MEASURING RESULTS OF ENVIRONMENTAL REGULATION AND COMPLIANCE ASSURANCE
Guidance for countries of Eastern Europe, Caucasus, and Central Asia
MEASURING RESULTS OF ENVIRONMENTAL REGULATION AND COMPLIANCE ASSURANCE: Guidance for countries of Eastern Europe, Caucasus, and Central Asia
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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This report is also available in Russian under the title:

Оценка результатов экологического регулирования и контроля: Набор общих подходов для стран Восточной Европы, Кавказа и Центральной Азии

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FOREWORD

The current Guidance is the first publication in a series of methodological papers meant to improve performance measurement systems within government authorities responsible for environmental regulation and compliance assurance in countries of Eastern Europe, Caucasus, and Central Asia (EECCA). It provides an overall analytical framework that countries could use to modernise performance indicators and companion diagnostic approaches. The need for such modernisation stems from the increasing pressures on governments to demonstrate that their interventions bring benefits to society. The promotion of improvements in performance management systems has been the most common response to such pressures, in EECCA and elsewhere.

In line with this general trend, governments have been looking for better indicators that could equip various stakeholders with accurate, impartial, and easy-to-understand information that describes systems of environmental regulatory management and compliance assurance (ERC). Demand for ERC indicators is rising as recognition is growing that continuous feedback from practice is needed to correct environmental legislation and policies. Also the gradual adoption of performance-oriented budgeting by EECCA countries has played an important role in stimulating intra-government demand for improved indicators and assessment frameworks.

The Guidance is designed to help environmental authorities in EECCA to respond, at least in part, to the above-mentioned demands. Based on good international practice, it provides policy recommendations that take account of existing institutional capacity and conditions in EECCA. The Guidance was shaped up by the results of two country studies in Armenia and Russia, a regional inventory of indicators used by environmental enforcement authorities, and debates within the Regulatory Environmental Programme Implementation Network (REPIN) of EECCA. It builds upon principles and methodological documents, developed by the OECD, UNDP, and Eurostat to improve statistics. Also recommendations provided by the International Network for Environmental Compliance and Enforcement (INECE) and lessons learned from reforms in OECD countries constituted important sources of inspiration for the Guidance. In 2009-2010, the Guidance will be complemented with a terminological standard, and a handbook explaining in more detail the design and use of performance indicators for environmental enforcement authorities (EEAs). In particular, the handbook will present “indicator fiches” for a core set of ERC indicators.

The development of this document is one of the activities undertaken within the OECD programme of work with non-member countries in the context of the Task Force for the Implementation of Environmental Action Programme for Central and Eastern Europe (EAP Task Force), for which the OECD Environment Directorate serves as a secretariat. Angela Bularga is the principal author of this document. Important inputs to its development were provided by REPIN members, most importantly Roza Julakyan (Armenia), Marina Yanush (Belarus), Dimitri Glonti and Elena Yakobidze (Georgia), Taisia Neronova (Kyrgyzstan), Kazken Orazalina (Kazakhstan), Mihai Mustea (Moldova); Vladimir Schwartz (Russia), and Artur Mustafin (Uzbekistan). Also experts from USEPA, most importantly Jon Silberman and Paul Borst, commented the guidance in their personal capacity. Zoya Savchenko provided support during the research phase of the project. At OECD, the guidance was reviewed by Krzysztof Michalak, Myriam Linster, Eugene Mazur, and Carla Bertuzzi. The project was implemented under the overall guidance of Brendan Gillespie.

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# TABLE OF CONTENTS

1. **INTRODUCTION** ........................................................................................................ 9  
   Background .................................................................................................................... 9  
   Purpose and scope of the Guidance .............................................................................. 9  
   Target audience ........................................................................................................... 9  

2. **BASIC NOTIONS** ..................................................................................................... 11  
   Performance measurement and indicators ................................................................... 11  
   Programme matrix ......................................................................................................... 12  
   Major types of environmental indicators .................................................................... 13  

3. **DEFINITION AND PURPOSE OF ERC INDICATORS** ........................................ 14  
   Definition .................................................................................................................... 14  
   Purpose of performance measurement ...................................................................... 14  

4. **THE CONCEPTUAL FRAMEWORK FOR ERC INDICATORS** .............................. 15  
   Theoretical basis underlying major categories of ERC indicators .............................. 15  
   Possible causal links within regulatory management and compliance assurance .......... 16  
   Correlation with programme elements and budgets ................................................ 17  
   Adaptation to target audiences .................................................................................. 19  

5. **STRUCTURING ERC INDICATORS** ...................................................................... 20  
   Disaggregation by regulated segments ....................................................................... 20  
   Issue-specific breakdown ............................................................................................ 20  
   Territorial breakdown .................................................................................................. 21  
   Disaggregation by types of instruments ....................................................................... 21  
   Disaggregation by the outcomes of procedures ......................................................... 22  

6. **DIAGNOSTIC APPROACHES** ............................................................................... 23  
   Comparison with plans and targets ............................................................................ 23  
   In-depth analysis of unwanted events ......................................................................... 23  
   Use of ratios and composite indicators ....................................................................... 23  
   Timeliness of response ................................................................................................. 24  
   Understanding demand ............................................................................................... 24  
   Trends and links to interventions ................................................................................. 24  

7. **INFORMATION DISCLOSURE** ............................................................................ 26  
   Reporting .................................................................................................................... 26  
   Communication mechanisms and products .................................................................. 27  
   Visual presentation of data ......................................................................................... 27  
   Limitations in disclosing information .......................................................................... 27  

8. **POSSIBLE CONSTITUENT ELEMENTS OF A CORE SET OF ERC INDICATORS** ... 28  
   Selection approach ...................................................................................................... 28  
   Regulatory quality indicators ..................................................................................... 28  
   Compliance assurance indicators ............................................................................... 30  
   Compliance indicators ................................................................................................ 32  
   Headline ERC indicators ............................................................................................. 33  
   Parameters to be monitored ....................................................................................... 34
9. INSTITUTIONAL FRAMEWORK FOR PERFORMANCE MEASUREMENT .......... 35
   Minimum criteria for the institutional framework ...................................... 35
   Standardisation of terminology and data collection........................................ 35
   Data management systems ............................................................................. 36
   Measuring and comparing performance of sub-national units.......................... 36
   Assessment of organisational capacity ............................................................ 36
   Mechanisms for feedback and partnerships ..................................................... 37

10. A ROADMAP FOR REFORMING PERFORMANCE MEASUREMENT SYSTEMS 38
   Step 1: Make a policy decision to reform indicators ...................................... 38
   Step 2: Ensure stakeholder involvement and study demand............................... 39
   Step 3: Assess the baseline and define the goals and sequence of reform ........... 39
   Step 4: Conduct pilot projects ........................................................................ 40
   Step 5: Enact a new performance measurement framework and monitor results .......................................................... 40
   Challenges and constraints to overcome ............................................................ 40

GLOSSARY OF MAJOR TERMS ............................................................................. 41
BIBLIOGRAPHY ....................................................................................................... 44
ANNEX 1. CRITERIA USED TO SELECT INDICATORS AND ENSURE DATA QUALITY 47
ANNEX 2. OECD SETS OF ENVIRONMENTAL INDICATORS ................................. 49
ANNEX 3. POSSIBLE INPUT INDICATORS ............................................................ 50
ANNEX 4. ROOTS OF NON-COMPLIANCE ............................................................. 51
ANNEX 5. HINTS ON VISUAL PRESENTATION OF DATA .................................... 52
ANNEX 6. HINTS ON DESIGNING SPECIALISED DATABASES AND SOFTWARE ...... 53
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEI</td>
<td>Core Environmental Indicators</td>
</tr>
<tr>
<td>EAP TF</td>
<td>Task Force for the Implementation of the Environmental Action Programme for Central and Eastern Europe</td>
</tr>
<tr>
<td>EEA</td>
<td>Environmental enforcement authority</td>
</tr>
<tr>
<td>EECCA</td>
<td>Eastern Europe, Caucasus and Central Asia</td>
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<tr>
<td>ERC Indicators</td>
<td>Indicators for Environmental Regulatory Management and Compliance Assurance</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>Eurostat</td>
<td>Statistical Office of the European Communities</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>KEI</td>
<td>Key Environmental Indicators</td>
</tr>
<tr>
<td>IMPEL</td>
<td>The European Union Network for the Implementation and Enforcement of Environmental Law</td>
</tr>
<tr>
<td>INECE</td>
<td>International Network for Environmental Compliance and Enforcement</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>MEA</td>
<td>Multilateral environmental agreements</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<tr>
<td>PSR</td>
<td>Pressure-State-Response</td>
</tr>
<tr>
<td>REPIN</td>
<td>Regulatory Environmental Programme Implementation Network</td>
</tr>
<tr>
<td>SME</td>
<td>Small and medium-sized enterprise</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environmental Programme</td>
</tr>
<tr>
<td>UNECE</td>
<td>United Nations Economic Commission for Europe</td>
</tr>
<tr>
<td>US EPA</td>
<td>United States Environment Protection Agency</td>
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</tbody>
</table>
EXECUTIVE SUMMARY

Indicators are an indispensable element of evidence-based decision-making. In the field of environmental management, indicators cover pressures from human activities, environmental conditions, and societal responses. The latter category of indicators is still insufficiently advanced. In particular, there is a lack of internationally-agreed indicators that would characterise the governments’ regulatory and compliance assurance efforts and changes in compliance and environmental results associated directly with these efforts.

The current document is a contribution towards redressing this imbalance. It was produced in response to demands from countries of Eastern Europe, Caucasus, and Central Asia (EECCA) to facilitate the adoption and use of tools that support performance-oriented management by, and enable regional benchmarking between, environmental enforcement authorities. To this end, an analytical framework for performance measurement within systems of environmental regulatory management and compliance assurance (ERC) is proposed. It provides the basis for recommending the following lines of policy action in EECCA countries:

- **Clarify the purpose of data collection and indicators**: Addressing information gaps and asymmetries helps governments and other stakeholders to correct market and policy failures. In practice, this important function tends to be viewed as a simple reporting obligation. To avoid this, government officials need to regularly revisit the purpose of data collection and indicators. In EECCA, this calls for enlarging the list of information uses so as data can help (i) demonstrating, as far as possible, the causal link between government’s efforts and regulatory compliance, and, more largely, with environmental improvements; (ii) developing and amending compliance assurance strategies and legislation; (iii) showing that the government preserves the level playing field for businesses and guarantees regulatory and enforcement coherence across different jurisdictions; (iv) ensuring a higher transparency and accountability of authorities in charge with regulatory management and compliance assurance; and (v) promoting a cost-effective use of public budgets.

- **Extract more information from existing data**: The value of currently collected ERC data may be considerably increased if these were better structured and analysed. Competent authorities should look critically at existing data sets and structure them, where not yet done, in accordance with target groups (e.g. stationary versus mobile sources of pollution; large industry versus small and medium sized enterprises), specific environmental issues or legal acts, and jurisdictions. Whenever possible, diagnostic approaches need to be enhanced by systematic comparison with targets, use of ratios and composite indicators, in-depth analysis of accidents or offences, determination of the timeliness of response to regulatory and enforcement tools, *ex ante* analysis of regulatory load (e.g. the likely number of facilities to be subject of a new regulatory requirement) and demand for services. A stronger focus should be put on the use of trends or comparisons across sectors, regions, and agencies.

- **Monitor performance beyond individual agencies**: Given that the economics of compliance and enforcement point to a cumulative impact of various interventions along the so-called “Regulatory Cycle”, ERC indicators need to mirror the phases of this cycle. This leads to the identification of three major categories of ERC indicators: (i) indicators of regulatory quality; (ii) indicators of compliance assurance; and (iii) indicators of compliance. In consequence, an effective system of performance measurement will require commitment and inputs from a myriad of bodies belonging to the legislative, executive, and judicial branches of the government. Statistical agencies may play a role in this process, particularly in terms of quality assurance and information disclosure.
• **Move towards a statistically sound determination of compliance rates:** Compliance rates may be the ultimate piece of information helping to bridge regulatory interventions with environmental results. Current legal systems in EECCA make such rates usable to a certain extent, but not totally representative. In theory, annual checks of all large facilities (as it is done in many EECCA countries) can ensure the robustness of compliance rates. Unfortunately, the obligation to announce on-site visits well in advance may increase the level of latent offences (e.g. illegal disposal of toxic waste) and affect the representativeness of compliance rates. Making them statistically sound would require allowing unannounced inspections, random checks, and identification of a representative sample size (i.e. defining the minimum number of regulated entities that should be inspected in order to get a representative picture of the regulated community).

