Is the program contributing to the goal of protecting human health and the environment through its actions and strategies?
- Is the program changing the behavior of the regulated community in ways that lead to improved environmental performance?
- Is the program achieving appropriate levels of compliance in key populations?
- Are we achieving the appropriate levels of enforcement activity in the regulated community?
- Is the program providing appropriate assistance to our state, provincial, and local partners to support them in contributing to improving environmental performance?
- Are resources being used efficiently to achieve optimal results?

Under each question, the relevant performance indicators are arrayed to address the question as thoroughly as possible. The framework allows data about results and the activities that produced them to be analyzed. These data can be examined for patterns and more can be learned about the combinations, types, and amounts of activities that produce the most desirable results.

### **D. Report to External Audiences**

Many environmental agencies provide reports to the public in response to laws or policies requiring such reports. For environmental compliance and enforcement programs, performance indicators can provide valuable information to the public, legislative overseers, regulated industries, and environmental organizations. Such programs can be well-served by providing an annual report to external audiences. Reports that emphasize results and outcomes achieved through activities and outputs of the program can enhance support for the compliance and enforcement mission. By describing accomplishments in terms that emphasize results – pounds of pollution reduced through enforcement actions, improved practices at facilities from compliance assistance, improved rates of compliance in an industry sector – an account of performance is provided that is meaningful to multiple audiences.

### **E. Analyze Behind the Numbers**

When using indicators to improve performance, program managers and staff should understand that data from indicators have their limitations. A number that provides the amount of an output or outcome produced does not tell program personnel all they need to know about that output or outcome. Such numbers need a context (e.g., a time period, a benchmark or standard for comparison, etc.) to realize their full value as a management tool. In many instances, data from indicators provide a kind of warning light that signals a need for deeper analysis or further investigation to understand the forces and influences that shape program performance.

## **F. Assess and Adapt Indicators**

After indicators have been implemented and are being used, ECE program managers and staff should be prepared to solicit, compile, and act on feedback about ECE indicators. This can be done immediately after implementation and on a continuous basis, or as a structured review after a suitable period (perhaps 1-3 years) of actually using the indicators. The assessment of indicators should involve stakeholders who can comment on the indicators as a device for explaining program activities and results to the public; policy-makers who may influence the level of budgetary resources for the agency; and program managers and staff who have actually used the indicators as a management tool for directing and improving the performance of the ECE program.

## **V. BENEFITS AND BARRIERS TO IDENTIFYING, IMPLEMENTING AND USING INDICATORS**

Environmental compliance and enforcement programs that undertake an effort to identify, implement, and use performance indicators will reap many benefits and confront many barriers during that effort. The benefits can be very rewarding and the obstacles very daunting. To help programs and agencies anticipate both the benefits and the barriers, some of the most important are described below.

### **A. Benefits of ECE Indicators**

When programs or agencies are able to establish a set or a system of performance indicators for their compliance and enforcement efforts, the indicators often provide a steering mechanism for program managers and staff, a window through which the public can view results and ensure program accountability, and a demonstration to regulated facilities and companies that compliance is expected and taken seriously.

For practitioners in environmental compliance and enforcement programs, the benefits of performance indicators include the following.

#### ***Improved Control of Program Operations***

Even a very basic set of output indicators will increase understanding about what is being accomplished, and when combined with data about inputs, judgments can be made about whether resources are being used efficiently. At a minimum, basic output indicators can help determine whether program staff are performing fundamental program activities.

#### ***Improved Ability to Set Goals and Adjust Strategies***

By using indicators as a management tool, goals can be set regarding the amount of activities or results that should be produced over a period of time. Indicators can also be used to identify needed adjustments in the mix of activities or results the program is producing.

#### ***Improved Decision-Making for Resource Allocation***

Output and outcome indicators can be analyzed to determine whether resources need to be increased, shifted, or altered in some way to meet goals and achieve desired results. Indicators provide an understanding of the relationship between outputs and outcomes, thereby enhancing the ability of program managers to increase resource investment in preferred outcomes.

#### ***Improved Ability to Identify and Correct Performance Issues***

Indicators that can be organized by type of output or outcome, by organizational unit, and by program area increase program managers' ability to identify performance problems and investigate them further to design solutions.

### ***Improved Ability to Motivate Employees***

There is much truth to the oft-repeated statement that “What gets measured gets done.” Performance indicators send a clear signal to program personnel about what needs to be accomplished. Setting a goal to achieve a certain amount of a specific output tends to organize and focus some portion of resources on achieving the goal.

