Methodology for Establishing Environmental Proofing of Investments funded under the InvestEU Programme

Case Study Report

Accompanying the Draft Technical Support Document

RPA Europe

EUROPEAN COMMISSION

Methodology for Establishing Environmental Proofing of Investments funded under the InvestEU Programme

Project Ref. 07.0203/2019/815252/SFRA/ENV.F.1

Case Study Report

Accompanying the Draft Technical Support Document

Marco Camboni, Rima Rumbauskaitė (RPA Europe S.R.L.)
Elizabeth Daly (Risk & Policy Analysts Ltd)
Shailendra Mugdal (B'Innov)
Zsolt Lengyel
François Levarlet (t33)
Jean-Marc Brignon (Ineris)
Ilkka Pentinnen (VVA)
Salam Kaddouh (Sofies)
Maria Salvetti (IAE de Paris - Sorbonne Business School)
November 2020

Luxembourg: Publications Office of the European Union, 2021

PDF ISBN 978-92-76-39406-8 doi:10.2779/848091 KH-09-21-250-EN-N

Table of Contents

1 Introduction 1

1.1 Objectives of the case studies 1

1.2 Criteria for case study selection 2

1.3 Case study selection 2

2 Case study 1: Expansion of a Food Processing Plant 2

2.1 Overview 2

2.2 Project description 2

2.3 Environmental assessment carried out 2

2.4 Quantification and valuation 3

2.5 Environmental proofing for InvestEU Programme 4

3 Case study 2: Construction of a New Wastewater Treatment Plant 12

3.1 Overview 12

3.2 Project description 12

3.3 Environmental assessment carried out 12

3.4 Quantification and valuation 13

3.5 Environmental proofing for InvestEU Programme 13

4 Case study 3: Expansion of a Metal Refining Facility 16

4.1 Overview 16

4.2 Project description 16

4.3 Environmental assessment carried out 16

4.4 Quantification and valuation 17

4.5 Environmental proofing for InvestEU Programme 18

5 Case study 4: Construction of a Healthcare Facility 20

5.1 Overview 20

5.2 Project description 20

5.3 Environmental assessment carried out 20

5.4 Quantification and valuation 21

5.5 Environmental proofing for InvestEU Programme 22

6 Case study 5: Waste to Energy Treatment Facility 23

6.1 Overview 23

6.2 Project description 23

6.3 Environmental assessment carried out 23

6.4 Quantification and valuation 24
6.5 Environmental proofing for InvestEU Programme 25

7 Case study 6: Hybrid Vessels 28
7.1 Overview 28
7.2 Project description 28
7.3 Environmental assessment carried out 28
7.4 Quantification and valuation 28
7.5 Environmental proofing for InvestEU Programme 29

8 Case study 7: Timber Production 30
8.1 Overview 30
8.2 Project description 30
8.3 Environmental assessment carried out 30
8.4 Quantification and valuation 31
8.5 Environmental proofing for InvestEU Programme 32

9 Case study 8: Loan Programme through Financial Intermediaries 33
9.1 Overview 33
9.2 Project description 33
9.3 Environmental assessment carried out 33
9.4 Quantification and valuation 33
9.5 Environmental proofing for InvestEU Programme 33

10 Case study 9: Environmental Profit & Loss Methodology 34
10.1 Overview 34
10.2 Impact areas 34
10.3 Steps for establishing an E P&L 35
10.4 Methodological principles 36
10.5 Application for environmental proofing 37

11 Conclusions 38

1 Introduction

1.1 Objectives of the case studies

This report presents the findings of testing the technical support guidance document for the environmental proofing of projects that may be funded by the InvestEU Programme. The objective was to highlight the value-added of the proposed approach for environmental proofing compared to existing practices, while considering its operational feasibility (i.e. the ease of application by those implementing partners with no or little experience with the assessment of environmental impacts of projects) and any administrative burden or time delay this may cause.

For each one of the nine case studies developed, the report presents a description of the assessment process and the information it provides. This covers the analysis undertaken in relation to:

- The Commission Guide to Cost-Benefit Analysis of Investment Projects and any other relevant guidance from the Commission, the European Investment Bank or other relevant InvestEU implementing partner;
- Corporate environment accounting;
- The Environment Impact Assessment or Strategic Environmental Assessment Directive procedures;
- Climate proofing undertaken (not main focus of the study);
- Social analysis undertaken (not main focus of the study).

The case studies have been developed on the material provided by implementing partners and refer to real assessments carried out by implementing partners on real projects in the past years. As some of the material (which have been provided in the languages of the countries where the projects have been implemented) contains confidential business information, the case studies have been anonymised to avoid the identification of the actual projects, project promoters and implementing partners involved.

For each case study, the report identifies the information available capturing and summarising the environmental impacts and risks and any other useful environmental performance information generated by other project planning requirements (e.g. to meet the assessment and reporting requirements for EU legislation relating to habitats, national emissions ceilings, major accidents prevention, etc.). The information may relate to the project planning, operation and, where relevant, decommissioning. The report indicates whether the information provided is qualitative or whether the environmental impacts of the project across its lifecycle have been quantified. In addition, the report explores whether the physical impact performance data have been or could be monetised to ensure that the socio-economic value of projects reflects the environmental merits.

The first two case studies provided in the report ("Expansion of a food processing plant" and "Construction of a new wastewater treatment plant") have been further investigated and used to show, in more detail, how the application of environmental proofing for the InvestEU programme would have worked in practice. The first case study refers to a project listed in Annex II of the Environmental Impact Assessment Directive[1] (EIAD) and articulated in two phases, with the first phase screened out by the national authorities and the second phase requiring an environmental impact assessment (EIA) and corresponding Industrial Emissions Directive and Integrated Pollution

[1] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 (OJ L 124, 25.4.2014, p. 1).

Prevention and Control Directive (IED-IPPC) integrated permits. The project is within a Natura 2000 protected zone falling under both the Birds and the Habitats Directives. The second case study refers to a project listed in Annex I of the EIAD and therefore requiring a mandatory EIA. The differences in the two case studies allow to show how the functioning and added value of the environmental proofing process for projects with different levels of environmental assessment required by the legislative framework.

1.2 Criteria for case study selection

The following criteria were defined for the selection of the case studies:

- Include projects and actions with potential significant impacts on the main Natural Capital compartments (Air, Water, Land and Biodiversity);
- Include projects with potential impacts during construction, operation and/or decommissioning;
- Include projects and actions with both environmental (e.g. wind farms) and non-environmental (e.g. industrial development) objectives;
- Include EIA Annex I projects and EIA Annex II projects screened out by the authorities;
- Include actions (financing and investment operations) covered by the SEA Directive;
- Include small and large investments;
- Include different types of financing (direct financing of final recipients, intermediated finance of infrastructure projects, intermediate finance of SMEs and mid-caps);
- Include projects and actions with climate and social impacts being reviewed in the context of the climate and social proofing exercises;
- Include projects and actions which have undergone assessments by different institutions, following different methodologies and involving different levels of quantification and monetisation of the environmental impacts.

1.3 Case study selection

The project portfolios of some of the implementing partners and the inventory of projects financed through the European Regional Development Fund and the Cohesion Fund (https://ec.europa.eu/regional_policy/en/projects) were screened to identify projects according to the defined criteria. A first long list of potential case studies was submitted to the Steering Group and implementing partners and revised according to the feedback received. An additional criterion was added in order to select and differentiate projects and actions among the four different policy windows defined by the InvestEU programme (sustainable infrastructure; research, innovation and digitisation; SMEs; social investment and skills) and that were financed through one or more of the 14 finance instruments now within the InvestEU remit.

The table below presents the eight projects for which background information and assessment reports have been provided by the implementing partners. In addition, the review of the Kering's Environmental Profit & Loss (EP&L) report is presented as an example of corporate environmental accounting. The EP&L measures carbon emissions, water consumption, air and water pollution, land use, and waste production along the entire supply chain, in order to make the various environmental impacts of the Kering group's activities visible, quantifiable, and comparable. These impacts are then converted into monetary values to quantify the use of natural resources.

Table 1-1: Case studies					
	Project type	**Policy window**	**Sector**	**Funding size**	**EIA?**
1	Expansion of a food processing plant	SMEs Annex II 7.	Bioeconomy	€20M - €50M	Fall under Annex II – screened out
2	Construction of a new wastewater treatment plant	Sustainable infrastructure	Wastewater management	>€100M	Yes
3	Expansion of metal refining facility	Research, innovation and digitisation	Industry - Manufacturing	€50M - €100M	Yes
4	Construction of a healthcare facility	Social investment and skills Annex II 11. d) iii)	Health and long-term care	>€100M	EIA Annex II screened in
5	Waste to energy treatment facility	Sustainable infrastructure Annex II 3b. Environment and resources	Waste management	€50M - €100M	Yes
6	Hybrid-electric ferries	Sustainable infrastructure	Transport	€20M - €50M	No
7	Biofuel production	SMEs	Wood products and biofuel by-products	€10M - €20M	No
8	Loan through financial intermediaries for eligible environmental projects, which may include investments in the energy efficiency of private buildings and businesses, and alternative energy solutions	Sustainable infrastructure; Research, innovation and digitisation; SMEs	Energy	€20M - €50M	No
9	Kering's Environmental Profit & Loss	SMEs; Sustainable infrastructure	Construction, forestry, pulp and paper, trade and retail, as well as logistics and IT	-	-

2 Case study 1: Expansion of a Food Processing Plant

2.1 Overview

The project has the objective of expanding the capacity of an agricultural processing plant producing food and fodder for animal husbandry built in a brownfield with exceptional value-chain logistics connections (rail, maritime, road). The project's implementation is structured in different phases over four years, and eventually results in the doubling of the production capacities of the country's sunflower oil market leader and further enabling its foreign market expansion. The project is financed through a split between owner's equity (50%) and a senior loan (50%) and in the €20 million - €100 million value range.

