The Role of Sustainable Development Goals in Environmental Assessment

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ABSTRACT

In the theoretical field, the integration of Sustainable Development Goals (SDGs) in Environmental Assessment (EA) has long been suggested, but in practice, it is not common yet. The present dissertation focuses on the investigation of the role of SDGs into EAs and its current use in practice to contribute to the overcoming of the theory-practice gap.

A web search to gather EA reports integrating SDGs was conducted. In total 34 reports, in languages not previously studied by Ravn Boes et. al. (2021), were gathered and analyzed according to a framework that classifies the level of integration of SDGs in EAs.

The results indicated a large number of EAs that only mention the SDGs, without them actually performing a role. In the reports that SDGs perform a scoping function it is still done in a non-transparent way and the influence of the SDGs on the process differs. A few number of reports were identified to have a high legel of integration with SDGs and in these no methodological pattern has been found. Concluding that it is still a very young and not widespread process.

The comparation between the findings of Ravn Boes et.al. (2021) has shown a great agreement between the studies. The divergences were found, mainly, in how the integration occurred, reinforcing the lack of an integration methodology.

The role of the SDGs within EAs has been demonstrated as guiding, even if in a limited extent, the EA process in order to support the project/plan in achieving the global sustainability concept.

Key Words: Environmental Assessment, SDGs, Sustainable Development Goals, Integration, EIA, SEA

RESUMO

No campo teórico, a integração dos Objetivos de Desenvolvimento Sustentável (ODS) na Avaliação Ambiental (AA) tem sido amplamente defendida, mas, na prática, isto ainda não é usual. A presente dissertação centra-se na investigação do papel dos ODS nas AAs e a sua utilização na prática, a fim de contribuir para a superação desta lacuna teórico-prática.

Uma pesquisa na web para reunir relatórios de AA integrando os SDGs foi realizada. No total 34 relatórios, em línguas anteriormente não estudadas por Ravn Boes et. al. (2021), foram coletados e analizados de acordo com uma framework para classificar o nível de integração dos ODS em AAs.

Os resultados indicaram um grande número de AAs que apenas mencionam os ODS, sem realmente desempenharem um papel. Nos relatórios em que as ODS desempenham uma função de delimitação do escopo, esta ainda é feita de uma forma não transparente e a influência das ODS no processo difere. Alguns AAs foram identificados como tendo um elevado grau de integração e nestes não foi encontrado qualquer padrão metodológico. Concluindo que se trata ainda de um processo muito recente e não difundido.

A comparação entre as constatações de Ravn Boes et.al. (2021) mostrou uma grande concordância entre os estudos. As divergências foram encontradas, principalmente, na forma como o uso ocorreu, reforçando o facto da falta de uma metodologia de integração.

O papel dos ODS na AA foi demonstrado como guia, ainda que de forma limitada, do processo de AA, a fim de apoiar o projecto/plano a alcançar o conceito global de sustentabilidade.

Palavras-Chave: Avaliação Ambiental, ODS, Objetivo de Desenvolvimento Sustentável, Integração, AIA, AEA.

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List of Acronyms

CDF	Critical Decision Factors
EA	Environmental Assessment
EACC 2030	Aragon Climate Change Strategy
EADS	Andalusian Strategy for Sustainable Development 2030
EIA	Environmental Impact Assessment
HIA	Health Impact Assessment
IA	Impact Assessment
MDGs	Millennium Development Goals
PCAET	Territorial climate, air, and energy plan of Plaine Commune 2020-2026
PAAC	Climate Action Plan for Andalusia
PAEM	Belgium's Marine Spatial Plan
PRDNE	Northeast Regional Development Plan
SA	Sustainability Assessment
SEA	Strategic Environmental Assessment
SESA	Strategic Environment and Social Assessment
SIA	Social Impact Assessment
SDG	Sustainable Development Goal
SRF	Strategic Reference Framework
UN	United Nations

1. Introduction

The Sustainable Development Goals (SDGs) are part of the 2030 Agenda for Sustainable Development, adopted by the United Nations (UN) in 2015 as a common sustainability agenda for the international community for the period of 2015-2030.

The importance and benefits of integrating SDGs and EA (Environmental Assessment) are widely recognized (Hacking, 2019; Morrison-Saunders et al., 2019; IAIA, 2019; Del Campo et.al,2020). EA can bring increased tangibility and practical meaning to the SDG framework and therefore the integration of SDGs into EA process can be one of the keys to SDG achievement (IAIA, 2019).

Nevertheless, these debates have been remaining at a conceptual level in such way that there are few studies in how to integrate EA and SDGs, existing a knowledge gap between theoretical considerations and EA practice.

In this context, the author Ravn Boes et. al. (2021) conducted a research to explore how and in what extent the EAs have been integrating the 2030 Agenda and its goals. A total of 45 cases of assessment in environmental impact and strategic environmental were analyzed by the authors using an analytical framework (Kørnøv et al. 2020) to classify the level of integration of SDGs in EAs. Ravn Boes et. al. (2021) analyzed reports written in English, Danish, Swedish, and Norwegian.

The present dissertation intends to focus on the investigation of the role of SDGs into EAs by analyzing EAs reports in Portuguese, Spanish and French. Amplifying the sample of EAs reports analyzed by Ravn Boes et. al. (2021), gathering cases in other languages not previously studied, will contributes to close the knowledge gap and to further elaboration of a conceptual framework of SDG integration in EAs.

1.1. Objective

The objective of this dissertation is to review reports of Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) and assess to what degree and how SDGs play a role in this type of assessments. In view of these aspects, the research Question was defined as the following: ***What is the role of SDG's in environmental assessments?***

Additionally, the outcomes are aimed to be linked to the research outcomes of Ravn Boes et. al. (2021). The methodology of the dissertation follows the methodology used by her to enable a comparison of results.

1.2. Motivation

The first drive for the development of this study began with the possibility of complementing a project developed by a Danish funded project on the use of SDGs in EAs, increasing its scope of analysis and contributing to the confirmation of its results.

Furthermore, I have always considered the SDGs a great challenge to achieve and that there were several gaps in means of reaching them. In this regard, with environmental assessments being seen as a tool for this achievement, the interest in studying the integration between these two themes emerged.

Therefore, the union of the desire to deepen the means for the achievement of the SDGs with the collaboration in a study that aims to explore how this integration is being carried out in practice were my motivation.

1.3. Dissertation Structure

The present dissertation is structured in six chapters described as follows:

- **Chapter 1 – Introduction:** provides an initial introduction to the theme studied throughout this dissertation, contemplating its objectives and motivation.
- **Chapter 2 – Literature Review:** addresses the main features of the SDGs and EAs and provides an overview of the literature which approaches their integration.
- **Chapter 3 – Methodology:** describes the methodology used to gather the review material and to classify the SDGs function within EAs.
- **Chapter 4 – Results:** presents the results of the core functions of SDGs within EAs according to the classification presented in chapter 3.
- **Chapter 5 – Discussion:** links the results presented in chapter 4 with those of Ravn Boes et. al. (2021) and discusses the role of SDGs within EAs based on the observed results.
- **Chapter 6 – Conclusion:** summarizes the main conclusions of the work developed throughout this dissertation and leaves some concluding remarks for future studies in this area of research.

2. Literature Review

2.1. Sustainable Development Goals (SDGs)

The SDGs were developed following the United Nations Conference on Sustainable Development in 2012 ('Rio+20') and build on the Millennium Development Goals (MDGs) adopted in September 2000 as part of the Millennium Declaration.

The 2030 Agenda can be defined as a plan of action for people, planet, and prosperity, also seeking to strengthen universal peace (2030 Agenda, 2015). The universality, ambition and scalability of this Agenda are demonstrated by the Sustainable Development Goals, consisted by 17 goals (figure 1) and 169 targets, which were described by the Cambridge Institute for Sustainability Leadership (CISL 2016, p.10) as "the closest thing to a strategy for planet Earth over the next 15 years that humanity has ever generated".

The universality of the SDGs means the application to all countries and all segments of society (Nilsson, et. Al 2017), implying that it is considered a universal strategy for the achievement of sustainability.

Figure 1: 17 SDGS. Source: United Nations, n.d.

2.1.1. SDG interlinkages

The SDGs are meant to be integrated, indivisible and collectively, i.e., although each goal focus on a different area, the achievement of sustainability of the SDGs are designed to be used in a holistic manner (Nilsson, et. Al 2017).

In this context, when integrating SDGs into policies, strategies and actions is important to display their interlinkages for successful practices, rather than working with them in an isolated form (Nilsson M., et al 2016; D.L McCollum et. al, 2018; Elder et al.;2016). An integrated approach

would help avoid costly and unnecessary trade-offs. (Elder et al, 2016; Machingura and Lally 2017).

However, this is still challenging in many jurisdictions as any thematic sub-division of the sustainability agenda risks the creation of silos (Haching, 2019). Although in principle the SDGs ideally should be worked in an interconnected manner, in practice the prioritization is seen in many cases as unavoidable (Machingura and Lally 2017).

In the present dissertation, its scope does not address in depth the use of SDGs interlinkages in EAs. The analysis of the EAs reports is constrained to identifying if the SDGs are mentioned as a whole policy or as individual goal-levels.

2.2. Impact Assessment and Environment Assessment

The EA is part of the Impact Assessment (IA)'s family of tools. The International Association for Impact Assessment (IAIA) defines the IA as a process of identifying the future consequences of a current proposed action, being the IA recognized as a prospective tool capable to proactively advise decision makers on what might happen if a proposed action is implemented.

It is a tool that may assist in the design and implementation of better policies, plans, programmes, and projects that will address important challenges such as climate change, biodiversity loss, population growth, urbanization, conflicts over increasingly scarce resources, inequities and new technological opportunities (IAIA,2012).

There is a family of instruments that involves IA. These include Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Health Impact Assessment (HIA), Strategic Environmental Assessment (SEA) and Sustainability Assessment (SA) which are instruments formalized through regulatory procedures. Non-formalized IA instruments include Technology Assessment, Ecological Impact Assessment and Biodiversity Impact Assessment. In this dissertation, the focus will be upon two of the IA instruments: the Environmental Impact Assessment and Strategic Environmental Assessment – both classified as Environmental Assessments.

The EIA is defined as formal and systematic process that includes *identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made* (IAIA, 1999; p. 2). While SEA, according to Sadler and Verheem (1996), is defined as a formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision making on par with economic and social considerations. The differences and the debates in the academic community concerning EIA and

SEA are not scope of the present study thus, for the purpose of the present dissertation the two instruments will be treated within the category of EAs.

2.2.1. Impact Assessment process

For a better comprehension of the IA process, and subsequently the EA process which will be further analyzed, the main steps are described below (Morgan, 2020; IAIA,1999):

- **Screening:** to determine whether a proposal should be subject to IA and, if so, at what level of detail.
- **Scoping:** to identify the issues and impacts that are likely to be important and to establish terms of reference.
- **Impact analysis:** to predict the effects of a proposal and evaluate their significance.
- **Mitigation:** to establish measures to prevent, reduce or compensate for impacts.
- **Reporting:** documentation of the information necessary for decision making.
- **Review:** to check the quality of the IA report.
- **Decision-making:** to approve (or reject) the proposal and set conditions Impact management – for the life of the project, and beyond.
- **Follow up:** to monitor the impacts of project implementation, audit management practices.
- **Public involvement:** to inform and consult with stakeholders (occur throughout the process).

2.3. SDGs and Impact Assessment

Impact assessment is widely seen and accepted as a "frontline" instrument for sustainable development long before the launch of SDGs as it can provide a platform for the development of increasingly sustainability-focused techniques or processes (Bisset 1996; Sadler, 1996, 1999). "By critically examining development actions while they are still being conceptualized, IA contributes to fostering a balanced and sustainable future, and to shaping, and making better, the society that future generations will be living in" (IAIA, 2012; p.1).

On the other hand, being the SDGs recognized as setting of the sustainability agenda, the use of IA as a major vehicle to facilitate the achievement of SDGs therefore seems logical (Morrison-Saunders et al., 2019).

IAIA has declared that: "For impact assessment (IA) in its multiple forms – such as EIA, SIA, SEA, HIA – the opportunities to play a crucial role in achieving the SDG targets are significantly greater than they were for the MDGs." (IAIA, 2019; p. 1) and in addition the UN Environment Program

(UNEP, 2018) underscores the importance of EA in achieving the 2030 Agenda for Sustainable Development.

Specifically in the case of SEA, and in the words of Del Campo et.al. (2020), a mutualistic relationship occurs between SEA and SDGs, benefiting both (Figure 2). SEA providing a systematic framework to incorporate SDGs into polices, plans and programmes, and SDGs with the potential to ratify SEA's contribution to sustainable development (Del Campo et.al,2020). In other words, “SEA can support the delivery of SDGs by integrating the relevant considerations pertaining to the goals through setting up, clarifying, or enhancing SDG-relevant targets to be achieved as part of development plans/ programmes. In turn, SDGs can better define the scope of sustainability in SEA (…) providing a more meaningful purpose to SEA (…) transforming what is currently an information tool into a more influential decision support tool.” (Del Campo et.al,2020; p.7).

Figure 2: Key benefits of a mutualistic relationship between Strategic Environment Assessment (SEA) and Sustainable Development Goals (SDGs). Source: Del Campo et. Al, 2020.

Hacking (2019) has also made a theoretical analysis focused on the distinguishing features of Sustainability Assessment (SA) that has revealed a potentially virtuous cycle between SDGs and SA, whereby the SDGs can inform the features of SA, and SA can support their attainment. The features analyzed by Hacking (2019) were: i) comprehensiveness; ii) integratedness; and iii) strategicness — the three dimensions of SA originally articulated by Hacking and Guthrie (2008) — and in table 1 the possibility of contribution of SDGs to each of these features are shown.

Table 1: SA Features analysis between SDGs and Sustainability Assessment. Source: retrieved from Hacking (2019)

SA features	SDGs & Sustainability Assessment
i) Comprehensiveness (sustainability 'themes' are covered)	The SDGs place strong emphasis on social themes, which are mostly still addressed less comprehensively in impact assessments than biophysical themes.
ii) Integratedness (the themes covered are connected and/or compared)	Since the SDGs, define the overall global destination, they do not provide guidance as how to manage trade-offs associated with individual projects; hence SA can play a crucial role by presenting the 'complete picture' of positive and negative impacts, and exploring interconnections.
iii) Strategicness (aspiration and connection to the wider context)	The SDGs can solidify and raise the ambition of SA by clarifying what is meant by sustainability and raising prominence.
	The SDGs can be used to generate objectives that can serve as assessment criteria in SA, either by being cascaded down via a tiered planning system or being used as a framework to inform their establishment.

Based on the same three dimensions of SA considered by Hacking (2019), the author Morrison-Saunders et al. (2019) developed an analysis with the aim of understanding how IA could be utilized as a major vehicle for facilitating achievement of the SDGs. As a conclusion , for the purpose of IA as a facilitator of SDGs achievement, "it is clear that at the very least, IA must become more comprehensive and integrated, such that the full suite of SDGs and the relationships between them (including potential tradeoffs) can be considered and debated in a transparent and inclusive way" (Morrison-Saunders et al., 2019; p.4).

Additionally, another issue pointed by Morrison-Saunders et al. (2019) was the need to IA be applied strategically. And to this effect, the integration of SDG target in will help "IA more objectives driven, rather than process- or impacts-oriented" (IAIA, 2019; p:2).

As can be seen, the importance of the use of SDGs in IA is broadly recognized. However, the explicitly use of any form of impact assessment in support of the SDGs is still not common

(Hacking, 2019) and in practice it appears to be done even with hesitation (Del Campo et. al, 2020).

The impact assessment community has been slow to adopt SDGs, although in other quarters, as the private sector and governments, they are receiving increasing attention (Hacking, 2019). The engagement with SDGs in IA practice has been shown to be limited beyond highlighting compliance or ensuring the compatibility of sustainability objectives at different policy levels (Del Campo et. al, 2020).

These shortcomings may be related to the lack of process and techniques that integrate SDGs and IA in a proper way (Hacking, 2019; Del Campo et. al, 2020), suggesting the need to clarify the IAs mandate for engagement with the SDGs, as well as provide training for a more proactive integration of the objectives and targets.

2.4. Measuring SDGs

There is not a defined methodology for integrating SDGs in an EA context. Therefore, for the development of a further integration framework and in the context of the scope of this study, which deals with practical cases of integration using SDGs measurement, it is important to have knowledge of the existing approaches of measuring SDGs.

The author Ravn Boess (2021, in press) have catalogued different approaches to SDG measurement used currently by reports companies and scientific articles. The results are summarized in table 2.

Table 2: Summary of measurement SDGs Approaches. Source: Ravn Boess (2021, in press)

Approach	Description
Determining direct & indirect influence	The breadth of influence that the object of assessment has on SDGs is shown by determining both direct and indirect influence. This is done for both positive and negative impacts.
Measuring fulfillment	The focus of assessment is determining whether the object of assessment fulfills the SDGs, according to a measurable threshold for fulfillment.
Measuring distance to fulfillment	The focus of assessment is determining how far the object of assessment is from fulfilling the SDGs, according to a measurable threshold for fulfillment.
Contributing to/delaying fulfillment	It is determined whether the object of assessment contributes positively towards eventually fulfilling the SDGs or delays the process, without establishing a measurable threshold for fulfillment.

Identifying progress/trends	The trend of the object of assessment in fulfilling SDGs is determined over a certain time span to indicate whether the trend is progressing or delayed.
Aligning/identifying overlap	An object of assessment is compared to the SDGs to determine overlap between the two entities.
Comparing performance/alignment	Two or more objects are assessed up against the SDGs (considering influence, fulfillment, alignment, etc.) and the results are then compared to one another.
Prioritizing SDGs/targets	SDGs or targets are prioritized in order to direct focus for future efforts.
Determining trade-offs/synergies	The interrelations within and between SDGs are identified as trade-offs and synergies.

2.5. Framework to analyse the level of integration of SDGs in environmental assessment

As previously addressed, the relevance of integrating the SDGs in EA is widely accepted, although the meaning of linking and integrating the two is still new and needs conceptual clarification. Thus, in the aim clarify the levels and underlying purposes of integration Lone Kørnøv et al. (2020) have proposed a conceptual framework with three overall categories and six levels of integration, which is illustrated in figure 3.

For the general comprehension of this this framework it is necessary to specify that the concept of integration used by the authors was “the action or process of combining two or more things in an effective way” and “into one” (Cambridge dictionary).

The three overall integration categories of the framework are:

1. Non – Integration: the use of the SDGs in this category within the EA is classified as passive and without any other use beyond mentioning the SDGs. Within this category there are two levels: washing and dropping.

2. Partial Integration: the use of SDGs into the EA in this category is classified as an active use, being part of the EA process. The use is limited to the existing EA framework and practice. Within this category there are two levels: scoping and testing.

3. Radical Integration: the use of SDGs into the EA in this category is classified as an active use, being part of the EA process. However, the use goes beyond existing EA frameworks

and provides new ways of approaching decision making. Within this category there are two levels: based and led.