• **Routinely disclose performance information:** Driven by demand for higher quality public services and a more effective use of budgetary allocations, performance indicators have become an important tool of government authorities that helps them promote visibility and raise popular support, including for improved resource allocation. None of these objectives will be fully achieved if competent authorities do not disclose their performance information more actively in a form that relates to the interests of specific audiences. In this context, the emerging practice of posting performance information on the web should be pursued, but more target-specific products and communication mechanisms need to be developed, for example dashboards for high-level policy makers, clear annotations to budget proposals for ministries of finance, or plain-language leaflets for local communities.

• **Improve institutional frameworks for performance measurement:** Institutional frameworks underpin performance measurement. The Guidance puts forward a set of minimum criteria that need to be followed by competent authorities in order to make performance measurement systems fully functional. Most importantly, terminological standardisation, normalisation, and procedural soundness of data collection are recommended. Adoption of modern techniques of data management is also necessary.

• **Do not hesitate to reform, but do it carefully.** Any decision to drop an indicator in use or change collection and aggregation methods needs a very careful consideration, as continuity of data sets has to be preserved and misinterpretations avoided. At the same time, any system needs modernisation as a result of evolving contextual conditions. The Guidance describes measures that may lower the risk of mismanaging reforms, most importantly by involving staff and stakeholders, and pilot-testing new indicators.

To further facilitate country-level reforms, the Guidance suggests a possible set of core ERC indicators, based on good international practice and discussions within the Regulatory Environmental Programme Implementation Network (REPIN). In the majority of cases, these indicators are derived from data already collected in EECCA. This list of indicators will be further refined in 2009-2010 in view of adopting a more focused set of indicators for cross-country comparisons. In addition, a roadmap for reforming performance measurement systems is proposed. Finally, the Guidance contains a glossary of major terms and annexes that aim to enhance the value of this document for practitioners.
1. INTRODUCTION

Background

Currently, EECCA environmental enforcement agencies collect over thirty key indicators of within relatively structured frameworks, though their number in some countries can exceed one hundred. The scope of data gathering is quite comprehensive: commonly, the ERC indicators cover the entire corpus of environmental legislation and are used in all jurisdictions. Sometimes, they are broken down by programme areas or industry sector. In some countries, non-compliance patterns are analysed by specific articles of the Administrative and Criminal Codes. Regular reporting to internal and external audiences ensures a certain level of transparency and accountability.

At the same time, indicators are designed around activity counts and much less attention is paid to their use to make strategic and operational decisions. Enforcement authorities focus on quantitative aspects of their activities without being able to show the connection between these activities and behaviour (compliance) and environmental changes. Only a very limited number of indicators exist to monitor the use of innovative instruments, e.g. compliance promotion. Reports often miss data analysis and are not tailored to stakeholder needs. There is a widespread association of high performance with high numbers of inspections, investigated violations, or monetary sanctions – regardless their impact. Poor standardisation of terminology and lack of procedural guidance opens up opportunities for misinterpretation or mishandling of data.

Purpose and scope of the Guidance

EECCA countries need improved performance measurement systems that would increase the soundness of strategic and operational decisions, which underpin environmental regulation and ensure both compliance and environmental results. To facilitate this task, the current document proposes an analytical framework in support to the design and use of indicators for systems of environmental regulatory management and compliance assurance (ERC indicators). The proposed framework encompasses a set of common principles and work approaches therefore and can be used by a wide spectrum of authorities dealing with environmental regulation. Although the Guidance’s development was initiated by environmental inspectorates, the resulting analytical framework takes a holistic approach to environmental regulation and compliance assurance and proposes indicators that go beyond the mandate of environmental inspectorates. The assumption is that environmental inspectorates alone are not able to guarantee compliance, e.g. because of strong connection between compliance and the quality of regulation.

Overall, the Guidance aims to promote a shared understanding of performance measurement systems and gradual convergence rather than impose specific requirements on the design and functioning of such systems. Translating the recommendations provided in this Guidance into practice is subject to adaptation and elaboration by national authorities. It very much depends upon their will and capacity to pursue good practices identified and agreed collectively.

Target audience

This guidance document is mainly intended for environmental authorities. Managers and staff of permitting and inspection bodies are the primary audience for the Guidance. They can use it to improve activity planning and monitoring, and enhance accountability to stakeholders and the public. At the same time, high-level policymakers can use the Guidance to initiate reforms and lead implementing branches of environmental ministries toward performance-based management.
The adopted holistic approach to performance measurement makes the Guidance relevant for other stakeholder groups. *Parliaments and courts* can apply its recommendations to their own work on regulatory design and enforcement. *Statistical agencies* can use the Guidance to launch or improve compliance and enforcement statistics. *Ministries of Finance* can become aware of ways to get a clearer account of the functioning and impact of competent authorities. This may enable them to make better informed decisions about budget allocation.

Also stakeholders outside state authorities can benefit from the Guidance. Representatives of *regulated entities* can better understand the system of regulation and compliance assurance and have additional incentives to improve their environmental results. *Citizens’ environmental organisations* can better monitor the day-to-day activities of environmental enforcement authorities and put pressure to ensure that they carry out their mission in a publicly accountable manner. *International organisations and donors* can use an additional performance measurement tool when designing, monitoring, and evaluating environmental projects and programmes they support.
Performance measurement and indicators

Performance measurement is not unique for environmental authorities. Driven by new public management approaches, it has evolved from an intra-departmental into a government-wide concern. In consequence, government actors at all levels need to have sufficient terminological clarity to ensure analytical soundness of performance measurement and an adequate response to new public management approaches. In this context, two notions are particularly important.

First of all, it is important to realize what exactly “performance measurement” implies. OECD countries share the understanding that whether policy objectives are met is the essence of appraising environmental performance. Performance measurement systems should, as far as possible, address three main questions that relate to the achievement of national objectives and international commitments: To what extent is the objective achieved? Is the objective ambitious or modest? Are results achieved in a cost-effective way? More generally, performance measurement can be defined as the process of developing and using indicators and other tools to assess progress in achieving predetermined goals.

Performance measurement is just one element of strategic management that involves an iterative cycle of activity and budget planning, implementation and evaluation. By generating and analysing indicators, performance measurement supports the decision making process. A good performance measurement system should:

- Cover a sufficiently broad range of elements (dimensions) of the phenomena to be observed;
- Balance different categories and types of indicators, but also be simple and selective; and
- Have significant implications in terms of monitoring, accountability, and decision making.

Secondly, the notion of “indicators” needs a shared understanding. Indicators are defined as measurable pieces of information (parameters, or value derived from parameters) that describe a phenomenon/area and possess a synthetic meaning. They help to reveal trends and draw attention to phenomena or changes that require further thinking and possible action. Indicators are not unique tools to measure performance. Context analysis, scientific and policy-oriented interpretation is required for them to acquire their full meaning. Some issues or topics do not lend themselves to evaluation by quantitative measures or indicators. In such cases, qualitative analysis is needed.

A significant challenge is to select indicators based on sound criteria that would help ensure both accuracy and “fitness for purpose” in terms of user needs. In this context, it is good practice to apply specific criteria to select indicators and ensure the quality of data (see Annex 1 for details).
Programme matrix

In countries where performance-oriented budgeting has been introduced, government authorities may be required to use the programme matrix (also referred to as the “logic model”) to correlate indicators with programme elements and budgets. The **programme matrix** is a theoretical road map of programme implementation, upon which ongoing progress assessment and final evaluation of performance are based.

Within this framework, indicators characterise:

- **Outcomes**: Outcome indicators measure the results of activities and are generally divided into two categories: (i) **intermediate outcome indicators** that measure progress toward a final outcome, such as a change in knowledge and behaviour or other results that contribute to the final outcome; and (ii) **final outcome indicators** that measure the societal benefits, such as improvements in environmental quality or human health. Usually, final outcome indicators cannot be attributed to one agency or even a stakeholder group, as they result from concerted efforts of the entire society to preserve certain values;

- **Outputs**: Outputs are activities, events, services and products that reach the general public or a regulated entity. They monitor whether authorities put efforts to carry out their mandate and provide services to the general public;

- **Inputs**: Inputs include staff time, funding, materials, equipment and the like that are necessary to carry out an activity. Input indicators can be used to show government’s commitment and are important components for determining programme efficiency and return on investment when considered together with outcomes.

If used correctly, a programme matrix can help to demonstrate causal links of a chain from inputs and activities to outcomes. Within this framework, government authorities need to use a mix of input, output, and intermediate indicators in order to identify what types of activities produce results most effectively and adjust strategies accordingly.

**Table 1. Main elements of a programme matrix and their relation to performance measurement**

<table>
<thead>
<tr>
<th>Programme elements</th>
<th>FINAL OUTCOMES</th>
<th>INTERMEDIATE OUTCOMES</th>
<th>OUTPUTS</th>
<th>INPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level and scope of accountability</td>
<td>Strategic accountability of public management systems</td>
<td>Substantive accountability of competent authorities</td>
<td>Procedural accountability of competent authorities</td>
<td>Fiscal accountability of competent authorities</td>
</tr>
<tr>
<td>Questions addressed</td>
<td>How is society benefiting from government action?</td>
<td>Do government actions have impact on the behaviour of target groups?</td>
<td>Do competent authorities implement their mandate?</td>
<td>Do competent authorities have organisational capacity?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Are regulatory objectives achieved?</td>
<td>What services do authorities deliver?</td>
<td>How are budgets allocated and used?</td>
</tr>
</tbody>
</table>

Major types of environmental indicators

The diversity of problems addressed by environmental management has naturally resulted in numerous indicators that respond to policy needs and public information requirements. In order to support a more structured and internationally harmonised approach to environmental information, the OECD introduced the “Pressure – State – Response” (PSR) framework that provides for a classification of environmental indicators into:

- **Indicators of environmental pressures**: These describe pressures from human activities exerted on the environment, including natural resources. “Pressures” cover indirect pressures (i.e. human activities and trends and patterns of environmental significance) and direct pressures (i.e. the use of resources and the discharge of pollutants and waste materials). Indicators of environmental pressures are closely related to production and consumption patterns; they often reflect emission or resource use intensities, along with related trends and changes over a given period;

- **Indicators of environmental conditions**: These relate to the quality of the environment and the quality and quantity of natural resources. As such, they reflect the outcome of environmental policies and compliance assurance. Examples of indicators of environmental conditions are: concentration of pollutants in environmental media, human health effects, the status of wildlife and ecosystems and of natural resource stocks;

- **Indicators of societal responses**: These show the extent to which society responds to environmental concerns. They refer to individual and collective actions and reactions, intended to: (i) mitigate, adapt to or prevent human-induced negative effects on the environment; (ii) halt or reverse environmental damage already inflicted; (ii) preserve and conserve nature and natural resources. Regulation and compliance assurance activities, and the behaviour response to these activities manifested by the regulated entities, belong to this category of indicators.

The PSR model and its variations\(^1\) highlight cause-effect relationships, and helps decision makers and the public to see how environmental, economic, and other issues as interconnected. Several sets of environmental indicators (Annex 2) can be identified, each corresponding to a specific purpose (tracking environmental progress and performance, informing the public, promoting integration, monitoring progress towards sustainable development). These sets are closely related to each other and none of them is necessarily final or exhaustive in character; they are regularly refined and may change as scientific knowledge, policy concerns and data availability progress. A set depicting regulatory management and compliance assurance in the field of environment is still missing. Work on devising such indicators has been underway internationally and in several world regions, including in EECCA countries.

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\(^1\) Depending on the purpose for which the PSR model is to be used, it can be adjusted to account for greater details or for specific features. Examples of adjusted versions are the Driving force – State - Response (DSR) model formerly used by the United Nations Commission on Sustainable Development in its work on sustainable development indicators, the framework used for OECD sectoral environmental indicators and the “Driving force-Pressure-State-Impact-Response” (DPSIR) model used by the European Environmental Agency. In the latter framework, “driving forces” are the social, demographic and economic developments in societies and the corresponding changes in lifestyle and overall levels of consumption and production patterns. They provoke changes in overall levels of production and consumption and thereby exert pressure on the environment. The category of impact indicators is added to capture the effect that pressures may have on the state of the environment.
3. DEFINITION AND PURPOSE OF ERC INDICATORS

Definition

Indicators of environmental regulatory management and compliance assurance characterise: (i) the efforts of government authorities to reduce the impact of economic activities on the environment and human health through regulation and supporting tools, and (ii) changes in compliance and environmental results associated directly with these efforts.