2.2 Project description

The new installation will include storage, husking, pressing and extraction of oilseeds with corresponding plants for extrusion, press, extraction, groats pelleting, oil cake pelleting and steam and silos for oil crops (over 5 thousand cubic metres) and cakes (around two thousand cubic metres) and oil storage tanks (over 15 thousand cubic metres).

The production capacity passes from around 300 tonnes per day during the first phase of the project to around 600 tonnes per day in the second phase. The residues of the oil production will be used for oil cake (animal fodder) and biomass energy (for on-site heat production).

The project's key objective is increasing the oilseed processing capacity of the company at a new production facility that has competitive advantage due to its proximity to both the agricultural production regions and international transportation hubs allowing for road, rail and maritime transportation of raw materials and end-products. Project promoter's primary aim is to produce for export markets both within and outside of the EU.

2.3 Environmental assessment carried out

The project falls under the Environmental Impact Assessment Annex II and was screened out with regard to its first phase but required a full EIA and corresponding IED-IPPC integrated permits in its second phase. The project is within a Natura 2000 protected zone falling under both the Birds and the Habitats Directives.

Project's installation design and equipment choices address Best Available Technologies (BAT) levels for compliance in all key impact areas such as energy efficiency, dust, odour and hexane recovery. Phase II of the project falls under the Industrial Emissions Directive requiring EIA-IPPC integrated permit and all other relevant permits. The onsite 10 MW biomass heat boiler using production residues is below the 20 MW EU Emissions Trading Directive's capacity threshold.

The project promoter carried out the initial assessment resulting in the Competent Authority's decision to "screen out" the project. Therefore, due to the "screening out" no assessment was required for permitting purposes under Phase I. Phase II permitting is not yet completed. Site specific information about the Natura 2000 have been available for the Competent Authority independently from the project promoter. The EIA screening out occurred before the financial closure for the Phase I of the project. The required assessment for Phase II - EIA-IPPC integrated permitting is carried out after the loan approval.

Climate proofing was not carried out for Phase I, the brownfield investment, though the area is on a low-lying floodplain potentially resulting in supply-chain logistics and/or site related disruptions. Extreme weather event proofing (heatwaves, etc.) could have also been beneficial from a raw materials and product storage safety perspective.

No social proofing was carried out. The estimated impact of the new plant on local employment is over 300 jobs during the years of construction and over 100 jobs during project operation.

The detailed consideration of Natural Capital compartments is applicable only after phase II.

Given the phase I "screening out" and corresponding lack of detailed assessment and the phase II EIA-IPPC integrated permitting requirements, the financing decision included specific conditionalities for Phase II guaranteeing that unless full regulatory compliance is secured, the loan will not be disbursed (i.e. failure to comply with the IPPC permitting requirements of phase II will lead to loan termination). Had there been a proofing carried out, the financing decisions would have taken the findings into consideration.

As the project area – both production facilities and especially storage areas – is expected to grow during the implementation of phases I and II, monitoring of environmental impacts is of crucial importance. Monitoring of impacts outside of the facility – from transport to noise and light pollution – is also of fundamental importance given the activity is within a Natura 2000 area.

2.4 Quantification and valuation

For phase I no environmental assessment or proofing was carried out, while for phase II the assessment is under way.

For the Competent Authority's screening-out decision, both qualitative and quantitative data was provided by the project promoter. As the production site is on a brownfield, situated within a Natura 2000 area, the Competent Authority has (access to) site specific data/information beyond what the project promoter had presented.

As the project promoter operates two other production facilities within the country, though outside of the Competent Authority's area, the initial submissions were deemed professionally sufficient (i.e. no clarification or additional information was requested, with the exception of requiring details of the on-site wastewater treatment plant that was not detailed well enough in the initial submission).

The evaluation for the screening out decision covered all site, and technology relevant criteria, corroborated with site specific information available at the Competent Authority, were used to assess air and climate change, water, land and biodiversity impacts in a qualitative manner. This, together with the proposed new plant, with its BAT/BREF compliant design specifications, were deemed sufficient to justify the screening out decision for Phase I. The table below contains the issues related to the impact areas considered for the screening out decision.

Table 2-1: Impact areas considered for the screening out decision

Impact	Source of impact/evaluation criteria
Air Quality and Climate change	Transport related and production process related: dust, PM_{10} and $PM_{2.5}$ concentration, hexene handling, biomass heat boiler emissions, deposited waste (organic, inorganic)
Water	Hydrological & hydrogeological impacts on groundwater and surface water: quality and flows
Land	Potential contamination, conversion of land use (from natural habitat to storage area)

Table 2-1: Impact areas considered for the screening out decision	
Impact	**Source of impact/evaluation criteria**
Biodiversity	Natura 2000 site impacts (noise, light pollution bot form site specific activities and transport)

2.5 Environmental proofing for InvestEU Programme

2.5.1 Overview

If the project promoter would have applied for funding through the InvestEU Programme, the project would have had to undergo environmental proofing, as the total project cost exceeds the threshold of €10 million. Therefore, it would have had to follow the screening and proofing approach as described in the technical support guidance document. This section describes how the environmental proofing process, more precisely the four steps envisaged in the guidance document, would have applied to the first phase of the project.

As a pre-requisite, all InvestEU supported operations, irrespective of whether subject to sustainability proofing or not, should be consistent with the core environmental policy objectives underlying EU legislation, as well as the core environmental principles enshrined in the Treaty on the Functioning of the European Union, and should comply with applicable EU and national legislation.

In this case, the implementing partner (IP) would have had to verify compliance of the project with key EU environmental directives. Annex 1 of the technical support document provides the Checklists for the legal compliance check. Answering the questions for compliance checks with EU environmental legislation (Checklist 3-1), EIA Directive (Checklist 3-2), Habitats and Birds Directive (Checklist 3-3) and Water Framework Directive (Checklist 3-4) would have helped the IP not only to verify compliance but also to develop an understanding of the likely scope of environmental proofing requirements.

The technical support document details four main steps for the environmental proofing and screening process. These steps, as applicable to the proofing of this case study, are provided in the next sub-sections.

2.5.2 Step 1: Identify if the project needs to go through sustainability proofing

Environmental proofing aims to capture the residual (post-mitigation) environmental impacts over the lifetime of the project, with the project lifetime defined as the life of the capital asset resulting from financing or the operational life of a project which does not involve capital financing. It therefore extends beyond the life of the finance itself, to ensure that significant residual impacts that would last beyond the period over which a loan, for example, is paid back are taken into account.

The first step consists of verifying whether the project needs to go through sustainability proofing. Since the total project cost exceeds the €10 million threshold and falls under the EIA Annex II, but its phase I was screened out by the national competent authorities, it would have had to go through the InvestEU screening to identify if proofing should be undertaken, and for which impacts.

Step 1 involves information collection on the impacts, consideration of the mitigation hierarchy and use of the screening checklists to identify whether there are any significant impacts that the project may give rise to after consideration of mitigation measures.

The application of the screening checklists would have helped the IP in identifying additional information necessary to fully assess impacts already identified in the documentation presented by

the project promoter and in recognising other potentially significant impacts not previously identified. The identification of negative and positive impacts facilitates the determination of follow-up actions and/or risk mitigating measures.

Environmental proofing for impacts on air quality

Checklists provided in Annex 2 of the technical support document help to identify significant negative or/and positive impacts on the air quality. Previously performed assessment by the project promoter and information used for the decision of screening-out considered several aspects related to impacts on air in relation to transport and production processes. It covered: dust, PM_{10} and $PM_{2.5}$ concentration, hexene handling, biomass heat boiler emissions, deposited waste (organic, inorganic). In addition, the following negative and positive potentially significant impacts could have been identified in step 1:

- Potentially significant negative impacts on Air:
  - Transportation (changes in transportation modes, transport routes on or around the location): The project involves transportation of almost 1 million tonnes of raw materials and products per year using existing rail and road infrastructure. Though the area is already industrialised with major manufacturing and a port, the (air) impacts generated by additional traffic could be significant.
  - Processing activities at the plant may lead to significant emissions of air pollutants.
  - Consequential development: The development/extension of the port infrastructure – both for importing raw materials and exporting products - could have significant impact.
  - Other activities required as a consequence of the project: The handling of the inert waste (up to 10 000 tonnes / year; i.e. 2% of processed raw materials) would result in dust/air quality concerns both on-site and where its final depositing occurs.
- Project characteristics reducing impacts on Air:
  - Energy efficiency / renewables / energy in waste: The entirety of the benefits of the biomass residue use for on-site heat production could have been captured more fully, including the trade-offs between alternative fuel use, air emissions associated with biomass burning etc.).
  - The BAT/BREF approach applied in sourcing the production equipment could have been further enhanced by applying a proactive “air impact reduction” lens.