### ***Improved Ability to Communicate with the Public***

Performance indicators help external audiences understand and support program activities. Output indicators can convey to the public that funds are producing some amount of inspections, enforcement actions, or other activities. Outcome indicators can convey that these activities are resulting in important outcomes such as reduced pollution, increased compliance, and improved environmental management at facilities.

## **B. Barriers to Development and Use of ECE Indicators**

There are many obstacles that impede the identification, implementation and use of performance indicators by environmental compliance and enforcement programs. Some of these obstacles are broad, institutional issues that affect adversely the overall operation of the whole environmental agency, not just its compliance and enforcement program. Other obstacles are more narrow but still troublesome, and they pertain to the difficulties surrounding performance measurement in general.

For developing and transitioning countries, there are at least four barriers that impede the development and use of indicators.

### ***Compliance Culture in Formative Stages***

In many countries, the obligation to comply with environmental (and other) requirements is not yet ingrained deeply. In some countries, the rule of law is not yet embraced fully by citizens, businesses, and institutions of government.

### ***Environmental Laws Not Fully Developed or Implemented***

Environmental laws may be relatively new, they may have undergone significant changes, there may not be much experience with the implementation of these laws or sections of the laws, and there may be impediments to implementation of specific sections of the laws.

### ***Environmental Agencies Not Mature***

The operation of environmental agencies may not be very sophisticated, they may possess limited capabilities and they may have severe resource shortages, and may even be struggling for viability.

### ***Systematic Data Collection Lacking***

Some countries lack data systems or may be only beginning to develop them. In the absence of organized efforts to report and collect data, even basic output indicators are difficult to establish.

These challenges are inter-related. For example, developing a compliance culture may be impeded in countries where environmental laws are not fully functional, and the lack of data reporting and collection systems may slow the effectiveness of environmental agencies. Finally, the fundamental tension between economic development and environmental protection is often exacerbated in developing and transitioning countries. The emphasis on economic improvement or expansion can often cause environmental protection to be a low priority for government attention.

Other barriers to development and use of ECE indicators are common to developed countries, though they can also be obstacles to developing and transitioning countries as well.

### ***Duration of Implementation***

Identifying and implementing a useful set or system of performance indicators takes time. Most of the agencies making progress in developing and using performance indicators have taken three or more years to establish them. An effort of this duration requires persistence, a long-term commitment, and continuity among the responsible personnel.

### ***Lack of Interpretive Skills***

Even if programs are able to establish indicators, interpreting their meaning -- “understanding what’s behind the measures” -- requires a sophisticated understanding of program operations and a skill for diagnosing problems. Often these skills are in short supply, particularly in initial attempts to use indicators to identify performance issues.

### ***Misuse by External Audiences***

When indicators data are shared with the public, there is an increased likelihood that such data will be inadvertently or knowingly misused by advocacy groups. This prospect often discourages program managers from initiating an effort to establish indicators. Or, if there is an instance of misuse, program managers reduce their support or even discontinue the effort to develop and use indicators.

### ***Inherent Limitations of Indicators***

As mentioned previously (see page 18, “Analyze Behind the Numbers”), ECE indicators provide information that signals a need for deeper analysis. They raise questions about program performance but, by themselves, do not answer those questions. For this reason, ECE program managers and staff may view indicators as a test for which the benefits of using them are not proportionate to the burden of establishing them.

## APPENDICES

## **APPENDIX A. Questions to Guide Stakeholder Discussions**

### ***Questions for all stakeholders***

- What criteria should be used to identify appropriate performance indicators?
- What makes a ‘good’ performance indicator – relevance, transparency, feasibility?
- Are there particular indicators that seem most promising?
- Are there indicators that are most urgent for EPA to adopt?
- What are the strengths and weaknesses of the three categories of performance indicators – outputs, intermediate outcomes and final or end outcomes?

### ***Questions for sub-national environmental agencies***

- Are sub-national ECE programs currently measuring outcomes of enforcement actions?
- Are sub-national ECE programs currently measuring compliance assistance outputs and their impacts?
- Are sub-national ECE programs able to use end outcome indicators to measure the performance of their enforcement and compliance assurance program?

### ***Questions for industry associations***

- How can information be collected to develop compliance rates that are based on representative samples of industry sectors?
- What information would be needed to measure positive change or achievements in environmental management by regulated entities? How would such information be collected?
- How could an ECE program structure categories of violations or enforcement actions to differentiate levels of harm or gravity?
- How can information be collected about the number of facilities or companies that have implemented environmental management systems?