Purpose of performance measurement

In modern systems of regulatory management and compliance assurance, the major aim of indicators and underlying data is producing analytically-sound evidence that goals and targets of regulation are translated into real change. More specifically, indicators and diagnostic approaches used to interpret them should satisfy the following needs of environmental enforcement authorities and other stakeholders:

- Monitor activities and performance, identifying achievements and problem areas and amending strategies and tools in line with lessons learned, thus contributing to the improvement of environmental effectiveness and cost efficiency.
- Demonstrate the causal link between government’s interventions and regulatory compliance, including compliance with administrative procedures and with general or facility-specific environmental requirements;
- Show that the government established, or at least is taking action to establish, a level playing field for businesses by enforcing the law equitably, proportionally, and timely across all business actors, and thus reinforcing the rule of law;
- Assess the quality of regulatory requirements, optimise compliance assurance instruments and their mixes, and motivate further improvement;
- Guarantee regulatory and enforcement coherence across different jurisdictions and programmes (i.e. vertically and horizontally);
- Enhance transparency and accountability towards external stakeholders, including legislative bodies, central budget authorities, non-governmental stakeholders, and the general public;
- Ensure that resources are estimated, budgeted and used appropriately and in a cost effective way to accomplish strategic and annual activity plans.

Most often, indicators are used to continuously monitor the “routine” work of competent authorities. In cases when time-bound projects are implemented to address specific problems, indicators may have a shorter lifespan. Sometimes, such projects may lead to the identification of new indicators for routine monitoring.
4. THE CONCEPTUAL FRAMEWORK FOR ERC INDICATORS

Theoretical basis underlying major categories of ERC indicators

The elements of the so-called “Regulatory Cycle” (Figure 1) provide a starting point for identifying and systematising ERC indicators. As a whole, the regulatory activity is an iterative (cyclical) process that links legislation, as an outcome of the policy design process, to environmental assessments and approvals of economic activity (such as, for instance, EIA – the Environmental Impact Assessment, permitting/licensing, and declaration or registration of activities), compliance promotion, compliance monitoring, enforcement (non-compliance response), and assessment and feedback, which closes the cycle with possible input for adjustments of laws and policies.

Figure 1. The simplified presentation of the “Regulatory Cycle”


Regulatory design and compliance assurance strategies are most efficient when general and facility-specific requirements induce a maximum level of “spontaneous compliance”, which occurs in the absence of enforcement and is driven by intrinsic (internal) motivation. Spontaneous compliance stems from social norms or from social and economic benefits of compliance. If intrinsic motivation is insufficient, as it is often the case, then regulatory monitoring and sanctions (external pressure) are necessary in order to ensure compliance.

The impact of regulation and compliance assurance can be assessed at each stage and at the end of the regulatory chain. If these activities do not ensure the desired level of compliance, the regulatory requirements, but also strategies and instruments to ensure compliance, are, probably, poorly designed. If compliance is achieved without environmental improvements (including changes in the environmental performance of the regulated entities and in the quality of the environment), this gives a clear indication that the regulatory requirements should be revised.
In line with this conceptual model, indicators that would be specific for regulatory management and compliance assurance may be grouped into the following categories:

- **Indicators of regulatory quality**: In order to understand the magnitude of the regulatory challenge, indicators are needed for the scope and quality of legal acts and permitting documents. The quality of lawmaking and facility-specific regulation is another important factor of effective regulation and require measurement as well, e.g. by counting the number and frequency of amendments or number of appeals driven by poor quality of legal acts;

- **Indicators of compliance assurance**: These aim to describe in terms of quantity and quality the main phases of compliance assurance, including (i) compliance promotion activities (e.g. the availability of technical advice or the extent to which financial incentives are used); (ii) compliance monitoring (e.g. the share of inspected facilities or sector-specific frequency of on-site visits), and (iii) non-compliance responses (e.g. the severity and application of various enforcement tools or trends in fine collection rates);

- **Indicators of regulatees’ compliance**: These cover both spontaneous and control-driven compliance within the regulated community. They may be related to the knowledge and acceptance of rules; compliance with specific obligations, e.g. to have a permit or a self-monitoring programme, etc. The environmental performance of the regulated community may also be attributed to this category and be reflected, for example, by changes in resource or energy efficiency within specific branches of economic activity.

The identified categories of ERC indicators call for intra-agency monitoring of indicators but also for monitoring beyond individual government bodies. Thus, regulatory design is a matter of interaction between the legislature and competent executive bodies; compliance monitoring may be organised by environmental components therefore involve several agencies or even ministries; enforcement actions sometimes require involvement of the judicial branch of the government. All these bodies need to contribute towards an improved set of ERC indicators. In operational terms, this requires a coordinated effort to identify indicators, establishing terminological clarity and unity, and guaranteeing access to all relevant data through a regular disclosure of information. Statistical agencies may play a role in this process, particularly in terms of quality assurance and information disclosure.

**Possible causal links within regulatory management and compliance assurance**

Those responsible for performance measurement need to be aware of possible “cause-effect” links between interventions along the Regulatory Cycle and behaviour response within the target groups.
Identifying such links can help to better define the scope of indicators, as well as to conduct a meaningful analysis of collected data.

Existing empirical evidence and the economic theory of enforcement point to several likely correlations (see Figure 3). For example, legal acts of poor quality may reduce compliance because of low acceptance of rules. Absence of compliance assistance may decrease the level of rule knowledge among regulated entities, in particular within the segment of small and medium-sized enterprises (SMEs). Irregular inspection may affect the level of compliance because of missing “visual signals” that compliance behaviour is monitored, leading to a more relaxed application of self-monitoring and environmental offences of different degree of seriousness.

**Figure 3. Main correlations between regulation and compliance assurance and behaviour responses**

![Diagram of regulatory correlations](image)

Source: OECD (2008), based on the Netherlands' Table of Eleven diagnostic tool.

At the same time, collection and analysis of new statistics may enable competent authorities to enlarge the list of such correlations and thus be able to conduct a better optimisation of instruments and strategies.

**Correlation with programme elements and budgets**

As mentioned, causal links between government efforts and their impact can also be demonstrated based on the use of the so-called “programme matrix”. The use of programme matrices becomes mandatory together with adoption of programme-oriented budget planning therefore competent authorities need to improve their understanding of this planning tool. In this context, Figure 4 provides examples of indicators that may correspond to different elements of the programme matrix.
**Figure 4. Examples of indicators corresponding to different elements of the programme matrix**

<table>
<thead>
<tr>
<th>The hierarchy of programme elements:</th>
<th>Some examples of indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINAL OUTCOMES</td>
<td>• Trends in ambient quality</td>
</tr>
<tr>
<td>State of the environment and human health</td>
<td>• Incidence of specific diseases</td>
</tr>
<tr>
<td></td>
<td>• Evolution of ecosystem structure</td>
</tr>
<tr>
<td>INTERMEDIATE OUTCOMES</td>
<td>• Impact of compliance assistance</td>
</tr>
<tr>
<td>Behaviour changes or environmental performance within the regulated community</td>
<td>• Likelihood of discovering non-compliance</td>
</tr>
<tr>
<td></td>
<td>• Deterrent effect of enforcement actions</td>
</tr>
<tr>
<td></td>
<td>• Degree of normative commitment</td>
</tr>
<tr>
<td></td>
<td>• Energy and resource efficiency achieved by regulated entities</td>
</tr>
<tr>
<td>OUTPUTS</td>
<td>• Access and recourse to compliance assistance</td>
</tr>
<tr>
<td>Implementation of mandates</td>
<td>• Intensity and structure of compliance monitoring activities</td>
</tr>
<tr>
<td></td>
<td>• Frequency, severity and structure of enforcement tools</td>
</tr>
<tr>
<td>INPUTS</td>
<td>• Adequacy of resources vis-à-vis the regulatory load</td>
</tr>
<tr>
<td>Organisational capacity</td>
<td>• Availability of specific knowledge and skills</td>
</tr>
</tbody>
</table>


Within this framework, only very rarely final outcomes can be attributed to specific activities conducted by one or several competent authorities. Measuring environmental improvements can also be expensive, they may take years to appear, and be influenced by many factors beyond the scope of government activity. However, it is important to include environmental and health improvements into the planning matrix. This re-iterates the strategic goals of environmental authorities thus preventing a “mechanical approach” to regulation and compliance assurance whereby regulatory activities are seen as an end *per se*, rather than a means. For example, particularly relevant may be the following:

- *Population’s exposure to adverse impacts* (share of population, leaving in areas with environmental conditions that does not correspond to mandatory standards);

- *Decoupling indicators* that measure differences in the pace of economic growth and environmental pressures (or, ideally, environmental degradation).

Output indicators are very often closely linked to specific tasks thus being the easiest to measure. Difficulties start at the level of intermediary outcome indicators, which characterise the compliance behaviour or the evolution in environmental performance of the regulated entities. Overall, there is little agreement currently what should be considered an “intermediary outcome”.

While transition to performance-oriented budgeting makes input indicators to fade away, EECCA countries, in fact, need to pay more attention to these indicators (see Annex 3) as they can identify problems with organisational capacity, lack of fiscal discipline, and help to determine efficiency. Fortunately, the latter use is facilitated by performance-oriented budgeting whereby budgets correspond to specific programme goals\(^2\). Indicators of fiscal discipline (*e.g.* rates of goods and services procured based on tender procedures) are often suggested by ministries of finance. Similarly, agencies in charge with public management reforms

\(^2\) In this context, it is important to determine the scope of programmes in a way that facilitates *ex-post* assessment of efficiency. For example, competent authorities may plan separately programmes that employ different types of instruments or address different segments of the regulated community.
facilitate the identification of indicators that characterise organisational capacity. Such measures enable intra-government benchmarking and guarantee personnel’s integrity.

**Adaptation to target audiences**

Within a performance measurement framework, the sets of indicators used for different purposes and audiences may be quite different. The most detailed information will be required internally within competent authorities. Externally, demands may vary in scope.

**Indicators for internal audiences within competent authorities.** Competent authorities need to distinguish between the set used to ensure accountability and indicators used in support to operational and strategic planning. Institutions involved in environmental regulation and compliance assurance may be accountable only for results that relate to their mandate, which may be different in different countries. Compliance is, however, the ultimate direct outcome of their work. Therefore, to guarantee accountability for results that benefit society, authorities will need to develop and use indicators that measure compliance. Besides substantive accountability, indicators for procedural and fiscal accountability are needed. These will help to demonstrate that appropriate means and resources are used to achieve compliance. While the state of the environment indicators matter for progress monitoring, they cannot be used to make accountable individual organisations (particularly in short or medium-term). At the same time, it is important to correlate compliance trends with trends in environmental indicators. This helps to understand whether policy objectives are sufficiently ambitious and, when necessary, correct them, domestically or globally.

**Indicators for external audiences.** As mentioned, external demands vary. Political leaders and legislators may want to receive succinct information on outcomes. The regulated community may focus on data that demonstrate that a level playing field exists, or require information helping to benchmark environmental performance. NGOs may be interested in a very wide spectrum of information, including activity and result counts, as this helps them to act as “watchdogs”. Finally, the general public may have a predilection towards data that enable them to make consumer and community-wide decisions. Generally, people are interested in what is happening in their neighbourhood, rather than in country-wide information as citizens cannot associate it directly with their own welfare. Responding to such demands requires capacity to collect and disclose an ever increasing amount of facility-specific data beyond emissions.

Overall, a combination of indicators – covering the profile of the regulated community and instruments of compliance assurance, measuring inputs, outputs and outcomes, generic or project-specific, aggregated and disaggregated, from a national and local perspective – should be used.

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3 This information can serve for the purpose of longer-term accountability of public management systems. This implies the need for a professional civil service and a certain continuity of policy goals, which are often difficult to ensure in EECCA countries.
5. STRUCTURING ERC INDICATORS

Disaggregation by regulated segments

Commonly, data are collected to describe specific objects and, where possible, to draw conclusions about larger populations. In both cases, quantitative assessments need to be based on a clear definition of the objects of analysis. Within environmental regulation and compliance assurance systems, two main populations having quite different characteristics are studied: (i) the regulated community; and (ii) competent authorities. In turn, each of these larger populations may be subject to a substantial degree of internal variability.

The regulated community in particular is very diverse, being composed of large, medium, and small companies that belong to different branches of economy. Depending upon the segment to which they belong, various members of the regulated community may respond differently to environmental regulation due to exposure to different incentives (e.g. more or less important consumer and supply chain pressure) or because of uneven management and financial capacity.