Environmental proofing for impacts on water

Checklists provided in Annex 3 of the technical support document help to identify significant negative or/and positive impacts on water. Previously performed assessment by the project promoter and information used for the decision of screening-out considered hydrological and hydrogeological impacts on groundwater and surface water (quality and flows). In addition, the following negative and positive potentially significant impacts could have been identified in step 1:

- Potentially significant negative impacts on Water:
  - Inland, coastal, marine or underground water bodies: The project is on a Natura 2000 area and a stream is one of its borders. Any (in)organic flow associated with production/storage/cleaning/etc. entering either underground water bodies or the surface waters of the Natura 2000 site (situated downstream form the production facility) can cause significant impact.

- Important or sensitive areas due to their ecology, e.g. wetlands, watercourses or other waterbodies: The site is located on a Natura 2000 area. The primary production area is a brownfield, but the areas used as (temporary) storage facility for inert waste (separated from the raw materials) are on the areas that have been part of the natural habitat.
- Consequential development: The industrial cluster developing around the port and the implied increased road and rail traffic is likely to have negative impacts on the water bodies.

- Project characteristics reducing impacts on Water:

  - Water efficiency and discharges to the water environment: The EIA screening-out process highlighted the need and specificities of the on-site WWT installation at relatively late stage of project preparations.
  - Hazardous substances to the water environment: The BAT approach and the multiple safety layers of design and process regulations have addressed the risk of water (air, soil) contamination aspects.
  - Other actions limiting impacts on the water environment: transport (on and off-site), rainwater discharge etc. could have gotten more (systemic) attention.

Environmental proofing for impacts on land and soil

Checklists provided in Annex 4 of the technical support document help to identify significant negative or/and positive impacts on land and soil. Previously performed assessment by the project promoter and information used for the decision of screening-out considered potential contamination, conversion of land use (from natural habitat to storage area). In addition, the following negative and positive potentially significant impacts could have been identified in step 1:

Potentially significant negative impacts to land and soil:

- Removal of vegetative soil cover, decline in soil organic matter, soil contamination, sealing due to increased transport, loss of soil biodiversity, undeveloped area where there will be loss of greenfield land: As the project not only covers a brownfield site but is a part of Natura 2000 area, attention to these factors could have resulted in alternative design and operation modalities.
- Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions: The location is in a low-lying flood-plain with exposure to flash-flooding and/or seasonal flooding. The changes to the surface in (temporary) storage areas can lead to soil loss due various factors (from flooding to erosion, etc.).

- Project characteristics reducing impacts on land and soil:

  - Remediation of contaminated sites: Information regarding the soil quality of the pre-existing brownfield site is not documented/known hence remediation needs/activities cannot be assessed.

Environmental proofing for impacts on biodiversity

Checklists provided in Annex 5 of the technical support document help to identify significant negative or/and positive impacts on biodiversity. The following negative and positive potentially significant impacts could have been identified in step 1:

- Protected sites or locally important sites, areas on or around the location that are important or sensitive, other factors which should be considered such as consequential development, areas already subject to pollution or environmental damage: The project area (brownfield and surrounding natural habitats) and its adjoining areas are either on Natura 2000 site or in its immediate proximity. Both direct project activities on-site (i.e. deposition of inert waste derived from raw materials) and offsite (transport of around 1 million tonnes of raw materials and end products) could have a significant impact on the Natura 2000 area.

- Project characteristics reducing impacts on biodiversity:

  - Project design to limit impacts on biodiversity, environmental good practice in project operation: More attention could be drawn to pre-emptive/preventive design and corresponding operational measures based on these issues.

Environmental proofing for impacts on cross-cutting areas

Checklists provided in Annex 6 of the technical support document help to identify significant negative or/and positive impacts on cross-cutting areas. Previously performed assessment by the project promoter and information used for the decision of screening-out considered aspects of Natura 2000 site impacts (noise, light pollution both from site specific activities and transport). In addition, the following negative and positive potentially significant impacts could have been identified in step 1:

- Potentially significant impacts on cross-cutting areas:

  - Noise and Vibration levels, changes in transport infrastructure or rolling stock: Operations and transport may contribute to noise and vibration levels not experienced by local population and local habitats beforehand.
  - Light: Rise to the potential for light pollution - the 24/7 operation of the plant, corresponding logistics and transportation is a likely source of light pollution on a Natura 2000 area interfering with the bird population (i.e. daily cycles, migration routes).
  - Hazard-related safety issues: Hazardous materials are used in the industrial process with all design and procedural precautions.

- Project characteristics reducing impacts on cross-cutting areas:

  - Specific measures to reduce noise or vibration: Transport and loading/unloading related noise reduction could have been part of the design but can also be installed during operations.
  - Specific measures to reduce light emissions: Design and operational provisions can be applied to reduce light pollution, at least in the direction of the Natura 2000 area (as the site is on the edges of the Natura 2000 area).

2.5.3 Step 2: Assessment of impacts

Because residual potentially significant impacts were identified in Step 1, the IP should follow with Step 2 and therefore assess the information provided by the project promoter in order to evaluate the significance of impacts and the potential for their reduction. (How this would have contributed to the assessment of phase I of the project is provided in the following sub-sections.

2.5.3.1 Impacts on air quality

The main cause of significant impacts on air quality is related to transportation and processing activities which give rise to emissions of air pollutants. The data on certain emissions is provided in the table below[2]. The assessment of this information is in addition to the previously performed assessment by the project promoter, complementing other aspects relating to impacts on air quality (such as dust, hexane use etc.).

Table 2-2: Data on significant emissions of concern

Source of emissions (activities)	Pollutant	Quantities emitted, kg	Factors / Description
Processing	CO_2	2000 / tonne	300 tonnes of production are produced per day, leading to annual 220 000 tonnes of CO2 emissions.
Transport	CO_2	1500 / tonne	1 million tonnes of raw material and products transported per year. This leads to total annual 1.5 million tonnes of CO2 emissions.
Processing	SO_2	3 / tonne	300 tonnes of production are produced per day, leading to annual 330 tonnes of SO_2 emissions.
Transport	SO_2	2 / tonne	1 million tonnes of raw material and products transported per year. This leads to total annual 2000 tonnes of SO_2 emissions.

Additional information shall have been provided to the IP in relation to energy efficiency and use of renewables for on-site heat production, including the data on impacts for CO_2 emissions' reduction. This would have enabled IP's consideration of the positive impacts of the project.

2.5.3.2 Impacts on water

The project is on a Natura 2000 area with a stream as one of its borders. Any (in)organic flow associated with production/storage/cleaning/etc. entering either underground or surface waters could have potentially significant negative impacts. In addition, the project requires extensive water supply capacity. Data available in relation to impacts on water is provided in the table below.

Table 2-3: Data in relation to impacts on water

Activities and project phase	Resources / outputs	Quantities	Description
Processing	Water usage	30 m3/hour	Facility operational 24/7
Household needs	Water usage	0,4 m3 / hour	Facility operational 24/7

[2] Even though technical support document does not cover GHG emissions, indicating key data may help IP in raising awareness of the significance of impacts. The separate proofing guidance developed specifically to assess climate impacts and GHG emissions should be referred to as necessary by the project promoter.

Table 2-3: Data in relation to impacts on water			
Processing	Waste water	1 m3/ hour	Facility operational 24/7; Potentially contains FFAs, H2SO4, SO4, solving agents, pesticides residues

The project may lead to the industrial cluster developing around the port and the implied increased road and rail traffic which is likely to have negative impacts on the water bodies. There is a lack of the data regarding the foreseen developments, which should have been projected and provided by the project promoter.

2.5.3.3 Impacts on Land

The project requires the land take of several thousand hectares, situated within a Natura 2000 area. While previous assessment had considered such aspects as potential contamination and conversion of land use (from natural habitat to storage area), additional information on the loss of greenfield area and potential significant impact on soil due to weather conditions should have been provided to the IP by the project promoter. This would contribute to the assessment of significant impacts on land.

In addition, information on brownfield soil quality and remediation measures would allow IP to assess the positive impacts on land the project may have.

2.5.3.4 Impacts on biodiversity

The project area (brownfield and surrounding natural habitats) and its adjoining areas are either on Natura 2000 site or in its immediate proximity. Both direct project activities on-site (i.e. deposition of inert waste derived from raw materials) and offsite (transportation of around 1 million tonnes of raw materials and end products) could have a significant impact on the Natura 2000 area. Project promoter should have provided additional information on impacts on biodiversity to the IP for assessing the impacts.

The following information on impacts on key species and habitats should have been identified: description with quantification where possible, e.g. area and populations likely to be affected, way in which designated features are expected to be affected, implications for habitats and species outside of the boundaries of the site etc.

2.5.3.5 Impacts on cross-cutting areas

The previous assessment covered the data in relation to noise level during the construction phase of the project, as provided in the table below.

Table 2-4: Data in relation to noise level during construction phase		
Activities	**Level, db/A**	**Description**
Construction work	73	People and biodiversity (birds and animals) near the project location will be affected
Construction machinery	75	
Trucks	68	

However, the noise and vibration impact from operational activities and transportation should have been further assessed. The table below provides data in relation to the noise level from different activities.

Table 2-5: Data in relation to noise level		
Activities	**Level, db/A**	**Description**
Transportation (truck)	90	Impact spreads to transport routes
Processing	85 -100	Localised impact

Project promoter should have also provided IP with the information on the level and effects of light pollution. Since the project is located in Nature 2000 area it is important to take light pollution into account for the assessment of impacts.