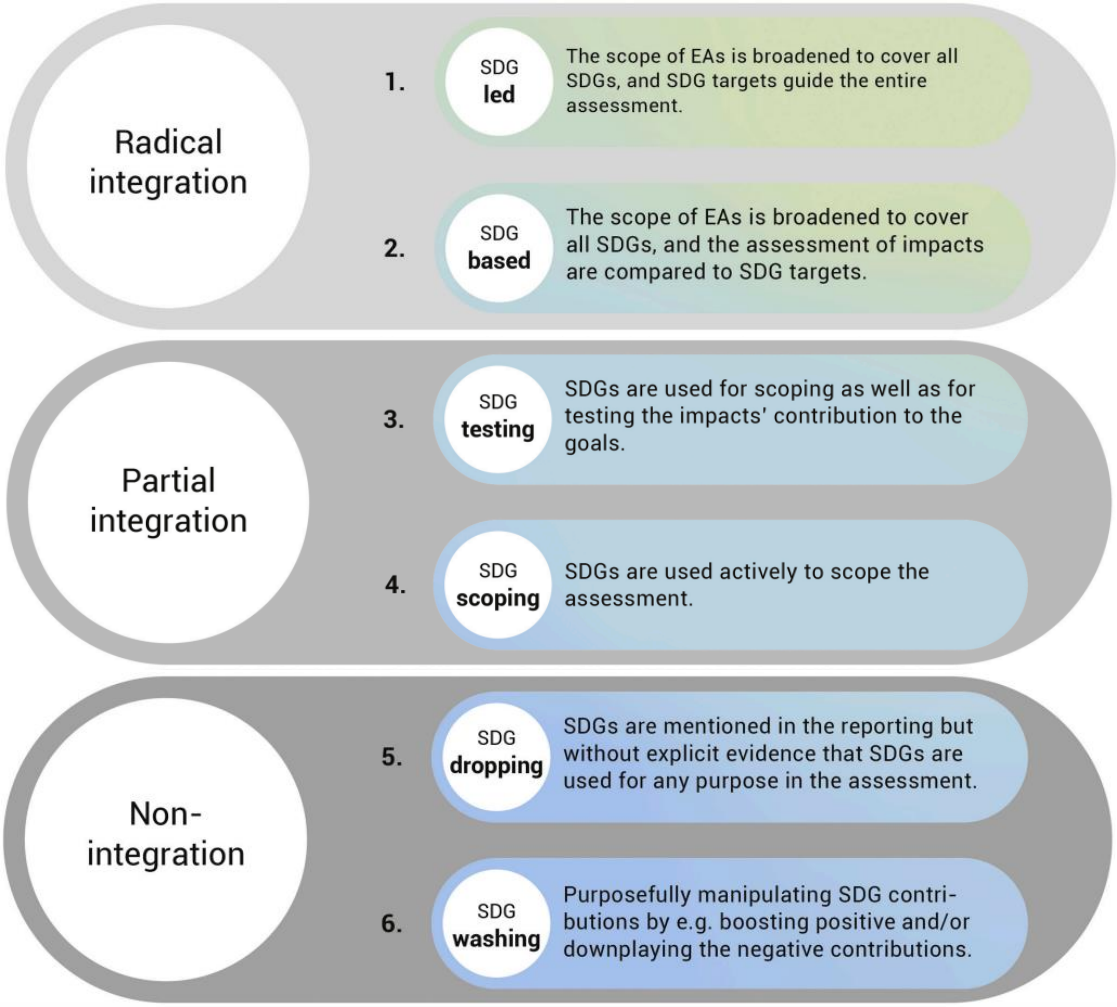

Figure 3: Conceptual Framework – The six levels of SDG and EA integration. (Lone Kørnøv, 2020)

By dividing the SDGs into three levels of integration, this framework represents a first step towards understanding the extent of SDG use within EAs. Being the lowest level of integration with the use of the SDGs without exercising any function in fact; the partial integration with the function of contributing either in the process of the EA scope or in the impact assessment; and finally, in the most radical form of integration, the function of a fully active use of the SDGs, being these integrated within the EA process.

2.5.1. The levels of SDG integration in EA reports

The author Ravn Boes et. al. (2021) has conducted research with practical EAs cases that already uses SDGs to understand the unfolding SDG functions in emerging practices. The research was based on Lone Kørnøv et al. (2020) framwerok to classify the level of integration of the SDGs

into the reports. In total, it has been reviewed a total of 45 cases of EIAs and SEAs reports from fifteen countries and five continents (fig. 4). It covers reports written in English, Danish, Swedish, and Norwegian.

The methodology used for the review and classification of the reports into one of the six-levels of integration was based entire on document text analysis without any further consultation, e.g., interviews with the report authors to understand unwritten intentions in the use of SDGs. This aspect combined with the lack of methodological transparency in the EAs reviewed made the determination of the function of the SDGs in the reports challenging.

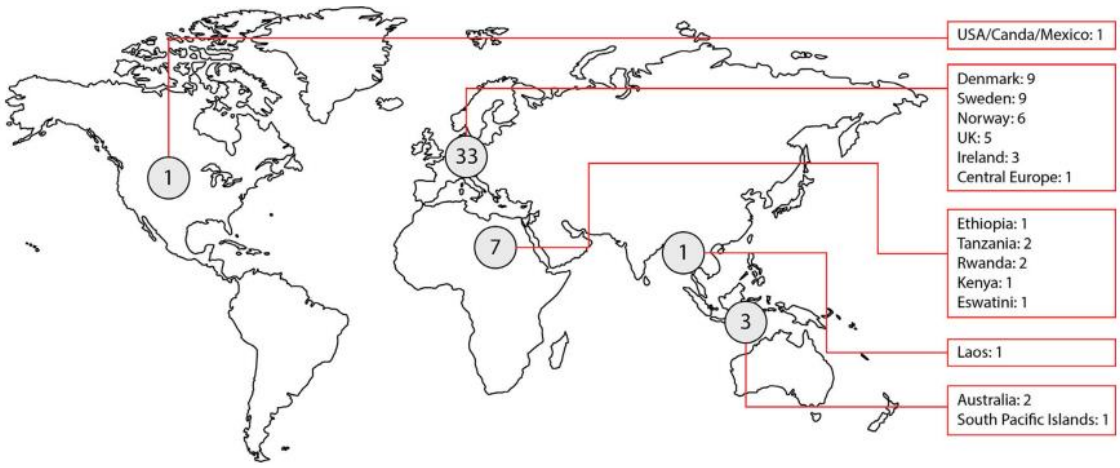

Figure 4: Geographic distribution of the EA reports reviewed by the study. Source: Ravn Bøss et al., 2021: p. 3.

From the six-level conceptual framework, only three levels were reflected in the reviewed EA reports by the study. Cases of SDG lead and based have not been found, and SDG washing were not considered as scope of the study. The main results of each of the levels are summarized in table 3.

The key conclusions of the study were that in majority the use of SDGs on the reports remains in a mention level without function, and when it exercises a function there is a considerable variation in how it is used in the assessment (Ravn Boes et. al., 2021).

In addition, Ravn Boes et. al. (2021) also concludes that *"Gathering cases from other avenues of practice, such as EA reports in other languages than the ones explored in this research, would also further help to minimize the gap between the framework and practice"* (Ravn Boes et. al.2021, p.8). The aim of the present dissertation, therefore, is explore EA report in languages that were not explored by Ravn Boes et. al. (2021) to clarify the meaning of linking and integrating EAs and SDGs through the understanding of how it's being done in practical cases.

Table 3: Summary of Ravn Boes et. al. (2021) study results. Source: adapted from Ravn Boes et. al. (2021)

Integration Level	Main outcomes	Total of cases
SDG Dropping	SDGS are considered within either the introduction to the project/plan or when outlining relevant policies and programmes (23/25 cases)	25
	Cases which the SDGs are recognized a global strategy that can be considered in project and plan development, but the applicability is not further elaborated	
	Cases which refer to other plans or strategies as a reference for how the plan correlates to the SDGs	
SDG Scoping	Cases which assess significant impacts that sets the frame for what SDGs are relevant, although the factors that go into using the SDGs are thereafter quite nuanced	9
	Scoping reports highlight the SDGs that would be relevant to address in the upcoming assessment report (5 cases)	
	Cases which SDGs are discussed in the context of relevant policies and programmes to consider in the EA	
	Cases which SDGs are mentioned in the empirical scoping procedure - linking SDGs to EA topics or integrating them into stakeholder dialogues (6 cases)	
SDG testing	The SDG testing is communicated in different parts of the EA reports: alongside the assessment (5/11), describe positive or negative contribution in a section outlining relevant policies and programmes (2/11), assess SDGs in a separate sustainability chapter (3/11), uses SDGs in developing mitigation measures (1/11)	11
	All reports exhibiting SDG testing describe those SDGs to which the project/plan is expected to contribute positively. And 6 cases include negative evaluations	
	Evaluating the degree of a certain impact (for instance how positive or negative an impact is) is not common (1/11). And it is not supported by quantitative measures.	
	No cases consider the interrelations between SDGs, including synergies or tradeoffs in efforts to contribute to SDGs	
	Variation in how results are presented throughout the reports	

3. Methodology

The present chapter describes the methodology to gather the EAs reports used as practical cases of study and define what is the role of SDGs in each of them. The results of the analysis are compared with the results of the study conducted by the author Ravn Boes et. al. (2021).

The methodology has been framed in accordance to the methodology presented by Ravn Boes et. al. (2021), in order to enable the linking between the outcomes.

In addition, this study is based on a document text analysis with the purpose of understand the function of SDGs into the scoping and assessment report, thereby there was no external consultation with plan/project stakeholders to understand their intention in the SDGs use. The cases reviewed may contain unrecorded SDGs functions on the documents texts and may not be identified by the present studied as contents that are beyond what is document are not part of the study scope.

3.1. Gathering review material

A systematic review on web for EA reports which integrates SDGs was conducted to gather review material to the study. The search was conducted in April 2021 and yielded a total of 34 EA reports for further analysis.

The source of the data collection was Google, as it is a global public domain search engine, enabling the collection of reports from different countries and languages, and that are openly available.

The input for the systematic review was a keyword string in three main languages: Portuguese; Spanish and French; due to the purpose of review EAs reports in other languages than the reviewed by Ravn Boes et. al. (2021). In all languages the keywords used were related to "Sustainable Development Goals" and "Environmental Impact Assessment" or "Strategic Environmental Assessment" considering possible written and languages variations, combinations and acronyms, there were no restrictions to neither plan nor project level reports. The equivalence of these keywords with the respective translations into the languages researched in this dissertation are identified in table 4.
In total 19 keyword phrases were used in the search and are available in Annex 1. Each keyword phrase was individually run through the public search domain. It covered scoping and assessment reports.

Although the searches yielded many results, in some cases with thousands and even millions result for a keyword phase, not all results were EA reports – less than 0,1% - were useful. Thus, to increase the efficiency of the search as most of the EA reports found were large documents in the format *pdf,* in some searches the results were filtered to just show *pdf* files – indicated in the Annex 1. In addition, the number of the search results differs each time the keyword phases

search is conducted and therefore, the “Number of results” indicated in Annex 1 is a total recorded when the search was initially conducted.

Table 4: Equivalence of the keywords with the respective translations into the languages researched. Source: author

English	Portuguese	Spanish	French
Sustainable Development Goals	Objetivos de Desenvolvimento Sustentável	Objetivos del Desarrollo Sostenible	Objectifs de Développement Durable
Environmental Impact Assessment	Avaliação de Impacto Ambiental	Evaluación de Impacto Ambiental	Étude d'impact Environnemental
Strategic Environmental Assessment	Avaliação Ambiental Estratégica	Evaluación Ambiental Estratégica	Évaluation Environnementale Stratégique

Lastly, the aim of the systematic review was not about finding every case of SDG use into EA in a manner that the study was conduct with base in a sample of reports, analyzing their tendencies and patterns.

Initially, the systematic review has yielded a total of 37 reports, however 3 reports were excluded since the sustainable development goals referred were not the SDGs from the 2030 Agenda. The resulting 34 EA reports were classified by report type, including 2 scoping reports, 15 EIAs and 17 SEAs (table 5). Four EIA reports are Environment Social Impact Assessment and one of the SEA reports is a Strategic Environmental Social Assessment. One EIA and one SEA are simplified EAs reports, which are simplified studies that arose from the need to establish a faster procedure for the evaluation of environmental impact enterprises of small size. The reports were also classified by the scope of application, whether elaborated for project or plan (shown in table 5 and detailed in Annex 2). The classification was made based on how the report referred to the proposed action. In total, 15 reports were related to projects and 19 were related plans.

Table 5: Classification of the EAs reports. Source: author

	Scoping	EIA	SEA	Total
Project	0	13	2	**15**
Plan, Policies or Programmes	2	2	17	**19**
Total	**2**	**15**	**17**	**34**

The geographic distribution of the reports gathered is shown in figure 5. The larger sample of the report is from Europe with a total of 14 reports, followed by South America which have 10. Almost one third of the EAs analyzed are from Spain, a total of 10 reports.

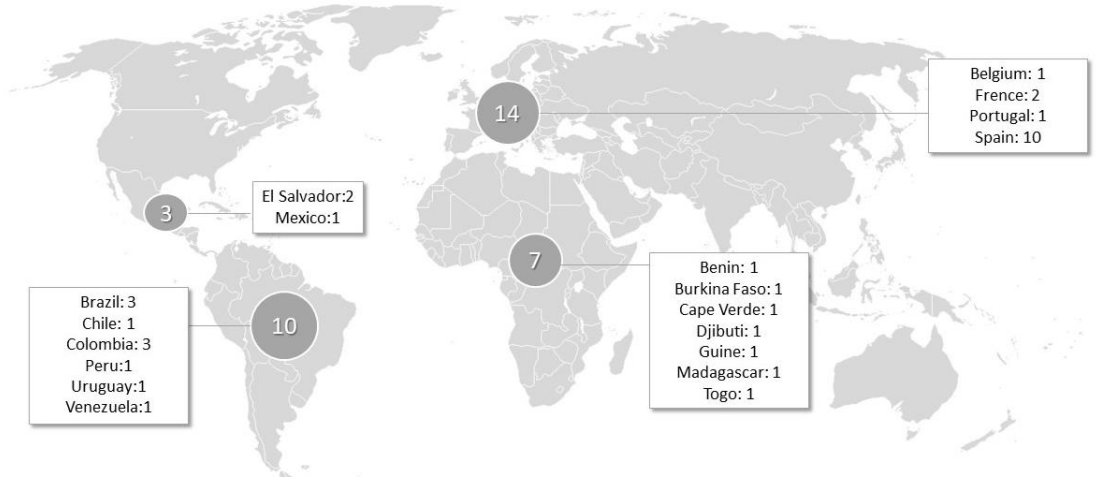

Figure 5: EAs geographical distribution. Source: author

And regarding the year of publication of the reports reviewed most of the reports were published in 2020 and 2019, respectively a total of 14 and 11 (figure 6).

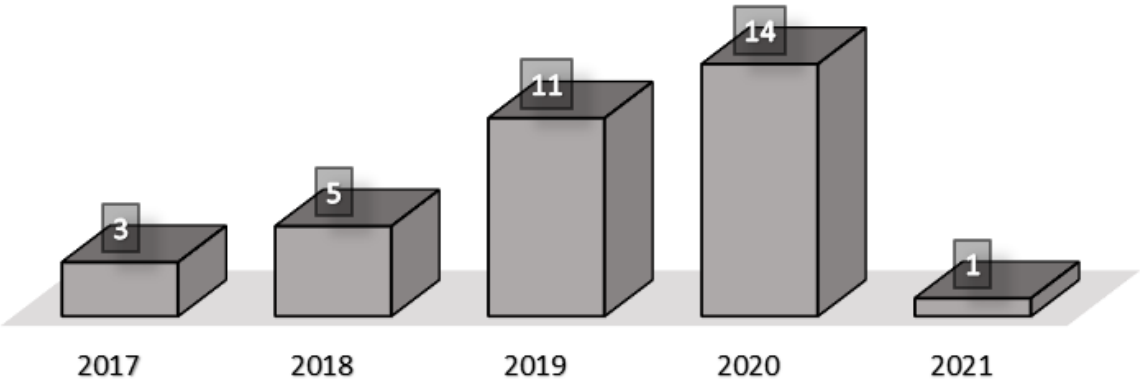

Figure 6: Year of publication of the analyzed documents. Source: author

3.2. Analysis of the SDGs integration into EAs

The analysis of each individual report is centered in the understanding of the SDGs role in the EAs. This was done by searching for “SDGs”, “Sustainable Development Goal” and “2030 Agenda” in the corresponding languages throughout the text reports and after the identification of the position of the SDGs mentions, a review was made based on three main aspects:

1. **Initial characterization of the report:** identification of the level of SDG use – goal, target, indicator –, number of times mentioned, and if SDGs interlinkage occurs by analyzing if the use of SDGs in individual goal-levels is done in an integrated

manner. The aim is to have an overview of the SDGs use, mainly in terms of the use as a whole policy, individual goals and/or integrated manner.

2. **Function interpretation**: classification of the SDGs function in the report based on the integration levels framework from Kørnøv et al. (2020). The aim is to understand the level of integration of the SDGs into the EA. The framework used is described in section 3.2.1. and the classification was made according to the analysis of the contextual conditions.
3. **Continuity of SDGs use throughout the report:** identification of the type of section in the report where the SDGs are mentioned with the aim to understand the continuity of its use and if it occurred in a punctual, structuring, or systematic manner. The classification was made using the definitions described in section 3.2.2.

Each of these parts analyses a different aspect of the use of SDGs in EAs to a further conclusion of the SDGs role. The outcomes of this analysis were compared with the achievements of Ravn Boes et. al. (2021) results, present in section 5.3.

It is important to highlight that the use of SDGs into EAs isn't procedurally defined by EA legislation, meaning that the SDG role in the report is up to interpretation of the present author in such a manner that this interpretation could differ from the role primarily through by the EA authors (Ravn Boes et. al.,2021).

3.2.1. Level of integration framework

The classification of the SDGs function in the EAs reports was made by the conceptual framework of Kørnøv et al. (2020), which is descripted in section 2.5., and has as objective to clarify the levels and underlying purposes of SDGs integration into EAs.

Then, considering the three levels of integration, the use of SDGs into the EAs cases were classified into the following levels:

1. **SDG Dropping:** The SDGs are mentioned in the text report, but without an explicit function.
2. **SDG Scoping:** The SDGs are used to scope the assessment such as assess relevance of alternatives and impact categories.
3. **SDG Testing:** The SDGs are used as a framework to evaluate the impacts contributions to the goals.
4. **SDG Based:** The SDGs broaden the conventional EA scope to provide an overview on how SDGs can be achieved, constituting a decision-support tool
5. **SDG Led**: The SDGs frame the EA around the concept of absolute sustainability by setting targets or benchmarks for the impacts.

The sixth level, SDG washing, was not considered to be within the scope of this research, since it includes a manipulation in the use of SDGs to ignore major negative impacts and/or exaggerated positive impact. This is impossible to conclude if the search was done only with written reports without external information as interviews with involved actors.

3.2.2. Section type in EAs

In the aim to understand if there is a continuity in the SDG use in the EAs report or if its mention occurs as a punctual manner, it was identified where in the reports occurred the mention of the SDGs according to classification by the type of section in which the SDGs appeared.