In order to ensure the statistical soundness of indicators, a better identification of the analysed sets and subsets of regulated entities is required. Treating them as a monolith most often will result in data that are practically unusable. Therefore, authorities need to track indicators according to certain “segments” of the regulated community. Most importantly, these should be defined based on the following criteria:

- Size of company (large or small and medium-sized enterprises);
- Type of pollution source (point source (stationary or mobile) or diffuse pollution);
- Regulatory regimes (e.g. facilities having individual permits or only required to submit declarations of activity to the competent authorities).

Additional criteria for structuring ERC data may include: (i) market position (producer, importer/exporter, transport company, etc.); (ii) ownership (private or public, domestic or foreign); (iii) branch of economic activity; (iv) risk for the environment (e.g. high, medium, or low); (v) compliance profile (e.g. recidivist, compliant, frontrunner); and (vi) other criteria, according to the specific context. Though the disaggregation approach may vary for data analysis and presentation, most of the above-listed criteria can be used as descriptors when drawing a regulated entity’s profile.

Issue-specific breakdown

The issue-specific breakdown can be based on either categories of environmental problems (air quality, waste generation, freshwater quality, climate change, etc.) or primary legislation enacted to address such problems. While being a largely accepted practice, law-specific breakdown creates obstacles for cross-country comparisons. As a result, it may be more practical to keep a certain differentiation by traditional environmental issues (see Table 2). The structure of the OECD core indicators by environmental issue provides an example of such issue-specific breakdown.
Table 2. Selected examples of issue-specific indicators

<table>
<thead>
<tr>
<th>Issues</th>
<th>Regulatees’ performance</th>
<th>Environmental conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>Greenhouse gas emissions</td>
<td>Atmospheric concentrations of GHGs</td>
</tr>
<tr>
<td>Ozone layer depletion</td>
<td>Consumption of ozone depleting substance</td>
<td>Ground-level UV-B radiation</td>
</tr>
<tr>
<td>Eutrophication</td>
<td>Nutrient balance</td>
<td>Nutrients’ concentration in inland waters</td>
</tr>
<tr>
<td>Acidification</td>
<td>Emissions of NOx and SOx</td>
<td>pH value</td>
</tr>
<tr>
<td>Toxic contamination</td>
<td>Emissions of heavy metals</td>
<td>Accumulation in trophic chains</td>
</tr>
<tr>
<td>Urban ambient quality</td>
<td>Urban air emissions</td>
<td>Population exposure to air pollution</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Land conversion</td>
<td>Area of key ecosystems</td>
</tr>
<tr>
<td>Waste</td>
<td>Movement of hazardous waste</td>
<td>Groundwater quality</td>
</tr>
<tr>
<td>Water resources</td>
<td>Wastewater discharge</td>
<td>Quality of inland water bodies</td>
</tr>
<tr>
<td>Forest resources</td>
<td>Logging</td>
<td>Area of forests</td>
</tr>
<tr>
<td>Fish resources</td>
<td>Fish catches</td>
<td>Size of stocks</td>
</tr>
<tr>
<td>Soil</td>
<td>Irrigation methods</td>
<td>Top soil losses</td>
</tr>
</tbody>
</table>


Territorial breakdown

Geographical differentiation of data sets is needed to ensure regulatory and policy coherence. Such differentiation is traditional in EECCA countries and this practice needs to be perpetuated. In certain cases, structural units of competent authorities do not coincide with administrative-territorial units. For example, there is an emerging trend toward river-basin organisation. This may add another layer of complexity to the organisation of data sets.

Disaggregation by types of instruments

Competent authorities need to monitor the use of various instruments applied to ensure compliance. The Table 3 below presents the most general categories of compliance assurance data. Some of the elements presented in this table can be further broken down in sub-elements, as shown in Table 4. Some of these are already used by EECCA countries, other ones (e.g. the types of site visits) still need to be introduced in the majority of these countries.

Table 3. Typology of major compliance assurance instruments

<table>
<thead>
<tr>
<th>Compliance assistance</th>
<th>Compliance monitoring activities</th>
<th>Non-compliance response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone advice</td>
<td>Information requests</td>
<td>Informal response</td>
</tr>
<tr>
<td>Information campaigns</td>
<td>Offsite record reviews</td>
<td>Restorative justice</td>
</tr>
<tr>
<td>Technical advice</td>
<td><strong>On-site visits</strong></td>
<td>Administrative enforcement</td>
</tr>
<tr>
<td>Presentations</td>
<td>Self-monitoring</td>
<td>Civil enforcement</td>
</tr>
<tr>
<td>Workshops</td>
<td>Ambient monitoring</td>
<td>Criminal enforcement</td>
</tr>
<tr>
<td></td>
<td>Environmental audits, etc.</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Some examples of further classification of compliance assurance instruments

<table>
<thead>
<tr>
<th>Types of on-site visits</th>
<th>Types of administrative enforcement instruments</th>
<th>Types of criminal enforcement instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned, or Reactive</td>
<td>Administrative orders</td>
<td>Monetary penalties</td>
</tr>
<tr>
<td>Integrated, or Medium-Specific</td>
<td>Monetary penalties</td>
<td>Imprisonment</td>
</tr>
<tr>
<td>Announced, or Unannounced</td>
<td>Temporary closure</td>
<td></td>
</tr>
<tr>
<td>Risk-based (targeted), or Random</td>
<td>Permit suspension or withdrawal</td>
<td></td>
</tr>
<tr>
<td>Other types</td>
<td>Other types</td>
<td>Other types</td>
</tr>
</tbody>
</table>


Disaggregation by the outcomes of procedures

Most of the procedures linked to regulation and compliance assurance are multi-choice. This implies the need to disaggregate data by the outcome of the procedure. For example, a permit may be issued or denied, an appeal case may lead to the conformation of cancellation of earlier-made decisions. Such disaggregation can point to compliance problems but also show where procedures need clarification and elaboration, and a more rigorous application.
6. DIAGNOSTIC APPROACHES

Similarly to piles of stones that cannot be considered a house, data as such cannot be considered “information”. Data mean nothing without diagnostic efforts. The current practice of performance measurement in EECCA, unfortunately, often stops at the data collection phase and only rarely some descriptive statistical analysis is undertaken. Improving data analysis should, therefore, become a priority for competent authorities, as this is likely to substantially increase the value of data that are currently filed away without their users realising that potential value. The current section suggests a number of diagnostic approaches.

Comparison with plans and targets

The simplest way to enhance the soundness of existing systems is to compare results of work with plans. In a first phase, this will cover mainly activities, as EEAs rarely establish measurable objectives. For example, the inspectorate may want to guarantee the implementation at least 85% of planned on-site visits. The national-level authority can compare annual figures for different territorial units. This will help them to assess the quality of planning within the organisation, and increase the fiscal and procedural accountability. In many cases such analysis can reassure the non-governmental actors that authorities are acting to fulfil their mandate thus contributing to the government’s credibility as a regulator. When countries improve their planning approaches and adopt the practice of target-setting, comparison with such targets should be adopted.

In-depth analysis of unwanted events

Increasing the ability to promptly detect events that lead to environmental harm and increased risks is often the first step to improve performance. Based on the knowledge of a specific problem’s frequency, characteristics, and consequences, authorities can set priorities, allocate resources, and adjust their instruments. In operational terms, this means that environmental authorities need to count, for instance, accidents, facilities without permits or violating permit conditions, etc. The incidence and the prevalence\(^4\) of these unwanted events may be systematically determined in specific segments of the regulated community.

Furthermore, the competent authorities need to study the characteristics of unwanted events, including who caused the unwanted event, where, why, and when the event occurred, and how long the problem persisted. Such understanding can help address the revealed causes of unwanted events, thus reducing the magnitude of problems. One of the simplest examples is the analysis of the roots of non-compliance (see Annex 4) every time when an offence occurs. Finally, authorities could monitor repeated occurrence of unwanted events and identify measures to prevent recidivism, where possible. For example, repeat violators could be denied permits to expand their production or open production in new locations.

Use of ratios and composite indicators

The practice of calculating ratios and indexes should be used more widely to allow comparison between indicators of the same or different kind and make relationships visible and interpretable. This can provide information, e.g. on the efficiency of an activity or the intensity of an impact. Furthermore, ratios and indexes can help determine linkages between environmental performance and compliance behaviour on the one hand, and economic and social dimensions of development on the other. Relative figures can also be useful in

\(^4\) “Incidence” is the number of newly revealed cases during a specific time period. “Prevalence” is the total number of cases of unwanted events observed on a certain date.
comparing two authorities of different organisational scale. Normalised data, which relate an absolute figure (e.g. the number of inspection) to a common denominator (e.g. the number of large facilities), enable programme managers to compare the relative performance of two units, regardless of differences in size, and determine factors that drive higher or lower performance.

Composite indicators, such as ratings of industry’s environmental performance or ratings of capacity and performance of competent authorities can be used to complement individual indicators. They are particularly useful for informing high-level policy makers and the general public. The constitutive elements of such indicators need to be identified with care and meet same type of selection criteria as any other individual indicator.

**Timeliness of response**

The competent authorities should be able to determine the timeliness of response – the time it takes to either respond to a violation, or achieve compliance. Ideally, many types of enforcement actions should be as swift as possible so that the offender can be returned to compliance as quickly as possible. Timeliness can be evaluated by monitoring trends and, sometimes, by comparing actual results against predetermined goals. Success is then measured by comparing the actual schedules with these timeliness goals. Goals can only be set for those types of enforcement actions that consistently take a predictable time to complete. These are usually the earlier and more routine (administrative) enforcement actions.

Enforcement actions involving later stages of legal procedures are generally too unpredictable to be evaluated in this way. Judging performance based on time for completing an action may not be possible or appropriate in some cases, such as criminal cases, that require detailed investigation before an enforcement action is taken. Care may be necessary to ensure that use of timeliness as a measure of programme success does not encourage enforcement personnel to take a simple administrative action instead of a more time-consuming court enforcement action.

**Understanding demand**

Services provided by competent authorities to the regulated community (e.g. issuing permits) and the general public (e.g. responding to information requests or complaints) can often take a lot of staff time. Understanding the frequency and characteristics of demand can help authorities to better manage and sometimes reduce the resource-intensity of services that they deliver through such actions as: (i) process redesign (e.g. integrating permits and extending the standard time of their validity); (ii) better scheduling of staff tasks using off-peak periods; (iii) applying information technology to respond to demands faster and, where possible, in bulk (e.g. identifying frequently asked questions and preparing standard responses); and (iv) outsourcing.

**Trends and links to interventions**

A stronger emphasis should be put on the use of trends over time or comparisons across sectors, regions, or agencies. Trend data are important so that changes in performance over time, or compared to a reference point, can be assessed. Trends can also be depicted relative to interventions, whereby information about non-compliance is linked to information about the enforcement action taken in response. A useful approach is monitoring the rate of change, e.g. comparing increases in the enforcement presence with improvements in compliance behaviour. Another useful addition to the current analysis of total and average values can be studying data at the upper and lower limit of a distribution. Timeliness indicators, showing the length or procedures or the time used to respond to non-compliance, as well as the severity of fines are examples of

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5 Several examples of ratings exist in EECCA and other regions of the world. REPIN has a separate work stream dedicated to the use of this approach to performance assessment. See also OECD (2002), Aggregated environmental indices: review of aggregation methodologies in use.
indicator for which such analysis is particularly relevant as it can reveal important disparities between different jurisdictions.

Environmental enforcement authorities should adopt benchmarking of their own performance and that of regulatees. Under this approach, performance is improved based on studying the strongest performers and factors underpinning stronger performance. In practice, leaders can serve as de facto goal setters. Benchmarking is not a quick fix, done once and for all. Benchmarking efforts may extend over a number of months, and it is vital to repeat them periodically so as not to fall behind rapidly changing circumstances when good practices become outdated.

Comparison should also be made with previous years, analysing positive or negative changes in the performance in a given jurisdiction. Such “retrospective” benchmarking has a potential to boost performance due to the intrinsic desire to improve performance over time. At the same time, retrospective analysis needs to take account of any changes in the collection or aggregation approaches in order to avoid misinterpretation. Contextual information is also needed in support to data interpretation.