2.5.4 Step 3: Monetary valuation

Next step in the environmental proofing process is to perform the monetary valuation of the identified and quantified impacts. It should be noted that monetary valuation may be feasible not for all impacts.

Sections below provide exemplary monetary valuations for certain impacts on air and cross-cutting areas. For the monetisation of impact on water, land and biodiversity additional data would be required (e.g. amount of pollutant in the waste water, extent of biodiversity to be affected etc.).

2.5.4.1 Impact on Air

Using air pollution damage cost values for use in proofing of transport projects from the "Handbook on external costs of transport" (see technical support document, Annex 2), monetary value of pollution costs of SO_2 emissions arising from transportation activities of project Phase I can be obtained. The estimation is provided in the table below.

Table 2-6: Calculations of monetary value of air pollution costs			
Total SO_2 Emissions from transport, ton	**Damage cost in** €/kg (EU28)	**Total costs, €**	**Factors / Description**
2000	10.9	€21.8 million	Covers all effects – health, crop loss, biodiversity loss, material damage.

2.5.4.2 Impact on cross-cutting areas

Annex 6 of the technical support guidance provides example values for noise cost for road transport. On average 0.08 €-cent per tkm (for suburban areas) could be used for determined the monetary value of noise impact caused by transportation activities of the project Phase I. Yet there is lack of the data on the expected transportation routes and distances in relation to supply of raw materials and transportation of final product which would be necessary for the cost calculation.

2.5.5 Step 4: Due diligence and reporting

Step 4 includes IP reviewing the information resulting from Steps 1-3 to determine whether the proofing process has been followed as required and that aspects such as the mitigation hierarchy have been given due consideration. Reporting includes setting out assumptions underlying the assessment carried out and any associated uncertainties which may impact on the final conclusions.

2.5.6 Conclusions

The availability and application of the environmental proofing could/would have resulted in the following potential project design / financial structuring improvements:

- Better understanding of the direct and indirect impacts (transport, light, non-brownfield area utilisation, etc.) on the Natura 2000 area;
- Clearer understanding of the implication of the Phases (I and II) of the project on environmental issues and their respective treatment (i.e. due to the staging, EIA necessitated design adjustments are hard/costly to be implemented);
- Financial (lending) conditionalities could have been replaced by a non-phased approval process reducing regulatory approval risks for both the implementing partner and project promoter.

Moreover, the proofing guidance could be applied by all project stakeholders, at reasonable costs, at an early stage of the project development and funding negotiations. It must be noted that the application of the proofing could have resulted in a non-phased implementation approach allowing for the use of the full technical capacities of the plant at an earlier date than under the phased approach. However, the start of the operations could have been delayed significantly due to a potentially lengthy permitting process upfront. Such approach would have reduced the operational/permitting risk both for the lender and the project promoter.

In addition, following Step 3 of the technical support document would have supported both project promoter and implementing partner in monetising impacts on all the natural capital elements, allowing for the use of standardised, replicable common metric (monetary value) for all impacts. Given the nature of the project and its specific location, the aggregated monetised value of the natural capital impacts (air and climate change, water, land and biodiversity) would have likely been negative. The value added of the monetisation is the ability to compare and rank the various, interdependent impacts – such as the impact of transportation on biodiversity, air quality and production related noise and light – with each other. Ranking and comparison allow for the most cost-effective interventions to be implemented. It must be noted that monetisation at an early project design phase would have allowed for potential modifications that may have been proven very costly and/or difficult at a later stage (i.e. during the Phase II permitting process, when the modification of Phase I installations is cumbersome or not even possible).

3 Case study 2: Construction of a New Wastewater Treatment Plant

3.1 Overview

The IP is providing a direct loan of over €100 million to the project promoter for the construction of a new wastewater treatment plant. Part of the funding for the investment is raised through a blue bond. The new wastewater treatment plant is being developed to answer to the following challenges:

- Population growth: in 20 years, the current load is expected to be 1.5 times higher;
- Increasing strict requirements by the authorities (e.g. on phosphorus, nitrogen and expected future requirements on micropollutants);
- Protection targets for the load recipient sea;
- Increasing nutrient levels in influent wastewater due to increased consumption of proteins;
- Climate change adaptation (more runoffs to sewers, floods).

The project aims to achieve high quality treatment results and a secure and safe operating facility through the careful construction and operational risk management, instructed by the principles of energy efficiency, cost efficiency and minimal harm to nearby residents and nature. Technical solutions will be applied to mitigate and adapt to climate change.

3.2 Project description

The project concerns the design, construction and operation of a new wastewater treatment plant for a city with around 500,000 inhabitants. The plant is designed to treat 150,000 m^3 of wastewater a day. The construction is expected to take 10 years. The wastewater treatment units are planned to be built underground. The structures planned above ground include administrative buildings, sludge and gas handling facilities, fuel and methanol storage as well as the exhaust stack. The project includes a ~10 km long sewage tunnel to discharge the wastewater effluent to an existing tunnel that will finally discharge into the sea around 10 km off the coastline. The new wastewater treatment plant will replace the old wastewater treatment plant serving the city, providing more treatment capacity and more efficient nutrient removal.

Depending on the growth of processing volumes, the productivity of the plant is expected to be at least 20 percent higher than that of the existing plant. The plant and the pipelines will connect new large residential areas to the regional sewerage network.

3.3 Environmental assessment carried out

The project falls within Annex I of the EIA Directive and therefore requires an EIA. The construction site is far from any sensitive ecological sites and will not require assessments in compliance with the Birds and Habitats Directives. The development of course takes into consideration the requirements of the Water Framework Directive.

The EIA considered impacts on all compartments: air and climate change, water, land, biodiversity and cross-cutting impacts such as noise, vibration and odour. For the latter, samples from the old WWTP and spread models were used to estimate the number of hours per year with clearly recognisable odours. The actual WWTP will be underground with the buildings on the surface hosting the administration offices and being inserted in a forested area.

The plant will recover heat from effluent wastewater and exhaust air ensuring complete self-sufficiency for heat. The plant's consumption of electricity will be part covered (50%) by on-site gas engines and solar power panels on rooftops.

3.4 Quantification and valuation

The environmental and social proofing is conducted based on the provisions illustrated in the IP's Sustainability Policy and Guidelines. It is worth noting that the level of details of the environmental review request is proportionate to the category of project scrutinized (i.e. project of type "A", "B" or "C"). This project falls under the project risk category 'C' (i.e. low potential negative effects: *projects with minimal or no negative environmental potential impact)*. The assessment conducted is both qualitative and quantitative, according to the IP's guidance. As a general approach, the IP carries-out an assessment based on a multi-criteria analysis. The environmental review is carried out directly by the IP environmental experts and monetization is not foreseen.

Construction requires drill and blast methods for the excavation of the caverns that will host the WWTP. The permit values for noise and vibration are set by the authorities and there are systems to prevent the accumulation of dirt and the spread of dust from the construction site. There are also groundwater leakage controls by pre-grouting and concreting. The excavated rock (approximately 1 million cubic metres) will be partly crushed on site to minimise traffic and the crushed stone will be used in the construction works when possible. The traffic and loads per hour have been estimated. The crushing plant will be located far from residential areas, irrigation will be used for dust control and land shaping for noise control.

The original development plan has been evaluated and updated after 3 years and takes into consideration new town development plans.

3.5 Environmental proofing for InvestEU Programme

3.5.1 Overview

This section provides a discussion on what additional assessment might have taken place had the environmental proofing guidance for InvestEU Programme been applied to the case study. It briefly considers each of the four steps of the proofing process as well as compliance checking. It then draws some overall conclusions on what application of the proofing process could have provided.

3.5.2 Compliance checking

The project has undergone an EIA and the key EIA requirements are assumed to have been fulfilled. The EIA notes that a new environmental permit is to be applied for and separate evidence of the permit application has been supplied. Since an EIA has been performed, InvestEU screening and proofing would therefore be a requirement rather than a voluntary option.

Regarding biodiversity, the construction of the plant is not expected to affect a Natura 2000 site. However, the sea gulf receiving the output from the new wastewater treatment plant (via a river) is a Natura 2000 site and a bird protection area. Subject to the extent of the impacts, this suggests that proofing for impacts on biodiversity may be required.

Of relevance to the Water Framework Directive, the existing assessments cover information on likely loadings (e.g. phosphates, nitrates) from the plant along with current waterbody status data. The potential for water impacts suggests that proofing for water may be required.

3.5.3 Step 1: Identify if the project needs to go through sustainability proofing

Since the project has an EIA, it is deemed mandatory that proofing occurs.

The checklists and reporting tables suggested in the technical support guidance may have helped the IP and the project promoter to better summarise the identified impacts and guarantee increased transparency. They would also have enabled the IP to showcase that different location options for the treatment plant were considered at the start of the process, in line with the mitigation hierarchy outlined in Step 1 of the proofing process. Mitigation measures such as use of irrigation for dust control and landscaping for noise control have also been recorded in the available documentation. Proofing would ensure that this information was easily accessible.

3.5.4 Step 2: Assessment of impacts

The assessment carried out for the development of this new WWTP was a state-of-the-art EIA, considering all significant impacts in qualitative and quantitative terms. This information could be utilised to identify the expected impacts to the four capitals in the proofing process (air, water, land and biodiversity).

