Operational guidelines for the environmental monitoring of plans and programmes (Article 18 of Legislative Decree 152/2006)

CReIAMO PA

Per un cambiamento sostenibile

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Premise

The Ministry of the Environment and Energy Security, within the activities of the LQS1 Line of Intervention Environmental Assessments - Actions for the improvement of the effectiveness of SEA and EIA processes related to programmes, plans and projects of the Project "CReIAMO PA Competences and networks for the environmental integration and improvement of PA organisations" of which it is a beneficiary, has started an experimental activity focused on the environmental monitoring of Plans and Programmes subject to Strategic Environmental Assessment provided for by art.18 of Legislative Decree 152/2006, of which this document, which aims to provide operational guidelines for the correct performance of SEA monitoring activities, is the final outcome.

The document was prepared by the Specialised Technical Unit of the LQS1 Line of Intervention based on the analysis of documentation at the European, national and regional level and thanks to the fundamental contribution of the Regions and Autonomous Provinces and other competent subjects.

The opportunity to dispose of support tools for the activities of the SEA competent and proceeding authorities represents an important chance to guarantee a homogeneous and correct application of the SEA discipline on the national territory: this is pursued by the CReIAMO PA Project through the publication of guidance documents that, although not binding, can orientate the activities of the different actors involved.

Gianluigi Nocco
Director General of the environmental assessments Directorate
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1 Introduction

Since the Strategic Environmental Assessment Directive came into force in 2001, and to date, thanks to the commitment of the Ministry of the Environment and Energy Security, numerous central, regional and local public administrations, universities and research centres, as well as NGOs, we have noticed an increased awareness of the purpose and benefit of this procedure. The subjects involved have mastered the art of drafting of SEA documentation that supports the phases from the initial launch of the Plan or Programme to its final adoption or approval - Preliminary Report, Environmental Report, Non-Technical Summary, Summary statement - but, although it is now possible to identify numerous best practices across all sectors and at all territorial levels, additional work is still needed to ensure that the quality and completeness of the SEA documents, during the phase supporting the formation of Plans and Programmes, become widespread practice.

The integration of Sustainable Development Strategies as a reference framework for the sustainability of Plans and Programmes subject to SEA - a unique case so far in the EU and a *trait d'union* with the objectives of the 2030 Agenda - represents the last important milestone in a sustainability-building process that, however, now needs to be confronted with facts, that is, with the concrete implementation of the Plan or Programme. In order to achieve this, the proceeding authorities must become aware that SEA is a process that covers the entire implementation period, which is developed through specific actions that are, in turn, articulated in projects, services or products that represent the object of monitoring, a compulsory activity within the SEA procedure, both from a formal and substantive point of view, although still much neglected.

In addition to the lack of awareness of this obligation, resulting in the almost total absence of SEA Monitoring Reports pursuant to article 18 of Legislative Decree 152/2006, there is, in the few cases where monitoring has been carried out, a persistent gap between the manner in which specific actions of Plans and Programmes are implemented and the indicators to measure the outcomes of these same actions.

Effective environmental monitoring is necessary to bridge this gap, through a careful selection of indicators that are actually useful to measure the implementation and effects of the Plan or Programme and to assess their correspondence with those hypothesised ex ante, and if necessary to correct where the action has proved ineffective or harmful, or to replicate where the action has been successful. Constant and constructive interaction between officials, technicians and decision-makers therefore plays a key role not only in ensuring the full implementation of Directive 2001/42/EC, but also in effectively assessing how far SEA processes contribute to the goal of sustainable development.

Anna Maria Maggiore
Head of the LQS1 Line of intervention
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1.1 International and European framework

Directive 2001/42/EC - the Strategic Environmental Assessment (SEA) Directive[1] aims '*to **provide for a high level of protection of the environment** and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development''.*

The achievement of the objectives stated in Article 1 of the Directive is ensured by submitting to SEA plans and programmes that, when implemented, are likely to have significant effects on the environment in the Member States of the European Union.

In this perspective, environmental monitoring is an activity that the SEA Directive envisages taking into consideration starting from the phase of preparation of the Environmental Report (Article 5), which, as is well known, will be an integral part of the Plan/Programme, and to carry out at the same time the implementation of the Plan/Programme itself.

For this purpose, point (i) of Annex I to the Directive provides that the Environmental Report must describe **the planned monitoring measures** as per Article 10;

Monitoring measures must then be clear in the information provided about the decision (Article 9, paragraph 1, (c)). From the framework of this article, it can be deduced that these measures must be accorded the status of an annex or stand-alone document, at minimum highly visible within the Environmental Report, so they can be instantly and very easily reviewed.

Finally, Article 10, describes the goals of monitoring as '*the control of the significant environmental impacts in the implementation of plans and programmes in order, inter alia, to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action*.' and suggests that control mechanisms be applied to avoid duplication.

In summary, Directive 2001/42/EC focuses on the goals of the monitoring, leaving it to the Member States to determine the subjects involved, the procedures, timing and tools of the monitoring activities.

The **Kiev Protocol on Strategic Environmental Assessment in a Transboundary Context**[2], provides some specifications on the procedures that the adhering States have to put in place in order to ensure internationally similar objectives to those set by Directive 2001/42/EC at EU level, with the focus on environmental and health protection.

Article 12 makes it explicit that the purpose of monitoring is to check the effects of the implementation of plans and programmes on environment and health, identifying unforeseen adverse effects at an early stage and ensuring that appropriate corrective measures are taken. Finally, it provides that appropriate information of the monitoring results be provided to the public for all the States that had participated in the transboundary consultations.

In summary, the Kiev Protocol, in describing the objectives of monitoring, makes explicit the monitoring of effects on both the environment and human health, and places emphasis on informing those who participated in the SEA process, including the public in other States, with their comments, of the results of monitoring.

1.2 National framework

The environmental monitoring fulfilments for Plans and Programmes subject to Strategic Environmental Assessment (SEA), introduced in Articles 11 and 17 of Legislative Decree 152/2006, are described in Article 18.

Article 11(2) states that '***the Competent Authority**, in order to promote the integration of environmental sustainability goals into sectoral policies and compliance with national and European environmental goals, plans and programmes*

[1] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment: https://eur-lex.europa.eu/IT/legal-content/summary/assessment-of-the-certain-effects-of-plans-and-programmes-on-the-environment-sea.html

[2] UNECE, Protocol on strategic environmental assessment to the convention on environmental impact assessment in a transboundary context, Kiev, 2003 https://unece.org/fileadmin/DAM/env/eia/documents/legaltexts/protocolenglish.pdf

[...] *shall* ***collaborate with the proceeding authority[3] in order to define the monitoring procedures referred to in Article 18*** [... and] *taking into account public consultation, the opinions of the subjects competent in environmental matters, shall express its own reasoned opinion on the plan and programme proposal and on the environmental report, as well as on the suitability of the* ***monitoring plan*** *with reference to the available financial resources*'. What we will henceforth refer to as the **'Environmental Monitoring Plan - EMP**' is the document designed to guide the environmental monitoring activities of the Plan/Programme throughout its entire implementation.

The need to provide indications on the '***measures taken regarding monitoring***' is also referred to in Article 17, Paragraph 1,(c), which provides that monitoring activities be considered at the adoption or approval stage of the Plan or Programme and that these measures, as anticipated in Article 11, require adequate financial resources, and this should be highlighted in the '*Information on the Decision* '.

Article 18 specifically focusses on environmental monitoring.

Paragraph 1 specifies the purposes of the monitoring phase, which *ensures the monitoring of significant impacts on the environment resulting from the implementation of approved plans and programs and the verification of the achievement of pre-determined sustainability goals, in order to promptly identify unforeseen negative impacts and to take appropriate corrective measures*' **focusing on 3 aspects:**

- **monitoring of significant impacts from the implementation of the Plan/Programme**;
- **verification that the sustainability targets have been achieved**;
- **identification of possible corrective measures**.

It also points out the potential synergy in conducting the monitoring work in conjunction with the National System for Environmental Protection[4].

Thus, monitoring serves to verify:

- **the absence of negative effects**, both in relation to any critical issues already highlighted in the Environmental Report and in relation to the occurrence of unforeseen phenomena due to endogenous causes (the outcome of actions, initially posited as negligible or null, which instead transpire to be harmful to the environment during the implementation phase) or due to exogenous causes (environmental problems of anthropic or natural origin impossible to predict during the planning/programming phase and related environmental assessment). These effects must be contained within well-defined limits (and for this, it would be ideal to define sustainability thresholds beyond which it is determined that the impact is no longer sustainable and, therefore, the necessary **corrective measures** against the negative impact must be taken);
- **emergence of positive effects** of the Plan/Programme anticipated *ex ante* in the Environmental Report, providing information on how the various actions to realise this actually contribute to achieving the consistent sustainable development goals.

Paragraph 2 **clarifies the list of subjects in the** approved Plan/Programme **involved in monitoring activities, outlining their respective responsibilities, and the resources necessary for the implementation and management of these monitoring activities**. This aspect, often overlooked, or not adequately examined, is one of the weaknesses underlying the poor implementation of monitoring itself: it is not clear who does what, in what timeframe and with what budgets.

Paragraphs 2-bis and 2-ter, introduced by Article 28(1)(d) of Legislative Decree 77/2021 transposed by Law 108/2021[5], further **clarify the activities for the proceeding and competent authorities**, providing that the authority shall periodically forward the results of the environmental monitoring and any corrective measures to be taken to the Competent Authority, and that the Competent Authority shall make a decision within thirty days of submission under a specific administrative procedure .

[3] The legislator is probably referring to the Lead Authority, even though Article 11(2) of Legislative Decree 152/2006 uses the term 'Proposing Authority'. The latter authority is in fact not included in the definition in Article 5 of Legislative Decree 152/2006.

[4] The National System for the Protection of the Environment (SNPA) consists of the Istituto Superiore per la Protezione e la Ricerca Ambientale [Italian Institute for Environmental Protection and Research] (ISPRA), the Regional Agencies for the Protection of the Environment (ARPA), and the Agencies of the Autonomous Provinces for the Protection of the Environment (APPA).

[5] Conversion into law, with amendments, of Legislative Decree No. 77 of 31 May 2021, on the Governance of the National Recovery and Resilience Plan and Initial Measures to Strengthen Administrative Structures and Accelerate and Streamline Procedures (OJ General Series No. 181 of 30-07-2021 - Ordinary Supplement No. 26).

The proceeding and supervisory authorities therefore need to, if they have not already planned to do so, structure themselves to carry out these specific fulfilments.

The Competent Authority verifies the mandatory preparation of the document containing the environmental monitoring outcomes and any potential corrective measures, which we shall call for simplicity's sake: the **'environmental monitoring report'.**

Paragraph 3 indicates the instruments and content of the monitoring information '*the manner in which the monitoring is carried out, the outcomes and any corrective measures* [...] *shall be adequately communicated through the websites of the Competent Authority and the Proceeding Authority*' .

The subsection stipulates that the information is to be accessible online via websites and clearly states who is to be responsible for providing the information on monitoring.

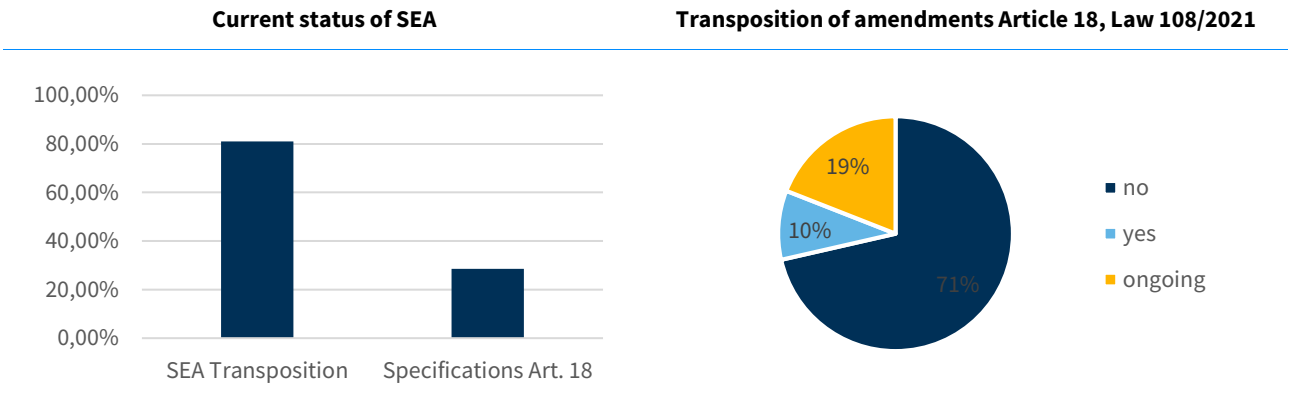
Paragraph 3-bis lays down a specific fulfilment for the Competent Authority, to **verify the results of the monitoring** that the Proceeding Authority has provided pursuant to Article 2-bis. The review covers both the impacts produced and ' their *contribution to achieving the environmental sustainability goals*[6] *defined by national and regional sustainable development strategies*'.