### ***Questions for environmental advocacy groups and other non-governmental organizations***

- How can an ECE program more effectively measure the deterrent effect of its enforcement actions?
- What changes should be made to current ECE output indicators? Are there current indicators that should be reduced or eliminated to make room for outcome indicators?

### ***Questions for other national regulatory agencies***

- Are other national agencies measuring the outcomes or results of enforcement actions?
- Are other national agencies measuring the outputs or outcomes associated with compliance assistance or other non-enforcement approaches to compliance?
- Are other national agencies using compliance rates to measure performance? Are any of these agencies using sampling techniques to make compliance rates statistically valid?

*Questions for budget oversight agencies*

- What indicators are currently used by such agencies to evaluate the performance of enforcement and compliance assurance programs?
- Are there other indicators such agencies would prefer as supplements or replacements for current indicators?

## **APPENDIX B. Guiding Principles for Efforts to Develop and Use Indicators**

***A combination of indicators – outputs and outcomes, quantitative and qualitative, statistical and narrative, aggregated and disaggregated, national and local -- is necessary to measure performance, inform management, and serve the full range of audiences and purposes.***

No single number, fact, or category of measure (e.g., output or outcome) can convey all the information necessary to comprehensively measure performance. For example, the mission of U.S. EPA's enforcement and compliance assurance program is complex. Its responsibilities are multiple, and the tools used to achieve them are multi-faceted. Therefore, a variety of performance measures is needed to ensure accountability, improve management, and increase program effectiveness.

***Performance indicators are most effective when they reflect management priorities and are linked to a limited number of program goals and objectives.***

Successful performance measures demonstrate the degree to which organizations or programs are achieving their goals and desired results. The number of measures should be limited to key performance elements essential for producing data that aids program evaluation and decision-making. Performance measures should reflect those operational aspects (e.g., quality, fairness, timeliness, cost, etc.) considered to be management priorities.

***Increased use of outcome indicators presents many challenges, because agencies or programs may influence – but not necessarily control – outcomes.***

Outcomes cannot generally be attributed or causally linked solely to the activities of an agency or program since most outcomes are influenced by many factors external to the agency. For example, compliance rates might be influenced by economic conditions that are conducive to investment in environmental management by companies or facilities. Agencies need to be careful not to take too much credit for successful achievement of outcomes; nor should they probably take too much blame when outcomes are not achieved.

***Problem-specific, tailor-made performance indicators are effective for evaluating performance in solving specific environmental and non-compliance problems.***

When agencies or programs identify and target high-risk, high-priority environmental or noncompliance problems, their performance in mitigating or solving such problems can best be evaluated using tailor-made indicators that specifically relate to each problem.

***Performance measures should be used principally to improve effectiveness and manage more strategically, rather than simply to report accomplishments to the public in a more interesting way.***

If developed and used correctly, performance indicators should permit more sophisticated analysis of results and activities that produced them, allow comparisons of the relative effectiveness of specific tools and strategies, and lead to informed resource allocation that is more likely to achieve the desired results. A well designed and wisely utilized set of performance indicators can put strategy and vision, goals and objectives at the center of management attention.

## APPENDIX C. Examples of Data for Monthly/Quarterly Reports

### ➤ Number of inspections conducted

Data organized by:

- ▶Regional/provincial office
- ▶Statute or program area

### ➤ Number of enforcement actions issued

Data organized by:

- ▶Type of action (e.g., civil, criminal)
- ▶Regional/provincial office
- ▶Statute or program area

### ➤ Monetary value of fines/penalties assessed

Data organized by:

- ▶Type of action (e.g., civil, criminal)
- ▶Regional/provincial office
- ▶Statute or program area

### ➤ Monetary value of investments in pollution control/beneficial projects<sup>2</sup>

Data organized by:

- ▶Type of action (e.g., civil, criminal)
- ▶Regional/provincial office
- ▶Statute or program area

### ➤ Enforcement actions resulting in improved facility practices

Data organized by:

- ▶Type of practice
- ▶Regional/provincial office
- ▶Statute or program area

### ➤ Enforcement actions resulting in pollution reduction

Data organized by:

- ▶Type of pollutant

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<sup>2</sup> Some countries have authority to require violating companies to invest in pollution control or beneficial projects as a condition of setting or concluding an enforcement action.