Considering cross-cutting impacts, noise has been taken into account in terms of construction noise. Other available documentation for the project mentions noise levels in relation to government guidelines and the need to test noise levels indoors where outside noise levels exceed guidelines. Odour impacts have also been considered in supporting documentation, with modelling used to assess the likely extent of odours.

Assessment of noise and odour impacts using the approach in the cross-cutting impacts section of the technical support document might have helped the potential significant impacts to be more clearly communicated.

3.5.5 Step 3: Monetary valuation of the negative and/or positive environmental impacts

Monetisation of impacts has not taken place. The life cycle of the project is expected to be over 20 years, thus any impacts that are expected to be experienced for the duration of the project could become significant. For example, the river is economically valuable and is an important spawning area for migratory fish. Monetisation could be undertaken based on changes in the number or value of angling visits due to anticipated changes in fish populations which could be driven by alterations in the quality of spawning habitat.

3.5.6 Step 4: Due diligence and reporting

This review can provide the following responses to the questions on due diligence:

1) Has proofing been carried out because it was mandatory?
   Yes, proofing would need to be carried out because the project was subject to an EIA, which was made available for along with other supporting documentation (e.g. permit applications).

2) For all projects, is there evidence that the mitigation hierarchy has been followed?
   In existing documentation, consideration has been given to alternative locations for the plant, with landscaping and dust control mentioned as mitigation measures for specific issues (noise

and air pollution). Figures are provided for the likely energy and heat consumption and the extent to which these demands can be met by onsite use of renewables (e.g. heat, solar).

3) Have project impacts been quantified?
Impacts have been quantified in the EIA with supporting documentation providing further detail.

4) Have significant impacts been monetised?
Impacts have not been monetised. Available information indicates that impacts are expected to be minor thus monetisation could be disproportional, but a lack of information on the assessment method means that it is not possible to make a judgement on this.

3.5.7 Conclusions on the application of the proofing process

The proofing process would provide more information through encouraging monetisation of some impacts where possible, and thus enabling comparisons. For example, application of monetary values could allow a comparison between the recreational values of the waterbody and impacts from temporary eutrophication caused by the nutrients in the wastewater due to emergency overflows. The current assessment has only considered such impacts in a qualitative manner. Whilst they are not expected to be significant, no description has been provided of the way in which the appraisal of the significance of the impacts has been carried out. Application of the proofing process would also bring together all the information in a more accessible format when reporting the responses to the due diligence questions in Step 4.

4 Case study 3: Expansion of a Metal Refining Facility

4.1 Overview

4.1.1 Scope

The project has the objective of investing in a new metal refining plant replacing outdated units, and upgrading the metal recycling unit. The objectives are to lower production costs, improve environmental performance, increase recycling rates of waste containing the metal, and improve working conditions.

The project has been financed through a loan of over €100M over 10 years. The construction of the new units is expected to take three years.

4.2 Project description

The investments in replacing outdated refining units and in upgrading of the recycling unit will allow an increased reliance on secondary resources estimated to be between 20 and 35% of the total refining capacity. In addition, by shifting from the use of fuel to natural gas, the facility will improve its energy efficiency by 10-20%. The objective of the investment encompasses the economic, social and environmental dimensions, as they aim to lower the production costs while improving the environmental performance, increasing the recycling rates of metal containing waste and, at the same time, improving working conditions.

4.3 Environmental assessment carried out

The project falls under the EIA Directive although the screening by the implementing partner was carried out prior to the environmental impact assessment. During the screening, the IP carried out a rapid assessment of the IED Requirements, but it is unclear if the emission levels have been compared to Best Available Technologies (BAT) levels.

The IP also carried out the climate proofing, assessing the reduction of the overall greenhouse gases (GHG) emission factor compared to the existing plant due to the increased use of secondary metal sources, and calculating the total future emissions. For the calculations, the IP used its own guidance and GHG emission factors for metal production and recycling. The resulting emissions have not been monetised.

It seems that no further environmental proofing or assessment was carried out, beyond the climate proofing and what required by the IED. While land and biodiversity are briefly mentioned, only the impacts on climate have been assessed.

Moreover, while one of the objectives is the improvement of the working conditions, the IP does not seem to have carried out any social proofing. The productive process has been automated in order to eliminate heavy physical labour and better protect the employees by reducing exposure to, for example, emissions of sulphuric fumes in the electrowinning process.

While the climate proofing was the sole basis to obtain the funds, the actual payments were conditioned to the results of the other assessments required by the EU legislation (EIA, Habitats, IED). The project promoter was required to provide interim information on emissions and a report including the achieved emission levels and energy consumption levels for the metal refinery facility, plus

comparison against expected levels at initial design. A description of any major impact on the environment (or any social impacts) is also expected in this report.

4.4 Quantification and valuation

The IP used a mix of qualitative and quantitative data to carry out the climate proofing and referred to its own guidance, which builds up on established international guidelines. The IP has sufficient resources to carry out proofing and assure the quality of the assessment.

Within the Air-Climate compartment considered in the proofing, only Energy and Climate aspects have been assessed, therefore the table does not include information on Air, Health or Chemicals.

Table 4-1 : Considered impacts and evaluation criteria	
Source of Impact	**Evaluation criteria**
Energy related emissions: energy efficiency	
Energy efficiency, process modification, improved resource management processes	Quantitatively: change in kWh / tonne of product
Assessing competitiveness, cost reduction, cost effectiveness, improved productivity, security of supply, recycling	Quantitative analysis of recycling (amounts recycled) Qualitative analysis of market / profitability (qualitative rating) and qualitative analysis of project financial risk
Application of best available techniques in carbon-intensive sectors	Quantitative: change in carbon intensity due to project
Quantitative impact assessment (GHG decrease receives positive score)	Quantitative, tonnes of CO_2 per year*
Adherence to energy-related standards and/or products	Not assessed
Modernisation of industrial processes	Qualitatively assessed in general, with description of new technologies Quantitative description of performance in terms of energy efficiency (kWh/t of product for electricity, Nm^3 gas / t of product for natural gas and t coal / t of product) and ability of use secondary material (t raw material / output).
Produced energy indicator / data on energy consumption relative to averages	See above, but no comparison to benchmarks
Energy related emissions: renewable energy	
Quantitative impact assessment (GHG decrease receives positive score)	Quantitative, Tonne CO_2 per year*
Percentage contribution to renewable energy targets	Not assessed
Availability of alternatives	Not assessed
Typology and amount of energy sources used in the installation	Quantitative assessment: (kWh/t of product for electricity, Nm^3 gas / t of product for natural gas and t coal / t of product)
Climate Change Mitigation / Greenhouse gas emissions (transport, energy, industry)	
Adjusted economic and financial rates of return based on economic cost of carbon	Not assessed
Carbon footprint assessment (more than 100 kt/yr or emission variation more than 20 kt/yr)	Quantitative Assessment (GHG emissions / output and GHG emissions / year)*
Quantitative impact assessment (GHG increase receives negative score)	Quantitative, Ton CO_2 per year and per output*

Table 4-1 : Considered impacts and evaluation criteria	
Source of Impact	**Evaluation criteria**
Energy and resource management	Quantitative assessment in terms of Ton CO_2 per year and per output, and Ton secondary raw material per output
Carbon credit potential assessment	Not assessed
Avoided CO2 targets	Not assessed (no comparison to benchmark)
Quantifying the carbon footprint of portfolios	Carbon footprint assessed in terms of GHG lifecycle emissions of the project
Project-level GHG accounting	No
Alternative options	Not assessed
Sub-project assessment	Different sub-projects have been assessed: plants for different metals are distinguished and within each plant, primary and secondary production are also distinguished.
Climate change - adaptation	
Climate change vulnerability assessment (aim: adverse consequences of projects addressed in SEA and EIA)	Climate assessment of GHG emissions carried out as mentioned above
Climate change risk information (project and system) requested: appropriate measures applied to significant risks	A Climate Risk Assessment was carried out to identify if the project was vulnerable to climate change. The qualitative outcome is “moderate” (but no particular vulnerabilities were identified).
More adaptation projects (land use, water, infrastructure, buildings)	Not adaptation needs identified.
Notes: * the assessment appears to compare the “with project” and “without project” on the same production output, despite the fact that the aim of the project is to increase production output by 25%.	

4.5 Environmental proofing for InvestEU Programme

A similar project, exceeding the threshold of 10 million and requiring an EIA, in order to be funded through the InvestEU Programme, would have to undergo environmental proofing. For projects in the planning stage as this one (i.e. before the grant of environmental authorisations / permits / licences and a development consent), the aim of the assessment is to ensure that environmental impacts are avoided or reduced through mitigation measures and adaptation of the project design. Any residual environmental impact should be quantified and, in this case because proportionate, monetised, in order to enable the determination of the need for further mitigation measures and allow the Investment Committee to judge whether the project does harm to the environment over its lifetime. The environmental proofing includes direct, indirect and cumulative effects, and market and non-market effects. The proofing of a similar project therefore would have to include the assessment not just of the volume of emissions to air, for example, but also the impact of this on ambient air quality and the consequent effects on human health and the environment, where these may be economic in nature (changes in health care costs or the value of crop yields) or more intangible (impacts on the ecological status of the environment).