Paragraph 4 spells out another objective of monitoring: **to provide information that supplements and extends the knowledge framework and supports possible Plan/Programme modifications or variants.**

1.3 Regional context

At the regional level, environmental monitoring has, for the most part, incorporated the content of Article 18 of Legislative Decree 152/2006, before the 2020 amendments[7].

Figure 1. Current status of SEA and transposition of the amendments to Article 18 introduced by Law 108/2021



Source: CReIAMO PA Project - LQS1 Line of intervention

There are still only a few Regions that have adopted the contents of the new regulatory provision and elaborated them in detail as well as providing specific guidelines for the different planning and programming sectors or territorial levels.

A greater number of Regions and Autonomous Provinces have drawn up or are drawing up guidelines that include monitoring, albeit in the more general context of operational guidelines on conducting the SEA. There are 8 Regions that referenced SEA monitoring in their Sustainable Development Strategies and who have provided, in some cases,

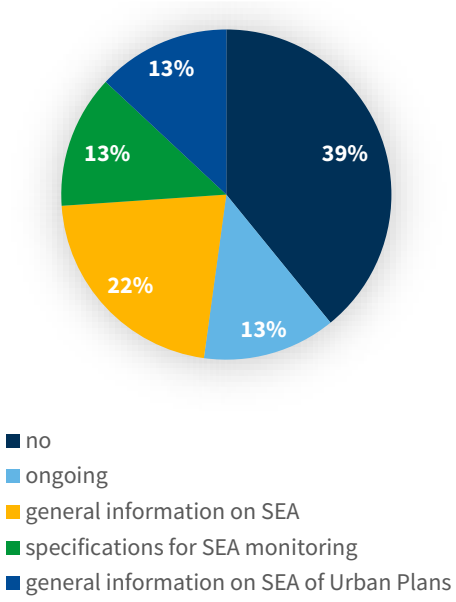
[6] Article 18, paragraph 3-bis, would seem to limit the scope of action to the 'environmental aspects' listed in the Sustainable Development Strategies. Realistically, while it remains a priority to respect certain environmental principles that are in some way 'superior' to the concept of 'development', given they are closely linked to environmental protection (precautionary principle, prevention principle, etc.), sustainability must be analysed, assessed and monitored in an integrated manner, taking three aspects into account: environmental, social and economic.

[7] The information reported in this paragraph is taken from a questionnaire submitted by the LQS1 Line of intervention of the CReIAMO PA Project in June 2023 to all the SEA supervisory authorities of the Italian Regions and Autonomous Provinces, with 91% of the interviewees responding. Percentage values and graphs, therefore, refer to the sample surveyed and not to the total Italian Regions and Autonomous Provinces.

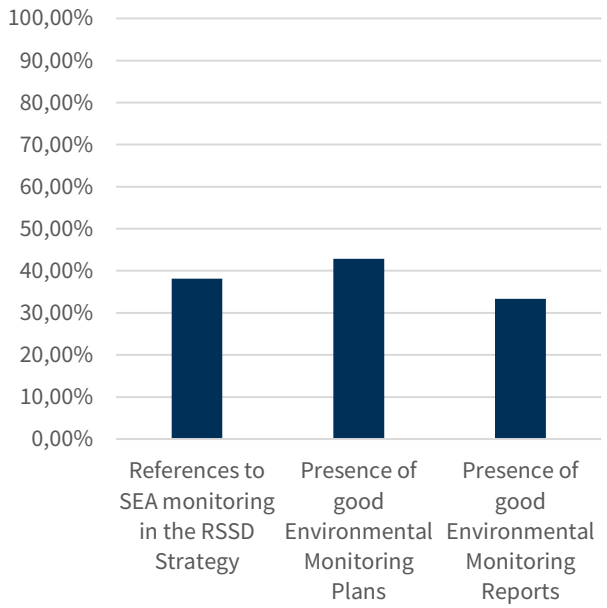
a set of reference indicators for monitoring the contribution of Plans and Programmes subject to SEA against the sustainable development goals selected at regional level.

Figure 2. Presence of supporting tools and quality of SEA monitoring

SEA Monitoring Guidelines



Quality of SEA monitoring



Source: CReIAMO PA Project - LQS1 Line of intervention

Although 42.9 % of the Regions and Autonomous Provinces state that Quality Environmental Monitoring Plans have been found and 33.3 % state that Quality Environmental Monitoring Reports have also been prepared[8], all of them specify that these are exceptions to the common practice followed by the Proceeding Authorities of Plans and Programs subject to SEA, which, in most cases, do not have either.

Based on experience, it is noted that the main difficulties in carrying out monitoring activities arise from the lack of common knowledge frameworks at an adequate scale, the lack of dedicated resources already at the planning stage, the "cultural" resistance of the proceeding public administrations that often perceive monitoring as a "control" activity by the Competent Authority and not as an activity useful for evaluating the effectiveness of their Plan/Programme.

[8] SEA monitoring, in the few cases where it exists, is mainly carried out by subjects that are particularly structured in terms of personnel, thus, with adequate internal resources and expertise, capable of designing and conducting environmental monitoring of Plans and Programmes within their competence.

2 Building and measuring the sustainability of a Plan/Programme

Preparing a 'sustainable' Plan or Programme is one of the aims of the SEA process. But what is meant by the term 'sustainable' and how can it be translated into the SEA process?

The answer can be found in article 34 of Legislative Decree 152/2006 which, in paragraph 5, states that '*sustainable development strategies define the framework for environmental assessments*'.

Therefore, the national and regional sustainable development strategies represent the implementation of the 2030 Agenda at the relevant territorial and sectoral levels and which translate the term sustainability into goals and targets to be pursued.

Figure 3. Sustainable Development Strategies set the framework for environmental assessments

Source: CReIAMO PA Project - LQS1 Line of intervention

This amendment to the Legislative Decree 152/2006 constitutes a real revolution in the approach to SEA, confirming and amplifying its proactive role in environmental integration in the content formulation of Plans and Programmes, thereby removing any lingering doubts for those who viewed it as a mere control tool.

However, implementing this substantial change, in practice, requires defining a methodology for constructing and measuring the sustainability of Plans and Programmes that follow this procedure; the very objective that these operational guidelines seek to achieve.

The purposeful approach, therefore, starting from the assumption that the Plan/Programme is designed in coherence with the Sustainable Development Goals listed hierarchically in the 2030 National Strategy Agenda and in the Regional Sustainable Development Strategies, bases SEA monitoring on the measurement of the contribution of the Plan/Programme to the achievement of these sustainability goals.

One of the strengths of the Sustainable Development Strategies is incorporating the three pillars of sustainability - environmental, economic and social - usually marginally addressed in environmental assessments, with a focus on the environmental aspects, neglecting the fact that the principle of sustainable development, which is the basis of the SEA, is implemented precisely by balancing these three aspects and determining a point of equilibrium.

Moreover, in Italy, Regional Sustainable Development Strategies have often been integrated with the topics and priorities for combating climate change or are accompanied by the development of autonomous but coherent Regional Climate Change Adaptation Strategies (SRACC) in line with RSSDs (Regional Strategies for Sustainable Development), which are becoming increasingly relevant in the definition of effectively sustainable Plans and Programmes and in monitoring their effectiveness.

Just as the construction of effective Plans and Programs for the achievement of Sustainable Development Goals requires synergistic work among all administrative levels, leading to coherence among policies, strategies, plans,

programs and projects, which is essential to ensure that the goals promoted by a given territorial or sectoral level are not contradicted or thwarted by other instruments placed at different levels, likewise, it is necessary that the monitoring activities envisaged in the SEA process for measuring the contribution of Plans/Programs to the achievement of those same objectives defined by the Sustainable Development Strategies be characterized by broad collaboration among the different Public Administrations involved. Only in this way is it possible to ensure that the different monitoring tools dialogue with each other, are consistent and integrate, rather than duplicate each other as frequently happens and, above all, that small and very small Local Authorities find, in this connection with the Regional and Central Administrations, the necessary support to effectively implement and monitor the Plans and Programmes within their competence, which play a very important role in the transformations of the territory and are too often neglected.

2.1 National Strategy for Sustainable Development

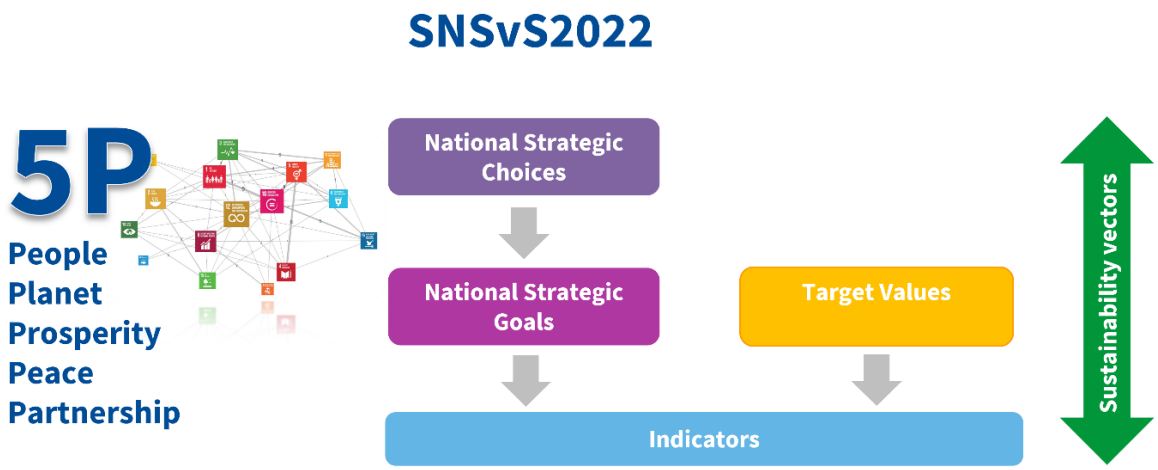
The National Strategy for Sustainable Development[9] (NSSD) is Italy's strategic reference framework for the national implementation of the 2030 Agenda to achieve its universal, interconnected, and indivisible goals. Designed as an update to the National Environmental Action Strategy approved in 2002, the NSSD broadens the reference paradigm and includes all aspects of sustainability; formulating strategic choices and national targets, connected with, but not coinciding with the '*Sustainable Development Goals*' of the 2030 Agenda.

This Strategy was approved by the CIPE (Inter-ministerial Committee for Economic Planning) Resolution No.108 of 22 December 2017 on foot of the proposal by the Ministry of the Environment and Energy Security (MASE)[10], in compliance with Article 3 of Law 221/2015. In March 2021, a periodic review process was initiated which provides a renewed and updated sustainability picture of our country. The renewed Strategy (NSSD 2022) received the favourable opinion of the Permanent Conference for Relations between the State, the Regions and the Autonomous Provinces of Trento and Bolzano at its meeting on 28 September 2022, underlining the urgency of its approval within the CITE framework[11] and the need for continuity to the accompanying mechanisms and multi-level dialogue in its implementation process.

The SNSvS2022, like the 2030 Agenda, is divided into 2 sections that define its overall strategic framework: one dedicated to the five areas, the "5 P's" of the 2030 Agenda, People, Planet, Prosperity, Peace and Partnership, and the other dedicated to the "Vectors of Sustainability" that are configured as enabling factors capable of triggering and sustaining the country's sustainable recovery and the invoked transformation of the 2030 Agenda.

The Areas of People, Planet, Prosperity and Peace are broken down into National Strategic Choices (NSS) and then into National Strategic Goals (NSGs).

Figure 4. Structure of the National Strategy for Sustainable Development



Source: CReIAMO PA Project - Line of intervention L2WP1 based on the National Strategy for Sustainable Development 2022

[9] National Strategy for Sustainable Development | Ministry of the Environment and Energy Security (mase.gov.it)
[10] In 2017, it was called the Ministry of the Environment of Land and Sea Protection.
[11] Interministerial Committee for Ecological Transition.

Each SSN is accompanied by one or more leading indicators. The set of indicators associated with the SSNs constitutes the first synthetic set of indicators to ensure the level of implementation of the 2030 Agenda in Italy and to monitor the achievement of the set sustainability goals.

Through the review process, SNSvS22 has identified National Target Values (targets) for the different National Strategic Goals, linked to reference indicators.

2.2 Regional strategies for sustainable development

For the robust implementation of the NSSD, this must be done within the territories. Article 34 of Legislative Decree 152/2006 requires the Regions and Autonomous Provinces to approve their own sustainable development strategy which is consistent with and defines their contribution to achieving the national strategy goals, and specifying the instruments, priorities and actions they intend to undertake.