- ▶Regional/provincial office
- ▶Statute or program area

➤ Regulated entities reached through compliance assistance

Data organized by:

- ▶Industry sector
- ▶Type of assistance
- ▶Regional/provincial office
- ▶Statute or program area

➤ Increased awareness, improved practices, pollution reduction through compliance assistance

Data organized by:

- ▶Type of result
- ▶Type of assistance
- ▶Regional/provincial office
- ▶Statute or program area

## **APPENDIX D. Indicators for International Comparisons**

ECE indicators can be developed for assessing progress in implementing national programs. There are many advantages, however, in developing indicators that can be used for international comparisons of individual country efforts in meeting national and international objectives. By considering OECD's Core Set of Environmental Indicators as they develop their own, developing and transitioning countries will be better positioned to make comparisons of their programs with those of other countries using the same indicators.

The OECD, when initiating its programs of environmental indicators, recognized that there is no universal set of indicators; rather, several sets exist, corresponding to specific purposes and uses. Within this framework, a Core Set of Environmental Indicators has been designed to help track environmental progress and the factors involved in it, and analyze environmental policies. The OECD countries commonly agreed upon the use of the OECD Core Set, which is published regularly and is available on OECD's website at [www.oecd.org/env](http://www.oecd.org/env). The Core Set contains some 50 indicators, and covers issues that reflect the main environmental concerns in OECD countries. It incorporates core indicators derived from sectoral sets and from environmental accounting. Indicators are classified following the PSR model: Indicators of environmental pressures, both direct and indirect; indicators of environmental conditions; indicators of society's responses. This approach has also been embraced by other international organizations, including the United Nations Headquarters and United Nations regional offices, the United Nations Environment Programme, the World Bank, and the European Union.

The cooperation among OECD Members (or within the OECD framework) focused on identifying commonalities and comparable elements. OECD countries have used the indicators as part of OECD "peer reviews," in which a group of like-minded countries work together on improving their individual and collective performance in environmental management. These reviews assist individual governments to assess progress, promote continuous policy dialogue among the countries, and stimulate greater accountability of their governments towards public opinion within their countries, the OECD and beyond.

The list of issues covered by the OECD Core Set of Environmental Indicators was not considered as final and exhaustive. The measured characteristics have been undergoing changes as scientific knowledge and policy concerns evolved. Furthermore, since the issues have been of varying relevance for different countries and different contexts, a certain balance had to be kept between the need for flexibility and the need for longer term monitoring and analysis. In this context, each country adapts and supplements the Core Set with additional indicators of its own particular interest. Over time the list will be expanded with indicators of progress of both social and environmental factors. Common international work on ECE indicators is expected to contribute to this process.

## APPENDIX E. Additional Resources

The following articles and publications contain useful information about identifying, implementing, and using performance indicators for government programs, and specifically for environmental compliance and enforcement programs. These articles can be very helpful to practitioners and stakeholders at any stage of development and use of ECE indicators.

Behn, Robert D., *Rethinking Democratic Accountability*. The Brookings Institution, Washington, D.C., 2001.

\_\_\_\_\_, “Why Measure Performance? Different Purposes Require Different Measures,” in *Public Administration Review*, Vol. 63, No. 5, pp. 586-606 (2003).

Hatry, Harry P., *Performance Measurement: Getting Results*. Urban Institute Press, Washington, D.C. (1999).

International Network for Environmental Compliance and Enforcement and Organisation for Economic Co-operation and Development, *Measuring What Matters, Proceedings from the INECE-OECD Workshop on Environmental Compliance and Enforcement Indicators*, 3-4 November, 2003, OECD Headquarters, Paris, France.

\_\_\_\_\_, “Environmental Compliance and Enforcement Indicators: Measuring What Matters,” Workshop Background Paper, in *Measuring What Matters, Proceedings from the INECE-OECD Workshop on Environmental Compliance and Enforcement Indicators*, 3-4 November, 2003, OECD Headquarters, Paris, France.

Lumb, A.B., “Review of Work on Performance Indicators for the Measurement of Enforcement Actions”, contract report to Environment Canada, 2003.

Stahl, Michael M., “Performance Indicators for Environmental Compliance and Enforcement Programs: The U.S. EPA Experience,” in *Measuring What Matters, Proceedings from the INECE-OECD Workshop on Environmental Compliance and Enforcement Indicators*, 3-4 November, 2003, OECD Headquarters, Paris, France.

Wholey, Joseph. “Performance-Based Management,” in *Public Productivity and Management Review*, Vol. 22, No. 3, March 1999.