Given its nature, the project is likely to give rise to significant impacts, even after a careful design of mitigation measures. The proofing would therefore proceed to Step 2, the application of the checklists. These would have allowed to consider and identify additional potential residual impacts, in particular on air quality and natural sites close by. It should be noted that the project is geared towards achieving positive environmental impacts when compared to the baseline (renewal of production

units and increased recycling rates) but the comparison does not take into account the expansion in capacity. Monetisation of the climate and air quality impacts associated with the expansion in capacity would have allowed a better comparison with the positive environmental impacts of renewing the production units and any social impacts (e.g. additional jobs).

The guidance could have helped in quantifying and monetising potential impacts in terms of air quality, and balance them against the impacts in terms of climate (whilst these have not been monetised in the screening of the project, their monetisation could have been also carried out with appropriate use of GHG emission social cost values).

5 Case study 4: Construction of a Healthcare Facility

5.1 Overview

The aim of the project is to consolidate and modernise the secondary healthcare services for a capital city and the tertiary care for the whole country. This will be done through replacing, constructing and equipping the existing healthcare facility assisted by two satellite outpatient centres. Three old secondary healthcare facilities will be closed and concerned staff will be integrated into the new hospital, which will be located in the close vicinity of other healthcare centres. The hospital will have over 10 floors and host around 400 hospital beds.

The cost of delivering the core hospital and the satellite centres, including all construction, planning, design, management, decant and consultancy costs is projected to total slightly less than €1 billion over 10 years. The implementing partner is financing around half of the investment. The balance will be financed by the State treasury and other external funding.

The completion of the two outpatient centres has been completed while the main hospital is still under construction.

5.2 Project description

The aim of the project is to consolidate and modernise the secondary hospital services for a capital city and the tertiary care for the whole country. Three existing secondary care hospitals will be replaced, all services will be consolidated in a new hospital and the concerned staff will be transferred to the new location. The new hospital will be located on the university campus and next to other healthcare centres. The two outpatient centres have been constructed in the outskirts of the city.

The new hospital will host around 400 hospital beds (including around 50 intensive care beds), 100 day care beds, 20 operating theatres, over 100 consultation rooms and underground parking for over 1,000 places. The two satellite centres, also in close proximity to other healthcare facilities, will have over 2,000 m^2 each in order to host consultation and urgent care rooms, day care observation beds and therapy rooms.

The primary project objective is a social one: the project is expected to increase the capacity to address the increasing demand of secondary healthcare services, providing higher quality and a wider range of medical services in a more efficient manner. These benefits are expected to contribute to healthier lives of the citizens.

The secondary objective is an economic one: by starting the digitalisation of the health care services, the project will have a wider impact on the country health sector. Research activities will benefit from the modern facility and the impact of this large-scale investment will have positive impact for the country economy during the implementation phase.

5.3 Environmental assessment carried out

The project falls into EIA Annex II and required screening. The EIA was mandatory according to the legislation in the Member State and was carried out by the competent authority as part of the approval process under the national legislation. The relevant planning and building permits were also issued during the process.

The Environmental Impact Statement (EIS) was commissioned by the project promoter and consultants from different consultancies carried out the different parts of the EIS. The EIS considered impacts in the following areas:

- Human life
- Flora and Fauna
- Soil and Geology
- Hydrogeology and Hydrology
- Noise and Vibration
- Air Quality and Climate
- Micro Climate
- Landscape and Visual Impact Assessment
- Waste Management
- Traffic and Transport
- Archaeological Heritage
- Architectural and Cultural Heritage
- Material Assets -Site Services
- Interactions and Potential Cumulative Impacts

In assessing the air quality and climate impacts the following methodology was adopted:

1. Characterisation of the receiving environment through detailed analysis of the national Environmental Protection Agency data;
2. Determination of appropriate criteria for evaluating the significance of air quality and climate impacts through reference to local guidance documents where applicable and international best practice;
3. Calculation of the potential air quality and climate impacts using industry standardised calculation methods;
4. Assessment of the impact by comparing the calculated levels against the adopted criteria;
5. Where necessary ameliorative, remedial or reductive measures to control the impacts were specified, and;
6. Presentation of the predicted impact of the proposed development including the ameliorative, remedial or reductive measures.

It mainly focused on emission from traffic and from the energy systems of the new hospital. The impacts on climate change were considered imperceptible and no monetisation was assessed.

Regarding the social aspects, in addition to the main objective of the project, the impacts on employment and impacts on the community during the building phase as well as during the operation phase (mainly due to an increase in traffic) were assessed.

5.4 Quantification and valuation

For each of the impact, the methodology adopted included:

1. Initial Assessment through detailed analysis of existing data/desk study;
2. Direct and Indirect Site Investigations and Studies;
3. Mitigation, Residual and Final Impact Assessment;
4. Completion of the EIS Section.

The different parts of the assessments were carried out by different experts from different consultancies depending on the subject matter.

No monetary evaluation was included for any of the impacts.

Table 5-2: Considered impacts and evaluation criteria	
Impact	**Source of impact/evaluation criteria**
Air Quality and Climate change	CO, benzene, PM_{10}, $PM_{2.5}$ and N_2O concentration
Water	Hydrogeological Impacts (groundwater): Impacts on Quality, Flows-Structures, Flows –Drainage and Bedrock Water Control Hydrological Impacts (surface water): quality and flows
Land	geomorphology; superficial and solid geology; made ground and contamination
Biodiversity	International Importance; National Importance; County Importance; Local Importance (Higher Value)

5.5 Environmental proofing for InvestEU Programme

While all main negative impacts seem to have been considered by the EIA, the technical guidance on environmental proofing would have encouraged the project promoter and the national competent authority to better highlight certain positive impacts that are currently only alluded to in the EIA. For example, the new building is supposed to be BREAAM certified and it is likely to be more energy efficient than the existing buildings it is replacing. In addition, the guidance would have facilitated the monetisation of the identified impacts, none of which was monetised.

6 Case study 5: Waste to Energy Treatment Facility

6.1 Overview

The project foresees the construction of a highly polished tertiary treated water to allow reuse of wastewater by agriculture to lower groundwater abstraction and increase aquifer recharge; the extension of water network and sewers, and the increase of desalination capacity. By doing so, the project intends to improve water supply and sewerage coverage, drinking water quality and production capacity, qualitative and quantitative groundwater management, as well as operational efficiency. The project includes 7 different actions. The project promoter and main implementing partner is the national body for producing and distributing potable water in the country.

The project is to be financed by a contribution from the Government and the total investment exceeds €150 million. The development of the project is expected to take three years, but the assessment period is 30 years. The assessment period thus corresponds to the estimated investment lifetime. The relevant life-cycle is not clearly specified although the information provided would suggest 80 years.

6.2 Project description

The project focuses on water supply and wastewater infrastructure, and includes the following actions:

- Balancing of the spatial distribution of groundwater abstraction for a better water blend;
- Investment in the primary water network to supply potable water to unconnected areas in the country;
- Investment in the primary water network to improve the efficiency of the blending capacity of the distribution system;
- Invest in energy efficiency and renewable energy measures to improve the sustainability of the water production and distribution process;
- Increasing the production capacity and stability of desalinated water;
- Invest in a secondary network to deliver highly treated polished water to communal distribution points across the country;
- Upgrading and expanding the public sewage network.

The key objectives of the project are economic and environmental, and to a lesser extent social:

- Economic, optimising operational efficiency of the project promoter (mainly electricity costs);
- environmental, reducing the environmental impact of the project promoter by preserving groundwater, improving wastewater collection and treatment;
- social, increasing piped water coverage and drinking water taste.

The project promoter expects the project to enable a Net Zero Impact Approach. But the water flows indicated does not seem to describe a Net-Zero Impact project. This would need to be clarified and the justification strengthened.

6.3 Environmental assessment carried out

The project falls under the EIA Annex II and was screened-in by the competent authority. The WFD is alluded to with regard to groundwater quantitative good status. The project could potentially fall

under the UWWTD and/or the Bathing Directive, as the quality of treated waters discharged to the marine environment will be well above the minimum requirements of the UWWTD.

Solely the Action 3 of the project (investment in primary network to improve the efficiency of the blending capacity of the distribution system) was submitted to EIA and to a technical and environmental vetting process by environmental risk assessment which is part of the development permission.

All 7 actions of the project were submitted to a climate change vulnerability risk assessment (CCVRA). The climate impact assessment undertaken follows the process set out in the EC guidelines contained in "Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient". The analysis was mainly qualitative, classifying various risk sensitivities, levels of exposure, project vulnerabilities and identified residual risks after the application of proposed adaptation measures. The analysis and information provided include quantification and monetisation of climate change impacts related to the reduction of emission generation associated with electricity and road transport. Further social proofing was not considered relevant. Only impacts on Air and Climate change and Water were considered in the assessment carried out. The analysis was used to distinguish between several investment options, which were assessed against a baseline scenario and a project scenario. No follow-up requirements for monitoring environmental impacts are mentioned in the brief document.

6.4 Quantification and valuation

All impacts identified have been assessed quantitatively and monetised. However, from the information received, it is difficult to assess whether the quantification is proportionate to the scale of the investment and if the scale of the investment is indeed relevant with the water demand evolution. This is especially true for the benefits calculation linked to potable water consumed for drinking water (most probably over-estimated which is a key issue, as it represents 86% of the total benefits of the project), irrigation demand from agriculture, externalities for groundwater abstraction, and externalities for electricity used by the project promoter.