Most of the Regions and Autonomous Provinces (17 out of 21) have approved their own sustainable development strategy and related monitoring system[12].

Table 1. Sustainable Development Strategies of the Regions and Autonomous Provinces

No.	Administration	Regional Strategy Approval Document
1	Abruzzo Region	Regional Sustainable Development Strategy Plan - DGR (Regional Government Resolution) No. 665/21 of 22 October 2021
2	Basilicata Region	-
3	Calabria Region	-
4	Campania Region	Sustainable Campania. Regional Strategy for Sustainable Development. DGR 104 of 7/3/2023
5	Emilia-Romagna Region	Regional Sustainable Development Strategy Agenda 2030 - DGR No.1840 of 8 November 2021
6	Friuli-Venezia Giulia Region	Regional Strategy for Sustainable Development - DGR No.299 of 17 February 2023
7	Lazio Region	Regional Strategy for Sustainable Development 'Lazio, a participatory and sustainable region' - DGR No. 170 of 30 March 2021
8	Liguria Region	Regional Strategy for Sustainable Development - DGR Act No. 60-2021 Session No. 3650 of 29/01/2021
9	Lombardy Region	Regional Strategy for Sustainable Development - DGR N. XI / 4967 of 29 June 2021. Third Strategy Update of 23 January 2023.
10	Marche Region	Regional Strategy for Sustainable Development - Resolution No. 25 of the Regional Legislative Assembly at its meeting of 13/12/2021, No. 49.
11	Molise Region	Regional Strategy for Sustainable Development 'Molise for sustainable development...let's change our future' - DGR Meeting of 26 July 2022, No. 248
12	Autonomous Province of Bolzano	Everyday for future - Together for sustainability. Resolution of the Provincial Council No. 627, sitting of 20/07/2021
13	Autonomous Province of Trento	Provincial Strategy for Sustainable Development - DGP No. 1721 of 15 October 2021
14	Piedmont Region	Regional Strategy for Sustainable Development of Piedmont - DGR no. 2-5313 of 8 July 2022
15	Apulia Region	Sustainable Development Strategy of the Apulia Region. Approval of Preliminary Document. DGR No. 687 of 26/04/2021
16	Sardinia Region	Regional Strategy for Sustainable Development. Implementation guidelines DGR 39/56 of 8 October 2021
17	Sicily Region	Strategy document prepared, resolution pending.
18	Toscana Region	Strategy document prepared, resolution pending.
19	Umbria Region	Regional Strategy for the Sustainable Development of Umbria DGR No.174 Meeting of 22/02/2023

[12] The updated overview of approved strategies is available on the Ministry of the Environment and Energy Security website: https://www.mase.gov.it/pagina/i-territori-lo-sviluppo-sostenibile

No.	Administration	Regional Strategy Approval Document
20	Valle D'Aosta Region	Valle D'Aosta Regional Sustainable Development Strategy 2030 integrated with the Regional Strategic Framework - DCR (Regional Council Resolution) No 2120/XVI of 11 January 2023
21	Veneto Region	Veneto Regional Strategy for Sustainable Development - DCR of 20 July 2020 No. 80

Source: CReIAMO PA Project - L2WP1 Line of intervention

The Sustainable Development Strategies of Regions Emilia-Romagna, Liguria, Lombardy, Marche, Piedmont, Sardinia, Umbria, and the Autonomous Province of Bolzano clearly make explicit the role of the strategy as a framework for environmental assessments. The strategies of the Marche, Piedmont, Sardinia, and Umbria regions provide indicators and targets for SEA monitoring[13].

2.3 Methodological approach to building and measuring sustainability

All the Plans and Programmes subject to SEA, contribute, at different territorial levels, - interregional, regional, local - to the achievement of one or more sustainable development goals, albeit with varying relevance depending on the type of Plan/Programme and regional contexts, both for geographic reasons and policy choices.

There is, therefore, a clear correlation between sustainable development goals and the principles underlying strategic environmental assessment, already widely shared at a national level[14].

For the "Planet" Area, most of the Plans/Programs subjected to SEA are found to be priorities, particularly for the achievement of objectives related to "Protection of Biodiversity and Sustainable Management of Natural Resources," which can be achieved through the contribution of specific spatial plans, such as the landscape plan or park plans, and sectoral plans, such as the water protection plan, forestry plan or Rural Development Programme (RDP). For the goals in the Option '*Creating resilient communities and territories and preserving landscapes and cultural heritage*' a significant contribution, on the other hand, could be provided by Regional Programmes co-financed by the European Regional Development Fund (ERDF), with funding from the Common Agricultural Policy (CAP), from some sectoral plans (e.g. the hydrogeological management plan, flood risk management plan) and from some territorial plans (e.g. landscape plan, park plans, urban plans).

The 'Prosperity' category is also robustly linked to the *Plans/Programmes* subject to SEA and a significant contribution could be provided from, for example, the European funded (ERDF and CAP) financing programmes for '*training employment and sustainable models of production and consumption'* goals or a significant contribution could come from various sectoral plans (e.g. the energy plan, the transport plan, the urban mobility plan), urban plans, as well as from ERDF and CAP funds, for goals linked to '*energy efficiency*, *sustainable mobility and the reduction of climate-changing emissions'*.

For the other Areas, on the other hand, the contribution of Plans/Programmes subject to SEA to the achievement of the relative sustainable development objectives is less direct and less frequent and, consequently, more difficult to identify and quantify. For example, to the objective "III.2 Spreading healthy lifestyles and strengthening prevention systems", several Plans/Programmes subjected to SEA contribute, but the quantification of the effects, which is the objective that SEA monitoring sets itself, is only possible if direct cause-effect relations are identified between Plan/Programme Actions and environmental sustainability goals.

Another example would be that urban planning could potentially contribute to the '*reduction of housing deprivation'* target in the '*People*' Category, whereas for the goal *'reduction of population exposure to environmental and anthropic risk factors' ,* in relation to territorial critical issues, some sectoral planning may be relevant (e.g. the preliminary hydrogeological plan, the flood risk management plan, the air quality plan, the water protection plan, the waste

[13] This information is from a questionnaire sent by the CReIAMO PA Project LQS1 Line of intervention in June 2023 to all the SEA supervisory authorities for the Italian Regions and Autonomous Provinces, with 85 of the respondents replying, a 25% response rate. Percentage values and graphs, therefore, refer to the sample surveyed and not to the total Italian Regions and Autonomous Provinces.

[14] Among the experimental activities carried out by the CReIAMO PA Project LQS1 Line of intervention on Sustainable Development Strategies as a reference framework for the SEA of Plans and Programmes, some Regions (Umbria, Piemonte, Liguria, Marche, to which Toscana and Abruzzo were added but only for certain plans/programmes) were asked to compile a correlation matrix between the sustainable development objectives of the NSSD and the Plans/Programmes, indicating, with a value from 1 to 3, the relevance (positive or negative) of the plan and programme to achieving the single sustainable development goal of the Strategy.

management plan, the plan for the reclamation of polluted areas, etc.). However, substantial contributions towards achieving the sustainable development goals for the '*People*' category are more likely to be made from programmes financed by the European Social Fund or from other plans/programmes of an intangible nature (education, training, social inclusion, health care), not subject to SEA.

The relevance of a Plan/Programme towards achieving one or more of these NDDS category goals therefore depends on the relevance of the natural, agricultural, urban and industrial zones system and on the needs and critical issues in a given territorial context. Any Sustainable Development Strategy should take this into account at the time of its conception and, consequently, direct the design and Strategic Environmental Assessment of the Plans and Programmes that contribute to its implementation.

Table 2. Draft correlation matrix for the analysis of the relevance of Plans and Programmes towards achieving individual NSSD goals

NSSD AREA	NSSD CHOSEN	NATIONAL SUSTAINABLE DEVELOPMENT STRATEGY GOAL	RP (Regional Plan) ERDF 21-27	Management Plan flood risk	PAI (National Action Plan)	PTR (Regional Territorial Plan)	Landscape Plan	Transport Plan	Quality Plan Air Quality Plan	Protection plan Water Protection Plan	Energy Plan	Waste plan	Mining Plan	Polluted zones-Remediation Plan	Forest Plan	Hunting Fauna Plan	Park Plan	PTCP (Provincial Territorial Coordination	PRG (Municipal Master Plan)	PUMS (Urban Mobility Plan)
PEOPLE	III. PROMOTING HEALTH AND WELL-BEING	III.1 Reducing population exposure to environmental and anthropogenic risk factors	3	3	3	1	0	0	3	2	0	1	0	3	0	0	0	1	3	2
		III.2 Encouraging healthy lifestyles and strengthening prevention systems	1	0	0	0	0	1	2	1	0	1	0	1	0	0	0	0	2	0
		.....																		
PLANET	I. HALTING THE LOSS OF BIODIVERSITY	I.1 Maintaining and improving the conservation status of species and habitats for terrestrial and aquatic ecosystems	1	0	0	2	2	0	0	2	0	0	0	1	2	2	3	2	2	0
		I.3 Increasing the protected land and marine area and ensuring their effective management	1	1	1	3	2	0	0	1	0	0	0	1	1	2	3	3	3	0
		.....																		
	II. ENSURING SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES	II.2 Halting soil consumption and combating desertification	0	0	0	2	2	0	0	0	0	0	0	0	2	0	2	2	3	0
		II.3 Minimising pollutant loads in soils, water bodies and aquifers, taking into account good ecological status levels of natural systems	1	0	0	2	0	0	0	3	0	2	0	3	1	0	1	2	2	0
		II.6 Minimising emissions and reducing air pollutant concentrations	3	0	0	0	0	3	3	0	2	2	0	1	2	0	0	0	2	3
		II.7 Ensuring sustainable forest management and combating forest abandonment and degradation	3	0	0	2	2	0	0	0	0	0	0	0	3	1	3	2	1	0
PROSPERITY	IV. DECARBONISING THE ECONOMY	IV.1 Increasing energy efficiency and energy production from renewable sources while avoiding or reducing impacts on cultural heritage and the landscape	3	0	0	2	2	0	1	0	3	1	0	0	0	0	0	2	1	0
		.....																		

Source: Elaboration based on the matrices prepared by the Piemonte, Umbria, Marche, Liguria Toscana and Abruzzo Regions within the activities carried out by the CReIAMO PA Project LQS1 Line of intervention.

In the light of these premises and the amendments introduced to article 18 of Legislative Decree 152/2006 and in addition to the part played by the Sustainable Development Strategies as a reference framework for the SEA of Plans and Programmes, the methodological approach for delivering the sustainability of a Plan/Programme can be articulated in three phases[15]:

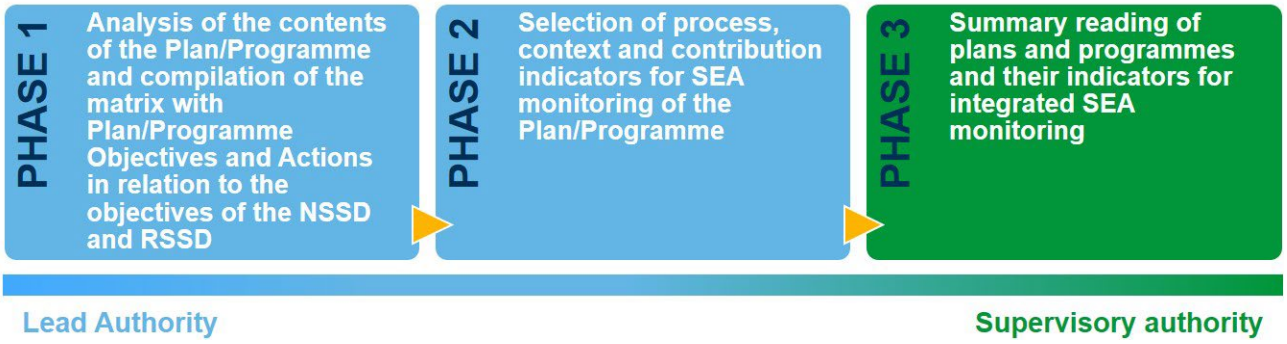
[15] The development of these phases has already been put into practice through numerous field tests carried out within the CReIAMO PA Project LQS1 Line of intervention which involved the Ministry of the Environment and Energy Security, the Regions, Municipalities, other Local bodies, and

PHASE 1 the first phase involves identifying the objectives and measures/actions of the Plan/Programme subject to SEA, that contribute to achieving a specific national and regional strategy sustainable development goal[16].

PHASE 2 the second phase focuses on the monitoring system, defining the process, context and contribution indicators relevant to the identified sustainable development goals and the actions implemented to achieve them.