Sometimes benchmarking does not necessarily identify best practices, because stronger performance may be explained by conditions or characteristics not related to the actions of government. Studying the strongest performers can, however, lead to the identification of the factors that do explain strong performance levels and motivate performance, as fair comparisons with “peers” can be stimulating factor.
7. INFORMATION DISCLOSURE

Information disclosure is often viewed as a trendy superfluous activity. At the same time, disclosure – making available or disseminating performance information – is crucial in order to show value and raise an agency’s credibility, establish a positive public image and raise society’s support. Another benefit of information disclosure consists in higher substantive and fiscal accountability vis-à-vis the hierarchical governmental authorities, including ministries of finance. Harnessing these benefits may necessitate a review of current practices of reporting and communication in general.

Reporting

As a first step to information disclosure, reporting on data can be reinforced through clear and well structured reporting forms. Steps will also need to be taken to ensure the quality of the reported data (e.g. random data audits or verification of specific data fields) through a continuous programme 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 information presented in reports to make decisions about strategy, and resource allocation.

Frequency of reporting is an important question. It can be weekly, monthly, quarterly, or annual. The objectives pursued by reporting determine its frequency. Some indicators may need weekly reporting. Other ones require only annual reporting. Competent authorities will decide how often to monitor indicators based on the national legal system, demand from stakeholders, and institutional capacity.

Annual reporting should be extended to fully fledged reports that contain narrative description, analysis of ERC indicators, and policy recommendations. The annual reports could be structured around the following headings:

- Goals, organisation and resources of the competent authority;
- Overall performance, including analysis of instruments and cross-programme comparison;
- Issues or medium-specific results and challenges;
- Progress in regions;
- Complaint tracking and public relations;
- Inter-agency co-ordination and feedback;
- Financial reporting.

Besides data about performance for the current year, the annual reports should also provide data about performance in the previously completed fiscal/calendar years to set a retrospective benchmark.
Communication mechanisms and products

Diverse mechanisms could be adopted to reach different audiences, such as: (i) publication of annual plans and annual reports (in hard copy and on the Internet); (ii) development of databases with indicators that are accessible via the Internet; (iii) personal communication with stakeholders; (iv) press releases and articles in mass media, etc.

The language and structure of any communication product should make the access to information easier. Meaningful headings and subheadings should be identified to help the reader grasp the important information as quickly as possible and easily navigate through the document. Reports should have concise (up to 4 pages) executive summaries to give programme managers, policy makers and other stakeholders, an overview of the main findings and recommendations of the report. Writing style should be clear and simple, so that ideas are easily and quickly understood by the reader.

Publicly disclosed information should be simple but not simplistic. It should be provided in a context that allows meaningful interpretation, and visualized to facilitate understanding. Statistics about non-compliance or enforcement actions should be accompanied by brief narrative information. Aggressive information campaigns at the time of significant events will stimulate people's interest in ERC issues.

Visual presentation of data

Visual presentation of data should be used to facilitate the explanation of concepts, statistics or facts. By using visual representation of performance information (e.g. tables, charts, flowcharts, maps, etc.), agencies could help themselves set priorities and target action on the most pressing problems. In general, data presentation should be treated as an essential area of competence of environmental authorities that need to build their capacity to translate data into visual means – graphs, maps, and photographs – and into stories that successfully capture the attention of key audiences. Progressively, mapping and Geographic Information Systems (GIS) could be used to identify geographic patterns of non-compliance, e.g. to view the compliance status of all facilities in a watershed in the context of integrated water management. This could be usefully combined with geo-referenced data on environmental quality or pressures. Annex 5 provides further hints on the visual presentation of data.

Limitations in disclosing information

Environmental enforcement authorities should be informed about, and take into account, certain limitations in disclosing information about environmental compliance assurance programmes and their results. Very little information cannot be reported publicly because of its confidentiality. At the same time, there are indeed security concerns in publishing facility locations on the Internet, especially for plants handling hazardous materials. There is also a certain danger of abuse of public information by the regulated community.

To avoid problems of information disclosure, guidelines setting the limits of confidentiality should be developed. In countries that are party to the Aarhus Convention, they must be in full compliance with the Convention’s requirements.
8. POSSIBLE ELEMENTS OF A CORE SET OF ERC INDICATORS

In order to support improvements in performance measurement with proposals for ERC indicators, representatives of environmental inspectorates took part in several brainstorming sessions organised in conjunction with regional or country-specific activities. The current section reflects the results of those sessions. It suggests possible constituent elements for a core set of ERC indicators. The list of indicators and their description will be further refined in 2009-2010. Detailed indicator fiches will be then published in a separate technical report. At the same time, it is important to note that the prerogative to define the national set of ERC indicators belongs to national authorities despite a growing need for international convergence and cross-country comparisons. The current proposal does not mean that an overhaul of existing indicators is recommended. Any decision to drop an indicator in use needs a very careful consideration, as continuity of data collection may be lost thus interrupting time series.

Selection approach

In the majority of cases, the proposed indicators are based on data that are already collected by competent authorities. This approach offers the benefit of achieving system improvements in the short-term without important financial implications. The knowledge of major problems in environmental regulation and compliance assurance in EECCA countries, acquired through regional reviews and exchange of opinions during REPIN meetings, helped to identify those indicators that might have the highest relevance for, and impact on, decision-making.

Regulatory quality indicators

A growing body of studies suggests that rules that exist just on paper fail to elicit compliance. Gradually, the understanding is rising that changes in compliance behaviour depend upon a large spectrum of factors related to the context in which regulation was designed and operates. Since regulatory design failures are important contributors to non-compliance, it would be sensible to adopt a special category of ERC indicators that addresses regulatory quality. Such indicators are described in the current section (Table 5). Their selection proceeded from empirical analysis of main elements of regulatory design failures, which is summarised below.

Lawmaking procedures play an important role in securing the quality of legislation. Lack or poor organisation of Regulatory Impact Analysis (RIA) and stakeholder consultations is detrimental to compliance because authorities may not find out about important factors impeding compliance or fail to secure target group support for a proposed regulation. RIA helps to quantify the likely costs of compliance on an individual citizen or business and clarify the costs of enforcement for the state. Consultation allows target populations to have an input into the terms of a proposed regulation so that they understand why it is necessary and how their concerns have been addressed. This can give them a sense of “ownership” or understanding that will increase their commitment to the objectives of regulation and, therefore, increase rates of compliance. If immediate compliance is not possible due to technical reasons, the law should provide for a longer implementation timeframe.

The proliferation of laws or multiple amendments to improve them can lead to a loss of simplicity and therefore a loss of ability to understand what compliance involves. Inaccessible and incomprehensible regulation particularly affects small business compliance rates.
By nature, environmental legislation will, to a large extent, be framework legislation. The practical application of the legal provisions in particular situations is further given shape in secondary legislation, as well as in environmental licenses/permits and other types of environmental approvals required before an economic activity is started. Environmental permitting is a key instrument for reducing industry’s environmental impacts, facilitating its compliance with environmental requirements and promoting technological innovation. The goal of protecting the environment as a whole has led many OECD and EECCA countries to introduce integrated permitting systems for large industrial installations. Small and medium-sized enterprises (SMEs) should be subject to a simplified regulatory regime as these businesses pose a lower environmental risk, since case-by-case permitting would impose a disproportionately heavy burden on them, as well as on the regulators. In addition to differentiation of regulatory regimes, modern permitting systems combine discretionary powers of regulators with transparency and broad public participation.

Table 5. Possible indicators of regulatory quality

<table>
<thead>
<tr>
<th>Core indicators</th>
<th>Complementary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lawmaking</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Quality of lawmaking (number and share of bills for which Regulatory Impact Analysis was conducted and secondary legislation is fully developed) | number and share of legal acts abrogated/not approved because of poor quality in the total number of prepared drafts  
number of articles containing duplications or inconsistencies  
number and share of appeal cases initiated/satisfied because of poor quality of legislation  
share of draft primary and secondary legal acts discussed with intra-government and non-government stakeholders; frequency and actual duration of stakeholder consultations |
| Instability of legislation (the number of articles amended within the first three years of an act’s promulgation) | average time periods between amendments  
maximum and minimum values |
| Scope of environmental legislation (the number of legal acts that need to be monitored by competent authorities, newly adopted and cumulative) | the number of law articles and pieces of secondary legislation that need to be monitored by competent authorities, newly adopted and cumulative |
| Access to bills and legal acts (share of bills, and primary and secondary legal acts available on-line) | average time necessary to post a new legal act (draft or promulgated) on the web-site |
| **Environmental approvals and permitting** | |
| Procedural soundness of facility-specific regulation (share of cases when competent authorities fully adhered to the legally prescribed procedures) | timeliness of regulatory decisions (average and maximum length of procedures)  
procedural transparency (share of documents subject to public hearings) |
| Regulatory load (the cumulative number of issued permits or reviewed Environmental Impact Statements (EIS)) | average number of days spent by experts within competent authorities to review EIS and permits (tracked by facility, averages - sector-specific) |
| Transparency of facility-specific requirements (share of application and final documentation posted on-line) | share of EIS/permits that have non-technical notes |
| Facility-specific permitting burden (share of issued integrated permits) | total number of working days/money spent on preparing permit applications and other documentation |

Source: OECD (2008), based on brainstorming during REPIN meetings.
Compliance assurance indicators

Another important group of compliance determinants is linked to the strategies and tools of compliance assurance. This group may be characterised by such phenomena as failure to promote and monitor compliance, ensure procedural justice and deterrence. The current section discusses these determinants than proposes indicators (Table 6) that may help competent authorities to assess and enhance the soundness of their compliance assurance strategies.

To accept voluntarily the necessity of complying with government regulations, both industries and the general public need to be well informed and understand the reasons behind regulatory requirements. Furthermore, their capacity to meet these requirements has to be enhanced. Through the use of preventative instruments, authorities can persuade companies to become compliant. Persuasion will be effective where companies see opportunities of gaining competitive advantage as a result of good environmental performance, e.g. if consumers make their choice based on environmental criteria. Wide social disapproval of non-compliant behaviour will be another important factor in preventative compliance assurance.

Regulations that are never monitored are unlikely to bring compliance. Furthermore, monitoring that is superficial or that is not targeted at high risk areas is less likely to be effective. But more rigorous and sufficiently frequent inspections can actually be more influential than penalty levels in improving compliance.

Procedural injustice is another major contributor to non-compliance. When regulated entities experience unfair treatment, they often respond by boycotting activities that would achieve compliance. A series of studies of the effects of different inspection styles used by regulators have shown that excessively coercive strategies de-motivate those actors who were already willing to be environmentally responsible. When punishment rather than dialogue is in the foreground of compliance assurance, an organised culture of resistance can emerging though this does not mean that authorities should be clement with premeditated or repeated offences.

Furthermore, competent authorities can face a failure of deterrence where infringements have high rewards and low probabilities of detection. This may happen when fines are not high enough to offset the profits potentially available from non-compliance, or because of limited resources or lack of strategy in monitoring and enforcement.