Since the research is based on reports from different countries and divergences in EAs nomenclature cold occur, the type of section the SDGs could be found were standardized and defined by the following framework shown in table 6.

An example of the divergence in nomenclatures is in the section defined as “Reference to legal framework, plans and programmes” which is defined by the author as the section of the report which address plans, programs and occasionally legislation relevant to the plan/project. Several variations of chapter names have been found that fit into this category, such as "Regulatory Framework", "Environmental and Sustainability Objectives in the European and Andalusian Spheres, and their Integration into the Plan", and "Legislative and Constitutional Aspects", but all have been classified as section type "Reference to legal framework, plans and programmes" as the chapter's approach, despite the different names, refers to plans and/or projects and/or legislation

The type of sections that the SDGs appear for each report are then identify. In a same report the SDGs could be mentioned in more than one type of section.

Table 6: Type of section where SDGs are found. Source: author

Type Section/Where SDGs are mentioned in the reports	Definition of the section/classification
Introduction	Introduction about the plan/project context which is going to be assessed; explanation of the main objectives and context of the IA.
Reference to legal framework, plans and programmes	Plans, programs and occasionally legislation relevant to the plan/project are described and in some cases their suitability for the plan/project is analyzed.
Diagnostic of the Environment and Social Parameters	In the diagnostic the main environment and social aspects, such as water availability, soil, climate change, gender equality, etc., are characterized.

Alternatives/Impact Assessment	Section where the effects of a proposal are predicted and evaluate their significance. The possible alternatives for the project/plan could be also assessed according to defined criteria.
Mitigation and Monitoring Plan	Plan to implement measures to prevent, reduce or compensate for impacts. Plan to monitor the impacts of project implementation (normally monitoring plan is described a part of the mitigation plan)
SDG's Chapter	The SDG's have a specific section in the EA where they are addressed.
Methodology	The EA methodology is explained and described.
Conclusion	Main points and outcomes of EA are described.
Annex	Annex of the report.

4. Results

The chapter provides an overview of the core function of the SDGs within the reviewed EAs. The SDGs function was classified according to the framework proposed by Lone Kørnøv et al. (2020), described in section 2.5 of the present dissertation. Details of each report are detailed in this section, such as excerpts parts of the reports where the SDGs are used.

During the review of the reports were identified instances within EAs of the same integration level, thus, in order to simplify the presentation of the results, in the subchapters the reporting was done following the identified instances. Subsequently, in the discussion chapter, the main outcomes of this classification were compared if the outcomes of Ravn Boes et. al. (2021).

4.1. The SDG Function

The reports cases are classified across SDG dropping, SDG scoping, SDG testing, and SDG bases as shown in table 7. No reports were found of SDG led integration cases.

The majority of the EA reports are classified or as “SDG Dropping” function (15 cases) which represents a non-integration classification, or as “SDG Scoping” function (15 cases) which is the weakest form of integration when SDGs have some function within an EA. The results are detailed in the following sections with texts examples, taken from the reports.

4.1.1. SDG-Dropping

The SDG-Dropping function is the most basic SDG integration into EA reports, in which the SDGs are briefly mentioned without an explicit purpose in shaping the EA process. Of the cases reviewed 15 were classified as SDG dropping, which can be distribute in 3 main instances described below.

1) Case where the project/plan is presented as a contributor to the achievement of and/or in alignment with the SDG (Republique de Djibouti, 2019; AETS Consortium, 2019; Amaranto et.al, 2018; AEE, 2019; DNG GL, 2019)

The first instance of SDG-dropping consists of cases where the project/plan assessed is introduced as a contributor to the achievement of and//or in alignment with SDGs. This is demonstrated through the ESIA for the health sector performance improvement project of the Government of Djibouti where two SDGs goals are mentioned in the context and justification of the project as an indicative that the purpose of the project is in line with these goals. The occurrence is transcript below:

> *“The Government of Djibouti, through the Ministry of Health (the executing agency for this project), **intends through this project to improve the performance of the health sector in order to align with the Sustainable Development Goals (SDGs) 2.** Eradicate*

hunger, achieve food security, improve nutrition and promote sustainable agriculture ***and 3.*** *Empower people to lead healthy lives and promote well-being for all people at all ages"* (translated from Republique de Djibouti, 2019: p. 18).

Table 7: A categorization of how the 34 EA reports is distributed across the six-level framework . Source: author

#	EA Reports	Integration level				
		SDG Dropping	SDG Scoping	SDG testing	SDG based	SDG Led
1	Travaux de construction/ rehabilitation du Lycee agricole Kika (Republique du Benin, 2020)					
2	Programme d'Appui à la Transformation de l'Agriculture Guinéenne/Volet Entreprenariat Agricole des Jeunes (Souleymane BALDE, 2018)					
3	Projet d'installation d'une centrale solaire de 30 mw dans le village de blitta losso (DNG GL, 2019)					
4	Projet d'Amélioration de la Performance du Secteur de la Santé (PAPSS) (Republique de Djibouti, 2019)					
5	Projet AEP Antananarivo (AETS Consortium, 2019)					
6	Projeto grota do Cirilo – pegmatito xuxa cava sul ampliação da cava norte (Vetor Soluções Ambientais,2020)					
7	Plan Control Territorial. Fase II (Gobierno de El Salvador,2019)					
8	Proyecto "Expansión del Acueducto Veredal Salibarba" (Amaranto et.al, 2018)					
9	Parque Eólico Valdejalón II (Linum,2020)					
10	Proyecto "Parque Eólico Muyu Y Su Línea De Transmisión" (Walsh Perú, 2020)					
11	Parque Eólico De Almonacid Del Marquesado (Salman, Gandárov Shadízhev 2020)					
12	Fábrica De Celulosa Y Puerto En Concepción (Pöyry Tecnologia Ltda.,2020)					
13	"Centro De Desarrollo De Manufactura Avanzada Para La Industria Electrónica Del Estado De Jalisco" (mLsambiental, 2017)					
14	Alternativa Ruta No 38-Tramo Variante Costa Azul-La Cumbre (Caminos de las Sierras, 2021)					
15	Complexo Eólico Delta 10 (OMEGA energia, 2019)					
16	Estudo De Avaliação Ambiental E Social Estratégica Do Setor Do Turismo Em Cabo Verde (Mundi Consulting et. al., 2018)					
17	Évaluation Environnementale Stratégique Du Plan D'aménagement Des Espaces Marins (Arcadis, 2018)					
18	Plan Climat Pays Basque (Communauté Pays Basque, 2020)					
19	Projet D'aménagement De La Centralité De Tanghin À Ouagadougou (Ageim ingénieurs, 2019)					
20	Plan Climat Air Énergie Territorial De Plaine Commune 2020-2026 (Plainne Commune, 2020)					
21	Plan Nacional Integrado Energía Y Clima 2021-2030 De España (AEE, 2019)					
22	Plan Andaluz De Acción Por El Clima (Junta de Andalucía, 2020a)					
23	"Modificaciones Puntuales Al Plan Regulador Comunal De Valdivia" (Municipalidad Valdivia, 2019)					
24	Redacción Del Plan De Residuos No Peligrosos De La Provincia De Sevilla (IDOM, 2020)					
25	Plan De Transporte Metropolitano Del Campo De Gibraltar. Plan De Movilidad Sostenible. (Junta de Andalucía, 2020b)					
26	Plan De Transporte Metropolitano Del Área De Málaga.(Junta de Andalucía, 2020c)					
27	Parque Natural Montes De Málaga Y Su Área De Influencia Socioeconómica .(Junta de Andalucía, 2020d)					
28	Transición Energética En Yucatán (Díaz, 2018)					
29	Plan Sectorial De La Zca Bañados Del Arroyo Pando (PlanProtecto Consultores, 2017)					
30	"Modificación Del Plan Regulador De La Comuna De Río Bueno" (Rio Bueno Municipalidad, 2019)					
31	Los Escenarios De Expansión De Transporte De Hidrocarburos (Unión Temporal,2017)					
32	Plan Parcial Del Sector Sunpi-I "Los Almendros" (PROYMASA, 2019)					
33	Avaliação Ambiental Estratégica Do Município De Belo Horizonte (Ministério do Turismo, 2020)					
34	Alterações Ao Plano Estratégico De Desenvolvimento Da Apdl (2017-2026) E Suas Unidades De Negócio (Partidario et al, 2020)					
	Total	15	15	3	1	0

The mention of the SDGs is in the introduction of the ESIA report and only occurs in the excerpt presented. The SDGs goals mentioned are those most related to health-sector, which are the scope of the project, although other goals could be also related to health-sector due to the SDGs interlinkages.

The first consideration, therefore, is that an explicit justification is not present in the choice of referencing only two of the seventeen goals, disregarding the indivisibility feature of SDGs. In addition, the reason for the dropping function classification is that the SDGs are mentioned as a global strategy considered in the context of the project, but its applicability is not further elaborated.

A similar case happens in the EIA report of the aqueduct expansion project in Colombia where the achievement of the SDG 1 and 6 are indicated as an implication of the development of the project as follows:

> *"Now, in terms of development,* ***the expansion of the Salibarba aqueduct implies progress in relation to the achievement of the SDGs.1*** *Thus, goal one, which proposes the end of poverty and includes access to basic services among its targets, benefits from this project,* ***as does goal six,*** *which refers to water sanitation,* ***and goal ten,*** *which refers to the reduction of inequality gaps. This is fundamental to make evident the relationship between the aqueduct and the progress of the population." (Translated from Amaranto et.al, 2018)*

This case also occurs in the introduction of the EIA and the contribution to the achievement of the SDGs are associate with evidence of a link between the aqueduct project and the progress of the population. However, more details on how this contribution of the SDGs would be measured, the magnitude of the positive impacts on SDG goals scope and the criteria for choosing only two SDGs, are neither transparent nor in-depth throughout the report.

Similarly, in the EIA for a solar plant project of the village of Blitta Losso in Togo the mentioned of the SDG 7 is made as an alignment with an ambitious energy access policy of the Togolese government. It aims to achieve a 90% electricity access rate in the country by 2028 and reach 50% of renewable energy matrix by 2030. Therefore, the promotion of the project is related to the government signature on several international commitments which have led to these ambitious energy targets and as a result the achievement of the SDG 7, energy goal (DNG GL, 2019).

In the SEA for the Spain's Integrated National Energy and Climate Plan 2021-2030 the SDGs are only mentioned in the annex, "*The commitments and best practice recommendations of the wind energy sector for the environmental sustainability of its products and facilities*", in reference to a commitment by the "Asociación Empresarial Eólica" (AEE), which is the responsible for the SEA:

> ***"AEE companies unconditionally support the United Nations Sustainable Development Goals (SDGs)*** *adopted in 2015. Of the 17 SDGs, there are 6 in which the*

Spanish wind energy sector wants to contribute substantially to their fulfilment: Climate, Health, Water, Clean Energy, Employment and Sustainable Industry." (Translated from AEE, 2019).

As in the others EAs classified as dropping, despite the commitment to the SDGs no measuring is made to indicate its fulfillment. In addition, in this particular case the commitment to SDGs is reference as "unconditionally support" meanwhile its mention only occurs once in the annex of the report.

Lastly, in the ESIA for the water supply project at Grand Tana, the SDGs appears in the context of the necessity of the project justified by a scenario in which, without actions on water supply, the achievement of the SDGs would be affected:

> *"Commercial losses are estimated at 20 to 23%, in particular due to unpaid invoices, illegal connections, defective meters. Added to these problems are insufficient pressure and water shortage, which, in the more distant areas of the Mandroseza Station, have become chronic. This results in customer dissatisfaction, slowdown in sales and impossibility of development which, in the long term,* ***make it difficult to achieve the Sustainable Development Goals (SDGs)."*** *(Translated from AETS Consortium, 2019: p. 12).*

Different from the other cases, there is no specification of particular SDGs and the project itself is not put as a directly contributor to the achievement of the SDGs. The context indicates that if the current scenario maintains the achievement SDGs will be hampered; therefore, being the project a contributor to the problem of "water shortage" this suggest that the implementation of the project will then facilitate the achievement of the SDGs. As in the other cases, the applicability of the SDGs is not further explored throughout the report.

Based on these cases, it is worth noting that although the achievement/fulfillment of SDGs are mentioned, there are no advances on how this will occur and no indicative of measuring the SDGs achievement.

2) Case in which the SDGs are considered within the legal frameworks, plans and programs in the project/plan context (*Caminos de las Sierras, 2021; Ageim ingénieurs, 2019; AETS Consortium, 2019)*

In this instance the mention to SDGs occurred in the review of main policies and programmes of the context of the project/plan assessed. In these cases, the SDGs are mainly mentioned to contextualize the frameworks, plans and programs at a global level not being further explored along the report.

An example is the SEA for the Tanghin Centrality Development project in Burkina Faso/Africa where the SDGs are mentioned within the chapter "Political, Legal and Institutional Framework".

In this chapter, the relevant frameworks for the land, natural resources and environment management in Burkina Faso are referenced and described.

The SDGs, therefore, are mentioned in the contextualization of the global scenario of those same topics, as indicated in in the excerpt below:

> *"From 25 to 27 September 2015, at the United Nations Headquarters in New York, the Member Countries adopted a new World Programme on* ***Sustainable Development, articulated around 17 goals including****, among others:*
>
> *- eliminate poverty in all its forms;*
>
> *- enable all to live in good health and promote the well-being of all;*
>
> *- achieve gender equality and empower all women and girls;*
>
> *- guarantee access to water and sanitation for all and ensure sustainable water resource management;*
>
> *- promote sustained, shared and sustainable economic growth, full and productive employment and decent work for all;*
>
> *- take urgent action to combat climate change and its repercussions;*
>
> *- preserve and restore terrestrial ecosystems" (Ageim ingénieurs, 2019; p. 22).*

As can be seen only a brief introduction of the SDG context is given, and subsequently seven SDGs goals are emphasized. Nevertheless, none explanation is given on the relationship between the goals mentioned and the project and neither nor whether and how the project will contribute to the achievement of the SDGs.

In the case of the EIA report of a new road in Spain the SDGs are mentioned in the section that lists *"(...) the international treaties to which the country has adhered, and which are in force: (…)* ***Paris Agreement, the 2030 Agenda SDGs for Sustainable Development****" (translated from Caminos de las Sierras, 2021; p. 13-14).* This section is inside a review *of "environmental and road regulations of relevance to the project, at the international, national, provincial and municipal the project, in the area of influence." (Translated from Caminos de las Sierras, 2021; p. 13).*

However, once again, the SDGs are not further mentioned or used with an inhered function in the assessment, being limited to mention in the international treaties adhered, even despite it is described with reference to climate change consequences as "*(…) basis for sustainable, low-carbon and resilient sustainable development, low greenhouse gas emissions and resilient to changing climatic conditions." (Translated from Caminos de las Sierras, 2021; p. 13-14).*

In the ESIA for the water supply project of Grand Tana, which was already mentioned in the case where the project/plan is presented as a contributor to the achievement of and/or in alignment with the SDGs. The SDGs are mentioned in two sections, in the introduction and in the chapter

of “Institutional and regulatory framework of the project”. In the introduction the project was present as a way to achieve the SDGs, which has already been described. In the second moment, in the institutional and regulatory framework, the SDGs/Agenda 2030 are mentioned as having been considered in the international agreement considered for the project:

> *“**The international agreements to be considered for the project** are those relating to water management, environmental protection and working conditions (…). **The international agreements and conventions to which Madagascar has adhered** in relation to these issues are as follows: (..) **Agenda 2030 for Sustainable Development** adopted in New York on 25 September 2015 (...)” translated from AETS Consortium, 2019: p. 17).*

The explanation of how the international agreement have been considered into the scope of the project and assessment and what is the extend of the influence of the 2030 Agenda on the project are not developed throughout the report.

2i) Case which refers to other plans, policies or frameworks as a reference for how they correlate to the SDGs (Republique du Benin, 2020; Souleymane BALDE, 2018; DNG GL, 2019; Pöyry Tecnologia Ltda.,2020; OMEGA energia, 2019; Díaz, 2018; Ministério do Turismo, 2020).

This is a sub-section of the previous because the mention of the SDG also occurs in the report chapter of reference to plans, policies or frameworks in the context of the evaluated project/plan. The particularity is that, unlike the cases already described where the SDGs are reference as one of the policies in this chapter, in the following cases the SDGs are mentioned within the scope of some legal framework, plans and programs reviewed, i.e., it is not a direct policy considered but it is referenced.

One example is the case of the ESIA for the construction/rehabilitation of agricultural high school in Benin where the SDGs are mentioned just once under the responsibilities of the Ministry of Planning and Development involved in the process of implementation of the program. Among the many responsibilities of the Ministry, one is to “*…ensure the implementation and monitoring of Government policies, actions and decisions **aimed at achieving (…) Sustainable Development Goals (SDGs)…”** (translation of Republique du Benin, 2020: p. 151).*

The Ministry of Planning and Development is one of the entities responsible to the project’s execution and although, as described above, it aims to achieve the SDGs, there is no explicit mentioned to the SDGs in the shaping of the project process.

Similarly, in EIA of the PARACEL project, a pulp mill in Paraguay, the SDGs are only mentioned within one of the principles of the country's environmental legislation:

> *“**Solidarity: This principle is** based on the Modern State, which considers the environmental legal good to be located in the social sphere; in other words, the necessary coordination of interests and legal spheres is required, **coordination in accordance with***

> ***the Sustainable Development Goals (SDGs).*** *The principle of solidarity has far-reaching implications, as it combines an intergenerational and an intragenerational dimension." (Translated from Pöyry Tecnologia Ltda.,2020; p. 139)."*

The principles of the country's environmental legislation are defined as creator of the Paraguayan environmental normative framework *"(...) which are the guides for the interpretation and application of the laws for the PARACEL project (…)" (Pöyry Tecnologia Ltda.,2020; p. 139).* However, despite the influence on the environmental framework which directly shaped the project and the EIA scope, the influence of the SDGs is not deepened beyond the brief mention within one of the many principles on which the law is based; so that it is not possible to measure how much of the scope of the project is molded by the SDGs.

In these two cases, the SDGs are mentioned within the national environmental framework, despite the fact that this indicate a potential in the EA national legislation, the SDGs do not have an inherent function in the assessment reports and therefore their influence on the EA procedure is inconclusive.

In the EIA for a wind power complex in the state of Piaui, Brazil, the SDGs are mentioned as one of the purposes of the Northeast Regional Development Plan (PRDNE): "***integration of the regional economy with the socio-technical standards proposed by the Sustainable Development Goals*** *(solar energy, wind energy, water reuse, reforestation reforestation, biodiversity, etc.)."* (Translated from *OMEGA energia, 2019; p. 131).* This excerpt was retrieved from the "Colocalised Plans, Programmes and Projects" EIA chapter which the object is to evaluate the relationship of the proposed project with other projects and compatibility with public policies and guidelines that have a functional interface with the project. The conclusion in relation to PRDNE was that the project is in line and consequently with the SDGs that the policy is based on:

> *"**The construction of a wind power complex in the state of Piauí is also in line with** the PRDNE and with the FDNE that among several objectives aims to **integrate the regional economy to the socio-technical standards proposed by the Sustainable Development Goals (SDGs)** (solar energy, wind energy, water reuse, reforestation, biodiversity, etc.)." (Translated from OMEGA energia, 2019; p. 144).*

In summary, a regional policy, which includes in it aims the achievement of SDGs, is considered in line with the project. The alignment of the project with the SDGs therefore, despite not explicit, can be concluded by extension.