The most significant impacts of the project seem to have been quantified. Nevertheless, it is unclear why some impacts have been quantified, for instance the ones associated with cesspits. If this quantification is indeed justified, then Opex associated with cesspits should also be accounted for (not only Capex). In addition, the document mentions that cesspits are related to "potential number of new residences", so it is unclear if those benefits/impacts are real or only potential.

Climate changes impacts related to reduction of emissions generation associated with electricity and road transport were quantified. Other environmental benefits were also accounted for, namely preservation and recharge of groundwater. The project includes increase of water coverage through secondary network expansion. The benefits associated with this network expansion are reflected in the revenues projection. However, it is not clear why the revealed preference method was used (namely willingness to pay) to assess market-based values which can be better assessed using cost-based methods. In addition, this network expansion (actions 2 and 6 of the project) would generate externality savings deriving from the avoidance of road transport of potable water. These benefits are not assessed in the brief document.

The impacts valued in monetary terms were:

- Benefits enjoyed from better quality of potable water consumed for drinking purposes
- Externalities (savings) from groundwater abstraction
- Externalities of electricity use by the project promoter
- Externality (savings) of road transport for emptying wastewater cesspits

- Avoided electricity cost for groundwater abstraction by agriculture
- Avoided costs of building new cesspits

These impacts are likely to be the most significant. However, additional externalities of road transport of drinking water could have been also assessed (see above). Standard methodologies were used although revealed preference method was used (namely willingness to pay) to assess market-based values which can be better assessed using cost-based methods. Additional externalities linked to road transport of drinking water could have been also valued (see above).

The following resources were used to assist in the assessment:

- Guidance documents
  - Guidelines for the drawing up of Cost-Benefit Assessments for EU Structural and Cohesion Funding
  - Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient
- Modelling tools
  - Water Blending Mathematical Modelling Tool for Malta
- Environmental valuation databases
  - Handbook of Shadow Prices (2010)
  - Updated Handbook on External Costs of Transport, European Commission DG Mobility and Transport (2014)
- Other
  - 2nd River Basin Management Plan, Carbon footprint analysis

The following table lists the source of impact / evaluation criteria for different environmental compartments.

6.5 Environmental proofing for InvestEU Programme

Although the most significant impacts have been identified and assessed, some of these impacts have most probably been over-estimated while additional externalities have not been accounted for.

Below the list of externalities that are not required in the scope of the environmental proofing and that were most probably over-estimated:

- Improved taste of drinking water consumed: these benefits derive from enjoying a better tasting drinking water ("improved quality in terms of chlorine which mainly affects water taste"). This is not strictly an environmental externality but rather a comfort (social impact). Its calculation is based on the "expected savings of water filtration expenses incurred by households". This benefit represents 86% of the overall benefits assessed. This is highly problematic as the CBA results predominantly rely on this benefit and value.
- Avoided costs of building new cesspits: these benefits concern the construction of potential new houses that would not have to build cesspits as they would have the possibility to connect to sewers. No information is provided with regard to housing planning previsions in the area.

Hence the basis for this externality assessment is absent as the number of houses to be built is unknown. The calculation methodology is not transparently explained. In addition, one can argue that cesspit building costs are part of the house construction costs as internal water pipes or electricity internal wires. At least, these costs could have been estimated against sewer connection costs that would be incurred for new houses when sewers will be built and operational. In terms of environmental benefits, a well-functioning cesspit does not offer higher nor lower environmental benefits than a sewer connection. It is generally in terms of real estate value that sewers are generally preferred to cesspits. Finally, this is not an environmental externality but rather a comfort (economic and social impact).

- Secondary network expansion: the project includes an increase of water coverage through a secondary network expansion. The benefits associated with this network expansion seem to be reflected and accounted for in the project promoter increased revenues projection. However, it is not clear why the revealed preference method was used (namely willingness to pay) to assess market-based values. Moreover, this is not an environmental benefit but rather a cost-recovery issue for the utility.

Following are the positive externalities that were most probably over-estimated:

- Savings in groundwater abstraction costs: it is clearly stated that the project, through the lowering of groundwater share in the final blend of water production, is expected to give rise to incremental benefits of reducing the volume of groundwater abstraction, which are in part offset by the incrementally higher water demand in the project scenario. As a result, this positive externality should be negligible to some extent. However, no water demand projections are available to estimate thoroughly the magnitude of this potential positive externality. This benefit represents 12% of the overall benefits assessed and is the 2nd most important one.

Following externalities were not accounted for:

- Savings in water transport externalities: the project entails the investment in the primary water network to supply potable water to unconnected areas. This network will provide an alternative to the distribution of potable water using road tankers. The externalities associated with the reduction and disappearance of road tankers have not been monetised not accounted for in the analysis.
- Costs of water transport externalities: a portion of the water produced by the Highly Polished Tertiary Treated Water plant will be transported using road tankers. The negative externalities associated with the road transport for the distribution of the highly treated polished water was not monetised nor accounted for in the analysis.

This guidance would most probably help discriminating between externalities that should be part of the Environmental proofing assessment, and the ones that should not. The cost-benefit analysis conducted as part of the Environmental proofing takes into account non-environmental benefits. This is highly problematic as the results of the environmental proofing rely predominantly on the monetisation of non-environmental externalities.

The guidance would have helped accounting for the "Costs of water transport externalities" as they would have identified and scrutinised under the Checklist for identifying potentially significant negative impacts to Air – question 8 "Would any other activities be required as a consequence of the project, which could lead to an increase in atmospheric emissions?"

The guidance could also help accounting for additional positive externalities notably by using the Checklist for identifying project characteristics reducing impacts to Air – questions 5, 6 and 9.

The guidance would be highly helpful since the "WFD related information as required by the JASPERS checklist" could help get information and data regarding the alternative options compared as part of the project assessment (which is not the case in the brief document received). It would also help get thorough information on the groundwater bodies status before and potentially after the project completion; on the water demand previsions for all sectors; on cost recovery elements of the project (especially since the project is promoted by a water and sanitation utility).

The guidance could also help accounting for additional positive externalities notably by using the Checklist for identifying project characteristics reducing impacts on the water environment – questions 5, 6 and 7.

Finally, the guidance would help accounting for externalities that have potentially been overlooked, notably during the construction phase of the project. Using the Checklist for identifying potentially significant negative impacts to land and soil – question 1, and the Checklist for identifying project characteristics reducing impacts to Land and Soil – questions 12 and 13 could help identify impacts that were not accounted for nor assessed in the brief document.

7 Case study 6: Hybrid Vessels

7.1 Overview

The loan provided by the implementing partner to a ship passenger carrier company is aiming at financing over 10 newly build hybrid-electric ferries. The 5-year loan is €50 million - €100 million of value. The new vessels will be deployed on three routes.

7.2 Project description

The objectives of the project are to make more sustainable the transport of sea passengers in general, targeting carbon neutrality. The new ferries will contribute to reduce air pollutants and CO_2 emissions and will support the phasing out of fossil fuel for short-distance connections.

7.3 Environmental assessment carried out

The project does not fall under any specific environmental directive requirements. A sustainability review was conducted by the IP experts. The sustainability review includes a climate-environmental assessment as well as the social proofing of the investments made. The sustainability review is usually carried out by the IP at the early stage of the project appraisal. It is a pre-condition for the financial approval of the project and the allocation of the IP funding to beneficiaries.

Natural capital compartments directly analysed in the environmental assessment were CO_2 and air pollutants emissions (NO_x, SO_x and particulate matters), oil waste management and noise. Moreover, water quality and biodiversity are also indirectly taken into consideration through the analysis of the use of ballast water tanks. Greenhouse gases emissions are estimated to decrease with the project and the marginal change was estimated in around 50,000 tCO_2 equivalent per year. Emissions of NO_x, SO_x and fine matter particulates are negligible. The project will also generate less noise impacts, lower use of oils and will produce less sludge oil waste. Monetisation is not foreseen in the IP assessment procedure.

Social proofing is part of the sustainable review conducted by the IP for each project. Social impacts assessment includes employment and gender issues in general. However, information available on this project does not provide a clear understanding on how social proofing was made, and which impacts were considered in the analysis.

Environmental and social monitoring is usually foreseen by the IP follow-up and monitoring guidance but was not required for this project (considering the low level of negative impacts expected).

7.4 Quantification and valuation

The environmental and social proofing is conducted based on the provisions illustrated in the IP's Sustainability Policy and Guidelines. It is worth considering that the information required to carry out the environmental review are proportionated to the category of project. The IP defines three project categories on the basis of the potential environmental impacts and this project fell within the intermedium category, i.e. with potential limited adverse environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures. The environmental review was carried out directly by IP environmental experts. The assessment was conducted based on a multi-criteria analysis and is both qualitative and quantitative in nature, according to the provisions in the IP's guidance. Quantified impacts were the annual energy use

(diesel and electricity) and associated emissions of CO_2, NO_x and SO_x. Monetisation is not included in the IP evaluation toolkit.

7.5 Environmental proofing for InvestEU Programme

The environment assessment made by the IP seems to cover all the relevant negative and positive impacts that are also indicated by the technical support guidance (steps 2.1 and 2.2 of the proofing process). The guidance (in particular step 4.2) might help in monetising the benefits of reducing the impacts of certain pollutants emitted by conventional ferries when adopting cleaner technologies: the values documented in the "handbook on the external costs of transport" for maritime transport, as mentioned in the technical guidance, could be used in monetising the project environmental benefits from reducing CO_2 emissions or other air-pollutants. However, given that the project is not expected to have significant negative impacts, monetisation of the positive environmental impacts may not be necessary.