Table 6. Possible indicators of compliance assurance

<table>
<thead>
<tr>
<th>Core indicators</th>
<th>Complementary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compliance promotion activities</strong></td>
<td></td>
</tr>
<tr>
<td>Access to compliance assistance (share of legal acts for which technical advice products are available)</td>
<td>structure of compliance assistance instruments</td>
</tr>
<tr>
<td></td>
<td>share of regulated entities reached through information letters, presentations, workshops, or during on-site visits</td>
</tr>
<tr>
<td></td>
<td>share of managers (operators/owners) of large facilities that were informed about the compliance status of their facilities and possible financial and environmental consequences of non-compliance</td>
</tr>
<tr>
<td>Recourse to compliance promotion (share of regulated entities requesting technical and financial assistance)</td>
<td>share of regulated entities that benefited from financial incentives e.g. reduced fees or preferential credit rates</td>
</tr>
<tr>
<td>Effectiveness of preventative tools (share of offences rooted in the lack of knowledge about legal requirements or ways to comply with them).</td>
<td>incidence of downloads of technical advice products</td>
</tr>
<tr>
<td></td>
<td>share of reactive on-site visits</td>
</tr>
<tr>
<td>Core indicators</td>
<td>Complementary indicators</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Compliance monitoring activities</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Enforcement presence</strong> (share of facilities inspected to the total number of regulatees by specific segments);</td>
<td>degree of implementation of inspection plans, % of executed in comparison with planned share of unannounced inspections share of facilities inspected randomly frequency and duration of inspection for various segments of the regulated community and industrial sectors incidence of sampling during on-site visits share of regulated substances that can be/are monitored by competent authorities frequency of offsite reviews (share of reviewed self-monitoring reports) recourse to outsourcing (incidence of mandatory environmental audits)</td>
</tr>
<tr>
<td><strong>Control commitment</strong> (incidence of denied entries of inspection personnel to a facility).</td>
<td>share of complete self-monitoring reports share of reports with self-monitoring data received by prescribed deadlines</td>
</tr>
<tr>
<td><strong>Procedural soundness of inspection</strong> (number and share of cases when inspectors have not adhered legally prescribed procedures of inspection)</td>
<td>number of late responses and their share in the total number of complaints share of regulated entities declaring that they were requested to pay bribes share of integrated inspections share of site visits conducted jointly with other authorities</td>
</tr>
<tr>
<td><strong>Reliability of informal control</strong> (share of complaints that led to offence discovery)</td>
<td>share of NGOs having active compliance monitoring programmes share of regulated companies that are subject to informal environmental controls by financing institutions</td>
</tr>
<tr>
<td><strong>Non-compliance response</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Predictability of offences</strong> (share and structure of offences that occurred because of factors other than force majeure or external to the regulated entity)</td>
<td>share of facilities with average age of infrastructure exceeding sector standard share of facilities with multiple sources of pollution</td>
</tr>
<tr>
<td><strong>Severity of administrative sanctions</strong> (share of administrative offences leading to sanctions other than administrative orders or fines);</td>
<td>enforcement pyramid: structure of administrative sanctions (relative share of different sanctions) comparison between actual level of sanctions and allowed level of sanctions comparison with sanctions for the same type of non-compliance applied by neighbouring countries and key trade partners</td>
</tr>
<tr>
<td><strong>Promptness of reaction to enforcement</strong> (share of fully/partially corrected non-compliance within prescribed deadlines)</td>
<td>average duration of non-compliance</td>
</tr>
<tr>
<td><strong>Procedural soundness of enforcement</strong> (number of satisfied appeals against decisions made by competent authorities)</td>
<td>actual duration of administrative and criminal proceedings share of cases accepted for criminal proceedings share of convictions in cases addressed through judicial enforcement share of decisions reviewed on grounds of appeal</td>
</tr>
</tbody>
</table>
### Compliance indicators

Revealing the impact of government’s efforts may rely on comparison between trends in environmental quality and human health with trends in compliance levels, assessed in relation to specific environmental requirements. For example, in order to demonstrate progress in water quality management trends in oxygenation levels of inland water bodies could be compared to the evolution of compliance rates specific to Emission Limit Values for BOD. In practice, this means that competent authorities need to routinely monitor the percentage of facilities in compliance (or “non-compliance”, depending upon the nuances that they want to confer to this indicator) with environmental laws – the so-called “(non-)compliance rates”.

Their development has faced, unfortunately, a number of problems. First is the representativeness of this indicator, as not all facilities are checked and the reasons for which facilities are chosen for inspection can dramatically affect the calculated non-compliance rate. A high non-compliance rate would be naturally expected if authorities inspect facilities on the basis of risk targeting, complaints or other information suggesting the presence of a problem. Similarly, results can differ in the case of announced and unannounced site visits.

In order to enable extrapolation, authorities will need to periodically abandon the strategy of targeted on-site visits. Since in practice no government agency can afford to inspect all the facilities every year, which would be the “perfect” method to calculate the real rate, random samples can be determined using sound approaches for selecting a statistically valid subset of facilities to inspect within different segments of the regulated universe.

Calculation of general non-compliance rates can pose serious interpretation problems, *e.g.* a low non-compliance rate can be misleading for programme design if the largest polluters remain out of compliance. Because of such difficulties in interpretation, it may not be reasonable to keep programme managers accountable for changes in non-compliance rates until the statistical soundness of their calculation is ensured.

Non-compliance rates, however, can give a clear signal for directing management attention (and resources) to specific areas. Overall, they are more constructive measures of performance than relying on input and output counts alone.

Indicators of environmental pressures (also referred to in this paper as “environmental performance of regulated community”) may serve as a complementary set of indicators that help to connect activities with environmental results. These indicators are largely available and continuously developed due to the emergence of corporate reporting and a more general trend towards greener patterns of economic development.
### Table 7. Possible indicators of environmental compliance

<table>
<thead>
<tr>
<th>Core indicators</th>
<th>Complementary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compliance behaviour</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Transparency commitment</strong> (share of regulated entities that participate in information disclosure schemes)</td>
<td>share of facilities issuing corporate environmental reports</td>
</tr>
<tr>
<td></td>
<td>share of facilities submitting a full set of data for Pollutant Release and Transfer Registers</td>
</tr>
<tr>
<td><strong>Normative commitment</strong> (share of fully compliant facilities)</td>
<td>rate of compliance with Emission Limit Values</td>
</tr>
<tr>
<td></td>
<td>rate of compliance with sampling scope and schedule, specified in self-monitoring programmes</td>
</tr>
<tr>
<td></td>
<td>rate of compliance with activities and schedule of their implementation, specified in Environmental Improvement Plans</td>
</tr>
<tr>
<td></td>
<td>timeliness of returning to compliance (share of violations that were corrected within the deadline prescribed by competent authorities)</td>
</tr>
<tr>
<td><strong>Normative negligence</strong> (rate of incidents and accidents related to factors other than external ones to the operation of a facility in the total number of observed incidents and accidents with environmental consequences)</td>
<td>share of facilities that do not have a mandatory permit or have a permit with expired validity;</td>
</tr>
<tr>
<td></td>
<td>chronic non-compliance (rate of facilities in non-compliance for over two years)</td>
</tr>
<tr>
<td></td>
<td>rate of recidivism (share of repeated offences of the same type by the same actor – applicable to offences that have a high degree of recurrence within a short period of time)</td>
</tr>
<tr>
<td><strong>Regulatees’ environmental performance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental commitment</strong> (relative decrease (increase) of damage cases compared to the baseline)</td>
<td>number and share of ISO 14 000 certified companies</td>
</tr>
<tr>
<td><strong>Environmental performance of regulated entities</strong> (evolution of decoupling indicators)</td>
<td>improvements in energy and resource efficiency;</td>
</tr>
<tr>
<td></td>
<td>changes in the surface of illegal dumps and cleaned up sites of historic pollution;</td>
</tr>
<tr>
<td></td>
<td>share of illegally poached natural resources</td>
</tr>
</tbody>
</table>

Source: OECD (2008), based on brainstorming during REPIN meetings.

**Headline ERC indicators**

In order to reach the general public more effectively, it might be useful to identify up to 10 indicators that present high interest for the mass-media. National priorities (e.g. focus on water or air quality, waste management, or illegal use of natural resources) should be considered when selecting such indicators. The following could be used as headline indicators:

- Inspection frequency of major polluters;
- Compliance rates among major polluters and their trend, including: (i) compliance with Emission Limit Values; and (ii) compliance with environmental improvement plans;
- Chronic non-compliance among major polluters;
- Incidence of industrial accidents and illegal dumping;
• Share of population leaving in areas with poor environmental conditions;

• Share of illegally poached natural resources.

Parameters to be monitored

Parameters to be monitored in support to ERC indicators may be quite numerous. For example, the following parameters may be associated with on-site visits: start and end date, method for choosing the facility to monitor for compliance (e.g., risk-based or random), method for scheduling the site visit (announced or unannounced), type of inspection (routine or reactive), scope of inspection (medium-specific or integrated), results of inspection (e.g., access denied, full compliance, partially corrected non-compliance), etc. These need a careful identification based on national legal systems and reflection in the template for an inspection report.
9. INSTITUTIONAL FRAMEWORK FOR PERFORMANCE MEASUREMENT

Minimum criteria for the institutional framework

Performance measurement needs to be fully integrated into strategic management thus placing strategy and vision, goals and objectives in the focus of policymakers and managers. This should stimulate environmental authorities to set realistic and measurable targets, and select the most effective and efficient mechanisms for assuring regulatory compliance.

In this order of idea, performance measurement needs to be placed among the core functions of authorities in charge with environmental policy implementation. Responsibilities for data collection and disclosure should be mandated either in the primary or secondary legislation.

It is also highly desirable that the organisation structure of competent authorities at both national and sub-national levels includes a unit responsible for planning, analysis, and performance measurement and reporting. Allocation of adequate resources will be required for the functioning of such a unit and the whole performance measurement system. The professional independence of the staff responsible is required to support the credibility of data collection and analysis.

Procedures need to be developed to routinely collect, validate, analyse and report relevant information. A careful development and continuous improvement of these procedures will help to produce information in an objective, professional, and transparent manner.

The system of performance measurement should be designed to use allocated resources in the most effective way. The number of indicators should, for instance, be limited to those ones that are essential for producing information that supports programme evaluation and decision-making. The reporting burden on both the regulated community and authorities should be limited to the extent possible. Information and communication technology could be used to decrease the reporting burden.

Indicators should be used at all levels of implementation (national, sub-national, and municipal). Differences may well exist between various sets of indicators used by authorities at different levels and still those sets be adequate to the mandate, goals and strategies of a given authority. At the same time, national-level sets of indicators should be universally applied and designed to ensure, among other things, comparison between results, as well as reveal any lack of cross-national coherence.

Standardisation of terminology and data collection

National level agencies should standardise ERC indicators, i.e. to ensure (i) terminological clarity and unity (the attribution of a same meaning to a single indicator or data category by all users), and (ii) the use of units that enable appropriate comparison and exchange of data among environmental authorities and other entities, domestically and internationally. Each data element (parameter, indicator, or index) should be represented by a name, definition, format (maximum length and data type), and where applicable, permitted values. In addition, explanatory notes can be provided relating to the definition and use of the data element.

A terminological (data) standard could be mandated by the legislature or the competent executive agency (e.g. the Ministry of Environment Protection or the Department of Statistics). Environmental regulation and compliance assurance authorities can initiate the process of standardisation, secure political support and funding, draft the standard, and engage in a broad dialogue with sub-national units and other stakeholders while drafting the standard. National standardisation of data should not constrain what information an agency
chooses to collect, nor automatically constitute a reporting requirement. In particular authorities at the sub-
national level should be allowed to devise sets of indicators that correspond best to local needs.

Data standards should be reviewed periodically to maintain their usefulness and applicability. It is
desirable that standardisation be implemented prior to, or at least in parallel with, information systems
development. Training for all involved actors should be provided after the data standard is adopted.

**Data management systems**

Environmental authorities should build comprehensive, accurate, and user-friendly data management
systems that would be capable of storing, integrating, analysing and reporting various kinds of data across
various programme and geographic areas. These systems can be organised in several blocks, including
specific information about regulatees (permit conditions and self-monitoring reports), data on compliance
promotion and compliance monitoring, and non-compliance response information (see Annex 6 for more
details). It is important that information systems ensure full traceability of individual cases, from inspection
and non-compliance discovery until the full execution of decisions related to non-compliance response.

Establishing clear data management procedures should be a first step toward this situation. Uniform
procedures of data production, validation and transfer, and requirements for a timely update of information,
can strengthen the usefulness, quality and accessibility of information. Automated data storage systems need
to be developed to improve access to primary data and enable direct consultation of dossiers electronically
through local area networks. Periodic auditing of procedures and information management systems for the
purpose of verifying their practical application and ensuring their use by staff is recommended.

Although upgrading information systems can be costly and difficult to design, this has the benefit of
providing avenues to retrieve and analyse information more effectively and timely. Improved information
management can enable a better targeting of resources towards the most serious compliance and
environmental problems. In fact, there is no other option to cope with a growing number of the regulated
entities than the adoption of automated systems.

**Measuring and comparing performance of sub-national units**

Besides measuring own performance, the national-level authorities should assess sub-national units. This
should be done in view of improving performance and harmonising approaches and capacity across all
geographic units, rather than punishing outsiders.

Normalisation of data, *i.e.* bringing them to a common denominator, is necessary to enable comparisons.
For example, comparing the total numbers of inspections in two regions will be meaningless if one is
characterised by a small number of large facilities and the other one has many Small and Medium-sized
Enterprises (SMEs). To make comparison possible, the number of inspections needs to be related to the
respective segment of the regulated community.

**Assessment of organisational capacity**

Organisational capacity should be assessed regularly, as it is an important factor that will influence the
proper functioning of performance measurement systems. In this regard, the key aspects to be considered are
as follows:

- **Information needs**: What are the current information needs for decision-making, in particular within
  the framework of strategic planning, and communication? Who are the stakeholders? What data are
  being collected and how are they used? Are new indicators needed as a result of change in strategies
  or enactment of new laws?
• **Data quality:** Do the scope, quality, and analysis of data meet the decision-making and outreach needs? How accurate should be the measurement? Are there guidelines to ensure national consistency and comparability of data?