Following this trend, the ESIA for the Guinea Agricultural Transformation Support Program only mention to SDGs is on the international agendas with which the National Economic and Social Development Plan is aligned. And in the EIA for solar plant in a village of Togo, the project is described as an outcome of the National Development Plan (NDP) that "**is based on (…) the 2030 Agenda…**" (DNG GL, 2019: p. 34).

It is important to highlight, that in neither of these cases there is a specification of which SDGs-goal the plans or frameworks are based on, transmitting the idea that they cover the whole SDG policy. Already in the SEA for the tourism sector of the Brazilian municipality, Belo Horizonte, the SDGs area mentioned within the description of municipal policies and management and in the case of the Urban Agenda of the municipality which is descripted as having its principles oriented to the SDG 11:

> *"**The Municipality's commitment to the NAU (New Urban Agenda)** includes consideration of agreements and pacts linked to it for the development of the urban growth and land use policy, with emphasis on the **principles oriented by the Sustainable Development Goal - ODS-11**" (Translated from Ministério do Turismo, 2020; p. 355).*

The SDGs are also highlighted as an international agreement to which Belo Horizonte is committed and thus the commitment of the Strategic Plan of the Municipality to the SDGs. In accordance with the other cases, the use of SDGs was classified as dropping because although they have a directive role in the municipal management mechanisms which are commitments to the achievement of the goal, they do not have an inherent function in the assessment reports.

In addition, it is important to mention that the focus of the review of the EA of the plans and policies stayed in the municipal and tourism-related level. This note extends to the other cases in which legal frameworks, plans and programs reviewed and reference is limited to a national, regional, and local overview.

At last, in the scooping SEA report of the Energy Transition in Yucatan, Mexico the only mention to SDGs occurs in the explanation of the Protocol on SEA with emphasis on the "*fulfilment of the 17 Goals of the 2030 Agenda for Sustainable Development" (Translated from Díaz, 2018; p. 4).* This Protocol is an international agreement that establishes legal obligations and a framework procedure for the implementation of SEA in countries that are parties to it and define the SEA as a tool to assist the Parties in achieving Sustainable Development Goals (UNECE, 2016).

The reference to the Protocol was made in the context of SEA mechanism description as a *"recent mechanism, there is still a dynamic process of establishing the legal framework for SEA at national and international level" (Translated from Díaz, 2018; p. 4).* The Protocol on SEA is recognized therefore as a SEA framework in the international level, and it's used as a main guiding framework to the scope of the EA. The integration of SDGs, however, is not verified and no further mention is made through the scoping.

2ii) Case which the SDGs are not considered relevant to be within the legal frameworks, plans and programs in the project/plan context (Municipalidad Valdivia, 2019)

The SEA of the "Modifications on Valdivia Communal Regulatory Plan" is an exception to the previous cases because the SDGs were discarded as a strategic reference framework for the plan.

In a chapter of the SEA, named "Strategic Reference Framework", which national, regional and communal sustainable development policies and its relation to the plan were analyzed, being mentioned how they framed the plan as shown in an example of the Nacional Policy Urban Development (table 8).

Table 8: Example of Instrument and their impacts on the amendments proposed in the SEA. Source: Municipalidad Valdivia, 2019

Nombre: Política Nacional de Desarrollo Urbano (2014)		
Objetivo	Lineamiento o meta	Relación con el IPT
Generar condiciones para una mejor calidad de vida para las personas entendida no solo de la disponibilidad de bienes o condiciones objetivas sino también en términos subjetivos asociado a la dimensión una y relación entre personas.	Los ámbitos temáticos que plantea son: **Integración social**: su objetivo central corresponde a velar porque nuestras ciudades sean lugares inclusivos, donde las personas	A partir de los ámbitos temáticos expuestos en la política se establecen objetivos específicos. A continuación se detallan los que tienen directa relación con las modificaciones puntuales objetos de este estudio.

The SDGs are not included in these polices which framed the plan and the explanation for this is illustrated by table 9 retrieved from the section "Records obtained from the Public Services query", which are in the annexes of the report.

Table 9: Query to determine strategic reference framework for the plan. Source: Municipalidad Valdivia, 2019

Políticas medio ambientales y de sustentabilidad que pudieran incidir en el Instrumento: En el punto 2 (página 6) se sugiere incorporar como título el concepto "Marco de Referencia Estratégico", considerando los siguientes instrumentos de gestión y planificación para el análisis en el Informe Ambiental: - Objetivos de Desarrollo Sostenible de las Naciones Unidas (PNUD y Agenda 2030 sobre el Desarrollo Sostenible). - Política Energética de Chile 2050. - Guía de Orientación para los Estudios de Franjas de Transmisión Eléctrica. - Estrategia Regional para la Conservación de la Biodiversidad - Región de Los Ríos. - Estrategia Nacional de Crecimiento Verde - Agenda Infraestructura Desarrollo e Inclusión, Chile 30/30. Plan Chile Obras Públicas y Agua para el Desarrollo 30/30. - Plan para la Reducción del Riesgo de Desastres en la Región de Los Ríos. - Plan Específico de Emergencia por Variable de Riesgo Tsunami, localidades del sector costero de las comunas de Valdivia, Corral, Mariquina y Lo Unión. - Ordenanza de Protección de Humedales de Valdivia (dependiendo de su estado de tramitación) - Zona de Interés Turístico (ZOIT) de Valdivia, - Plan de Descontaminación Atmosférica para la comuna de Valdivia. - Estrategia para la Gestión del Control de Ruido Ambiental - Decreto Supremo N°38/2011 que establece Norma de Emisión de Ruidos generados por fuentes que indica. - Estrategia para la Gestión de Olores en Chile.	El Marco Referencial Estratégico definido para el presente estudio corresponde a los siguientes instrumentos: - Política Nacional de Desarrollo Urbano (2014) - PLADECO 2016 – 2020 (2016) - Plan Maestro de Aguas Lluvias 2012 - Nueva Agenda urbana, suscrita por Chile el año 2016. Hábitat III. (2017) - Zona de Interés Turístico (ZOIT) de Valdivia (2017) - Plan de Descontaminación Atmosférica para la Comuna de Valdivia (2016) - Estrategia para la Gestión del Control de Ruido Ambiental 2010 – 2014 - Estrategia para la Gestión de Olores en Chile (2017) Su incorporación en el plan se encuentra descrita en el ítem III del Informe Ambiental (Políticas de desarrollo sustentable y medio ambiente que enmarcan la propuesta de política, plan o instrumento de ordenamiento territorial. Marco Referencial Estratégico).

Table 9 shown the records of one of the queries, in which environmental and sustainability policies that could have had an impact on the plan were discussed. The list of these policies is the left

column of the table, and the SDGs were listed in the possibilities. However, in the right column which shown the define the policies reference to the study the SDGs do not appear.

3) Case in which SDGs are mentioned in the Assessment Impact chapter but without an assessment function (Amaranto et.al, 2018)

In the EIA of the aqueduct expansion project in Colombia, the SDGs are mentioned with the assessment impact chapter. In the discussion of the positive and negative effect of an impact, the contribution of SDGs to the achievement is mentioned to emphasize the positive effect, as it's shown in the excerpt:

> *"On the other hand, the second impact is fundamental, as the identification matrix shows that it has two dimensions, one negative and one positive. (…) assuming the positive dimension of the impact implies recognizing not only the social contribution that increased coverage brings with it, but also the benefit in terms of reducing the NBI,* ***and the contribution to achieving the SDGs."*** *(Translated from Amaranto et.al, 2018: p. 213 and 214).*

The SDGs, however, do not perform an assessment function, and how the impact is going to contribute to the achievement of the goals is not clear. Thus, this case was classified as dropping.

4.1.2. SDG-Scoping

The SDG-Scoping function is the use of SDGs to scope the assessment such as assess relevance of alternatives and impact categories and identifying the "… major issues and impacts in the decision-making process" (Kørnøv et al., 2020: p. 6). Of the cases reviewed, 15 of 34 were classified as SDG scoping, consisting of 1 scoping report, 6 EIAs and 8 SEAs. The use of the SDGs is distributed in 4 main instances described below and in which the function of the SDG is in the scoping of the plan/project design or in the EA process.

1) Case in which SDGs have influenced the plan/project design (Plainne Commune, 2020; Junta de Andalucía, 2020a; Junta de Andalucía, 2020b, Plan de Andalucía, 2020c, Plan de Andalucía, 2020d; *Rio Bueno Municipalidad, 2019*; IDOM, 2020; *Junta de Andalucía, 2020c*).

In this instance, the EAs cases use the SDGs as a policy that framed the plan/program design. There are two example of cases, those that presented an active scoping and those that presented a passive scoping. Overall, the methodology used in the integration of SDGs into the plan/project design is not transparent.

As a first example, there is the SEA for Territorial climate, air and energy plan of Plaine Commune 2020-2026 (PCAET), in France. The plan proposes an ambitious climate and energy strategy which it is structured in five pillars and different programs and plans define the structure and

quantitative targets at higher levels. The use of SDGs occurs in one of these pillars, “climate change”, with which the plan is aligned and can be seen in the excerpt below:

> *“Climate change, with greenhouse gas reduction targets* ***in line with (..) the Sustainable Development Goals*** *(…)” (Translated from Plainne Commune, 2020; p: 20)”.*

This excerpt was taken from the chapter “Linking of the Plan with other Plans or Programs”. Unlike other reports classified as *SDG dropping*, in the case of the PCAET it is explained that programs and plans at international, European, national, regional and metropolitan level have scoped the structure, and the quantitative targets of the plan.

In the case of the SEA for the Climate Action Plan for Andalusia (PAAC) the use of the SDGs occurred in two main moments. The first was in the introduction chapter of the plan, in which the international, national and regional scenario for combating climate change was described. A brief contextualization of the scope and goals, specifying the goal 13, is given as shown below:

> ***“At the international level, (…) in 2015, the UN approved the 2030 Agenda for Sustainable Development,*** *with the aim of advancing the Millennium Development Goals, pursuing equality between people, protecting the planet and ensuring prosperity as part of a new Agenda for sustainable development. This Agenda contains 17 Sustainable Development Goals (hereafter SDGs), and 169 targets.* ***There is a goal focused on combating climate change, called "Goal 13. Climate action",*** *whose line of work is to take urgent action to combat climate change and its effects.” (Translated from Junta de Andalucía, 2020a; p.6).*

Subsequently, after a national and regional introduction the PAAC is defined as the main planning instrument for climate change policies to combat climate change in the Junta de Andalucía as a result of the relevant policies and commitments towards climate change at all levels.

At a second moment, the SDGs are mentioned in the diagram of elaboration of the plan (Figure 7), in the chapter “Information of the PAAC”. The diagram suggests a direct connection – pink arrow - in the diagram between the PAAC and the SDGs, it is being interpreted as a direct influence in the design of the plan. Nevertheless, within the SEA it does not explain exactly how the SDGs was integrated into the plan, although the flowchart suggests a direct and significant influence.

In addition, others global, national and regional climate change instruments as plans and policies considered relevant have been analyzed according to coherence with PAAC. In total of 58 instruments have been analyzed including: 12 at the international and European level, 10 at the national level and 36 at the Andalusian regional level. With the aim of ensuring that the PAAC is fully aligned with the current regulations and strategic framework. The SDGs were included in this analysis, even though there is no further explanation on how the PAAC and the SDGs are aligned and how the influence in the PAAC elaboration occurs.

Other possibility is to consider that the influence is summed up in a global context of climate change awareness triggered by the establishment of the SDGs, which have culminated in a series of national and regional plans and policies committed towards climate change and the PAAC is a result of this context, and this would be the explanation of the direct link in the diagram.

Concluding, according to the context presented, although the SDGs are considered as a global influence and have triggered plans and projects due to the commitment of countries, plans and national and regional policies with it, they end up with a very weak use within the EAs, not being used within the discussions or parameters. And even when the SDGs are indicated as directly influencing the plan design, as it is the case, the method of how this happens is unclear.

Other three reports from the Andalusian Council have been analysed: the SEA for Sustainable Development Plan for the Montes de Málaga Natural Parkand the scoping report of the Metropolitan Transport Plan in Campo de Gibraltar. In both were observed a similar framework in the SDG use.

In the case of the Sustainable Development Plan for the Montes de Málaga Natural Park, firstly it was described how Europe have integrated 2030 Agenda in the aspects of governance, shared responsibility for implementation and recognition of excellence. For this purpose, it has been set out as a "workstream to fully integrate the **SDGs of the 2030 Agenda into the European policy framework and the Commission's current priorities**" *(Translated from* Plan de Andalucía, 2020d; p.45) and specifically in the aspect of "shared responsibility for implementation and recognition of excellence" the integration has been set as follows:

> *"**The SDGs are a collaborative agenda between all levels of government and civil society, endorsed by all UN member states**. Their implementation must be carried out jointly by all (…) **In addition, local and regional authorities have a special role to play** in the implementation of the **2030 Agenda with a specific target"11.** Make cities and human settlements inclusive, safe, resilient and sustainable" as well as the **other related urban goals in the 2030 Agenda**." (Translated from* Plan de Andalucía, 2020d; p.45)

The importance of local and regional authorities in implementing the 2030 Agenda is highlighted and therefore, in this context, the plan for the Montes de Málaga Natural Park is presented as contributor to the four SDGs goals – 3. Health and Well Being, 8. Economic growth, 9. Infrastructure and 15. Life on Land – and that it was *"developed from a cross-sectoral approach to ensure that economic, social and environmental challenges are addressed jointly, while also contributing to measuring progress at local level"* (Translated from Plan de Andalucía, 2020d; p.45).

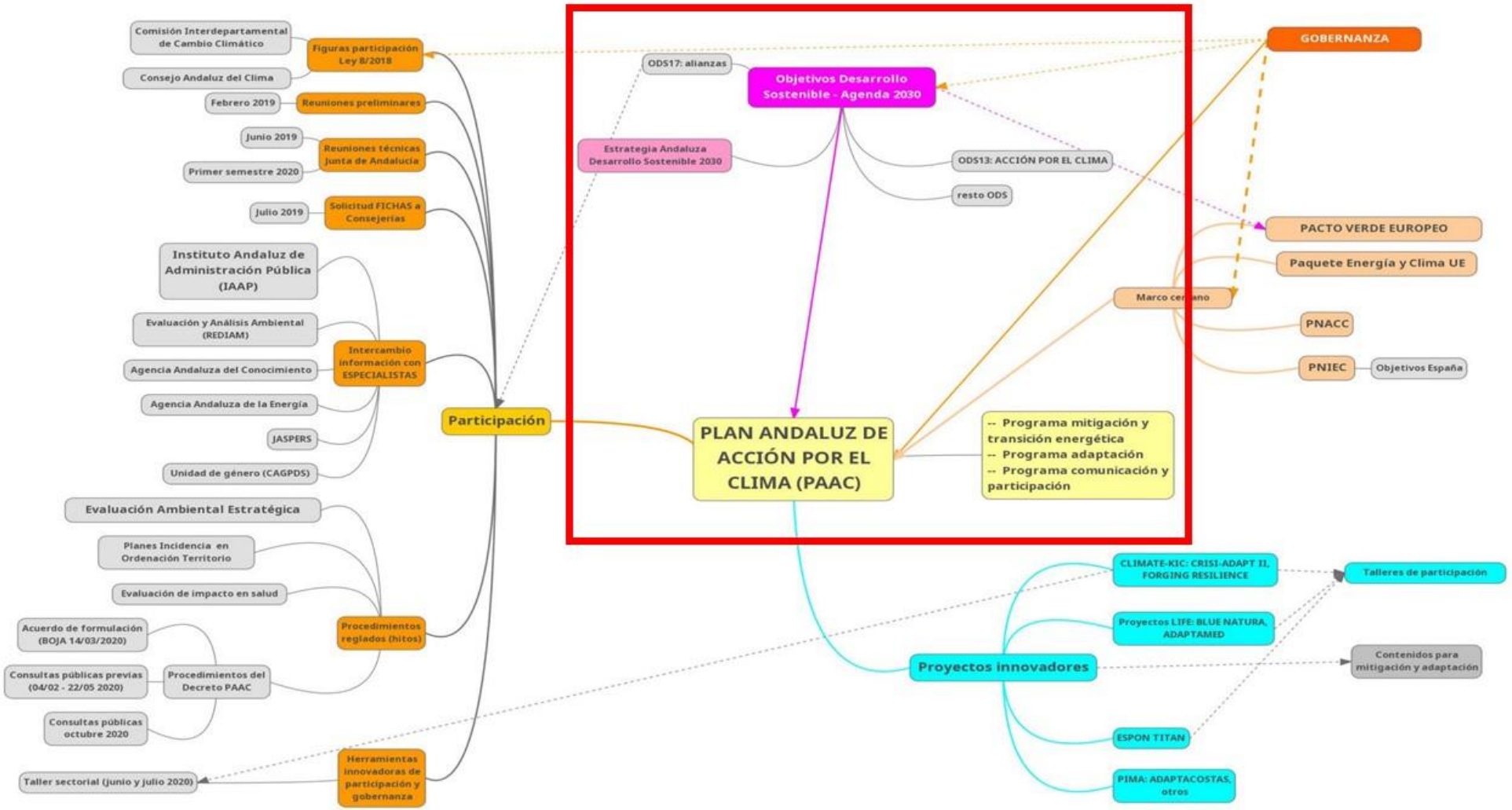

Figure 7: Diagram of the participation, coordination, and governance process for the elaboration of the PAAC (Source: Junta de Andalucía, 2020a)

This contextualization and explanation about the influence of 2030 Agenda on EU policy was made in the section named "*Next steps for a sustainable European future. European action for sustainability",* meaning that the influence of the SDGs on the current European sustainability guidelines is explicit. Therefore, from a national level the influence of SDGs is extended to regional policies such as the Andalusian Strategy for Sustainable Development 2030 (EADS) which has as one of its aims "*provide the principles and priorities of an action plan that* ***measures the degree of progress for each of the Goals and targets of the United Nations 2030 Agenda****" (Plan de Andalucía, 2020d; p 49).* In the SEA an analysis of the relation of the strategies set out in EADS 2030 to the measures envisaged in the Sustainable Development Plan is done (table 10), showing a high degree of overlap which equally implies a high degree of overlap with the SDGs as it has influenced the EADS.