PHASE 3 the third step concerns the integration of the Plan/Programme monitoring into the more general monitoring of the Regional and National Strategies, to assess the contribution of each Plan/Programme to the achievement of its targets. This is essential in order to have an overall view of the implementation of the Regional and National Strategies. The competence for this last phase lies with the competent authorities for the national and regional SEA that have to coordinate and integrate the monitoring carried out for plans and programmes at the different levels.

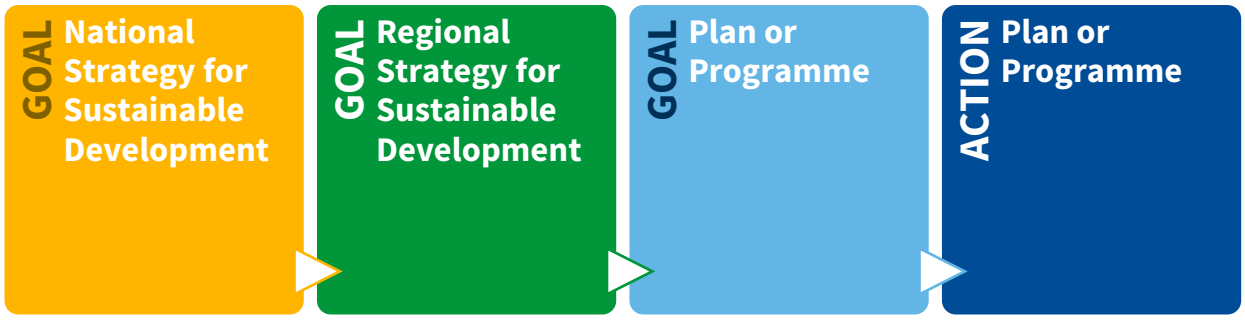
Figure 5. Constructing and Measuring the Sustainability of Plans and Programmes - Phases



Source: CReIAMO PA Project - LQS1 Line of Intervention

The same step by step approach should be followed, when, in **PHASE 1**, the objectives and actions of the Plan/Programme relevant to the individual sustainable development goal come into play.

Figure 6. From the goals of Sustainable Development Strategies to the goals and Measures/Actions of the Plans and Programmes



Source: CReIAMO PA Project - LQS1 Line of intervention

Universities. The document '*Monitoring in the Strategic Environmental Assessment of Plans and Programmes: Field Test outcomes* ' describes the course taken and the results achieved. This document is available at: https://va.mite.gov.it/it-IT/DatiEStrumenti/StudiEIndaginiDiSettore

[16] While it is desirable that the NSSD serves as a guide for this logical process and that there is as much of a clear and direct correlation as possible between the objectives of the NSSD and those of the RSSDs, the RSSDs may have their own objectives, not at a national level, but which must nevertheless be taken into account in the analysis.

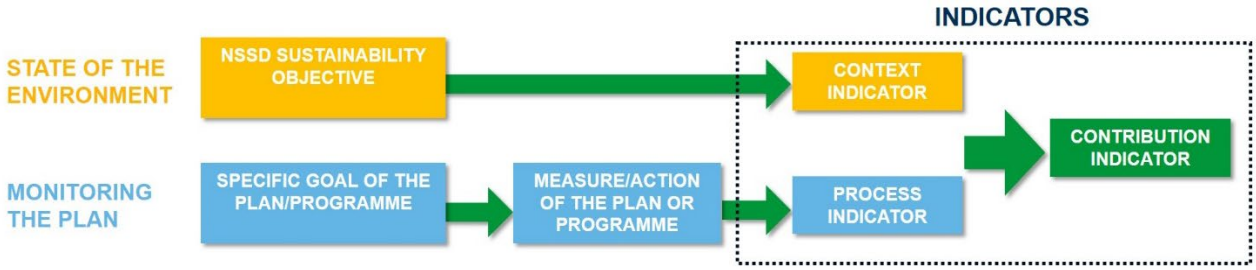
Following this logical framework, we move onto the more or less structured analysis of the available resources (financial, human, informational resources, etc.) of the Plan/Programme content - which is usually characterised by a hierarchy of their own Objectives, Measures and/or Actions - in relation to their potential contribution towards achieving of one or more sustainable development goals, and towards compiling the matrix.

This is a very important phase because it helps in understanding which measures and actions the Plan/Programme actually contributes towards achieving the goal and if, simultaneously, this does not cause negative impacts that may hinder or slow down the achievement of other sustainable development goals: only if there is a direct relationship between decision/action and sustainability goal will it be possible to build an effective monitoring system, by selecting useful indicators to measure concrete effects. The indicators identified for SEA monitoring during the preparation of the Environmental Report often do not take into account the Plan/Programme Measures/Actions in order to assess future effects: the sets of monitoring indicators provide a simple snapshot of the state of the environment and the socio-economic context but are not useful for understanding and describing the dynamics of change potentially triggered by the Measures/Actions.

Once the measures/actions of a Plan/Programme contributing to achieving the Strategy's individual sustainable development goal have been defined, we proceed, in **PHASE 2**, to determining the indicators, which must be classified using a taxonomy now established in the SEA:

- **Context indicators** to describe the environmental context and its evolution. They are selected on the basis of their close connection with the sustainability goal to be pursued;
- **Process indicators** to measure Plan/Programme Actions (they measure what has been achieved and are closely linked to Plan/Programme goals and measures/actions);
- **Contribution indicators** to measure the effect of the Plan/Programme Actions on the environmental context.

Figure 7. Process, context and contribution indicators



Source: CReIAMO PA Project - LQS1 Line of Intervention

The selection of context, process and contribution indicators at different territorial scales and for the different types of Plans/Programmes must be conducted following three basic criteria:

- population potential;
- effectiveness in representing the environmental and socio-economic context;
- effectiveness in representing the transformations taking place in a territory and their positive and negative effects.

The SEA therefore uses a specific taxonomy of indicators, which may be different from that used, for example, for the indicators selected to measure the physical, financial and procedural progress of a Plan/Programme. This is the case, for example, in the Cohesion Policy where the same name 'contribution indicator' within the common set of indicators has a different meaning and purpose and, therefore, this must be made clear when, in SEA monitoring, an indicator from the Cohesion Policy set is used to measure the environmental effects of the Plan/Programme.

Indicators, therefore, are only the final step in a process that starts with identifying the Plan/Programme's goals and measures/actions and their relationship with the sustainable development goals and which concludes, in **PHASE 3**, with the integration and coordination of the monitoring work (at regional level and then at national level).

This integration echoes, downstream, the integration of several planning and programming instruments (of which those subject to SEA are only a part), which is the only way to ensure the achievement of each single sustainability goal and the Sustainable Development Strategies as a whole.

Table 3. Integrated approach to monitoring

NSSD AREA	NSSD CHOSEN	NSSD GOAL	NSSD TARGET	NSSD INDICATORS	RSSD GOAL	RSSD TARGET	RSSD INDICATORS	PLAN PROGRAMME	WEIGHT	P/P OBJECTIVES	MEASURES P/P ACTIONS	PROCESS INDICATORS	CONTEXT INDICATORS	CONTRIBUTION INDICATORS	TARGET P/P
PLANET	I. HALTING THE LOSS OF BIODIVERSITY	I.3 Increasing the protected land and marine area and ensuring their effective management	By 2030, protect at least 30% of the land surface and 30% of the sea surface through an integrated system of protected areas, through the Natura 2000 network and other legally protected areas	Protected land and sea areas				Programme ...							
								Programme ...							
								Plan							
								Plan							
								Plan							
NSSD (National Strategy for Sustainable Development) (Area, Choice, Objectives, Targets, Indicators)					RSSD (Regional Strategy for Sustainable Development) (Goals, Targets, Indicators)			Identification of goals, actions, relevant to the RSSD goal, Selection of context, process and contribution indicators, Identification of targets for each Plan/Programme							

Source: CReIAMO PA Project - LQS1 Line of intervention

This consideration is related to the provisions of Article 34 (4) of Legislative Decree No. 152/2006 ('*Regions ensure homogeneity in planning*) which requires the construction of a coherent set of implementing tools (plans, programmes, rules, regulations, etc.) of the NSSD and Regional Strategies, which work in close synergy to contribute to the achievement of the sustainability goals at different levels.

3. Environmental Monitoring Plan

Monitoring is a phase that requires suitable resources, professional competence and tools which needs to be carefully planned and meticulously defined.

The tool that describes environmental monitoring activities in detail is the **Environmental Monitoring Plan (EMP)**. The EMP is included in the environmental report and abides by the content required by Annex VI (i) '*description of the planned measures to monitor and control the significant environmental impacts resulting from the implementation of the* [plan] *or proposed programme; specifically defining the data collection procedures, the development of impact - evaluation indicators as well as defining the periodicity for producing an impact evaluation report including the required corrective measures*'.

In the Environmental Reports, the Environmental Monitoring Plan often becomes a separate chapter that covers the purposes set out in Article18 of Legislative Decree 152/2066 with a list of indicators whose purpose is rarely stated clearly.

The following information must be included in the Environmental Monitoring Plan:

- Subjects involved in environmental monitoring activities (Governance);
- Sustainable development strategy goals to which the Plan/Programme contributes (in positive and negative terms) with an indication of the relevant Plan/Programme objectives and actions (building sustainability);
- The functional indicators to measure the Plan/Programme's implementation status and its contribution towards the sustainable development goals and related targets (sustainability measurement) or possible deviations from these, as well as the tools for collecting, storing, processing information (information systems, databases, GIS tools);
- Content and procedures to deliver the monitoring results (Monitoring Report);
- Information on monitoring activities and outcomes;
- Human, instrumental and economic resources needed to carry out monitoring activities.

It is important that these contents are included not because they fulfil a formal obligation but because they substantiate the purposes of monitoring. A proper articulation and definition of these contents is already an important point of reference, because it enables first and foremost the Proceeding Authority - but also all those involved - to have a clear picture of the work to be done, the resources to be committed and the gaps, not only cognitive, to be filled.

Table 4. Structure of the Environmental Monitoring Plan

Content	Description
Governance	Subjects involved in environmental monitoring activities: ▪ Proceeding Authority ▪ Head of environmental monitoring activities ▪ Working group carrying out environmental monitoring activities ▪ Subjects involved in the collection of data and information to populate the indicators ▪ Competent Authority
Objectives and Actions of the monitored Plan/Programme	▪ Identification of the objectives and actions of the Plan/Programme that contribute to the goals of the national and regional sustainable development strategies or which might have negative impacts and therefore require monitoring (see Chapter 2.3)
Measuring the impacts of a Plan/Programme	▪ Definition of functional indicators to measure the implementation status of the Plan/Programme in achieving the sustainable development goals and related targets. ▪ Tools for collecting, storing, processing information
Content of the environmental monitoring report	▪ Summary of the Plan/Programme's objectives and actions ▪ Reasons and purpose of SEA environmental monitoring ▪ Subjects involved ▪ Adopted methodology (recall the EMP and any changes made to it) ▪ Evolution of the environmental context of reference for the Plan/Programme in relation, where possible, to the more general evolution of the socio-economic context and any changes made to it) ▪ Implementation status of the Plan/Programme by populating process indicators ▪ Contribution to the achievement of the individual sustainable development goal related to the implementation of the Plan/Programme measures/actions ▪ Possible monitoring of projects where the SEA of the Plan/Programme is the reference framework as well as monitoring the SEA of synergetic or complementary Plans/Programmes ▪ Potential critical issues encountered in the collection of environmental information and data ▪ Analysis and evaluation of the environmental impacts of the Plan/Programme Actions ▪ Success rate in the Plan/Programme's environmental goals ▪ Suggestions, recommendations and possible indications for corrective measures to be made to the Plan/Programme
Information on the environmental monitoring activities	▪ Institutional information ▪ Information for technical personnel and peer information/training ▪ Information and communication for non-technical audiences
Resources needed	▪ Human resources (internal and external) needed to draft the EMP, periodic monitoring reports, documents and products to communicate and disseminate monitoring outcomes ▪ Human and instrumental resources needed for the collection, storage, processing of information and monitoring data ▪ Financial resources: estimated costs

Source: CReIAMO PA Project - LQS1 Line of intervention

3.1 Governance

Well-structured **Governance** is one of the main success factors in environmental monitoring.

Indicate the following for every subject involved in the monitoring activities: role, required tasks, implementation procedures and timeframes. The main subjects are listed below.

Proceeding Authority: the public administration responsible for the monitoring activities and for the communication of the environmental monitoring outcomes (monitoring report) as well as any corrective measures to the Competent Authority.

Head of environmental monitoring activities: the person, identified by the Proceeding Authority, possibly in-house, who guarantees the institutional and operational link between this authority itself, the working group and all the subjects involved in the monitoring activities. This person is particularly relevant whether monitoring activities are outsourced (partly or completely) or whether internal resources within the administration are used and allocated across different departments and requiring coordination.