• **Data collection and storage:** How frequently should data be collected? Who will collect the data? Who will ensure quality control and quality assurance of data? Where will the data be stored? Is there an existing data system that collects timely and accurate data? Can it be enhanced? Will the data be computerised? What resources are needed to obtain the necessary data?

• **Data analysis:** Who will analyse the data? How should the data be reported, and to whom?

• **Information dissemination:** What is the message? Who is the audience? What products and delivery mechanisms are most appropriate to deliver the message?

**Mechanisms for feedback and partnerships**

National level enforcement authorities should establish effective feedback mechanisms on ERC indicators and a forum for sharing best practices nationally. The sub-national authorities should be able to comment on existing indicators, their interpretation and collection approaches, as well as to propose new approaches for performance measurement. They also should have the opportunity to share experience from adopting innovative instruments and ERC indicators. This will benefit the development of environmental regulation and compliance assurance at all levels.
The REPIN members identified several priority lines of action to reform performance measurement in EECCA. These include: (i) improve data collection, management and reporting procedures; (ii) analyse available data meaningfully; (iii) regularly disclose performance information; (iv) add new indicators to the existing toolbox, including input indicators, output indicators for new instruments and statutes, and intermediate outcomes indicators. This section of the Guidance can help countries to design and implement reforms along these lines.

One important consideration is that “reform” does not mean a total overhaul of the existing system. Such an approach is particularly dangerous in the field of data collection where important trend may be overlooked if there is no sufficient continuity in the set of indicators. Conducting a “reform” rather means a substantive improvement in the design and functioning of the system without losing any of the important structural elements and washing out technical competence, as it sometimes happens in EECCA countries. Nor “reform” means organisational restructuring.

Step 1: Make a policy decision to reform indicators

Reforming indicators is impossible without a policy decision on the initiation of reform. It must be made at a political level that has a sufficient degree of control over the environmental regulation and compliance assurance system in order to enable effective liaison between different competent authorities. The establishment of an expert group could be the “material expression” of the political will to improve performance measurement. Since several bodies belonging to the executive and judicial branch are often involved in environmental regulation and compliance assurance, it is important that one of them coordinate efforts to reform indicators and provide a platform for various agencies, as well as non-governmental stakeholders, to contribute to this process with comments and proposals. It is equally important to specify the mandate of the expert group, in particular outputs of its activities, and resources that would need to be dedicated to its functioning (e.g. staff time, venue for meetings, administrative support, etc.).

The expert group may, among other things, have the following responsibilities:

- Seek input from all government stakeholders and consult non-governmental stakeholders;
- Decide on reform options, based on brainstorming and review of domestic and international experience with ERC indicators;
- Promote improvements in the current approaches to data analysis and reporting;
- Decide on the scope for new indicators and criteria to select them, and initiate pilot projects;
- Commission the development of, and agree on, a national guideline on ERC indicators;
- Establish a mechanism to regularly monitor and assess the ERC indicators and the performance measurement system as a whole, and to identify possible redundancy, gaps, or need for new indicators.

The above list is just a possible “menu” that can be adjusted to fit priorities of participating government agencies. The mandate of the expert group should be decided collectively by its members. It will be necessary that its members reflect on such priorities and decide what has to be done in the short term and what needs more research and consensus building.
Secretariat support for the expert group can be outsourced. Nevertheless, the process of reform should heavily rely on the involvement of staff of the enforcement agency that will increase their sense of ownership of new indicators.

**Step 2: Ensure stakeholder involvement and study demand**

The expert group needs to ensure stakeholder involvement, including personnel of agencies participating in the reform, outside experts, and non-government actors. This can bring the following benefits:

- Agency personnel is an important source of expertise and can be instrumental in the selection and development of relevant and feasible performance measures. Staff may also know of information sources that could be used for developing indicators;
- External experts can 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 programmes can provide useful assistance;
- Non-governmental stakeholders can help to ensure that ERC indicators will be accepted as legitimate measures of performance, and will meet the needs of the general public.

Stakeholder involvement helps to understand demand for specific information, which will differ from one group of stakeholders to another.

**Step 3: Assess the baseline and define the goals and sequence of reform**

The expert group will need to get a full understanding of the existing performance measurement system that should help to develop a roadmap for its reform. This can be achieved by conducting an assessment based on the analytical framework presented in the current paper. Such a baseline study should lead to the identification of gaps and the scope of reforms. It is important to notice that smaller-scale recurrent assessments may be required every 2-3 years, or at any time when the regulatory framework is updated, strategies are modified, and innovative instruments are adopted. The personnel of environmental enforcement authorities should be prepared to routinely solicit, compile and act on feedback about performance indicators. Furthermore, the results of assessment can be complemented with reviews of international experience, particularly if the latter are readily available.

Based on analysis and brainstorming, options for reform will be identified. It should be possible to define actions that are feasible in short-term and do not require important resources, mid-term actions, and actions in a long-term perspective. Most likely, changes will be required in all elements of performance measurement (indicators, data collection procedures, and diagnostic approaches).

Given that some performance indicators already exist, ensuring the robustness of data collection may need to receive the highest priority in the short-term perspective. Most often, terminological and data collection standards will need to be developed. Sometimes, the adjustment of forms with primary data, such as inspection or non-compliance reports, may be required. Registries with administrative information may also need immediate improvement to enable the traceability of individual cases and respective administrative papers.

It is important that a plan be developed that describes the tasks to be completed to implement the reform, and provides a schedule for completion of the tasks. The plan should be disseminated to managers and staff, and to external stakeholders as appropriate. Monitoring of implementation can help determine whether adjustments are needed.
Step 4: Conduct pilot projects

The use of pilot projects to develop performance indicators can help to test them before fully fledged national implementation. During this period, data can be analysed, 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 then 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 lessons learned from the project at its conclusion.

Step 5: Enact a new performance measurement framework and monitor results

Following the testing period, the new elements of performance measurement – if found appropriate – have to be extended to the entire system. This can be done by enacting new national-level guidelines or amending existing ones. The performance measurement system will need to be regularly monitored and assessed to identify possible redundancy or the need for new indicators as the general social and economic context changes.

Challenges and constraints to overcome

International experience shows that several challenges – real and perceived – must be addressed during the implementation of a performance measurement reform:

- **Apparent difficulty of reform**: Developing performance indicators strikes many as an overwhelming task – one for which many compliance promotion and enforcement staff believe they are ill equipped. Two strategies can be applied to address this concern: involving staff and keeping the scope manageable. Besides, a lot of the desired information is, in fact, already being measured, though not comprehensively, consistently or for the same purposes.

- **Likelihood of reform fatigue**: Organisational change does not come easily. New initiatives, such as development of indicators, generally entail new responsibilities and activities. The tendency is for new initiatives to fade as the initial enthusiasm wanes; and organisational inertia can easily result in a “drift” back into doing what an organisation is used to do. Resisting the drift requires sustained focus and attention. The purpose, progress and impact of the new activities must be re-iterated by managers. Milestones should be clearly established and successes celebrated. It is also important to constantly remind staff how these measures will support line management in their decision-making.

- **Seeing indicators as a threat**: To the extent that performance indicators accurately reflect performance, they may be resisted as a potential means of critiquing management. It is important to understand and convey the message that the new performance measures are geared primarily to support management, not to evaluate it.

While the overall framework in EECCA (in particular new budgeting requirements) is favourable to the reform of ERC indicators, much will depend upon the ability of institutions and even individuals to accept and pursue changes. Several constraints may limit reforms or reform success. Environmental authorities have undergone structural changes that resulted in the lack of continuity and losses of experienced staff. They have limited organisational capacities and resources. Integrated information management systems are lacking, and interpretative skills are limited. A long-term commitment to improve performance assessment and continuity among the responsible personnel may also be absent.

The fact that some of these factors are not under direct control of enforcement agencies should not be used to argue against reforms: A good sequencing of the required changes could help to advance improvements as far as possible under existing conditions. Furthermore, the evolution of the general administrative framework (introduction of new administrative tools, new policy objectives, increasing pressure from the general public, etc.) should be monitored to fully utilise the opportunities for change.
**Amending legislation**: legislation that alters the effect of existing legislation, whether by modifying or repealing provisions or by adding or substituting new provisions.

**Bill**: draft of primary legislation in the form that will be considered by Parliament.

**Compliance**: Compliance is a response to regulatory requirements manifested through the state of technical and behavioural conformity with the law.

**Compliance assurance**: Compliance assurance is defined as the application of all available tools to induce compliance and includes:

- **Compliance promotion**, which is any activity that facilitates or encourages voluntary compliance with environmental requirements.
- **Compliance monitoring (non-compliance discovery)**, which is the collection and analysis of information on compliance status (through pre-inspection and inspection activities, ambient and emission monitoring, when needed, and other kinds of data gathering);
- **Enforcement (non-compliance response)**, which can be defined as the set of actions that governments or others take to correct or halt behaviour that fails to comply with environmental requirements.

**Compliance assistance** comprises activities that aim to help the regulated community to understand and meet their environmental obligations.

**Compliance inspection** is a visit to a facility or site for the purpose of gathering information to determine compliance, including offsite observations.

**Compliance monitoring action** is any action taken by a competent authority for the purpose of determining, or assisting in the determination of, the status of compliance with applicable environmental laws or rules at a regulated facility or of a regulated entity.

**Duration of inspection**: The amount of time spent on-site. In some legal systems, this may be the amount of time from obtaining the inspection warrant to the delivery of the inspection report to the inspected company.

**Follow-up inspection**: An inspection to verify compliance with administrative orders issued to bring the facility back into compliance.

**Frequency of inspection** is defined as the return to a facility, per certain period of time, for assessing its environmental compliance.

**Indicator**: A parameter, or a value derived from parameters, which points to, provides information about, describes the state of a phenomenon/environment/area, with a significance extending beyond that directly associated with a parameter value.
Index: A set of aggregated or weighted parameters or indicators.

Information request is an enforceable, written request for information to a regulated entity or potentially regulated entity or about a site, facility, or activity.

Integrated inspection means that impacts on all environmental media are considered in their mutual relation, to obtain a holistic picture of a process and avoid cross-media transfer of pollution.

Law drafting: the process of converting new policy into legal rules in legislation, in the appropriate legal form and style, prior to the act of law-making.

Legislation: written law (normative acts) made by Parliament, Government or other body with power (e.g. conferred by the Constitution) to issue law-making instruments.

Methods for choosing facilities to monitor for compliance: Three methods can be used to choose the facilities that will be inspected: (i) all regulated facilities; (ii) statistically valid, randomly sampled subset of the overall number; (iii) a subset of the existing facilities chosen, for example, due to specific characteristics, such as the risk for the environment or compliance history that exhibits repeated violations or severe violations.

Methods for scheduling inspection: These include announced and unannounced inspections. Facilities that have prior notification of an inspector’s visit (announced inspection) may be more likely to fix problems prior to the inspector’s arrival than if the inspector arrives unannounced.

Offsite record review is an assessment of information requests, self-monitoring reports, and other records, conducted at the competent authority’s premises, in order to determine the compliance status of the reviewed company or facility.

Parameter: A property that is measured or observed.

Presentations are specific compliance assistance materials communicated to a group of regulated entities at meetings that may or may not be sponsored by the compliance assistance programme. Presentations include speeches, multi-media demonstrations, and panel discussions.

Primary legislation: legislation made by Parliament (i.e. the body vested with the principal law-making function for the State).

Reactive inspections: Inspections carried out as a reaction to incidents or accidents, or triggered by an adverse trend in environmental indicators.

Regulatee (also referred to as a regulated entity): A natural person or legal entity, including governments and their subsidiary bodies that are subject to legally-defined environmental requirements. The definition of «regulatee» extends to privately or publicly-owned enterprises in all their possible forms.

Regulatory Impact Analysis (RIA): a verification process to assess the impact of alternative policy choices or of a legislative proposal, particularly the economic and financial impacts.

Routine (planned) inspections: Inspections carried out proactively as part of a planned programme in order to show inspection and enforcement presence by the authorities. In most of the cases, this will prevent the non-compliance of the regulated community

Sampling inspection: An inspection that involves collection of physical samples.

Secondary legislation: legislation made by Government or another executive body that is vested with power to issue law-making instruments (e.g. decrees, directives, regulations, rules, orders).
**Self-monitoring** refers to measures put in place and paid by operators in order to monitor their own compliance with regulatory requirements and report results to the competent authorities. Self-monitoring primarily relates to measurements of process conditions (operation monitoring), process releases (emission monitoring), and environmental conditions (impact monitoring) in accordance with requirements specified in laws, regulations, permits, or other legally binding documents.