Table 10: Relation of the strategies set out in EADS 2030 to the Plan for the Montes de Málaga Natural Park. Source: Plan de Andalucía, 2020d

	Medidas y EADS 2030												
Medidas PDS	Cohesión Social	Salud	Educación y Formación	Gobernanza	Recursos Naturales	Calidad Ambiental	Energía	Cambio Climático	Movilidad	Innovación y TIC	Competitividad y Empleo Verde	Producción y Consumo Sostenible	Desarrollo Rural
Conservación y valorización de los recursos naturales del monte público													
Puesta en valor del Parque Natural													
Realización de campañas de educación y sensibilización ambiental													
Promoción de la industria agroalimentaria y fomento de la comercialización de productos del Parque Natural													
Impulso de las explotaciones agrícolas y ganaderas													
Fomento de la producción ecológica													
Acciones de apoyo a los aprovechamientos forestales													
Plan de uso y gestión del turismo dentro del Parque Natural													

In the case of the scoping report of the Metropolitan Transport Plan in Campo de Gibraltar, Spain, the SDGs are mentioned in the introduction, where a brief contextualization of sustainability and climate change occurs. In this context, an overview of the creation of the SDGs and its aim is described, followed by the national plans implemented due to the commitment to the SDGs, and lastly the relevant SDGs goals to mobility plans are referred:

> *"Given the cross-cutting nature of transport and mobility for sustainable development, there are numerous* ***SDGs that interact with mobility plans, among which three are worth highlighting: SDG 7 (…), SDG 9. (…), SDG 11. (…), SDG 13."*** *(Translated from Junta de Andalucía, 2020b; p. 2)*

The transport and mobility plans framework are indicated as in interaction with relevant SDGs. In total, four SDGs are highlighted as relevant, and they are directly related to mobility: energy, infrastructures, smart cities and climate change.

After this contextualization of the SDGs and the goals relevant in mobility plans, the EADS is introduced as a community level instrument for guiding the policies developed in Andalusia towards a model of sustainability consistent with the fight against climate change and that a

"*maximum coherence between the proposals of the plan and the action lines/measures defined in EADS 2030 is essential*" *(Junta de Andalucía, 2020b; p. 3)*.

Thus, as in the previously Plan for the Montes de Málaga Natural Park, EADs are also presented as a policy that framed the plan. The difference from these cases to the SDG dropping cases, which refer to other plans, policies or frameworks as a reference for how they correlate to the SDGs, is that the EADS are defined as a national tool to the achievement of SDGs. In addition, the same structure is identified in the last case of the Andalusian Council, the SEA of Metropolitan Transport Plan for the Malaga Area.

In the case of the SEA for the "Plan of Non-Hazardous Waste of the Province of Seville" the SDGs are described as contributor to the design of the plan as it has been directly designed to contribute to the achievement of SDG 12, specifically as shown in the excerpt taken from the section named "Specific considerations in relation to the contribution to the global 2030 Agenda for Sustainable Development":

> . *"The Plan is fully* ***aligned and designed to contribute directly to Sustainable Development Goal (SDG) 12:*** *Ensure sustainable consumption and production patterns and its Targets.*
>
> *The Plan* ***will also make a significant contribution to the SDGs:***
>
> *-* ***SDG 8.*** *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.*
>
> *-* ***SDG 9.*** *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*
>
> *-* ***SDG 13.*** *Take urgent action to combat climate change and its impacts" (Translated from IDOM, 2020; p. 48).*

Again, as in previously EAs, although the SDGs are described as direct influence on the plan design, there is no explicit explanation of how the SDGs has been used in this process. In other words, the function of SDGs is described as an active scoping in which the relevant SDGs have influenced on decision-making and project/plan design.

The exception to the SDGs indicated as a direct influence on the plan design is the case of the SEA of the modification of the regulatory plan of the commune of Rio Bueno, in Chile. The SDGs in this case are mentioned in the "The Sustainable Development and Environmental Policies that Frame the Proposed Policy, Plan or Land-Use Planning Instrument" chapter, in which policies from different levels are descript as does their link with the plan.

The policies are classified as direct or indirect instruments of the proposal framing and the SDGs are classified as a policy with indirect influence as shown in table 11. The relation established and pointed out between the SDGs and the plan are positive achievements that will be accomplished by the plan such as resilient and sustainable cities and settlements, which are related to the objectives of SDGs. There is no mention of any other type of influence otherwise the alignments

between the positive consequences of territorial plans and the contribution to the achievement of the SDGs.

On the other hand, national policies on sustainable development and climate action were defined as a policy of direct influence. The influence of this policies on the proposal does not remain only in the alignment of objectives but it framed the definition of environmental objectives and critical decision factors, which was the case of the National Urban Development Policy of Uruguay. Therefore, it is appointed the function of active scope of the purpose to national policies whereas the SDGs, an international level, is pointed as a passive scope function.

Table 11: Link between the SDGs and the SEA of the regulatory plan of Rio Bueno. Source: Rio Bueno Municipalidad, 2019.

Instrumento	Descripción	Relación con el proceso de Evaluación Ambiental Estratégica para la elaboración de Instrumentos de Planificación Territorial
O.D.S., O.D.M., Agenda 2030 Sobre Desarrollo Sostenible (2017)	Los Objetivos de Desarrollo Sostenible constituyen un esfuerzo de la comunidad internacional, promovido por Naciones Unidas, para crear un conjunto de objetivos de desarrollo común a todos los países del mundo, que tendrían que ser alcanzados para el 2030. A través de este conjunto de objetivos, metas e indicadores, se pretende establecer una agenda de prioridades políticas basadas en la integración de las diferentes dimensiones del desarrollo sostenible: social, económico y medioambiental.	Instrumento de incidencia indirecta. De los objetivos que se plantean para alcanzar el propósito de transformar nuestro mundo, las modificaciones propuestas a través del presente estudio se enmarcan en lograr un espacio urbano destinado a equipamiento de salud adecuado para la población; ciudades y asentamientos inclusivos, seguros, resilentes y sostenibles, aprovechando de una manera eficiente los recursos y reduciendo la existencia de pasivos ambientales como lo son los sitios eriazos que consigo traen generación de microbasurales y/o aumento de vectores.

1i) Case in which relevant SDGs are determined and influenced the plan/project design (Salman, Gandárov Shadízhev 2020; Communauté Pays Basque, 2020; IDOM, 2020; PlanProtecto Consultores, 2017)

In this instance, the relevant SDGs to the project/plan scope are determined and used within the plan/program design. It is a sub-section of the previously presented as in both the SDGs have as primary aim the frame of the plan/project design.

In the EIA of the Almonacid del Marquesado wind farm in Spain, which was realized as a bachelor's thesis from Polytechnic University of Valencia, the SDGs were mentioned in an annex apart, named “Annex: Sustainable Development Goals of the 2030 Agenda”.

It classified the SDGs goals according to its alignment with the project (table 12) and evaluation the relevance into the project. The SDGs with the criteria of “high”, “medium”, “low” relevance and “not relevant”, and as result with a discarding three goals considered “not relevant”. In total eight

goals were classified as being in “high” alignment with the project. Nevertheless, despite the classification of the relevance of SDGs, the criteria used is not explicit and there are no further analysis about the relation of the project impacts and the SDGs.

As a conclusion of the chapter this classification appears the project is presented as in alignment with the SDGs:

> *“(…) the construction of the wind farm responds to society's demand for clean and renewable energy* ***in the scope of the objectives of the 2030 agenda.”*** *(Translated from Salman, Gandárov Shadízhev 2020; p: 179)*

Table 12: Relevance of the project to the Sustainable Development Goals.Source: Salman, Gandárov Shadízhev 2020.

Objetivos de Desarrollo Sostenibles	Alto	Medio	Bajo	No Procede
• Fin de la pobreza.		+		
• Hambre cero.		+		
• Salud y bienestar.	+			
• Educación de calidad.	+			
• Igualdad de género.				-
• Agua limpia y saneamiento.	+			
• Energía asequible y no contaminante.	+			
• Trabajo decente y crecimiento económico.		+		
• Industria, innovación e infraestructuras.	+			
• Reducción de las desigualdades.				-
• Ciudades y comunidades sostenibles.	+			
• Producción y consumo responsables.		+		
• Acción por el clima.	+			
• Vida submarina.				-
• Vida de ecosistemas terrestres.	+			
• Paz, justicia e instituciones sólidas.		+		
• Alianzas para lograr objetivos.		+		

Another case, the relevant SDGs goals to the plan are defined is the EIA of the Basque Country Climate Plan (PCAET). Among the 17 SDGs-goals it was considered that the PCAET address 13 (figure 8). The mention of the SDGs in this report occur in a separated sub-topic, “Link to Sustainable Development Goals (SDGs)”, of the chapter “Explanation of the reasons why the project was selected”.

The SDGs then are used as a reason for the choice of the project as the *“PCAET must be compatible with many other approaches, at all geographic scales.”* and *“Globally, the United Nations has established Sustainable Development to ensure a "better and more sustainable*

future for all"" (Communauté Pays Basque, 2020; p.52). In means the SDGs are used as a sustainability vision in a global level which has scoped the plan.

Figure 8: SDGs linked to the Basque Country Climate Plan. Source: Communauté Pays Basque, 2020.

Therefore, the plan has been screened against the SDGs to analyze if it meets these global goals. The criteria for this analysis, the magnitude of linkage with the goal, and how the plan contribute to the achievement of the goals are not explored.

In the last case, the SEA report of the Sectorial Plan of LA Zca Bañados Del Arroyo Pando, Uruguay, six SDGs are determined as relevant to the Sector Plan as indicated below:

> *"**Complementary to the national framework, the consideration of the Sustainable Development Goals (SDGs)** of the 2030 Agenda for Sustainable Development of the UN, **implies that the planning proposal presented should also contribute to achieving the following objectives** that were **selected for their relevance** to the Sector Plan proposal presented: (…) "(PlanProtecto Consultores, 2017; p.23)*

The SDGs therefore are described as a consideration complementary to the national framework, which means that they have influenced in the scope of the project, but the main guideline is the national. In addition, this use occurs within the conclusion of the report enhancing the use the "complementarity" scope of the SDGs in this case.

2) Case SDGs are used to frame the EA mitigation plan (Walsh Perú, 2020; PROYMASA, 2019)

The function of the SDGs in this instance is to frame the mitigation plan according to the themes addressed by the policy and it is considered relevant to the plan/project scenario.

In the EIA for Muyu wind farm project in Peru, the actions' purpose by the mitigation plan regarding local development are defined as in alignment with SDGs, as can be seen in:

> *"EGP[1], aware of the social context, **proposes to contribute through actions** that allow an improvement in the quality of life and that are framed in the Sustainability Policy, **aligned with the Sustainable Development Goals (SDGs)** promoted by the United Nations and without exceeding the roles of the State institutions and their local governments (regional and municipal governments).*
>
> *Based on the Sustainability Policy, **actions aimed at the creation of shared value will be mainly promoted, and the themes aligned to the SDGs**: 4 (Quality Education), 7 (Affordable and clean energy), 8 (Decent work and economic growth), 9 Industry, Innovation and infrastructure, 11 (Sustainable cities and communities) and 13 (Climate action)." (Walsh Perú, 2020; p:121).*

Therefore, examples of actions promoted and that are in alignment with the SDGs themes are: a circular economy programme and a local product and/or services procurement programme. However, the programmes proposed do not have indicators based on the SDGs to measure its success and although is mentioned that they are aligned with a selected SDG's the criteria for prioritising some over others is not clear. In addition, the SDGs are mentioned just in the plan directed to the local development, which are just one topic of the mitigation plan. In the topics related to environment issues, per example, there is no mention of SDGs, thus it uses as a scoping function is done is an isolated way and not systematic throughout the mitigation plan.

The other case of SDG scoping the EA mitigation plan was identified in the simplified SEA of the modification of a sectorial plan of "Los Almendros" in the community of Madrid, Spain, in which the SDGs are used in the elaboration of preventive and/or corrective measures.

In a fist moment, the SDGs creation were descripted and the goal 11 *"Sustainable Cities and Communities"* is mentioned as pertinent for the urban planning context. Subsequently, the context description of SDGs is stated the following:

> *"**In this context**, although urban planning at this stage of development does not define in detail the constructive characteristics of the actions, **it has been considered appropriate to establish a series of reflections, recommendations and environmental determinations in order to reduce or eliminate the foreseeable negative effects** that may occur on the receiving environment as a result of their development, although their degree of definition will be in line with them."* (Translated from PROYMASA, 2019; p. 83).

In addition, a series of measures and recommendations to reduce or eliminate the foreseeable effects of the plan were then detailed, considering social, environmental and economic

[1] EGP: Enel Green Power – company responsible for the project

sustainability criteria, and in particular measures that acts against climate change. The measures range from certification of energetic efficiency in buildings to the introduction into unoccupied spaces of vegetation with water requirements adapted to the climate and conditions of the region.

The interpretation made of this context was that the aim of the plan to being aligned with SGD 11 had led to the establishment of the measures in the areas of: climate change, hydric environmental, vegetarian, landscape, waste management and cattle raising. Nevertheless, how the SDGs have based the definition of the measures, and thus the use of SDGs as active scope is not explicit in the report. Lastly, is important to be noted that the classification of the SDGs as a scoping function was because of the interpretation by the present author that the SDG scenario framed the mitigation measures of the project.

3) Case in which the SDGs are used to frame the analysis of the project/plan alternatives (Gobierno de El Salvador,2019)

In this instance the SDGs are used in the analysis of the project/plan alternatives as a criteria to the choice of the "better alternative". This occurred in the preliminary EIA report of the Territorial Control Plan of El Salvador government which has considered the SDGs in the alternative prioritization, where the scenario with and without the program was analyzed as transcribed below:

> **"*Among the alternatives for the Programme, the following were studied and analysed*** *together with the consultant team, the Alternative considering the "Execution of the Territorial Control Plan Programme Phase II" and the Alternative "Without Execution of the Territorial Control Plan Programme Phase II". Considering:*
>
> *- **The positive socio-environmental impacts** derived from the operation stage associated with the implementation of the Programme, which seek inter-institutional interventions on the territories, **in line with the Sustainable Development Goals.***
>
> *(…)*
>
> *The alternative "Implementation of the Territorial Control Plan Programme Phase II" is prioritized" (Gobierno de El Salvador,2019: p. 29).*

The function of the SDGs in the EIA was then classified as *scoping* because the selection of the project alternative scoped the EA process, which was elaborated to the alternative which presents positive socio-environmental impacts aligned with the SDGs. As points of attention, the methodology of how these goals were defined is not transparent such as the measurement of the positive impacts in alignment with SDGs and the criteria for choosing the relevant goals, 6 of the 17 SDGs have been mentioned.

4) Case in which the SDGs are used as parameter in the evaluation of a baseline's topic (Vetor Soluções Ambientais,2020; Linum,2020; mLsambiental, 2017)

The use of the SDGs in the evaluation of the baseline's topics of the EA occurred in three cases. The first one was in the baseline's studies of social context in the EIA of a mining expansion in Brazil topics (Vetor Soluções Ambientais, 2020). The SDG target 3.2. was use as parameter to evaluate the progression of the topic "Longevity, mortality and fertility" in the project region, as transcript below:

> *"**Infant mortality** (mortality of children under one year of age) **in Itinga** reduced by 48.46 between 2000 and 2010, from 39.0 to **18.9 deaths per thousand live births**. In 1991, the **mortality rate in the municipality was 48.8, while in the state the rate was 35.4 in the same year, 27.8 in 2000 and 15.1 in 2010**. (…) meets one of the goals of the United Nations Millennium Development Goals, according to which the infant mortality rate in the country should be below 17.9 deaths per thousand in 2015. With the replacement of the Millennium Development Goals by the **Sustainable Development Goals - 2030 Agenda (SDG), the results show compliance with SDG 3, item 3.2,** namely: "By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality **to at least 12 per 1,000 live births and the mortality of children under 5 years of age to at least 25 per 1,000 live births**". (Vetor Soluções Ambientais,2020: p. 306).*

The comparation between the infantility mortality rate of Itinga city and the target 3.2. showed a compliance of the studied topic with the SDGs. Thus, the use of the SDGs in the evaluation of the baseline's topics, which it has as main function evaluating the original status of the major issues in the area before the development work of the project starts, it has the role of scoping and established the baseline measurement to the further assessment of the impact.

Nevertheless, it should be noted that the use of the SDGs was restricted to the evaluation of one parameter within the diagnosis, not extending to other parameters of nor to the evaluation of the project's impacts, which it would characterize a *testing function.*

The second case this use was identify was in EIA of the Valdejalón Wind Farm in Zaragoza, Spain, where the SDGs are also mentioned in the baseline's studies but within the "Climate Change" topic. Different of the last example where the SDGs were used as a quantitative evaluation parameter, in this case the SDGs were considered as policy base for the Aragon Climate Strategy, which is the focus of the "Climate Change" baseline study:

> *"The Aragon Climate Change Strategy (EACC* 2030*) **is the consequence of the firm adherence of the Government of Aragon to the** Climate Agreement reached at the Paris Summit, as well as to the European and national political priorities derived from it and the **Sustainable Development Goals** established in the 2030 Agenda of the United Nations."* (*Translated from Linum,2020; p. 44).*

Along the section the EACC 2030 targets and goals are described, and how the project and the Aragon scenario will contribute to its achievement, being the conclusion of the baseline study: "(...) it can be said that the promoted Project contributes to the fulfillment of the EACC 2030,

through its Goal 2 proposed in the EECC 2030 of moving towards a low-carbon energy model (…)" (*Linum,2020; p. 47).* In this context, the SDGs are used again to link implementation of the regional climate plan with the compliance of SDG 7:

> *"Aragon is an autonomous community with a great capacity in the energy field, with renewable resources, such as wind and solar, as well as hydraulic and mini-hydraulic resources. renewable resources, such as wind and solar, as well as hydraulic and mini-hydraulic resources.* ***These characteristics enable the transition towards a low-carbon energy model, a necessary measure to comply with the SDGs of the 2030 Agenda, especially SDG 7*** *"Affordable and clean energy", and the EU's objectives for the 2030 Agenda (increase at least 27% share of renewable energies and increase to at least 27% improvement in energy efficiency)."* (*Translated from Linum,2020; p. 45).*

The function of the SDGs, therefore, were of a qualitative parameter used in the evaluation of a specific topic of the baselines study, which means it was not systematically use.

Finally, the last case is the EIA of the project "Ciatec II Zapopan", center for the development of advanced manufacturing for the electronics industry in the state of Jalisco in Mexico. The SDGs were mentioned in the baseline's studies within the study of the topic "Air".

The SDG use was done within the topic context explanation of the region of the project. The context is the following: the Zapopan city despite having a Climate Action Plan does not have a municipal energy policy with the aim of monitoring and developing programmes to reduce emissions and energy use from the activities that emit the most greenhouse gases into the atmosphere. Given this context, the SDG are used to bring the sense of urgence to this gap between plan and implementation, as transcribed below:

> *"Zapopan must join* ***global efforts to take urgent measures to combat climate change and its effects (SDG 13),*** *with mitigation actions such as the protection of forests (SDG 15) and the* ***adoption of sustainable forests (SDG 15)*** *and the adoption of sustainable consumption patterns to reduce greenhouse gas emissions; and adaptation, such as the* ***protection of hydrological systems and agricultural production areas*** *to prevent climate risks, ensure food security and access to water"* (Translated from mLsambiental, 2017; p: 139).

Therefore, the lines of action deriving from this strategy aligned with the SDGs are described to conclude the topic. The function of the SDGs chosen in this EIA were of guide the strategy against the limited programmes to combat climate change, being the SDG 13 (climate change related) mentioned one of the reasons to the city take measures about the topic, being used as a qualitative parameter of evaluation of the baseline "Air" topic. And once again it is noted that the SDGs are used only in one of the topics of the baselines.