Working Group: The group of technicians involved in the collection, processing, management of data and information related to the implementation of the Plan/Programme and the environmental, economic and social impacts. The Working Group, where necessary, updates the Environmental Monitoring Plan, and draws up the periodic Monitoring Reports. The necessary skills are defined on the basis of the type of measures/actions in the Plan/Programme and their possible impacts. The Working Group may be composed of internal resources, to which individual specialists may be added if the issues addressed require it, or it may be composed of resources external to the administration following a specific assignment.

It would be desirable for the Working Group that drafted the Plan/Programme Environmental Report (and therefore also the Environmental Monitoring Plan) to also be involved in the implementation of environmental monitoring downstream of the approval of the Plan/Programme.

In the case of a local-scale plan, such as a municipal master plan, the reduced availability of resources may guide the choice of an internal working group that makes the most of the human capital already available in the municipal administration.

Subjects involved in collecting information and data to populate the indicators: the subjects possessing the information and data needed to populate the indicators. The list of subjects is defined on the basis of the monitoring indicators selected.

In the case of both internal and external subjects, it is preferable to sign agreements for the collection of data in the agreed format and timeframes. Two critical aspects in the retrieval of monitoring data are the availability of the data over time and the use of the same data production methods that allow comparison over time.

Among the subjects that can play a significant role in retrieving data for populating the context indicators are the National System for Environmental Protection and the regional services that manage territorial, environmental and statistical data.

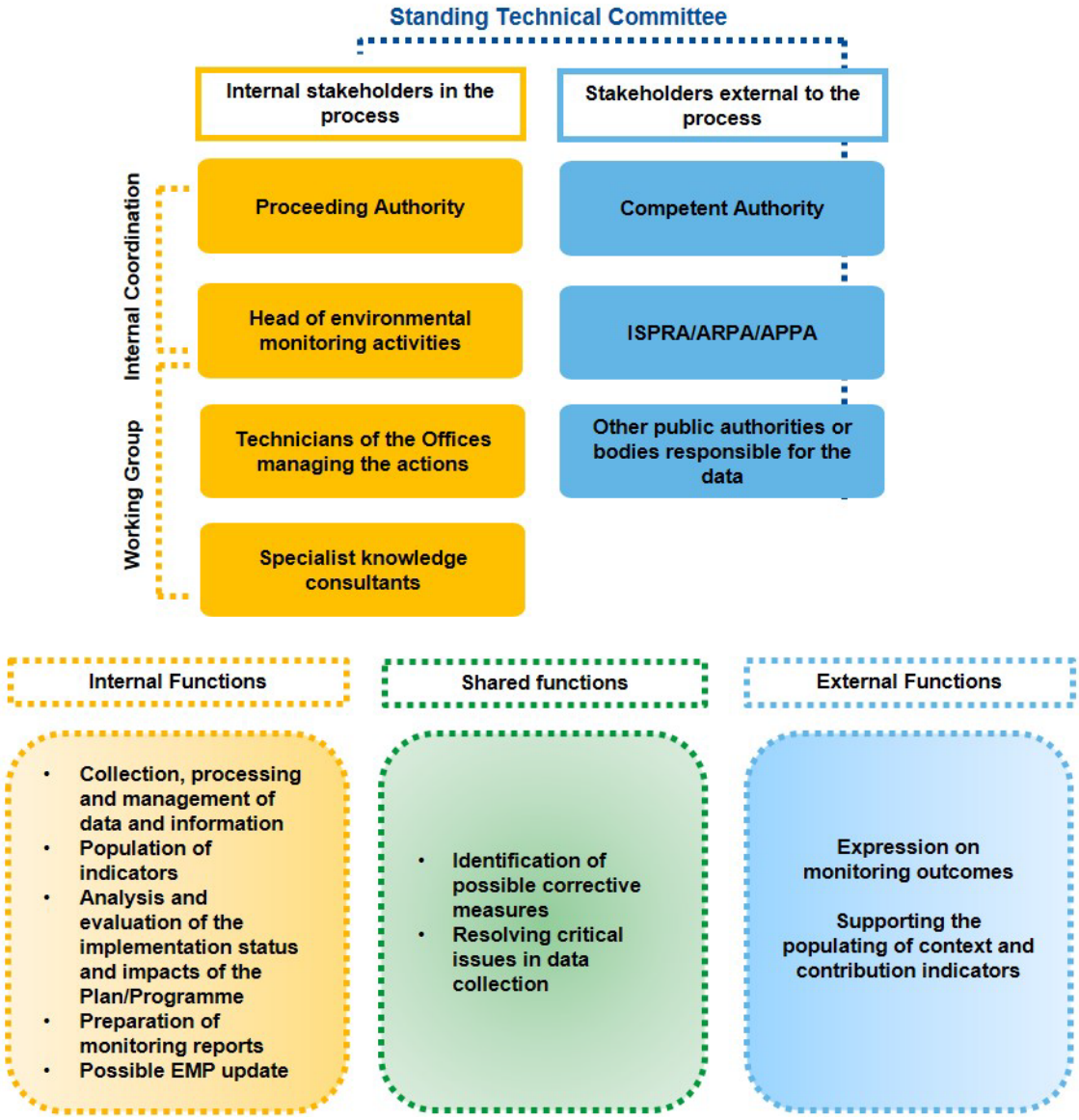
Those subjects competent in environmental matters, involved in the previous phases of the SEA process, may also be a source of data for populating context indicators, in which case the modalities of involvement and the possible contribution to the populating of the selected indicators must be defined.

Competent Authority: based on the implementation status of the plan or programme, the public administration responsible for verifying the impacts produced and the plan or programme's contribution towards the environmental sustainability goals as defined by the national and regional sustainable development strategies referenced in Article 34 of Legislative Decree no. 152/2006. The Competent Authority expresses its opinion on the periodic monitoring report submitted by the Proceeding Authority.

The governance of monitoring activities can be represented by means of organisation charts that identify subjects, responsibilities, activities and related outputs. It is important that the organisation chart includes both the internal figures of the offices, sectors, services of the Proceeding Authority involved in the implementation of the Plan/Programme and the external ones, but also that it clearly distinguishes them, so that the activities and outputs linked to internal human resources of the Authority can be included in the organisation of the ordinary activities of the Authority and in the reporting to be produced for any administrative management plans that the Authority has, while the activities and outputs that the Authority has entrusted externally can be kept under control by the Environmental Monitoring Manager and by the other figures within the Authority that support him/her, ensuring consistency between the organisation chart (human resources) and the time schedule (outputs and milestones of environmental monitoring). The organisational chart must be updated in the event of revisions to the organic plan and, according to this update, the time schedule in which the *milestones* and *output*s are assigned must also be adjusted if necessary.

In the management of monitoring activities, especially in the case of Plans/Programmes at national and regional level, where the Proceeding Authority deems it useful, the establishment of a permanent technical committee may also be envisaged to accompany the monitoring activities and to help identify and promptly resolve any problems that emerge, such as, for example, difficulties in populating indicators and the need to replace them with others, or the definition of corrective measures for the management of unforeseen environmental effects. The Committee may be composed of the following subjects: Proceeding Authority, Competent Authority, Institute for Environmental Protection and Research (ISPRA)/ Regional Environmental Protection Agency (ARPA) (according to the level of the Plan/Programme), other Public Administrations already involved in the previous phases of the SEA process (Subjects competent in environmental matters).

Figure 8. Governance framework for environmental monitoring



Source: CReIAMO PA Project - LQS1 Line of intervention

3.2 Measuring the impacts of a Plan/Programme

In order to have objective information on the basis of which to carry out the assessment of the effects of the Plan/Programme, it is necessary to define a set of indicators which, as illustrated in Chapter 2, is able to represent the state of implementation of the actions identified by the Plan/Programme (process indicators), to describe the

environmental context (context indicators) and to measure the contribution to the change in the environmental context due to the actions of the Plan/Programme (contribution indicators)[17].

It is important to emphasise that in measuring the 'contribution' to sustainability, the identification of negative impacts through monitoring, as expressly stated in article 18 of Legislative Decree 152/06, is significantly important, and that, therefore, the 'contribution' can be interpreted, in relation to the specificity of the action, both negatively (obstacle to the sustainability goal) and positively (facilitates achieving the sustainability goal).

A **metadata**, represented by a structured set of descriptive information about the indicator, must be prepared for each indicator.

Metadata is indispensable to enable different users to assess the usefulness of the information available, to know its scope, its temporal validity, to have information on its source, its production process, as well as its accessibility and availability. The dissemination of shared metadata also allows indicators to be easily found through search tools for whoever is looking for them, making them available to different types of users.

Table 5. Minimum information to be included in the indicator metadata

Information contained in the indicator metadata	Description	Process Indicators	Context and Contribution Indicators
Name	Indicator name	x	x
Description	Brief description of the indicator	x	x
Source	Entity holding and responsible for the indicator	x	x
Unit of Measurement	Unit of measurement	x	x
Production process	Description of the production process for the indicator, the source data used and the processing methods used to produce the indicator	x	x
Online resources	Information regarding online sources (URLs) from which the indicator can be obtained	x	x
Spatial coverage and disaggregation	Geographical area to which the indicator refers and level of disaggregation available	x	x
Timeframe	Indicator availability period	x	x
Updated version - date	Date of last available update of the indicator	x	x
Update frequency	Frequency with which the indicator updates are recorded	x	x

[17] The 'Methodological and operational indications for SEA monitoring' is a document drawn up by the Ministry of the Environment in collaboration with the Institute for Environmental Protection and Research (October 2012) and is considered a useful reference for measuring the impacts of a Plan/Programme, for defining process, contribution and context indicators, as well as for the collection, processing and storage of data and information.

Information contained in the indicator metadata	Description	Process Indicators	Context and Contribution Indicators
Topic[18]	Select one or more topics: □ Water □ Air □ Biodiversity □ Cultural Heritage and Landscape □ Climate □ Population □ Waste □ Natural and man-made hazards □ Noise □ Human health □ Soil □ Territory □		x
DPSIR framework	Indicator category of the DPSIR framework □ Drivers □ Pressure □ State □ Impact □ Response	x	x
Type of indicator	Specify Indicator Type □ Process Indicator □ Context Indicator □ Contribution Indicator	x	x
Target	Provides the targets to be achieved, set by the National and Regional Strategies or by the 2030 Agenda. The target may also refer to legal threshold values or to guidelines from other instruments. It is also possible to set targets on a case-by-case basis depending on the type of action and Plan or Programme.		x
Format	File extension used for the indicator (e.g.: PDF, JPG, XLS, etc.)	x	x
Type of representation	Type of indicator representation □ Tabular □ Graphics □ Mapping	x	x
Indicator and metadata Manager	Name, telephone, e-mail, PEC of the data and metadata Manager	x	x
Identifier	Unique indicator identifier	x	x

Source: CReIAMO PA Project - LQS1 Line of intervention based on the meta-documentation used by the Institute for Environmental Protection and Research, the SNPA and the territorial meta-documentation defined by the 2007/02/EC INSPIRE Directive

[18] The topics indicated refer to Legislative Decree 152/2006, article 5, (c). but, although homogeneity would be a useful, if not an indispensable requirement for integrating monitoring, topics may be added and modified for the specific monitoring requirements of the Plan/Programme.

When choosing indicators, decision-making involves prioritising certain topics over others.

Monitoring Plans too often set themselves the objective of "monitoring everything possible": this approach involves a large number of indicators that must be drawn up and managed by the Proceeding Authority, with a consequent increase in monitoring costs.

Therefore, it is essential to "**choose**" what is really to be monitored in order to concentrate efforts on a few key issues related to the type of Plan/Programme and the characteristics of the environmental and socio-economic context.

3.2.1 Process indicators

Process indicators are the indicators that describe what has been achieved in a territory and are the first type of indicators to be defined: if you do not know what has been achieved in a specific area how can you understand its impacts?

Thus, the selection of **process indicators** is closely linked to the actions/interventions that the Plan/Programme intends to implement.

For example:

- if the 2021-2027 ERDF Regional Programme foresees actions on 'Energy efficiency in public buildings', the 'Number' of public buildings where energy efficiency has been achieved and the estimated 'non-renewable primary energy saved in MWh/year' could be used as process indicators to measure the implementation of this action. These indicators, if properly developed, can provide a measure of the Programme's contribution to Goal VI.1 'Reduce consumption and increase energy efficiency' in the Prosperity category of the 2030 Agenda.
- if the Municipal land-use Plan provides for actions in favour of 'Public and social housing', the 'Number of public and social housing dwellings realised' could be used as a process indicator to measure the implementation of these actions. This indicator can provide a measure of the Plan's contribution to Goal I.3 'reduce housing deprivation' in the People category of Agenda 2030.

There may be no clear definition of the actions in the Plan/Programme, and this may be one of the **main critical issues** for the selection of process indicators. However, it is still possible to identify general actions by deducing them, for example, from the goals of the Plan/Programme or from the legislation that establishes minimum content and governs its design.