**Technical advice products** include printed materials (e.g., newsletters, fact sheets, information packets, sectoral guides, self-audit checklists, brochures), videos, slide shows, and websites.

**Telephone assistance** includes assistance provided by hotlines, where the telephone is the primary outreach vehicle.

**Types of non-compliance response:** The non-compliance responses types include: (i) informal response; (ii) administrative response without damage compensation claim; (iii) administrative response complemented with damage compensation claim; and (iv) launching of a criminal enforcement case. Instruments used under each of this path of enforcement may be different and it will be important to make a full inventory of such instruments and track their use individually.

**Workshops** include training sessions and seminars, sponsored by the compliance assistance programme, that involve a group of regulated entities or assistance providers.
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ANNEX 1. CRITERIA USED TO SELECT INDICATORS AND ENSURE DATA QUALITY 6

As indicators are used for various purposes, it is necessary to define general criteria for selecting indicators and validating their choice. For example, three basic criteria are used in OECD work: policy relevance and utility for users, analytical soundness, and measurability. These criteria describe the “ideal” indicator; not all of them will be met in practice.

In terms of policy relevance and utility for users, an environmental indicator should:

- Provide a representative picture of environmental conditions, pressures on the environment or society’s responses;
- Be simple, easy to interpret and able to show trends over time;
- Be responsive to changes in the environment and related human activities;
- Provide a basis for international comparisons;
- Have a threshold or reference value against which to compare it, so that users can assess the significance of the values associated with it.

In terms of analytical soundness, an environmental indicator should:

- Be theoretically well founded in technical and scientific terms;
- Be based on international standards and international consensus about its validity;
- Lend itself to being linked to economic models, forecasting and information systems.

In terms of measurability, the data required to support the indicator should be:

- Readily available or made available at a reasonable cost/benefit ratio;
- Adequately documented and of known quality;
- Updated at regular intervals in accordance with reliable procedures.

Measurability issues such as the quality of underlying data are important in the use of environmental indicators, and must be taken into account to avoid misinterpretation. Measurability and data quality vary greatly among individual indicators. Some indicators are immediately measurable, others need additional efforts before they can be used.

The OECD Quality Framework for Statistical Activities comprises seven dimensions of data quality, which can be summarized as follows:

- Relevance of data products is a qualitative assessment of the degree to which they serve the purposes for which they are sought by users. Data can be well-recognized in the field and cited in government reports (high policy relevance) or little used beyond academic papers (lower policy relevance).

• **Accuracy** is the degree to which the data correctly estimate or describe the quantities or characteristics they are designed to measure. Data can derive from well-accepted classifications and procedures, validated by reference to independent data sources (high quality) or from ad hoc classifications and procedures with no cross-checking against other data (lower quality).

• **Credibility** refers to the confidence that users place in the data products. It is determined in part by the integrity of the process through which the data is generated. Results can be based on standard, replicable procedures capturing unambiguous data (highly objective), or include survey-based data (less objective) or expert assessments (least objective).

• **Timeliness** reflects the length of time between data availability and the event or phenomenon they describe.

• **Interpretability** concerns the ease with which the user may understand and properly use and analyse the data. It is determined in part by the adequacy of the definitions of concepts, variables and terminology, information describing the limitations of the data.

• **Coherence** is the degree to which data are logically connected and mutually consistent – within a dataset, across datasets, over time and across countries.

• **Accessibility** reflects how readily the data can be located and accessed. Key considerations include the source of information and the ease with which the user can gain access to the data.
ANNEX 2. OECD SETS OF ENVIRONMENTAL INDICATORS

Core environmental indicators (CEI) are designed to help track environmental progress and the factors involved in it, and analyse environmental policies. The OECD member countries agreed on a set of about 50 core environmental indicators that are annually gathered and published by the OECD Secretariat.

Key (headline\textsuperscript{8}) environmental indicators (KEI) are a reduced set of core indicators (around 10 indicators) that serve wider communication purposes. They inform the general public and provide key signals to policy-makers.

Sectoral environmental indicators (SEI) are designed to help integrate environmental concerns into sectoral policies (transport, energy, household consumption, tourism, agriculture). They reflect sectoral trends of environmental significance; their interactions with the environment (including positive and negative effects); and related economic and policy considerations.

Indicators derived from environmental accounting are designed to help integrate environmental concerns into economic and resource management policies. Focus is on: environmental expenditure accounts; physical natural resource accounts; and physical material flow accounts.

Decoupling environmental indicators (DEI) measure the decoupling of environmental pressure from economic growth and are valuable tools for determining whether countries are on track towards sustainable development.

\textsuperscript{7} Source: OECD (2003), OECD Environmental Indicators: Development, Measurement and Use: Reference Paper.

\textsuperscript{8} Such indicators are also called “headline” indicators since they are designed to reach the headlines of newspapers.
The basic input indicators that need monitoring include:

- Staff number at national and sub-national levels;
- Staff turnover (including newly hired personnel; number of staff who resigned; number of staff on a long-term unpaid leave; fired staff (due to a lack of competence, because of corruption, other causes));
- Staff hired based on competitive selection procedures;
- Length of service, professional background and educational level;
- Functional balance (absolute figures / as percentage of the total staff);
- Computer literacy, % of personnel;
- Age structure according to groups (<25; 25-30; 30-40; 40-50; 50-60; >60);
- Gender structure;
- Knowledge of foreign languages (one, two, more than two), %;
- Number and share of accredited laboratories;
- Share of competitive hiring of staff and procurement of services;
- Percentage of staff involved in training at least once a year;
- Allocated budget and its structure.
ANNEX 4. ROOTS OF NON-COMPLIANCE

Compliance monitoring authorities may want to analyse the roots of non-compliance, which could be grouped in the following categories and sub-categories:

- **Human error**, related to: (i) individual responsibility or professional judgement; (ii) involvement in corruption; (iii) fatigue, lack of alertness, distraction; (iv) lack of experience, knowledge, of technical expertise;

- **Procedural faults**, such as: (i) inadequate record keeping procedures; (ii) unclear reporting or notification procedures; (iii) unclear operating procedure; (iv) failure to follow operating procedures; (v) lack of written operating procedures;

- **Management problems**, such as: (i) inappropriate staffing or level of expertise; (ii) environmental aspects of facility process and operations not identified; (iii) environmental planning or budgeting not completed; (iv) management support or guidance not provided; (v) oversight not provided; (vi) control of purchased materials, equipment and services not provided or inadequate;

- **Communications deficiencies**, such as: (i) difficulties of communication between employees; (ii) difficulties of communication between facility and regulatory agencies;

- **Poor emergency preparedness**, such as: (i) emergency preparedness plan insufficient; (ii) lack of emergency preparedness plan; (iii) poor knowledge of emergency preparedness plan among employees;

- **Inadequate self-monitoring**, including: (i) self-monitoring programme absent or not sufficiently detailed; (ii) no system to ensure timely submission of environmental reports to the regulatory agency; (iii) self-inspection not conducted;

- **Poor design of regulations and permits**, such as: (i) ambiguous regulatory requirements; (ii) contradictions between national and sub-national regulations; (iii) inconsistent or contradictory interpretation of regulations; (iv) contradictory interpretation by enforcement agencies; (v) rule implementation time frames are too short; (vi) permit parameter not measurable in real time; (vii) calculation error by agency in permit resulted in limit set too low; (viii) facility unaware of applicability of a regulation;

- **External circumstances**, such as: (i) failure of sub-contracted services; (ii) external phenomenon (weather, theft, flood, fire);

- **Equipment problems**, related to: (i) design or installation; (ii) maintenance; (iii) age of infrastructure.
Useful analysis need not be complicated. It does, however, need to catch the attention of decision makers and the regulated community. Possible ways to present data visually include:

**Graphs.** Graphs come in many forms, including:

- Line charts, which can show trends over time, including in direction and slope. They enable, for example, comparison of annual changes or achievements of targets / predicted values;

- Bar charts, which work well for showing the comparative incidence of problems for specific time periods. For example, non-compliance responses can be presented as an “enforcement pyramid”. Bar charts can also be used to show how component parts of annual trends change over time;

- Pie charts, which convey variability within one category of indicators, *e.g.* the structure of the regulated community, violations, or non-compliance responses.

There are no rules for the form of a graph to use. Authorities need to consider a particular situation and use their best judgment to convey a story using graphs. For example, authorities often want not only to track environmental problems but also to link them to an economic activity. Showing actual environmental pressures and normalised data, *e.g.* vis-à-vis GDP or industrial output, on the same graph is one way to show this relationship simply.

**Maps.** Maps can show possible relationships between causal factors (conditions) and indicator variations across an area for a specific time period. Maps for different time periods convey both spatial and temporal variation.

**Photos.** Photos capture and communicate multiple aspects of change that are too complicated to convey concisely with numbers or even with graphs. Photos can be use, for example, to find and show illegal constructions.

New technologies make it feasible to connect maps and photos with graphs and underlying numbers. These technologies can to help staff and the public to see problems more clearly, understand their possible causes, and tailor solutions more precisely.

Whenever possible, authorities are advised to use stories to give data a face, illustrating potential consequences of an environmental danger with a story about a person at risk or actually harmed. In addition to bringing attention to problems, data-supported stories can be used to promote promising practices. Also, stories can be used to share local successes and build confidence in agency competence.

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ANNEX 6. HINTS ON DESIGNING SPECIALISED DATABASES AND SOFTWARE

The databases related to environmental regulatory management and compliance assurance should help organise, analyse or produce the following *types of information*:

- Laws and regulations;
- Facility-specific data;
- Inspection reports;
- Non-compliance reports;
- Incidents and accidents;
- Sampling reports and information on the rest of steps in the data production chain;
- Self-monitoring reports;
- Reports on compliance assistance activities;
- Complaints and data requests from the general public;
- Non-compliance cases and responses;
- Correspondence with the regulated community;
- Correspondence with partners;
- Resources used to conduct activities;
- Publishing activity and sub-contracts;
- Performance data.

The software designed to handle this information can have the following *functions*:

- Facilitate tracking any information that is relevant for the profiling of the regulated community and compliance assurance;
- Enable the analysis of performance and sharing of data on violators and non-compliance responses in different regions;
- Provide for automatic calculation of fees, fines and damage compensations, where possible;
- Make the link to the existing information systems of other state agencies, especially other enforcers (e.g. for identifying new facilities, recently registered, or check the financial status of enterprises and their fiscal discipline);
• Identify the resource-intensity of any activity and facilitate a better budgeting and expense monitoring within the Inspectorate;

• Decrease the amount of paper work and optimize reporting.

Several **interfaces** need to be available, including (1) input and transfer interface and (2) reporting interface(s). Through the input and transfer interface, the employees of competent authorities should be able to record new enterprises and their characteristics, open folders for storing data from regulated community, input data from any reports and transfer data, which have been send electronically by permit holders to authorities, etc.

At a minimum, data sets should be searchable by region, by chemical or pollutant of concern, by business sector, and by individual enterprises. The preference, however, should be given to search possibilities by any key word or combination of key words.

The reporting interface(s) should offer the possibility to view data in various combinations and time perspectives. They have to be tailored to different categories of users (high level officials, managers, and inspectors).

Given the nature of stored information, the access to some data sets should be restricted to authorised employees.

The following minimum **technical criteria** should be respected when designing the software:

• The database can be operated from one server computer and will be accessible from personal computers in the LAN in accordance to permissions set by the IT administrator;

• New data from regions can be uploaded into the main database only by staff working in the regions or in the head office;

• There should be the possibility to add new modules/databases;

• The databases and the applications will be compatible with other computer tools available within the Ministry of Environment, as well as other governmental authorities, in particular the Ministry of Interior.
Indicators are an indispensable element of evidence-based decision-making. In the field of environmental management, indicators cover pressures from human activities, environmental conditions, and societal responses. The latter category of indicators is still insufficiently advanced. In particular, there is a lack of internationally-agreed indicators that would characterise the governments’ regulatory and compliance assurance efforts and changes in compliance and environmental results associated directly with these efforts.

The current document is a contribution towards redressing this imbalance. It was produced in response to demands from countries of Eastern Europe, Caucasus, and Central Asia (EECCA) to facilitate the adoption and use of tools that support performance-oriented management by, and enable regional benchmarking between, environmental enforcement authorities. To this end, an analytical framework for performance measurement within systems of environmental regulatory management and compliance assurance (ERC) is proposed.