4.1.3. SDG-testing

The level SDG-testing is the use of SDGs as a framework for assessing impact, such as determining positive or negative impacts resulting from the project/plan or even determining how the project/plan performs according to the SDGs goals. Of the cases reviewed 3 of 34 were classified as SDG testing, consisting of 1 Strategic Environment and Social Assessment (SESA) and 2 SEAs. There was identified two main instances in the SDG-testing function, which are described below.

1) Case the SDGs are used in the evaluation of the project impacts (Mundi Consulting et. al., 2018; Arcadis, 2018)

The first instance of SDG-testing consists of cases where the SDGs were used in the evaluation of the project/plan alongside the assessment chapter within the EA report.

In the SESA of the Tourism sector in Cape Verde the SDGs were used in the diagnosis of the dimensions considered relevant in the scope of this Strategic Evaluation, especially in the characterization of the existing situation. If the SDGs have been used only as a characterizer of the plan scenario the classification function of it would be “Scoping”, however in one of the topics characterized, “gender”, the SDGs are used to determine that the plan will entail to a positive impact to the topic.

> *“**It is verified that the impact of the actions that will be undertaken in the tourism sector will also cause an impact on Goal 5 of these SDGs**, namely "Achieve gender equality and empower all women and girls”. (Translated from Mundi Consulting et. al., 2018; p.76).*

The justification for the positive impact is given before the mention of the SDG goal. The gender diagnostic begins with a description of the scenario in Cape Verde, the challenges faced, the government strategies, data about the topic, the relation of gender with economic growth, infrastructure and poverty eradication and also the scenario of these topics. The positive impacts of the tourism in gender are then detailed: *“The mainstreaming of the gender approach in tourism enriches the management model because: (…)” (Mundi Consulting et. al., 2018; p.72).* Therefore, the positive impact on Goal 5 of SDGs and the justification for this affirmation are discriminated along the report “gender chapter”, in a qualitative form.

In addition, the goals 8 and 12 are also mentioned, because of their association with the poverty eradication considered essential for the achievement of gender equality, *as “**the Sustainable Development Goals (SDGs) recognize** that the greatest challenge facing the world today is the eradication of poverty and that as long as poverty exists there can be no sustainable development” (Mundi Consulting et. al., 2018; p.75).*

Tabela 2.17_Objetivos de desenvolvimento sustentável

Objetivo	Meta
8. Promover o crescimento económico sustentado, inclusivo e sustentável, emprego pleno e produtivo, e trabalho decente para todos	8.9: Até 2030, conceber e implementar políticas para promover o turismo sustentável, que gera empregos, promove a cultura e os produtos locais
12. Assegurar padrões de produção e consumo sustentáveis	12.b: Desenvolver e implementar ferramentas para monitorizar os impactes do desenvolvimento para o turismo sustentável, que gera empregos, promove a cultura e os produtos locais

Fonte: ICIEG, Plano de ação para a transversalização da abordagem de género no turismo (2016-2018). Praia, 2016. p.10.

Figure 9: Sustainable Development Goals 8 and 12 and its targets related to sustainable tourism (Retrieve form: Mundi Consulting et. al., 2018; p.72).[2]

Therefore, the SDGs targets mentioned are which specify strategies for actions against poverty through sustainable tourism, which as consequence will contribute to the achievement of the goal 5 "gender equality". The excerpt below correlate employment and economic growth with gender equality:

> *"(…),* ***the promotion of the strengthening and consolidation of Small and Medium Enterprises (SMEs), planned in the SDGs,*** *besides being a strategy for generating self-employment, is a means to empower women in the economic, social and political spheres, by including them in the formal tourism network and ensuring that they can access economic incentives, social security and gain visibility and space to participate in the design of sector policies. There are already good experiences in Africa and Latin America in supporting women's entrepreneurship in the tourism sector, specifically in the hotel sector. ". (Translated from Mundi Consulting et. al., 2018; p.76).*

Overall, the SEA is classified as "SDG-testing" because uses SDGs to justify the positives impacts of the plan within a specific topic "Gender", relating it to other issues as poverty and lack of jobs, which also will have positive impacts with the implementation of the project.

Nevertheless, the use of SDGs as impacts assessment in this SEA is limited to one of the topics studied in the diagnostics, which it has analyzed several topics apart "Gender". The SDGs are mentioned in other topic "Environmental Resources and Quality", in which the precarious situation of Cape Verde is described, but no association of the SDGs and a positive or negative impact by the plan occur as in the topic "Gender". The use of the SDG in this topic in limited to a contextualization of an ideal scenario that currently does not reflect the reality of Cape Verde in the topic.

> *"Access to adequate water services is an extremely important determinant for improving the living conditions of the population.* ***Target 6.1 (SDG 06) proposes to increase***

[2] Translation: The table-figure was retrieved from the SEA of Cape Verde tourism and indicates the SDG 8 "Sustainable economic growth" and 12 "sustainable production and consumption paths" and respectively the targets 8.9 "policies to promote the sustainable tourism" and 12.8 "develop and implement tool to monitor the development impact for Sustainable tourism".

universal and equitable access to safe drinking water at an affordable price for all" *". (Translated from Mundi Consulting et. al., 2018; p.38)."*

In the context of the excerpt above the SDG function is a "Scoping", being the case SDGs are used in the evaluation of the baseline's topics. Hence, it is important to emphasize that despite the SEA in question be classified as "SDG-testing" not all the uses of SDGs can be classified as the same, i.e., in this case the use of SDG as testing is not holistic to all the report but it is an isolate case.

The other case in this instance is the SEA of Belgium's Marine Spatial Plan (PAEM), in which the SDGs are also used in the impact's analyses, although in a different form of the Cape Verde Tourism assessment.

In the non-technical summary of the assessment of the SEA, it is stated that the different alternatives of the plan will be compared with environmental aspects in the aim of achieving the SDGs. In reinforcement of this statement, in the environmental objectives of the plan the contribution to the SDGs is again referred to:

"*In terms of the good status of the marine environment, the PAEM should* ***contribute as far as possible to the achievement of the following spatial conditions:***

- The United Nations Sustainable Development Goals (SDGs) and more particularly SDG 14 *'Conserve and sustainably use the oceans, seas and resources for sustainable development' and* ***SDG 15*** *'Conserve and restore land ecosystems, ensuring they are used sustainably, manage forests sustainably, combat desertification, halt and reverse the process of land degradation and halt biodiversity loss '. These goals are to be achieved by 2030 and succeed the millennium goals." (Translated from Arcadis, 2018; p:15).*

Therefore, in the evaluation of the plan impacts a specific assessment framework based on SDGs is used within the assessment of the topic "climate". The framework followed the approach outlined next:

i. **SDG goal introduction:** SDG goal introduction.
   The SEA case assessed the SDG 7 "Affordable and sustainable energy" and SDG 13 "Climate action", both considerer relevant to the "Climate" topic.

ii. **Indicator:** the indicator selected to track the progressive at the respective SDG.
   In the SEA under study the indicator was selected in accordance with the indicator defined by the National Statistical Office to track Belgium's progress at the respective SDG. The indicator selected to the SDG 7 was "Percentage of renewable energy in final consumption" and to the SDG 13 was "Greenhouse gas emissions, tonne CO2 equivalent per capita".

iii. **Indicator definition:** the indicator is defined in terms of concepts, coverage and exclusions.

iv. **Objective:** the objective to the indicator is defined.
In the case of the energy-indicator, the objective was defined according to the Belgium scenario which the planned share of renewable energy is 18% by 2030 and in the case of climate-indicator the objective was defined the Kyoto Protocol, which indicate the necessity of decrease the tonne of CO2 equivalent per capita.

v. **Assessment of the alternatives:** the alternatives are evaluated according to the positive or negative impacts on the theme in analyze according to the indicator and objective defined.
The conclusion in the energy aspect was that *"additional offshore wind capacity of 1.8 GW to 2.3 GW (respectively alternatives 1 and 2) will make a significant contribution to achieving the goal of increasing the share of renewables in the global energy mix by 2030" (Arcadis, 2018; p:116*). But in the case of the emissions aspect despite the two planning alternatives contribute to the reduction of greenhouse gas emissions by providing additional offshore wind farms, considering consider the evolution of CO2 emissions due to electricity production *"the constant increase of renewable energy sources in the energy matrix does not offset the accentuated increase in electricity production and CO2 emissions" (Arcadis, 2018; p:117*).

The same process was used in the evaluation of "biodiversity impacts" and "climate change risks" topics. In terms of "biodiversity impacts" the SDGs goals considered as relevant to the topic were the SDG 14 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development' and SDG 15 'Preserve and restore terrestrial ecosystems, ensuring that they are used sustainably, forests, combat desertification, halt and reverse land degradation and halt biodiversity loss'. The indicator then selected to track Belgium's progress in terms of SDG 14 was *"Marine area in the Natura 2000 zone"* and then an objective was defined "*protect at least 10% of coastal and marine areas by 2020*" in accordance with national and international legislation. In the case of SDG 15 no indicator relevant was defined.

Lastly the "climate change risks" topic evaluated by the framework based on SDGs followed the steps described: definition of the relevant SDG goal, definition of an indicator and explanation of it, definition of an objective and assessment of the alternatives considering the indicator and objective.

Comparting the two cases described is noted a difference between the measuring of impacts. While the SESA of Cape Verde use qualitative indicators to measure the positive impacts, the SEA of the Belgium Plan uses quantitative indicators such as *percentage of renewable energy in final consumption.* In addition, while the focus of the first case is in the description of the SDGs to which the project/plan is expected to contribute positively, in the Belgium case evaluated according to the positive or negative impacts on the theme in analyze according to the indicator and objective defined.

Finally, in contrast to some EAs that have been classified as SDG-dropping or as SDG-scoping and stated that project/plan would contribute with SDGs but with no indication in how this achievement would happen, in the SDG-testing the achievement is described and measured or in a qualitative or in a quantitative manner.

2) Case the SDGs are used in measure the efficiency of the monitoring plan (Unión Temporal,2017)

In the SEA of a project of expansion scenario for hydrocarbons transport in Colombia, the SDGs have been used as efficiency indicators of the monitoring plan as well as for active scope. Therefore, the EA was classified as testing, because the SDG have a role of scoping and assessment.

Initially, the SDGs are mentioned in the "Regulatory and Sustainable Development Policy Framework for the Hydrocarbon Sub-sector" chapter as the main commitment to sustainability issues in connection with the Paris Agreement.

The influence of the SDGs on the Columbian national level has been described and is stated that according to the National Development Plan *"Colombia **must bring the SDGs down to the national context** and be able to generate synergies between the different sectors of the Colombian State, which will enable the achievement of the new sustainable development goals proposed by the world"* and to the achievement of this purpose a document have being elaborate to be *"a clear reference **on how the Goals are implemented and internalized in the institutional dyna**mics*" (Translated from Unión Temporal,2017; p. 37).

Table 13: Sustainable Development Goals and their relation to project of hydrocarbons transport expansion. Source: Unión Temporal,2017

Objetivos de Desarrollo Sostenible ODS	
Objetivo	**Metas relacionadas con los planes de expansión de transmisión y transporte**
 Asegurar el acceso a una energía asequible, fiable, sostenible y moderna para todos	Para 2030, garantizar el acceso universal a servicios de energía asequibles, confiables y modernos. Para 2030, duplicar la tasa mundial de mejora de la eficiencia energética. Para 2030, ampliar la infraestructura y mejorar la tecnología para prestar servicios de energía modernos y sostenibles para todos.
 Construir infraestructura flexible, promover la industrialización inclusiva y sostenible; y fomentar la innovación	Desarrollar infraestructuras fiables, sostenibles, resilientes y de calidad. Promover una industrialización inclusiva y sostenible y, a más tardar en 2030, aumentar de manera significativa la contribución de la industria al empleo y al producto interno bruto. Para 2030, mejorar la infraestructura y reajustar las industrias para que sean sostenibles, usando los recursos con mayor eficacia y promoviendo la adopción de tecnologías y procesos industriales limpios y ambientalmente racionales

Subsequently, the SDGs targets in direct relation to the expansion project are referenced. Table 13 shows the form this mention was made despite it doesn't show all the SDGs indicated as relevant. In total, targets from eight goals were listed: 7. Affordable and Clen Energy, 9. Industry and Infrastructure, 11. Sustainable Cities, 12. Responsible Consumption and Production, 13 Climate Action., 14. Life Below Water, 15. Life on Land, 16. Peace and Strong Institutions; and from these goals seventeen targets are indicated as related to the expansion plan.

From the sustainable development policy and regulatory framework, the second moment the SDGs are used was in the evaluation and monitoring plan of the strategy for the management of the socio-environmental implications of the hydrocarbon transport growth scenarios as an indicator of its effectiveness.

Effectiveness in the EA case was defined as a project that *"have been successfully developed (…) under the precepts of sustainable development that are part of the country's the country's policy"* (Unión Temporal,2017; p. 304). Therefore, the framework used to the measure of effectiveness of the mitigation plan are based on two components:

1. Efficacy: *"refers to the achievement of actual changes in the management situation and the achievement of the project management defined objectives taking into account the established sustainable development horizon"* (Unión Temporal,2017; p. 303). The efficacy is measured in short, medium and long term, respectively year 2019, 2025 and 2032 (Table 14).

Table 14: Measurement of efficacy in the expansion project. Source: Translated from Unión Temporal,2017

Efficacy of scenario impact management	
Long Term	
Achievement of sustainable development goals	Achievement of scenario development
Medium Term	
Reduction of conflictive around the sector's projects	Execution of scenario projects
Short Term	
Level of project governance	Quality of operational planning

2. Efficiency: *"refers to the quality of scenario management processes in terms of the administrative, operational and technical support necessary for the development of the management"* (Unión Temporal,2017; p. 303).

Specifically, in the efficiency measure method the SDGs were used as a "*measured in terms of whether the scenarios proposed for the different sectors comply with the country's sustainability precepts"* (Unión Temporal,2017; p. 303). The SDGs as directive of the Columbian Sustainable Development Policy is then established as a base of measurement for the long-term efficiency.

The long-term efficiency refers to the scenarios developed in accordance with the sustainable development precepts that the Columbia has set for itself and therefore achievement of sustainable development objective (Unión Temporal,2017). To this end, four sustainable developments goals related to the project were set as well as indicators to measure the achievement of the goals established (table 15).

Accordingly, to the use of the SDGs in the EA described the function of the SDGs have been defined as testing because of its establishment of measurement base for the long-term efficiency of the project and its consequences. Furthermore, it is important to emphasize the importance of the SDGs in the national sustainable policy and how this is reflected in their integration in SEA, being a long-term objective of the project's success to achieve the SDGs and the framing of indicators for this evaluation.

Table 15: Measurement of the long-term efficiency of the project. Source: Translated from Unión Temporal,2017

Efficacy			
Temporality	**Indexes**	**Attributes**	**Indicators**
Long-Term Efficacy	Achievement of sustainable development goals	Low carbon emissions	% variation of emissions from scenario projects vs. average operation year 2018
		Infrastructure that withstands the onslaught of climate variability	% of scenario development infrastructure that suffered disruptions in service delivery due to extreme weather events
		Control of spills and emissions derived from operations	% variation of operational spills of the scenario projects vs. the average operating period year 2018
		Protection of species and ecosystems that are sensitive, vulnerable or at risk	# of projects that contemplated ecosystem sensitivity conditions in their design/ # total scenario projects

4.1.4. SDG- based

In the SDGs-based the scope of EA is formulated to consider how the plan/project could achieve the SDGs and provide decision support to this aim, not limited the function as a framework for assessing the impact (Kørnøv et al. ,2020).

Among the 34 cases analyzed, only one EA was classified as SDGs-based due to the integration of SDG as a decision support-tool in the EA process.

The SEA of the alteration of the Strategic Development Plan of the Administration of the Ports of Douro, Leixões and Viana do Castelo, in Portugal, which has used a methodology of SEA based on a strategic thinking approach for sustainability, as defined by Partidário (2012).

The use of SDGs occurs in two main moments: in the Strategic Reference Framework (SRF) and in the assessment of the opportunities and risks of the plan options.

Firstly, in the Strategic Reference Framework (SRF), the macro policies that have determined the reference for evaluation were identified. In total, twenty-six (26) policies were identified as relevant, including the Sustainable Development Goals.

According to the methodology used in the SEA, the SRF are used as base for the identification and justification of the critical decision factors (CDF) of the assessment through an integrated analysis. The analysis was made identifying the relevant relation of the macro policies with the CDFs (tables 16), identifying the goals and targets of the policies applicable to the plan, by critical decision factors (table 17) and identifying the relation of the macro policies with the strategic issues for the plan (table 18).

The relations made in the SEA shown a high level of relation between the SDGs and the CDFs as the SDG appears as relevant in the tree CDFs (table 16). Since the CDFs are crucial to the support of the assessment decision making, therefore the EA was formulated considered the SDGs in the decision support.

The second moment in the SEA the SDGs perform a function in the Evaluation of Strategic Options of the plan, in which are evaluated environmental and sustainability opportunities and risks of the options. The function of SDGs in the evaluation is verify the alignment of the options with it. For instance, the opportunity descripts by in the excerpt below represented by the strategic option is evaluate as in alignment with SDGs and other two relevant plans.