It is for this reason that the Monitoring Plan should be conceived as a **dynamic tool** that can be refined and improved over time, as actions are detailed (through implementation plans and during the implementation of interventions).

3.2.2 Context and contribution indicators

The selection of **context indicators** is closely linked to the **sustainability goal** in question for which the plan action is assumed to produce an effect. Therefore, it is necessary to have a reference scheme that relates the objectives of the Sustainable Development Strategies to which the actions contribute (both in positive and negative terms) and to select context indicators that can effectively represent the sustainable development goal.

In the selection of context indicators, it would be desirable to use the same indicators identified by the National and Regional Sustainable Development Strategies, for which a periodic population disaggregated at least at a regional level is guaranteed.

In order to also support SEA monitoring activities of sub-regional level plans, several Regions have started to standardise the reference knowledge frameworks. The regional Competent Authority's effective support to the proceeding Authorities should provide:

- the list and the homogeneous classification of basic data for environmental assessments;
- the identification of available cartographic data for use with GIS tools;
- meta-documentation of data;
- the progressive collection of data not available but a priority for environmental assessments and possible accessibility timeframes;
- data availability;
- the scalability of context indicators for local level plans.

The LQS1 Line of intervention of the CReIAMO PA Project has prepared a document describing the priority data and information for environmental assessments[19] and also proposes a procedure for classifying them for easy cataloguing and research.

Table 6. Proposed classification of basic data for environmental assessments

Topic	Topic issue
Agriculture and animal husbandry	Agriculture
	Zootechnics
Trade	Trade
Energy	Energy
Industry (non-energy)	Industry (non-energy)
Fisheries and aquaculture	Fishing
	Aquaculture
Telecommunications	Telecommunications
Transport	Transport
Tourism	Tourism
Water	Water quality and water resources
Air	Air quality
	Atmospheric emissions
Biodiversity	Protected natural areas and ecosystems
	Flora and vegetation
	Fauna
Climate	Weather and climate characteristics
	Climate Change
	Greenhouse gas emissions
Landscape, cultural heritage	Landscape
	Cultural Heritage
Population	Demographic and socio-economic characteristics
Waste	Municipal and special waste
Natural hazards and anthropogenic hazards	Seismic risk
	Volcanic risk
	Hydrogeological risk
	Fire risk
	Sink hole risk
	Weather hazards
	Major incident hazards
	Other Risks
Noise and radiation	Noise
	Ionising radiation
	Non-ionising radiation
Human health	Population health status
Soil	Geological, lithological, structural, geomorphological features
	Soil characteristics and quality
	Contaminated sites
Territory	Cartography
	Land management
	Land cover
	Land consumption
Environmental assessments and authorisations	Environmental Assessments
	Environmental Authorisations

Source: CReIAMO PA Project - LQS1 Line of intervention

The **contribution indicator** measures the effect of the Plan/Programme Actions with respect to the environmental context and shows how the Plan/Programme Actions contribute, positively or negatively, to achieving the sustainable development goal[20]

The definition of contribution indicators is probably the most complex part of the SEA monitoring approach, as it requires the identification of causal relationships between objectives and actions. Only the correct identification of these relationships makes it possible to understand how much of the change that is embodied in the change in the context indicator, over time, is attributable to the Plan/Programme actions.

The contribution can be represented, at a macro level, as the change in the context indicator. If detailed information on the actions and a clear and shared calculation model are available, the specific contribution of the individual action can be calculated. This second option requires a significant effort that must be carefully evaluated.

[19] Environmental assessment frameworks available on the Environmental Authorisation and Assessment Portal - Sector studies and investigations (https://va.mite.gov.it/it-IT/DatiEStrumenti/StudiEIndaginiDiSettore)

[20] The evaluation approach of identifying ex-ante contribution indicators is based on the 'theory of change', i.e. on the assumption that the Plan/Programme actually generates the assumed impact. It is an approach widely used in evaluation practices and also suggested by the European Commission in the evaluation of programmes financed by European Funds.

By way of example, the following is a sequence for correctly identifying the context and contribution indicator.

- **To which sustainable development goal does the action contribute?**
  - Indicate the sustainable development goal identified by the strategy and the Plan/Programme objective and action contributing to the goal:
    - NSSD goal: PEOPLE category - *III.1 Decrease population exposure to environmental and anthropogenic risk factors*;
    - Municipal Master Plan target: *Decrease population exposure to flood risk*;
    - Municipal Master Plan action: Relocation of commercial activities located in areas of high flood risk.

- **How is the implementation of the action or its progress measured?**
  - Select the process indicator measuring the realisation of the action or its progress:
    o Delocalised activities (Number, surface area in m^2 by type of activity).

- **How can the sustainable development goal be effectively represented?**
  - Select the context indicator that effectively represents the sustainable development goal:
    - NSSD goal: PEOPLE category - *III.1 Decrease population exposure to environmental and anthropogenic risk factors*.
    - Context indicator: *Population exposed to flood risk*[21] *(No. and % of total resident population)*

- **How can the contribution to achieving the sustainable development goal be effectively represented? What is the target value that the Plan/Programme aims to achieve?**
  - Select the contribution indicator that shows how much the context indicator has changed based on the action implemented:
    - Contribution indicator: *Change in population exposed to flood risk (No. and % of total resident population).*
    - Target value: *By 2030, reduce the population exposed to flood risk by 2.6% compared to 2019.*

In addition to the definition of the contribution indicator, it would be preferable to also indicate the intended target, i.e. the expected contribution.

The target value can be expressed as a threshold or a range of values (sustainability *range*).

When defining target values, there is also the option of using values identified by national and regional strategies for sustainable development or legally established threshold values, where available and scalable to the specified planning/programming level.

Table 7. Example of a correlation between process indicators of an action and context and contribution indicators related to a sustainable development goal

NSSD Goal	Plan Objective	Action Plan	Process indicators	Context indicators	Contribution indicators	Target Value
PEOPLE category - III.1 Decrease population exposure to environmental and anthropogenic risk factors	Reduce population exposure to flood risk	Relocation of commercial activities from areas with high flood risk	Delocalised activities (No. and m^2 and type of activity)	Population exposed to flood risk (No. and % of total resident population)	Change in population exposed to flood risk (No. and % of total resident population)	By 2030 Reduce the population exposed to flood risk by 2.6% compared to 2019

Source: CReIAMO PA Project - LQS1 Line of intervention

In summary, monitoring should be carried out only on the actions specific to the planning/programming tool and through the context indicators that may actually be affected by these actions. In this way, it can be an effective tool

[21] RT band 100-200 years. According to the Implementation Status report of the Ecological Transition Plan of 30 May 2022, the population exposed to flood risk in 2019 was 6,183,364 people or 10.4% of the population.

for monitoring the planning/programming process and the environmental effects produced. Once the set of indicators has been constructed, it is advisable to try to answer the following questions:

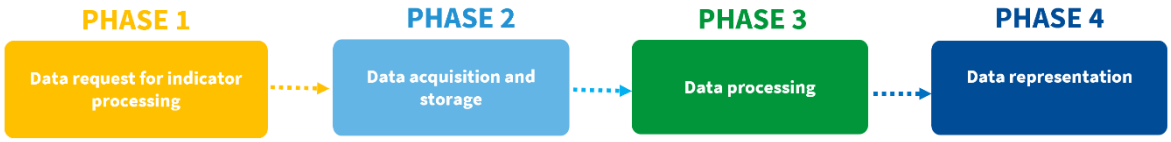
- Is the Plan/Programme linked to a schedule and in terms of location and technology, does it provide sufficient details regarding the actions to be executed?
- Can the selected process indicators effectively translate the actions to be implemented?
- Can you acquire the information to populate the indicators easily and regularly? Are you equipped with appropriate tools?
- Do the selected context indicators succeed in fully representing the sustainable development goals of the national and regional strategies to which the plan contributes?

3.3 Collection, processing and storage of data and information

The following steps show how to create indicators:

1. Request the necessary data to process the indicator;
2. Data collection and storage;
3. Data processing;
4. Alphanumeric, graphic or cartographic representation of the indicator.

Figure 9. Steps for information and data management



Source: CReIAMO PA Project - LQS1 Line of intervention

3.3.1 Requesting data to create the indicator

In the indicator's metadata there is the 'production process' entry which should specify the provenance of the data source and the type of processing required. In order to avoid data populating problems during the entire monitoring period, it is preferable to define the agreements, conventions, protocols with the subjects holding the data/information source, requiring them to regularly provide the data and information within their competence.

This is true both in the case of actors outside the Proceeding Authority and of internal actors.

In some cases, the provision of data or the production of the indicator (in the form and manner established by the Proceeding Authority) may entail charges. It is therefore advisable to identify in advance the source of the indicator and any external processing required for its production. The metadata sheet of the indicator, which clarifies the source of the data and the production process, is very useful for this verification.

An agreement/convention between parties should at least include:

- The name of the facility responsible for providing the data and point of contact;
- The name of the data source needed to populate the indicators or the name of the indicator, with its metadata specifying the production process;
- Periodicity of data transmission or indicator transmission;
- Method for reporting the data or the indicator (format);
- Any expected costs and the manner and timing of payment.

In the event that the Proceeding Authority has to 'grant' to third parties an 'instrument' that allows for the concrete implementation of the Plan/Programme (e.g. a loan, a permit, an authorisation), it is very useful to include, as a clause, the obligation of the provision of data for monitoring activities by the holder of the specific 'grant':

- in the case of a Programme financed by Structural Funds, this could be a clause in the agreements between the Managing Authority (which is the same as the Proceeding Authority) and the Beneficiaries, obliging them

to provide the environmental monitoring data for the intervention funded, along with all the other information on the physical, financial and procedural progress they are obliged to provide;

- in the case of a Municipal Master-Plan, one of the actions implemented by an Urban Implementation Plan/Building Subdivision, could be, for example, an annex to the documentation required for the submission of the building application and the subsequent notice of completion of works/accessibility. Considering the level of uniformity of this specific documentation, achieved thanks to the adoption by the Regions of the single national forms for commercial and assimilated activities and for building activities, and to the creation of the One-stop offices for productive activities (SUAP) and for Building activities (SUE), it would be desirable that any additional annexes intended for SEA monitoring and falling within the competence of these offices be integrated into the single regional forms, also in order to fulfil the horizontal and vertical integration of monitoring.

It should not be underestimated that much environmental information is already contained in the documentation required to obtain European and national authorisations, opinions and *nulla osta* or funding and that, moreover, its preparation is often functional to the fulfilment of legal obligations that are independent of SEA monitoring. By way of example only, and going back to the case of building activities that are part of the implementation of a municipal Master Plan, when they consist of energy requalification activities, these are always linked to an energy report in the case of private individuals accessing specific forms of tax bonuses or in the case of public administrations that, among other things, in addition to energy regulations, are also obliged to comply with the various decrees on Minimum Environmental Criteria. It is therefore a matter of selecting well the information for environmental monitoring and collecting it in a constant and orderly manner so that, in addition to being objectively useful, the collection does not represent an excessive burden both for the Proceeding Authority and for the individual subjects involved in the direct implementation of Plans/Programmes.

Once the works to be realised are clearly identified, the technical specifications to forward the geo-referenced project information can be prepared.

This becomes relevant when data processing requires the use of GIS tools (e.g., spatial analysis, as described in the following points).

3.3.2 Data collection and storage

It is of fundamental importance that the process of information and data **collection** to populate the indicators is done in a **constant and systematic** manner and that all the information available is collected in a fit-for-purpose **information system**.

Equipping and maintaining an information system requires dedicated resources, and not all the Proceeding Authorities are equipped with them; in several Regions, in order to facilitate collection activities, software applications are made available to support the archiving of certain information[22].

When storing data, data and related metadata must always be kept together. Metadata facilitates research activities, the correct use of data, as well as the comparison of data from different sources or from different databases.

The following types of data are mainly collected to populate the indicators:

- Tables in XLS or CSV format;
- Images in JPG or PDF format and text documents in *PDF* format;
- Geo-referenced and non geo-referenced data in vector (e.g. *shapefile*) or raster format.

Whenever possible, data acquisition should take place through a direct upload of data onto the information system of the Proceeding Authority. This allows the Proceeding Authority to dispose of ready-made data for analysis activities.

The data and information needed to populate an indicator are often provided within reports (e.g., building plan) and not in the form of tabular numerical data. This involves considerable data extraction activities prior to the processing phase.

[22] It would be preferable for information on environmental monitoring to be collected in the same information system monitoring the progress of the Plan/Programme (physical and procedural); then there would be a single system to allow for integrated analyses and understanding the resulting cause-effect relationship. Such integration should be supported and encouraged under programmes financed with European funds.