> *"OE1.1[3] represents the opportunity for ADPL[4] to invest in initiatives for the protection, conservation and valorization of areas with special protection status in VC[5] and VN[6] (PSRN2000[7], **ODS[8]**, PGAMLN[9])" (Partially translated from Partidario et al, 2020; p. 44)*

Another example that opportunity is verified as consistent with the SDGs:

> *"**These opportunitie**s are based on (…) the natural and cultural values inherent and cultural values, as well as investments in mitigation and adaptation to climate change (OE2.1) **which follows the guidelines of the SDGs** (…)" (translated from Partidario et al, 2020; p. 35).*

[3] OE1.1: Strategic Option 1.1
[4] ADPL: Port Administration of Douro, Leixões and Viana do Castelo
[5] VC: Port of Viana do Castelo
[6] VND: Douro waterway network
[7] PSRN2000: Natura 2000 Sectorial Plan
[8] ODS: Sustainable Development Goal in Portuguese
[9] PGAMLN: North Coast Marine Area Management Plan

Table 16: Relevance of strategic documents to critical decision factors. Source: Partidario et al, 2020

DOCUMENTOS ESTRATÉGICOS RELEVANTES / FCD	OBJETIVOS DE DESENVOLVIMENTO SUSTENTÁVEL – AGENDA 2030	PIANC: GUIA PARA A GESTÃO DA SUSTENTABILIDADE NOS PORTOS	QUADRO PARA O ORDENAMENTO DO ESPAÇO MARÍTIMO E GESTÃO COSTEIRA INTEGRADA	PLANO DE SITUAÇÃO DO ORDENAMENTO DO ESPAÇO MARÍTIMO	DIRETIVA-QUADRO ESTRATÉGIA MARINHA	ESTRATÉGIA MARÍTIMA NA REGIÃO ATLÂNTICA	ESTRATÉGIA NACIONAL PARA O MAR 2013-2020	PROGRAMA OPERACIONAL RELATIVO AO FUNDO EUROPEU DOS ASSUNTOS MARÍTIMOS E DAS PESCAS	ESTRATÉGIA EUROPEIA PARA OS RECURSOS HÍDRICOS	PLANOS DE GESTÃO DE REGIÃO HIDROGRÁFICA (RH1, RH2 E RH3)	LIVRO BRANCO DA POLÍTICA EUROPEIA DE TRANSPORTES	PLANO ESTRATÉGICO DOS TRANSPORTES E INFRAESTRUTURAS	ESTRATÉGIA PARA O AUMENTO DA COMPETITIVIDADE DA REDE DE PORTOS COMERCIAIS DO CONTINENTE	PROGRAMA NACIONAL DE INVESTIMENTOS 2030	ESTRATÉGIA EUROPA 2020	PROGRAMA NACIONAL DA POLÍTICA DE ORDENAMENTO DO TERRITÓRIO	ESTRATÉGIA DE BIODIVERSIDADE DA UE PARA 2020	ESTRATÉGIA NACIONAL PARA A CONSERVAÇÃO DA NATUREZA E DA BIODIVERSIDADE	PLANO SETORIAL REDE NATURA 2000	PLANO DE GESTÃO DA ÁREA MARINHA LITORAL NORTE	QUADRO ESTRATÉGICO PARA A POLÍTICA CLIMÁTICA	PROGRAMA NACIONAL PARA AS ALTERAÇÕES CLIMÁTICAS 2020	ESTRATÉGIA NACIONAL DE ADAPTAÇÃO AS ALTERAÇÕES CLIMÁTICAS	ROTEIRO NACIONAL DE BAIXO CARBONO 2050	PLANO NACIONAL ENERGIA E CLIMA 2030	ESTRATÉGIA TURISMO 2027
RELAÇÃO ESTRATÉGICA PORTO-REGIÃO	✓	✓	✓	✓		✓	✓				✓	✓	✓	✓	✓	✓											✓
INTERFACE PORTO-CIDADE	✓	✓		✓		✓	✓	✓			✓	✓		✓	✓	✓				✓	✓	✓	✓	✓			✓
SUSTENTABILIDADE NA INOVAÇÃO	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Table 17: Objectives and targets of the policies applicable to the plan, by critical decision factors. Source: Partidario et al, 2020

Orientações de Ambiente e Sustentabilidade	FCD			Metas relevantes
	#1	#2	#3	
Promover o bom estado das massas de água através da proteção, melhoria e recuperação da qualidade dos recursos hídricos. Monitorizar o estado quantitativo e qualitativo das massas de água (**ODS; PIANC; PGRH; PGAMLN**).			■	Até 2030 (**PNEC 2030**): ▪ Emissões de gases com efeito de estufa (redução em % face a 2005): 45-55% ▪ Energias renováveis no consumo de energia final: 47%; ▪ Eficiência energética (ganho em % no consumo de energia primária face a 2005): 35%. Até 2030 (**EE2020, PNAC2020, RNBC2050**): ▪ Emissões de gases com efeito de estufa (redução em % face a 1990): 30% ▪ Energias renováveis no consumo de energia final: 20%; ▪ Eficiência energética (ganho em % no consumo de energia primária face a 2005): 20%. Até 2050 (**LBPET**):
Promover a comunicação, sensibilização e envolvimento das populações, agentes económicos e outros agentes com interesses no sector da água, no processo de planeamento e gestão dos recursos hídricos (**PGRH; ODS**).	■	■	■	
Melhorar a educação, aumentar a consciencialização e a capacidade humana e institucional sobre medidas de mitigação, adaptação, redução de impacto e alerta precoce no que respeita às alterações climáticas (**ODS; ENAAC**).		■	■	
Contribuir para a criação de ferramentas e estratégias para dar resposta às alterações climáticas globais, incluindo estratégias de atenuação e adaptação (**ODS; QEPC**; **EMRA; ENAAC; PIANC**).			■	
Envolver a sociedade nos desafios das alterações climáticas, contribuindo para aumentar a ação individual e coletiva (**QEPC; PNAC2020**).		■	■	
Garantir zonas marinhas e costeiras capazes de resistir às alterações climáticas (**QOEMGCI; PNPOT**).			■	
Garantir condições eficazes de governação e assegurar a integração dos objetivos climáticos nos domínios setoriais (**QEPC**).	■	■	■	
Reduzir a dependência de combustíveis fósseis e das emissões de poluentes atmosféricos e de gases com efeito de estufa (GEE) (**LBPET; QEPC; PNEC 2030**) por passageiro e por unidade de carga transportada (**PETI3+**).			■	
Promover a transição para uma economia de baixo carbono, gerando mais riqueza e emprego e contribuindo para o crescimento verde (**QEPC; PNAC2020; PNEC 2030**), e adaptando os territórios às alterações climáticas, garantindo uma maior resiliência das infraestruturas (**PNI 2030**).		■	■	
Aumentar a participação de energias renováveis na matriz energética (**ODS; PNEC 2030**), promovendo a sua utilização bem como de a gás natural liquefeito (**PIANC**).			■	
Favorecer o desenvolvimento das fontes de energia marinha e de energias novas e renováveis no meio marinho e costeiro da Região Atlântica (**EERH; EMRA**), a interconexão das redes de energia e a eficiência energética (**QOEMGCI**).			■	
Reforçar a cooperação internacional para facilitar o acesso à investigação e às tecnologias de energia limpa e promover o investimento em infraestruturas de energia e em tecnologias de energia limpa (**ODS**).			■	
Garantir a preservação, a proteção e a melhoria do ambiente, bem como a utilização prudente e racional dos recursos naturais, nomeadamente para alcançar um bom estado ambiental, travar a perda de biodiversidade e a degradação dos serviços dos ecossistemas e reduzir os riscos de poluição marinha (**QOEMGCI; ODS; DQEM; PSOEM**).	■	■	■	

Table 18: Relation of the macro policies with the strategic issues for the plan (Source: Partidario et al, 2020)

Macropolíticas QRE	Questões Estratégicos									
	EE1	EE2	EE3	EE4	EE5	EE6	EE7	EE8	EE9	EE10
Objetivos de Desenvolvimento Sustentável – Agenda 2030	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PIANC: Guia para a Gestão da Sustentabilidade nos Portos	✓			✓			✓	✓		
Quadro para o Ordenamento do Espaço Marítimo e Gestão Costeira Integrada	✓			✓	✓		✓	✓		
Plano de Situação do Ordenamento do Espaço Marítimo	✓		✓		✓		✓	✓		

In total, the SDGs are mentioned twenty-eight times along the evaluation of the risks and opportunities of the plan option always with the function of verify with the option is in line with its guidelines.

The biggest difference between the cases classified as SDG-testing and this particular case classified as SDG-based is the manner the SDGs are integrated into the decision process. In the SDG-testing reports, the SDGs were limited to the evaluation of the plan/project impacts according to relevant SDGs. On the other hand, in the SDG-based case the SDGs have been integrated into the entire decision process, since in the definition of the critical decision factor as in the alignment of the different plan alternatives with the SDGs.

As important issues to highlight, which were not verified in the present SDG-based case, were the non-use of SDGs measuring tools as the use of qualitative and quantitative indicators and no interrelations between SDGs, including synergies or tradeoffs.

5. Discussion

The chapter discuss the role of the SDGs in EAs based on 3 main aspects analyzed into the reports:

i. SDG level usage: was made a characterization in the level of SDG use – goal, target, indicator -, if the SDG were used as a whole policy or as specific goal-levels and if was the case of specific goal-levels how many are considered. Based on that, an analysis was performed on the level of utilization of the SDGs

ii. Continuity of SDG use across EA: the purpose here is to comprehend where the SDGs primarily occur within the contents of the reports, whether SDG are used in an isolated section or along the report, and whether there is any relationship of the section SDGs are used and the function within the report has been classified.

iii. Linking the results with those of Ravn Boes et. al. (2021): this section identifies the outcomes of of Ravn Boes et. al. (2021) that were verified in this dissertation; the partially observed outcomes; and different observed outcomes which not necessary are outcomes that diverge from what Ravn Boes et. al. (2021) observed.

5.1. SDG level usage

Regarding the way SDGs were included in the report, there are four levels to be considered: whole policy, goal, target or indicator level. A significant variation was found, shown in table 19. The classification of each report is in annex 3.

Table 19: SDG level usage by number of EAs reports and respectively function

SDG level usage	Number of EAs Reports	SDG function in each case level
Whole Policy	11	Dropping (9 cases) Scoping (2 cases) Based (1 case)
Goal Level	19	Dropping (5 case) Scoping (14 cases)
Target Level	4	Scoping (1 cases) Testing (3 cases)
Indicator level	0	-

None of the reports reviewed refer directly to the SDGs indicator level, although in two cases, classified as SDG-testing, indicators were developed to respond to the SDGs (Mundi Consulting et. al., Unión Temporal,2017). In the other usage levels, patterns were found according to the SDG integration function: Dropping cases using SDGs in the form of whole policy; Scoping cases using SDGs in a goal level; and Testing cases using SDGs in the form of target level.

Regarding SDG dropping level, the majority cases of just mention the SDG as a whole policy, that tends to be the cases the SDGs policy are mentioned as an international commitment to which the country has adhered (AETS Consortium, 2019; Caminos de las Sierras, 2021) and when the SDGs policy are referenced within the review of legal framework, plans and programs relevant to the EA context (Republique du Benin, 2020; Souleymane BALDE, 2018; Pöyry Tecnologia Ltda.,2020; Ageim ingénieurs, 2019; Ministério do Turismo, 2020; OMEGA energia, 2019). In the SDGs dropping cases where the SDGs were used in a goal level, it was verified that were cases the project/plan is presented as a contributor to the achievement of and/or in alignment with specific goals considered related to the plan/project scenario (AEE, 2019; Republique de Djibouti, 2019; Amaranto et.al, 2018).

In the SDGs scoping cases, overall, the SDGs are used at a goal level. In the occasions where the SDGs are used as a whole policy are cases the SDG policy have influenced the plan/program design (Plainne Commune, 2020; Rio Bueno Municipalidad, 2019). The trend verified in SDG-scoping cases which uses the goal level are in which the cases the relevant SDGs to the plan/project are defined (Salman, Gandárov Shadízhev 2020; Communauté Pays Basque, 2020; IDOM, 2020; PlanProtecto Consultores, 2017). In the unique scoping-case the target level was used, one SDG target was used in the evaluation of one parameter within the diagnostic phase of the EA (Vetor Soluções Ambientais,2020).

All the reports classified as SDG testing used the SDGs at the target level. The trend identified were the use of the SDGs targets as parameters in the evaluation of the project impacts (Mundi Consulting et. al., 2018; Arcadis, 2018). However, despite the use of a SDG in all the cases of SDG testing, this did not extend to the SDG-based case, in a such a way that it's not possible to conclude that as the level of integration of SDGs into EAs increase, the tendency is to use a deeper SDG level as targets and indicators inside the report.

As a matter of fact, in the SDG-based case of the 58 times SDGs are mentioned in only one time it was referred the individual goal-levels, when it is emphasize the risk of an opportunity for in the aim of achieve a specific goal: "(…) encouraged by SDG 17, there is a need for improved channels of information and transparent communication (…)" (Partidario et al, 2020; p. 46), all the other mentions/use are done with the SDGs as a whole policy.

Moreover, in the cases of the individual goal level, a variation on how many SDGs are considered was found. Regarding SDG count, the results range from indicating the use of one goal (PROYMASA, 2019; DNG GL, 2019; Linum, 2020) to fourteen goals (Salman, Gandárov Shadízhev 2020). The Gandárov Shadízhev (2020) case was the only one where an explicit evaluation of the relevance was verified, considering all the SDGs with the criteria of "high", "medium", "low" relevance and "not relevant", and as result with a discarding three goals considered "not relevant". This case although was classified as scoping because the relevant SDGs were not used along the assessment.

In all the other cases in which there was a mention of the relevant SDGs for the project/pan, it was not possible to identify an explicit evaluation of all the SDGs, in such a way that on many occasions the justification of the relevant goals is that they are related to the scope of the project/plan, i.e., in an EA of an energy project the goals considered relevant are the directly related to energy.

Lastly, there was no example of case that worked with the SDGs ideally an interconnect manner (Machingura and Lally 2017)., being the prioritization the most common form of use.

5.2. Continuity of SDG use across the EA

The review of the location of the SDGs within EA are shown in table 20. The column "#" indicates the identification of the case already stipulated previously in table 7.

There was identified some noteworthy tendencies. The first tendency, which is in line with the results of Ravn Boes et. al. (2021), is that the majority of the reports mention SDGs while describing relevant legal frameworks, policies or programmes that relate to the project/plan or in the introduction during the provision of background information for the project/plan. This applies to a total of 24 reports, of which 16 mention SDGs while describing relevant legal frameworks, policies or programmes and 8 reports in the introduction.

This tendency is recurrent in SDG dropping cases, 64% of the total cases (9 reports) mention SDGs inside the "Reference to legal framework, plans and programmes" section, and in 27% of the total cases the SDGs appear in the "Introduction". These results are in line with the conclusions of the SDG dropping cases identify by Ravn Boes et. al. (2021).

The second trend is that 3 out of the 4 cases, in which the SDGs are used in the "Diagnostic of the Environment and Social Parameters", are classified with a SDG scoping function. In these cases, the SDGs are used in the evaluation of the baseline's topics (Vetor Soluções Ambientais,2020; Linum,2020; mLsambiental, 2017).

The cases with a higher level of integration – testing and based – use the SDGs in other sections: Diagnostic of the Environment and Social Parameters (1 SDG Testing case), Assessment Impacts/Alternatives (1 SDG Based case and 1 SDG Testing case), Mitigation and Monitoring Plan (1 SDG Testing case).

Finally, in 28 of the 34 cases reviewed, the SDGs appear in a unique section. In the six cases, in which the SDGs appear in multiple sections: 2 are Dropping, 1 Scoping, 2 Testing and 1 Based. From these results, the findings demonstrate that in general, in Dropping and Scoping cases, the reference and use of the SDGs occurs only in one section. This differs from the findings of Testing and Based cases, in which the use of the SDGs occurs in more than one section, with the exception of one Testing case (Mundi Consulting et. al., 2018). However, the amount of cases with a higher level of integration was only 4 out of 24 cases, thus to validate the previous statement we would have to expand our sample of Testing and Based cases.

Table 20: Where the SDGs mentions are distributed across the EAs type section and SDG function (Source: own author)

		Where SDGs are mentioned in the reports								
#	SDG Function	Reference to legal framework, plans and programmes	Introduction	Diagnostic of the Environment and Social Parameters	Alternatives/Impact Assessment	Mitigation and Monitoring Plan	SDG's Chapter	Conclusion	Annex	Total of sections
1	Dropping	■								1
2	Dropping	■								1
3	Dropping	■								1
4	Dropping		■							1
5	Dropping	■	■							2
6	Scoping			■						1
7	Scoping				■					1
8	Dropping		■		■					2
9	Scoping			■						1
10	Scoping					■				1
11	Scoping						■			1
12	Dropping	■								1
13	Scoping			■						1
14	Dropping	■								1
15	Dropping	■								1
16	Testing			■						1
17	Testing	■	■		■					3
18	Scoping						■			1
19	Dropping	■								1
20	Scoping	■								1
21	Dropping								■	1
22	Scoping	■	■							2
23	Dropping								■	1
24	Scoping	■								1
25	Scoping		■							1
26	Scoping		■							1
27	Scoping	■								1
28	Dropping		■							1
29	Scoping							■		1
30	Scoping	■								1
31	Testing	■				■				2
32	Scoping					■				1
33	Dropping	■								1
34	Based	■			■				■	3
	Total	16	8	4	4	2	2	1	2	

5.3. Linking the results with those of Ravn Boes et. al. (2021)

This section discusses the findings of the present research with those presented by Ravn Boes et. al. (2021), who classified 45 EA reports according to SDG function and provided an overview of the most significant tendencies, presented in section 3.4.

The comparison was structured based on Table 3, which summarizes the results of Ravn Boes et. al. (2021) for each of the integration levels. Thus, each of these results was classified into 3 levels of verification, according to the results of the present review:

- **Verified:** Same results in both EAs reviews. Color in table: green. Symbol: "✓ " ("check").
- **Partially Verified:** Minor divergence among results of EAs reviews**.** Color in table: blue. Symbol: "━ " ("horizontal dash").
- **Not Verified:** Different results among EAs reviews. Color in table: red. Symbol: "X".

In addition, some findings not observed by Ravn Boes et. al. (2021) are described further in this section.

Table 21: Comparison between the results of of Ravn Boes et. al. (2021) and the present study. Source: own author based on Ravn Boes et. al. (2021)

Integration Level	Results of Ravn Boes et. al. (2021)	Observed in the present study?*
SDG Dropping	SDGS are considered within either the introduction to the project/plan or when outlining relevant policies and programmes	✓
	Cases which the SDGs are recognized a global strategy that can be considered in project and plan development, but the applicability is not further elaborated	✓
	Cases which refer to other plans or strategies as a reference for how the plan correlates to the SDGs	✓
SDG Scoping	Cases which assess significant impacts that sets the frame for what SDGs are relevant, although the factors that go into using the SDGs are thereafter quite nuanced	✓
	Scoping reports highlight the SDGs that would be relevant to address in the upcoming assessment report	━
	Cases which SDGs are discussed in the context of relevant policies and programmes to consider in the EA	━

	Cases which SDGs are mentioned in the empirical scoping procedure - linking SDGs to EA topics or integrating them into stakeholder dialogues	
SDG testing	The SDG testing is communicated in different parts of the EA reports	
	All reports exhibiting SDG testing describe those SDGs to which the project/plan is expected to contribute positively. Only a few includes negative evaluations	
	Evaluating the degree of a certain impact (for instance how positive or negative an impact is) is not common. And it is not supported by quantitative measures.	
	No cases consider the interrelations between SDGs, including synergies or tradeoffs in efforts to contribute to SDGs	
	Variation in how results are presented throughout the reports	
SDG based	No SDG based cases were identified	

*****Legend: Verified - color green and symbol. Partially Verified - color blue and symbol: "– ". Not Verified – color red and symbol: "X".

5.3.1. Verified outcomes

Regarding the cases of Droppings, all the outcomes observed by Ravn Boes et. al. (2021) were also observed in the review conducted in this study. The first result verified and already presented in section 5.2. was that in Dropping cases the mention of the SDGs occurs within either the introduction to the project/plan or when outlining relevant policies and programmes.

It was also identified 7 Drooping cases which recognize the SDGs are a global strategy that are considered in project and plan development (Republique de Djibouti, 2019; AETS Consortium, 2019; Amaranto et.al, 2018; AEE, 2019, Caminos de las Sierras, 2021; Ageim ingénieurs, 2019; AETS Consortium, 2019), and without a further elaborate applicability of the SDGs. In section 4.2.1., these cases are within the instances "Case where the project/plan were presented as a contributor to the achievement of and/or in alignment with the SDG" and "Case in which the SDGs were mentioned within the legal frameworks, plans and programs in the project/plan context".