3.3.3 *Processing and representation of indicators*

Prior to the processing activities, a data verification and control activity is carried out (spatial coverage, temporal coverage, reliability and accuracy, format, georeferencing, associated data, etc.).

Subsequently, data processing is carried out following what is defined and reported in the "production process" of the metadata of the indicator.

The data can then be aggregated and returned in tables or through graphs.

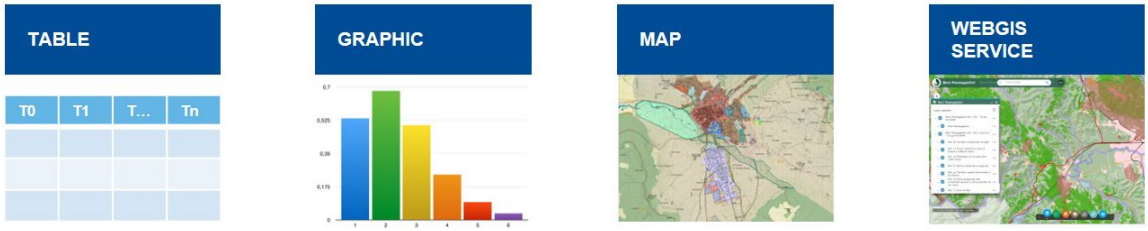
In the case of non-georeferenced cartographic data, the data are first georeferenced and then overlaid with environmental data on which to perform spatial analyses.

Following processing with GIS tools, the data can be returned and represented through:

- Tables;
- Graphs;
- Maps;
- *Web GIS* services.

The most effective formatting can be chosen on a case-by-case basis to represent the content.

Figure 10. Examples of data representation



Source: CReIAMO PA Project - LQS1 Line of intervention

Various applications are required for the types of processing described above; in most cases there are *open-source* versions available at no cost.

If it is decided to carry out processing with GIS tools, human resources skilled in these applications are needed.

Similarly, if it is decided to display monitoring results through dynamic maps (*web GIS* services), human resources must be provided to develop the web services as well as for the implementation and management of a geographical information system.

3.4 Content of the environmental monitoring report

The purpose of the monitoring reports is to document, over time and with the periodicity defined in the EMP, the environmental effects, both positive and negative, that have occurred as a result of the implementation of the various actions of the Plan/Programme subject to SEA.

The environmental monitoring report must be a document that is as autonomous and exhaustive as possible, well delimited with respect to the state of implementation of the Plan/Programme to which it refers and, at the same time, with a constant structure that allows easy comparisons with what has been or will be detected by the subsequent periodic reports foreseen by the MAP.

The general questions that an environmental monitoring report must answer and that characterise its structure can be summarised as follows:

1. Which of the goals and actions of the Plan/Programme produce positive and/or negative effects on the economic and social environment?
2. Based on the actions identified, what is the purpose of SEA monitoring? Who were the subjects and how were they involved, what were their roles? Is the chosen environmental monitoring methodology able to monitor

the environmental effects envisaged by the Environmental Report? Can the impacts be reported accurately and in a timely manner to assess whether these impacts have followed or are following the direction assumed for them in the planning/programming phase?

3. Has the environmental context in which the Plan/Programme operates followed the expected change, or have changes occurred that may influence the environmental impacts of the Plan/Programme and the effectiveness of its Actions in achieving the environmental goals set out in the Environmental Report?
4. What is the implementation status of the Plan/Programme? Is the progress status in line with the time frames defined in the schedule? Are there any factors hindering the implementation of the Plan/Programme? Are additional actions needed to overcome hostile factors?
5. What is the contribution of the Plan/Programme to the achievement of the individual sustainable development goals identified in the LDC? Is the objective value (target) set for each contribution indicator being achieved, or are there obstructive elements, endogenous or exogenous to the Plan/Programme that prevent it from being achieved??
6. Have there been any critical points in the collection of information and data for populating the indicators? Can these be resolved by integrating/changing the collection method or source? Is it necessary to modify the set of indicators?
7. Were the models, tools and techniques used to analyse and evaluate the environmental impacts of the Plan/Programme Actions suitable? What environmental, economic and social impacts and results did the analysis of process, context and contribution indicators reveal?
8. Based on the results of the analyses and assessments carried out, to what extent have the environmental goals of the Plan/Programme been achieved? Have the assumed environmental goals (target values) actually been achieved?
9. On the basis of the results of the analyses and assessments carried out, are any corrective measures needed for the Plan/Programme necessary (or variant)? Are more in-depth topic-based studies needed?

The assessment 'questions' summarise the reasons why environmental monitoring is carried out, and the answers to these questions correspond to specific chapters of the monitoring report. The correlation between the assessment questions and the report chapters is not merely formal but substantial in that it ensures that the contents of the report adequately respond to the reasons for which it was prepared and, therefore, that there is no unnecessary, off-topic or out-of-scale content, and that its aims are fully met.

These questions may also serve as a 'check list' of activities to be implemented and of contents that may present knowledge gaps, internal or external to the administration, for which appropriate action should be taken, such as the reinforcement of the working group or a targeted interlocution with the Competent Authority and other actors who have direct responsibility for specific knowledge aspects.

Table 8. Proposed structured index for the environmental monitoring report

No.	Chapter of the Report	Content
1	Summary of the goals and actions of the Plan/Programme that impact (positively and/or negatively) on the economic and social environment	This chapter should provide a summary of the objectives and actions of the Plan/Programme, also representing elements, where known at the planning/programme stage, such as locations or specific types or technologies implementing the action, planned and actual implementation times. Locations and types/technologies actually adopted to implement an Action 'make a difference' in its environmental sustainability, sometimes even more so than the policy choice selected upstream (for example, an action intended for renewable energy production, which is certainly effective in reducing CO^2, can only be evaluated in terms of its negative effects on other environmental components - soil, biodiversity, waste production, etc. - when the type of energy source and its location have been chosen. - only when the type of energy source and its location are chosen). Greater detail on the Actions will provide a clearer picture of the specific environmental impacts, both positive and negative, that the monitoring procedure needs to keep under control and that necessitate its implementation. Returning to the example of an Action aimed at renewable energy production, if during implementation resources will finance large photovoltaic installations, monitoring of positive effects may detect the nominal installed power, MWh/year produced, CO^2 avoided, etc., while monitoring of negative effects may detect impacts on landscape, biodiversity, etc. The greater detail of the Actions and the environmental monitoring activities connected to them makes clearer not only the work done to produce the monitoring report, but also its concrete usefulness both to decision-makers and to the interested public, who often attribute a pre-established judgement (positive/negative) to specific types of Action, lacking the technical expertise to enable them to make objective and structured judgements based on the combined observation of several variables.
2	Reasons and purpose for SEA environmental monitoring, subjects and chosen methodology	Clarifying the reasons and purpose of SEA monitoring is useful not only for policy makers and the public but also for the technicians in charge of implementing the Plan/Programme. Policy-makers should be explicitly told that this tool is a guarantee of the quality of public choices and, at the same time, of their farsightedness, including in this capacity, usually too much projected into the remote future, also the possibility of "changing" one's mind in the near future, when the change becomes necessary and reasonable on the basis of the "evidence of facts". The public should get the message that the purpose of environmental monitoring is to verify, on a daily basis, the sustainability of the Plan/Programme and its adherence to its goals. The Plan/Programme's adherence to the goals, including the environmental goals, the very reason it was developed, is even more crucial in terms of legally defined goals. This alignment represents the only true justification for any public investment. Having clear reasons and the purpose of monitoring is also important for the technicians dedicated to it, as it is a reminder to better orient the work and not waste the already scarce resources available. The greater the detail of the Actions and the consequent possibility of defining their environmental effects, the greater the clarity with which the subjects involved in monitoring are identified, the methods of involvement, and the environmental monitoring methodology adopted to monitor the environmental effects envisaged in the Environmental Report.

No.	Chapter of the Report	Content
3	Changes to the environmental context in which the Plan/Programme operates in relation, where possible, to the more general evolution of the socio-economic context	The update of the reference context for the Plan/Programme must provide an overall picture of the state of the environment, economy and society that will be affected by its implementation. As comprehensive as it may be, this picture must be constructed on the basis of direct relationships between the actions and the environmental, social and economic issues that are to be described, avoiding producing "encyclopaedic" context analyses against which the effects of the Plan/Programme are not effectively reflected. It should not be forgotten that this framework serves for the comparison between what would have happened in the absence of the Plan/Programme and what could happen following the implementation of each specific action of the Plan/Programme. It must therefore be an extremely quantitative framework that lends itself to the statistical interpretation of phenomena. This does not mean neglecting qualitative aspects, but rather basing qualitative judgements as objectively as possible by providing a qualitative-quantitative representation. This is the case, for example, with indicators such as the 'Difficulty of access to certain services' (ISTAT)[23] based on sample surveys of the population. It is therefore always possible to quantify and compare in time and space and, consequently, to assess phenomena affecting territories and populations on a scientific basis. The synthesis and relevance of the analysis will obviously be ensured by a good selection of the set of indicators, which must be able to " point out" whether there is an alignment between the forecasts hypothesised ex ante in the Environmental Report or whether there are unforeseen evolutions of one or more indicators that may highlight emerging critical issues, with respect to which the Plan/Programme can and must react by modifying one or more actions, in order to achieve the set environmental objectives.
4	Implementation status of the Plan/Programme	Knowledge of the implementation status of the Plan/Programme is a pre-condition to assessing its environmental impacts. Building indicators that effectively monitor how much, how and where the planned is progressively realised is even preordained with respect to the analysis of the environmental effects of the 'realised'. When a Plan/Programme is not subject to mandatory monitoring, its physical progress is often unknown. The causes may be manifold and must be resolved before starting any environmental monitoring, as they are a precondition for its success. Once the state of progress of the Plan/Programme has been reconstructed, this must be compared with the timing of implementation defined in the ex ante phase, because the non-implementation of an action could coincide with a lack of 'response' to the needs or criticalities that it was intended (often also the obligation, in the case of Plans/Programmes with a strong environmental vocation) to satisfy or resolve, or even trigger criticalities. If the Plan/Programme is not being implemented as envisaged, the obstructive factors that have slowed down or prevented its implementation must be researched, feasible solutions must be formulated to remove the obstacles, and possible supplementary or alternative actions must be elaborated, when those originally hypothesised should prove to be really unfeasible.
5	Contribution of the Plan/Programme to the achievement of individual sustainable development goals	The analysis of the contribution of the Plan/Programme to the achievement of the individual sustainable development goals identified in the LDC is carried out by comparing process indicators with context indicators. This comparison, more or less direct, makes it possible to know the variation that the Plan/Programme has generated with respect to a given phenomenon.

[23] ISTAT indicator selected by the National Strategy for Sustainable Development to monitor the national strategic objective PEOPLE I.3 Reduce housing deprivation.

No.	Chapter of the Report	Content
		In this specific case, the phenomena are represented by the sustainable development goals to which the Plan/Programme intends to contribute and against which the selected indicators define the specific measurement methods. This analysis should help determine whether the target set for each contribution indicator has been reached or, depending on progress, the likelihood of reaching it. Knowing the distance to the target and the actual likelihood of reaching it serves to understand whether action needs to be taken for that target. This intervention, if necessary, must be modified depending on the causes of the discrepancy between the expected goal and the result achieved. The cause could be attributable to a trivial over-dimensioning of the target, too ambitious, for example, compared to the budget of an action. Should, on the other hand, the cause be attributable to the occurrence of unforeseen, endogenous or exogenous criticalities, the elements that caused the gap between the expected target and the achieved result must be removed, in particular when the target was not set by the Proceeding Authority but is a legal obligation.
6	Potential critical issues encountered in the collection of information and data	Regardless of the progress of the Plan/Programme, specific critical issues may arise during environmental monitoring when collecting information and data to populate the indicators. These should be solved by adding to or changing the method or source of data collection, or by making relevant revisions to the set of indicators. The reporting of any critical issues or information gaps is essential to ensure the transparency of the process and to hold the subjects involved in the collection of data and information responsible for such problems.
7	Analysis and assessment of the environmental impacts of the Plan/Programme Actions	The models, tools and techniques used to analyse and assess the environmental impacts of the Plan/Programme Actions must be chosen with care, considering several factors: these may vary not only in relation to the nature of the action, but also depend on the progress of the Plan/Programme. The application of certain analytical techniques, such as counterfactual analyses[24] or, more generally, impact analyses[25], should be planned well in advance, because they provide for the monitoring not only of the actions promoted by the Plan/Programme but also of a similar sample that, however, was not affected by that action. Similar considerations concern the choice of quantitative, qualitative or qualitative-quantitative assessment models, tools and techniques, which, in any case, must be based on a suitable statistical sample to be analysed: the soundness of the evaluation depends on the quality and quantity of the data available. The larger the statistical sample, the smaller the margin of error; paradoxically, if a very limited statistical sample is available, the 'case study' may be much more useful than a statistical analysis. The correct and constant populating of process, context and contribution indicators is therefore of fundamental importance in order to be able to detect the environmental, economic and social effects and results generated by the implementation of the Plan/Programme, but the models, tools and techniques used to analyse them provide different perspectives in interpreting the same indicator and must be chosen rationally and carefully. If the techniques possibly assumed in the EMP do not prove to be suitable, it is important to have sufficient flexibility to be able to select those that can provide the best answers to the environmental effects of the Plan/Programme. This flexibility, as well as decision making flexibility, also lies in the ability to foresee in advance the possibility of this problem arising and thus to find precautionary solutions (e.g. a contract that reserves margins for flexibility, a "treasury" for unforeseen events, etc.).

[24] Counterfactual analyses are based on a comparison of the results obtained from a survey sample that benefited from the Action of a Plan/Programme, with those obtained, in the same timeframe, from a similar survey sample that did not benefit from the Action (counterfactual sample).

[25] Impact analyses aim to establish whether a given action of a Plan/Programme produces the ex-ante expected effects on a pre-established area of interest (e.g. improvement of an environmental performance or in a social condition). The overall objective of impact assessments is to answer the question 'does the action make a difference?' by identifying and estimating the causal effects between the action itself and any changes that have occurred in the area of interest. It therefore differs, from methods based on the 'theory of change', which are aimed at understanding why an action produces/doesn't produce the intended effects, for whom/what it produces them and in what context, answering the question 'why does the action work/doesn't work?'.

No.	Chapter of the Report	Content
8	Success rate in the Plan/Programme's environmental goals	Providing a summary of the results of the analyses and assessments carried out and the overall level of success of the Plan/Programme's environmental goals is an important aspect to be addressed in the monitoring report, which may have the same value as the Non-Technical Summary associated with the Environmental Report. The results achieved (or missed) must be expressed objectively, explicitly and comprehensibly even for a non-expert audience.
9	Suggestions, recommendations and identification of possible corrective measures	The collection of data and information and their analysis and assessment are aimed not only at keeping track of what is happening, but also at alerting those responsible for implementing the Plan/Programme to any critical issues that have been recorded, in order to provide useful suggestions and recommendations for resolving them quickly, where possible, and preventing them from recurring, or to support, by means of the knowledge available, or through any in-depth thematic studies that may be necessary, the technicians and decision-makers in the possible preparation of amendments to the Plan/Programme. In this chapter, on the basis of the results of the analyses and assessments carried out, the reasons that make it necessary to draw up and adopt any corrective measures to the Plan/Programme (variant) and the indications for making these measures effective, with particular regard to environmental effects, will be provided.

Source: CReIAMO PA Project - LQS1 Line of intervention

3.5 Information on the results of environmental monitoring

The most rigorous collection of environmental data and information would be of no use if it was limited to the information system of the Proceeding Authority. Making the data collected available to other public administrations, evaluators and technicians and disseminating the results of monitoring to politicians and citizens is the real purpose of environmental monitoring and also justifies its cost and effort.

To construct accurate information, it is preferable to define a communication plan that clearly states:

WHAT TO COMMUNICATE?

- Communication goals and content.

WHO TO COMMUNICATE TO?

- Recipients of the communication:
  - Competent Authority whose task it is to express an opinion on the results of monitoring on the basis of periodic monitoring reports;
  - subjects competent in environmental matters;
  - subjects involved in the implementation of the Plan/Programme;
  - administrators (politicians);
  - citizens.

HOW TO COMMUNICATE?

- The most effective communication tools for each recipient:
  - monitoring report;
  - web page on the institutional website of the Proceeding Authority;
  - texts, images, interviews, videos on social media and other media;
  - publications (notebooks, brochures, infographics);
  - gadgets;
  - press releases.
- Communication tools (tools and language) and activities:
  - website;
  - social media platforms, media;
  - participation in events;
  - organisation of workshops, conferences;

- meetings with facilitators.
- Communication language (technical language, non-technical language).

WHEN TO COMMUNICATE?

- Timing of the information regarding the environmental monitoring outcomes.

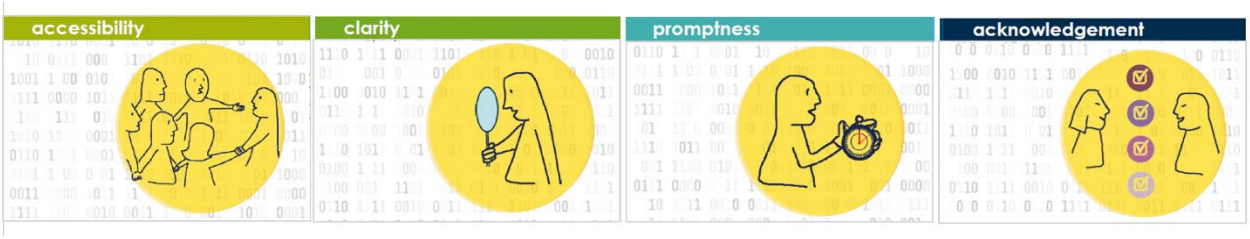
The extent of the communication activity may depend on the resources available. However, it is appropriate for the Proceeding Authority to define its own strategy to communicate depending on if and how the plan or programme is being implemented and its impacts.

During the information/communication activities, the work done should be documented and the effectiveness of the information for the different target groups should be assessed; in particular, it should be checked whether:

- the tools used were suitable and easily accessible (e.g., if information on the monitoring outcomes can be found easily on the website of the Proceeding Authority, or if, instead, numerous steps are required to access this monitoring information);
- are the texts and images used to describe the monitoring outcomes clear, easily understandable even to a non-technical audience;
- is the information on the monitoring outcomes and possible corrective measures timely;
- did the monitoring provide answers/feedback to citizens and administrators on the sustainability of implementing the Plan/Programme.

The proposed checks respond to four principles identified within the Charter of Principles "Transparency and Participation in Environmental Assessments", implemented by the CReIAMO PA Project LQS1 Line of intervention, namely: accessibility, clarity, promptness and acknowledgment.

Figure 11. Principles of the Charter of Intent for monitoring outcome information



Source: Charter of Principles 'Transparency and Participation in Environmental Assessments' created by the CREiAMO PA Project LQS1 Line of intervention

Information and communication activities have a cost and must be included as a cost item in monitoring activities.

3.6 Financial Resources

The earmarking of **financial resources** which, according to Legislative Decree 152/2006, should have already been done when preparing the Environmental Report, is indispensable to activate human and instrumental resources without which, objectively, monitoring could not be carried out.

It is no coincidence that the EU-funded programmes include substantial financial resources dedicated to *technical assistance,* thanks to which it is also possible to provide for analysis, management, monitoring, exchange of information, implementation of control systems, evaluations, expert reports, statistics, and studies, etc., and which could also legitimately include the resources for SEA environmental monitoring. In the 2021-2027 ERDF Programmes, for which SEA is mandatory, the resources that can be allocated to such activities amount to as much as 3.5 % of the total amount for the Programme[26].

[26] The Ministry of the Environment and Energy Security, in collaboration with NUVAP-DCS-PdC, carried out important awareness-raising and dissemination work for the integration of SEA also in the implementation phase of Programmes financed with EIS Funds, within the scope of the activities of the National Evaluation System - NES. In light of the congruence between SEA goals and the programme goals dictated by the common

For the other types of Plan/Programmes, the issue of resources appears to be a critical element but, through careful analysis of the activities described in the previous chapters, the cost of this activity can be estimated, making it compatible with the available financial resources.

Table 9. Outline of the main monitoring cost items

Cost item	Description
Human Resources	Head of environmental monitoring activities Working Group: ▪ Data collection and data management operators ▪ Technicians for the analysis and evaluation of environmental impacts Specialist experts: ▪ GIS data processing experts for data processing and reporting ▪ Communication specialists ▪ Information systems specialists ▪ Possible industry specialists
Resource tools	High graphic performance PCs Information system for the collection and management of data and information
Data/indicators retrieval from external sources	Agreements, conventions, protocols for the provision of data or the production of paid-for indicators
Communication Products	Publications (monitoring report, brochures, infographics, non-technical summaries of monitoring outcomes) Website, social media updates Gadgets
Unforeseen events	Possible additional costs to monitor activities to solve implementation phase problems

Source: CReIAMO PA Project - LQS1 Line of intervention

The creation of a 'budget item' dedicated to SEA monitoring but integrated into the overall resources budget resources allocated to the implementation of the Plan/Programme ensures that these activities are also kept under control from a procedural point of view, in the same way as all other activities that need to be carried out and reported.

framework of the 2030 Agenda. Particular attention was also paid to the integration of environmental aspects in the preparation of the Assessment Plan (article 44 Reg. No. 1060/2021) by the Public Administrations in charge of the 2021-2027 programmes. This administrative capacity-building action, which stems from the need to actually implement the 2030 Agenda Goals and to use the SEA as a tool for ex-ante design of environmental sustainability goals as well as to measure their success on an ongoing basis, starts from the lesson learnt from the few exemplary cases in the 2014-2020 European Structural and Investment Funds programming cycle that allocated a share of technical assistance resources to SEA environmental monitoring and specialised environmental studies, which is hoped to give a significant boost to central administrations and regions. The data on the poor practice of SEA environmental monitoring in Europe is particularly worrying when viewed in the light of the fact that programmes financed with EIS funds are managed under the close supervision of the European Commission itself and that, therefore, there are numerous 'silos' to be broken down, not only to ensure multilevel governance - from the EU down to local bodies - but also to ensure an internal dialogue across all public institutions involved in SEA implementation, starting with the European Commission itself.

For their contribution regarding the status of SEA environmental monitoring in the Italian Regions, we extend our thanks to:

- Abruzzo Region: Territory - Environment Department, Environmental Assessment Service, SEA Office and support to the Environmental Authority.
- Basilicata Region: Department of Environment, Territory, Sustainability Policies.
- Autonomous Province of Bolzano: Environmental Assessment Office.
- Calabria Region: Land and Environmental Protection Department, Environmental Assessments and Authorisations Division - Sustainable Development.
- Emilia-Romagna Region, Environmental Impact Assessment and Authorisation Area.
- Friuli-Venezia Giulia Region: Central Directorate for Environmental Protection, Energy and Sustainable Development, Environmental Assessment Service.
- Lazio Region: Regional Directorate for Housing Policies, Spatial, Landscape and Urban Planning, Landscape Authorisation and Strategic Environmental Assessment Section.
- Liguria Region: Spatial Planning and SEA Service.
- Lombardy Region: Urban Planning and SEA Unit - Directorate General for Territory and Green Systems.
- Marche Region: Environment and Water Resources Directorate, Environmental Assessments and Authorisations Division.
- Molise Region: Department II 'Financial Resources - Environmental and Natural Resources Development - Regional System and Local Self-Government', 'Environmental Protection and Assessment' Service.
- Piemonte Region: Environment, Governance and Territory Protection Directorate, Environmental Assessments and Integrated Procedures Division.
- Sardinia Region: Directorate General for Environmental Protection, Environmental Sustainability, Strategic Assessment and Information Systems Service.
- Sicily Region: Department of Territory and Environment, Department of Urban Planning, Service 1 - Regional Spatial Planning and Programming - SEA Procedures and Applicability Checks
- Toscana Region: Environment and Energy Directorate, EIA - SEA Sector.
- Autonomous Province of Trento: Provincial Environmental Protection Agency, Environmental Quality Sector - O.U. for Environmental Assessments.
- Umbria Region: Regional Directorate for Agriculture, Environment, Energy, Culture, Cultural Heritage and Entertainment - Environmental Assessment, Development and Sustainability Service
- Veneto Region: Environmental Assessments Directorate, Legal Support Litigation - O.U. SEA, VINCA, Natural Capital and NUVV.
- Autonomous Region of Valle D'Aosta: Department for the Environment, Transport and Sustainable Mobility, Department for the Environment, Sustainability and Environmental Assessment.

Thank you for timely comments on the document and useful additions provided:

- Lombardy Region: Urban Planning and SEA Unit - Directorate General for Territory and Green Systems.
- Marche Region: Environment and Water Resources Directorate, Environmental Assessments and Authorisations Division.
- Sardinia Region: Directorate General for Environmental Protection, Environmental Sustainability, Strategic Assessment and Information Systems Service.
- Autonomous Province of Trento: Provincial Environmental Protection Agency, Environmental Quality Sector - O.U. for Environmental Assessments.
- Umbria Region: Regional Directorate for Agriculture, Environment, Energy, Culture, Cultural Heritage and Entertainment - Environmental Assessment, Development and Sustainability Service
- Veneto Region: Environmental Assessments Directorate, Legal Support Litigation - O.U. SEA, VINCA, Natural Capital and NUVV.

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