Ravn Boes et. al. (2021) identified 2 of the 25 Dropping cases which refers to other plans, policies or frameworks as a reference for how they correlate to the SDGs. Meanwhile, in the present review, this instance was verified in 8 of the 15 Dropping cases (Republique du Benin, 2020;

Souleymane BALDE, 2018; DNG GL, 2019; Pöyry Tecnologia Ltda.,2020; OMEGA energia, 2019; Díaz, 2018; Ministério do Turismo, 2020). In a manner that despite this type of SDG mention was observed in both reviews, in the present one the number and the proportion of cases in this category was higher.

The outcome verified of Scoping cases was the case pattern which the project/plan framework is being used to indicate relevant SDGs (Salman, Gandárov Shadízhev 2020; Communauté Pays Basque, 2020; IDOM, 2020; PlanProtecto Consultores, 2017), which is considered by Ravn Boes et. al. (2021) the simplest form of use SDG as a scoping function. Also, the lack of methodology for determining relevance was not transparent.

In relation to the SDG testing level, in both was verified that the Testing is communicated in different parts of the EA reports as observe in section 5.2., it could be used alongside the assessment chapter within the EA report (Mundi Consulting et. al., 2018; Arcadis, 2018) or in the mitigation measures chapter (Unión Temporal,2017). Also, as observed by Ravn Boes et. al. (2021) in the Testing cases no cases consider the interrelations between SDGs, including synergies or tradeoffs in efforts to contribute to SDGs as it was indicated in section 5.1.

The variation in how results are presented throughout the reports was likewise noted. Two cases just used written text, justifying the positives impacts of the plan through SDGs (Mundi Consulting et. al.,) or assessment of the impacts using a framework based on SDGs (Arcadis, 2018). The use of table was also observed, with SDG-based indicators aimed at measuring efficiency (Unión Temporal,2017).

It is important to highlight, a common challenge between the two reviews regarding the determination of the SDG influence in EA, mainly due to the lack of methodology transparency. Some aspects were implied by the written text but there was no way to confirm them since it was a primarily textual analysis. In this context, it is observed the possibility of future reviews of SDG integration in EAs being done by other means, such as interviews with authors and stakeholders involved in the EA process.

5.3.2. Partially verified outcomes

From partially verified results, there are the cases of Scoping reports identified by Ravn Boes et. al. (2021) that highlight the SDGs that would be relevant to be addressed in the subsequent assessment report. Of the cases of Scoping verified in this study, only one scoping report was actually classified as Scoping (Junta de Andalucía, 2020b) and in it there was the identification of the SDG targets relevant to the plan, but without any indication that they would be addressed in subsequent assessment reports.

It is emphasized that the sample of scope reports in this review is smaller than the sample of Ravn Boes et. al. (2021), which analyzed 10 reports against only 2 reports in this review. As a consequence of this fact, there were not verified scoping reports in which the SDGs were

discussed in the context of relevant policies and programs that would be addressed in the upcoming assessment report, however, this discussion occurred in 4 assessment reports classified as Scoping in the present study (Junta de Andalucía, 2020a; Rio Bueno Municipalidad, 2019; IDOM, 2020). This indicates a similar trend of how the SDGs are integrated but at different stages of the EA process, hence it was classified as a partially verified result.

The SDGs linking to EAs topic, supporting its frame, was done in the following topics of SDG Scoping cases: mitigation plan (Walsh Perú, 2020; PROYMASA, 2019), the project/plan alternatives analysis (Gobierno de El Salvador,2019) and evaluation of a baseline's topic (Vetor Soluções Ambientais,2020; Linum,2020; mLsambiental, 2017). As these cases are assessment report the SDGs linking to EAs was not observed in the scoping procedure as by Ravn Boes et. al. (2021) and neither was verified any dialogue with the stakeholders taking the SDGs and their integration as a topic.

Regarding the SDG Testing partially verified outcomes as well as in the cases of Ravn Boes et. al. (2021) all the Testing described the SDGs with which the project/plan is expected to contributes positively (*Mundi Consulting et. al., 2018; Arcadis, 2018; Unión Temporal,2017).* The difference, and the assignment of the "partially verified" classification, is due to the fact that while in this review none of the cases described negative evaluations of the SDGs in the Ravn Boes et. al. (2021) review, some cases of this type were identified. It is important to note, however, that in 2 cases the use of quantitative indicators occurs (Arcadis, 2018; Unión Temporal,2017), with which it is possible to assess the degree of a certain impact (i.e,. how positive or negative an impact is). Thus, it is not possible to conclude that in these test cases negative impacts were purposely ignored or whether positive impacts were exaggerated, because in theory negative impacts could be identified through the indicators.

In addition, the use of quantitative measures to support degree assessment of a certain impact was not verified in any case of Ravn Boes et. al. (2021), which identify just one case that uses qualitative measures. As previously mentioned, 2 cases use quantitative indicators, although no case of this type which use qualitative measures was identify. Thus, not being in line of the findings of Ravn Boes et. al. (2021),

5.3.3. Different outcomes and complementary findings

Regarding the different outcomes among the EAs reviews, the first difference found was the proportion of the results classification in the integration levels. The review by Ravn Boes et. al. (2021) found 56% Dropping cases, 20% Scoping cases and 24% Testing cases, while the results in the present study were respectively: 44%, 44% and 8%. The present study also identified a Based case, a level not identified in the review by Ravn Boes et. al. (2021).

Regarding Dropping cases, there was only one exception in the patterns previously identified by Ravn Boes et.al. (2021), which was the case where SDGs are mentioned in the Assessment Impact chapter but without an inherent function (Amaranto et.al, 2018).

On the levels with higher integration, where the SDGs start to perform a function in fact, although the macro trends were totally or partially verified, the way this occurs varies a lot, i.e., in which part of the EA process this integration occurs, the lack of a standard in how this is performed and different integration methods. All these aspects identify the lack of a recognized methodology to perform this integration in practice.

Thus, the gap in the SDG narrative emphasizes by Ravn Boes et.al. (2021) is enhanced (Hacking, 2019; Morrison-Saunders et al., 2019; IAIA, 2019; Del Campo et.al,2020). While in theory the importance of SDG use is defended in practice the role of the SDGs in the EAs is still very incipient. The intention to achieve the SDGs is mentioned a considerable number of times within the EAs, but this does not extend to the incorporation within the assessment process. And usually when this incorporation is done, it is not in a clear and integrated way. The exceptions are the Testing and Based cases found; however, they are isolated cases.

In this context, one of the key challenges of the SDGs within EAs is to effectively indicate how SDGs will be achieved and to drop the speech "the project/plan will contribute to the achievement of the SDGs (...)" found in Dropping and even in Scoping cases.

Finally, it is important to highlight that the number of reports in the sample collected showed a trend of increasing use of the SDGs over the years, with 2020 being the year with the highest number of EAs (14 of the 34 cases). Hence, it is stressed that the integration of SDGs into EAs “is an emerging field, and that the prominence of the SDGs may grow in conjunction with more frequent experimentation and the development of methodologies” (Ravn Boes et.al.,2021: p.8). The divergences and shallowness in the integrations found during these studies are natural of a process that is not yet consolidated and widespread among the EA community.

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5. Conclusion

The present dissertation has reviewed the funcion that SDGs perform in 34 EAs reports. The results of this review indicated a large number of EAs that only mention the SDGs, without them actually performing a role. While in cases where the role of the SDG is to collaborate in the scoping of the EA process, the integration is still done in a non-transparent way and the influence of the SDGs on the scoping differs, ranging from active to passive.

From the cases reviewed, the SDG role in the EA process identified were the following: in 6% as scoping of the EA mitigation plan; in 3% as scoping the analysis of project/plan alternatives; in 9% as a parameter in the evaluation of a baseline topic; in 3% as a framing to assess impacts; and in 3% as a basis in the EA process with the aim of its achieviment.

In the cases where the SDGs are used as a framework for assessing, no pattern of integration was found, and different ways of assessing impacts through the SDGs were found, e.g. one case using qualitative indicators and another using qualitative indicators.

In the specific case, the role of the SDG was identified as supporting the project/plan in achieving the SDGs, and the EA was formulated for this purpose. This case represents the form in which the SDG was integrated in a more radical form, it have been the basis for the construction of the entire assesment process. However, since it was the only one identified, it still represents a very young and not very widespread form of integration.

Comparing these results with those of Ravn Boes et.al. (2021) there was general agreement between the studies. The majority part of the findings of Ravn Boes et.al. (2021) were partially or fully verified in the reviewed of EAs. The strongest similarity of results occurred when the SDGs did not play a role in EA. In the cases where SDGs exercised a role some divergences were found, mainly in how the integration occurred, reinforcing the lack of an integration methodology.

In conclusion, the role of the SDGs within EAs has been demonstrated as guiding, even if to a limited extent, the EA process in order to support the project/plan in achieving the global sustainability concept. For future research it is understood as necessary to study the integration of the SDGs in practical cases studies based on consultations with decision makers and authors of the EA process, with the aim of better understanding their perspective and motivations for this practice. Such aspects are not possible to address because these are only reviews of written texts.

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7. Annex

Annex 1: Keyword Phrases used in the systemic review.

#	Keyword phrases	Number of results (Google indicator)
Portuguese		
1	avaliação ambiental AND ("AIA" OR "Avaliação de Impacto Ambiental") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável")	208.000
2	avaliação ambiental AND ("AIA" OR "Avaliação de Impacte Ambiental") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável")	15.400
3	("Estudo de impacto ambiental" OR "AIA" OR "Avaliação de Impacto Ambiental") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável")	1.170.000
5	("Estudo de impacto ambiental" OR "EIA") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável") filetype:pdf	315.000
5	impacto ambiental AND ("RIMA" OR "relatório de impacto ambiental" OR "relatório de impacte ambiental") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável") filetype:pdf	85 300
6	("RIMA" OR "relatório de impacto ambiental" OR "relatório de impacte ambiental") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável") filetype:pdf	112.000
7	avaliação ambiental AND ("AAE" OR "avaliação ambiental estratégica") AND ("ODS" OR "Objetivo de Desenvolvimento Sustentável") filetype:pdf	65
Spanish		
8	Evaluación Ambiental AND ("EIA" OR "Evaluación de Impacto Ambiental") AND (" Objetivos del Desarrollo Sostenible" OR "ODS")	8 370 000
9	Evaluación Ambiental Y ("DIA" OR "Declaración de Impacto Ambiental") AND (" Objetivos de Desarrollo Sostenible" OR "ODS") filetype:pdf	299 000
10	Evaluación Ambiental AND ("EAE" OR "Evaluación Ambiental Estratégica") AND (" Objetivos de Desarrollo Sostenible" OR "ODS") filetype:pdf	49.400
11	"impacto ambiental" AND ("EIA" OR "evaluaciones del impacto ambiental") AND (" Objetivos del Desarrollo Sostenible" OR "ODS")	1.450.000
12	"impacto ambiental" AND ("EIA" OR "evaluaciones del impacto ambiental") AND (" Objetivos del Desarrollo Sostenible" OR "ODS") filetype:pdf	67 300
13	"estudio de impacto" AND ("EIA" OR "estudio de impacto ambiental ") AND (" Objetivos del Desarrollo Sostenible" OR "ODS") filetype:pdf	104.000
French		
14	("EIE" OR "Étude d'impacts environnementaux" OR" étude d'impact environnemental") AND ("objectifs de développement durable" OR "ODD")	1.630.000

15	(“EIE” OR “Étude d'impacts environnementaux” OR” étude d'impact environnemental”) AND (“objectifs de développement durable” OR “ODD”)	229.000
16	“impact environnemental” AND (“RIE” OR “Rapport sur les Incidences Environnementales”) AND (“objectifs de développement durable” OR “ODD”) filetype:pdf	10.600
17	“impact environnemental” AND (“RIE” OR “Rapport sur les Incidences Environnementales”) AND (“objectifs de développement durable” OR “ODD”) filetype:pdf	8.900
18	“évaluation environnementale” AND (“EES” OR “ évaluation environnementale stratégique”) AND (“ODD” OR “(“objectifs de développement durable” OR “Objectif pour le développement durable” OR “Objectifs du Développement Durable”)	49.000
19	“évaluation environnementale” AND (“EES” OR “ évaluation environnementale stratégique”) AND (“ODD” OR “(“objectifs de développement durable” OR “Objectif pour le développement durable” OR “Objectifs du Développement Durable”) filetype:pdf	29.000

Annex 2: Identification of the Reviewed Reports

#	Type	Original Name	Country	Language	Project ou Plan?
1	ESIA	TRAVAUX DE CONSTRUCTION/ REHABILITATION DU LYCEE AGRICOLE KIKA (BORGOU)	Benin (Africa)	French	Project
2	ESIA	Programme d’Appui à la Transformation de l’Agriculture Guinéenne/Volet Entreprenariat Agricole des Jeunes (PATAG-EAJ)	Guine (Africa)	French	Plan
3	EIA	PROJET D’INSTALLATION D'UNE CENTRALE SOLAIRE DE 30 MW DANS LE VILLAGE DE BLITTA LOSSO	Togo (Africa)	French	Project
4	ESIA	Projet d’Amélioration de la Performance du Secteur de la Santé (PAPSS)	Djibuti (Africa)	French	Project
5	ESIA	projet AEP Antananarivo	Madagascar (africa)	French	Project
6	EIA	PROJETO GROTA DO CIRILO – PEGMATITO XUXA CAVA SUL AMPLIAÇÃO DA CAVA NORTE	Brazil	Portuguese	Project
7	EIA	PLAN CONTROL TERRITORIAL. FASE II	El Salvador	Spanish	Plan
8	EIA	PROYECTO “EXPANSIÓN DEL ACUEDUCTO VEREDAL SALIBARBA”	Colombia	Spanish	Project
9	EIA	PARQUE EÓLICO VALDEJALÓN II	Spain	Spanish	Project
10	EIA	PROYECTO “PARQUE EÓLICO MUYU Y SU LÍNEA DE TRANSMISIÓN”	Peru	Spanish	Project

11	EIA	PARQUE EÓLICO DE ALMONACID DEL MARQUESADO.	Spain	Spanish	Project
12	EIA	Fábrica de Celulosa y Puerto en Concepción	Venezuela	Spanish	Project
13	EIA	"CENTRO DE DESARROLLO DE MANUFACTURA AVANZADA PARA LA INDUSTRIA ELECTRÓNICA DEL ESTADO DE JALISCO"	Mexico	Spanish	Project
14	EIA	ALTERNATIVA RUTA No 38-TRAMO VARIANTE COSTA AZUL-LA CUMBRE	Spain	Spanish	Project
15	EIA	Complexo Eólico Delta 10	Brazil	Portuguese	Project
16	SESA	Estudo de Avaliação Ambiental e Social Estratégica do setor do Turismo em Cabo Verde	Cape Verde	Portuguese	Plan
17	SEA	ÉVALUATION ENVIRONNEMENTALE STRATÉGIQUE DU PLAN D'AMÉNAGEMENT DES ESPACES MARINS	Belgium	French	Plan
18	SEA	PLAN CLIMAT PAYS BASQUE	France	French	Plan
19	SEA	PROJET D'AMÉNAGEMENT DE LA CENTRALITÉ DE TANGHIN À OUAGADOUGOU	Burkina Faso (Africa)	French	Project
20	SEA	Plan climat air énergie territorial de Plaine Commune 2020-2026	France	French	Plan
21	SEA	PLAN NACIONAL INTEGRADO ENERGÍA Y CLIMA 2021-2030 DE ESPAÑA	Spain	Spanish	Plan
22	SEA	Plan Andaluz de Acción por el Clima	Spain	Spanish	Plan
23	SEA	"MODIFICACIONES PUNTUALES AL PLAN REGULADOR COMUNAL DE VALDIVIA"	Chile	Spanish	Plan
24	SEA	Redacción del Plan de Residuos no Peligrosos de la Provincia de Sevilla	Spain	Spanish	Plan
25	SEA	Plan de Transporte Metropolitano del Campo de Gibraltar. Plan de Movilidad Sostenible.	Spain	Spanish	Plan
26	SEA	Plan de Transporte Metropolitano del Área de Málaga.	Spain	Spanish	Plan
27	SEA	Parque Natural Montes de Málaga y su área de influencia socioeconómica	Spain	Spanish	Plan
28	SEA	TRANSICIÓN ENERGÉTICA EN YUCATÁN	Mexico	Spanish	Plan

29	SEA	PLAN SECTORIAL DE LA ZCA BAÑADOS DEL ARROYO PANDO	Uruguay	Spanish	Plan
30	SEA	"MODIFICACIÓN DEL PLAN REGULADOR DE LA COMUNA DE RÍO BUENO"	Chile	Spanish	Plan
31	SEA	los escenarios de expansión de transporte de hidrocarburos	Colombia	Spanish	Project
32	SEA	PLAN PARCIAL DEL SECTOR SUNPI-I "LOS ALMENDROS"	Spain	Spanish	Plan
33	SEA	Avaliação Ambiental Estratégica do Município de Belo Horizonte	Brazil	Portuguese	Plan
34	SEA	ALTERAÇÕES AO PLANO ESTRATÉGICO DE DESENVOLVIMENTO DA APDL (2017-2026) E SUAS UNIDADES DE NEGÓCIO	Portugal	Portuguese	Plan

Annex 3: SDS Use Level

#	Function	Whole policy or individual goal-levels?	SDG as goal, target, indicator?	How many SDGs goals are mentioned?
1	Dropping	Whole Policy	None	None
2	Dropping	Whole Policy	None	None
3	Dropping	Individual Goal Level	Goal	One
4	Dropping	Individual Goal Level	Goal	Two
5	Dropping	Whole Policy	None	None
6	Scoping	Individual Goal Level	Target	One
7	Scoping	Individual Goal Level	Goal	Seven
8	Dropping	Individual Goal Level	Goal	Two
9	Scoping	Individual Goal Level	Goal	One
10	Scoping	Individual Goal Level	Goal	Five
11	Scoping	Individual Goal Level	Goal	Fourteen
12	Dropping	Whole Policy	None	None
13	Scoping	Individual Goal Level	Goal	Two
14	Dropping	Whole Policy	None	None

15	Dropping	Whole Policy	None	None
16	Testing	Individual Goal Level	Goal, target	Four
17	Testing	Individual Goal Level	Goal, target	Four
18	Scoping	Individual Goal Level	Goal	Thirteen
19	Dropping	Individual Level	Goal	seven
20	Scoping	Whole Policy	None	None
21	Dropping	Individual Goal Level	Goal	Six
22	Scoping	Individual Goal Level	Goal	None
23	Dropping	Whole Policy	None	None
24	Scoping	Individual Goal Level	Goal	Four
25	Scoping	Individual Goal Level	Goal	Four
26	Scoping	Individual Goal Level	Goal	Four
27	Scoping	Individual Goal Level	Goal	Four
28	Dropping	Whole Policy	None	-
29	Scoping	Individual Goal Level	None	Six
30	Scoping	Whole Policy	None	None
31	Testing	Individual Goal Level	Goal and targets	Eigh
32	Scoping	Individual Goal Level	Goal	One
33	Dropping	Whole Policy	None	None
34	Based	Whole Policy	None	None