8 Case study 7: Timber Production

8.1 Overview

The implementing partner is granting a 10-year loan worth of €10 - €20 million to a family-owned group of companies that operates sawmills and refining facilities for mechanical wood processing. In addition to lumber in special dimensions, the company produces planed, sawn and glued laminated (glulam) wood products. NIB's loan is financing a subsidiary that runs three sawmills. Over the last three years, the group's turnover has grown by over 50%. The company has made significant investments during the past five years, focusing on obtaining efficient production processes in state-of-the-art plants with high-technology machines. The IP's loan would finance, among other things, flue gas scrubbers, dryers for sawdust and bark, and a pellet factory.

8.2 Project description

In terms of the production benefits, the production of sawmill goods is expected to almost double, raising to a combined capacity of 1,600,000 m^3. This will also have a positive impact on the current product availability of the company, which plans to open a mill. In terms of efficiency, the investment will allow significant efficiency related to the treatment of cutter chips, wet bark and sawdust. Cutter chips used for pellet production have been earlier delivered to an off-taker for energy generation, so the benefit of this investment is a more refined product for the company. The investments aiming at drying of wet bark and sawdust utilizing the heat from flue gas treatment will improve the caloric value of this biofuel by over 30%. Furthermore, the dried biofuels require less transport volume, resulting in an estimated reduction of over 1,000 truckloads a year. The reduction in associated transport distance is not available, so the reduction in associated emissions cannot be quantified. In any case, this impact is assessed to be minor. Altogether, the transportation costs and environmental impact will be expected to be lowered by around 20% due to air drying technology used for sawmill by-products.

8.3 Environmental assessment carried out

The funding of this project falls under the EIA Directive scope as listed in Annex II as a "Textile, leather, wood and paper industries [..] Manufacture of fibre board, particle board and plywood."

The environmental assessment was carried out by the main implementing partner, while most of the responses were based on earlier assessments provided by national authority. This includes the following assessment:

- Environmental permit for the sawmill and glue laminated wood factory;
- Environmental permit for the pellet factory;
- PEFC certificate.

Climate change adaptation in this case relates mostly to sustainable forest management. The PEFC certification was considered to cover the area sufficiently. There was no specific social proofing that was provided.

The business operations of the promoter do not require an environmental impact assessment, but an environmental permit is necessary for each production site. The factories have an environmental permit for the sawmill and glue laminated wood factory and for the pellet factory. The second factory has an environmental permit for the sawmill and glue laminated wood factory. The new pellet factory

will need an environmental permit, as the pellet production exceeds 5,000 tonnes per annum. The company has initiated the amendment of the environmental permit for the sawmill to include the increased production. Further, the promoter will apply for the permit revisions required due to the investments in the flue gas treatment and drying of wet biofuels. Considering that the adverse impacts of the project operations are minor, it is expected that the new/revised permits will be granted as applied.

The assessments carried out Natural Capital compartments in terms of air and climate change, water, land, and noise. The assessment resulted, after the sector and impact assessments, in the rating of the project being "Good".

The assessment will be followed up by ex-post environmental indicators which focus on the annual production of glue laminated timber and its estimated share of the total wood product processing.

8.4 Quantification and valuation

The assessment is based on national environmental assessments of the company, mixing qualitative and quantitative data. Some factors, such as energy supply, geological factors, radioactive materials, chemical impact etc., are not taken into account for variety of reasons (i.e. the company is self-sufficient with renewable energy sources).

The assessment is done as part of environmental standards, as the project promoter has environmental permits in place for its operations. Some permit amendments are required due to the investments. Considering the minor adverse impacts of the operations, it is anticipated that these will be granted as applied. The sustainability review is performed generally at the company level, as it is not possible to ring fence adverse impacts solely associated with the investments. The promoter's other investments are not assessed to bring any quantifiable positive or negative local/regional impacts.

Considering that the adverse impacts of the promoter's operations are minor, it is expected that the new/revised permits will be granted as applied. Data to quantify the impact of the investments on the power use of the company or biofuel production are not available. Climate change adaptation is considered to be sufficiently covered by the PEFC certification. The biofuel transport associated reduction in emissions is assessed to be minor. In general, due to this proportionality the impacts were not quantified. Other issues were addressed in qualitative terms, with the exception of key social issues, and key environmental and social credit risks. Also, for example transportation costs were seen as too minor to quantify, data to quantify the impact of the investments on the power use of the company or biofuel production are not available.

The assessment was carried out by the project promoter, supported by the assessment done by the national authority. There was no monetary valuation of the impacts. The main resources used in the assessment were the national environmental permits for different facilities of the applicant.

The impacts are evaluated mostly by quantitative criteria, as showed by the table below looking into the four environmental compartments and their evaluation:

Table 8-1 - Evaluation criteria by environmental compartment

Environmental compartment	Source of impact / Evaluation criteria
Air and climate change	Air quality – mostly quantitative criteria (amount of particles released to air in other locations, explanation on one location why there is not particles released),

Table 8-1 - Evaluation criteria by environmental compartment	
Environmental compartment	**Source of impact / Evaluation criteria**
	Energy production and use – quantitative and qualitative criteria (description of energy production processes that are self-sustainable and do not require external power production), Waste production – quantitative criteria (amount of waste produced by waste type and explanation of its following treatment), Public health – quantitative criteria (explanation of the amount of pollution released, including noise pollution), Chemical risk management – qualitative criteria (description of the safe treatment of chemicals and measures in case of urgencies), Climate change mitigation – quantitative criteria (description of amount of GHG release which amount of them is explanation on how investments help to mitigate the pollution)
Water	Chemical impacts – quantitative criteria (description of amount of chemicals used, how they are stored and treated), Waste impacts – quantitative criteria (explanation of wastewater released into nature and assessment of its amount [rainwater]), Other impacts – quantitative criteria (explanation of the small amounts of cleaning water that is delivered to recycling)
Land	Waste management – quantitative criteria (), Chemicals management – quantitative criteria (description of amount of chemicals used, how they are stored and treated),
Biodiversity	Wastewater management – quantitative criteria (explanation of wastewater released into nature and assessment of its amount [rainwater]), Other impacts – quantitative criteria (explanation of the released pollutants and amounts, while it is noted that there is no impact on biodiversity)

8.5 Environmental proofing for InvestEU Programme

As the group's investment loan is worth over EUR 10 million, it meets the threshold for environmental proofing in terms of directly financed operations. Hence, a similar project would have to undergo environmental proofing.

There are some impacts that could be evaluated via environmental proofing:

- Identification to of the residual (post-mitigation) environmental impacts over the lifetime of the project: mitigation measurements of the investment could also focus on the sustainability of the end products the investment allows to have. Especially in terms of sustainable building, wooden materials act as a carbon sink. However, the raw material is produced by forestry, which has multiple impacts, including on climate and biodiversity. Assessing the full impact of these products requires the consideration of the supply chain impacts.
- Consideration of how any environmental changes may affect the project over its lifetime: the impacts are not assessed in terms of emission trading, which does have a clear monetary impact to the economic sustainability of the project, especially as the prices of emission trading system have been increasing recently. Similarly the possible environmental changes for an industry that relies heavily on forestry might need further assessment, although there are no foreseeable concerns on the raw material supply.

Considering these components, possible guidance would provide limited help on assessing the monetary impact of the investment for example in terms of emission trading. However, as the subject to the assessment is self-sustainable in terms of e.g. fuel consumption, hence issues related to fuel are not relevant.

9 Case study 8: Loan Programme through Financial Intermediaries

9.1 Overview

The IP's loan programme aims to finance SMEs and environmental projects. The loans will be allocated to recipients, SMEs and private households, by financial intermediaries (FIs). The total amount of the scheme is around €30 million, of which around one third is earmarked for environmental projects. The programme has a lifetime of 7 years.

9.2 Project description

The project objectives are both to improve access to credit for SMEs operating in sectors such as construction, forestry, pulp and paper, trade and retail, as well as logistics and IT, improve energy efficiency and promote alternative energy solutions in private homes and businesses through, for example, the installation of heat pump and solar panels.

9.3 Environmental assessment carried out

The IP loan programme and related investments do not fall under any specific environmental directive requirements. An environmental proofing of the loan programme has been carried out according to the IP's guidance and before disbursement to the FI, considering that it is a pre-condition for funding. Considering the type of projects supported by the programme, the scheme should not cause any significant negative impact.

Follow-up requirements for FIs are specified in the IP guidance, and reporting on the financing and recipient of the loans should be performed on a yearly basis. The reporting on environmental impacts is not mandatory but recommended.

9.4 Quantification and valuation

The IP is responsible for checking the capabilities of the financial intermediaries in conducting a sustainability assessment of investments according to the IP rules, while the assessment of the specific investments is made by the FI based on its specific resources. The approach followed by the IP is a multi-criteria analysis and does not foresee any monetary evaluation of the impacts.

9.5 Environmental proofing for InvestEU Programme

The technical support guidance prepared for the InvestEU Programme could aid the financial intermediaries in identifying positive or negative environmental impacts of the grants provided through the IP loan programme.

10 Case study 9: Environmental Profit & Loss Methodology

10.1 Overview

Environmental Profit & Loss (E P&L) enables measuring and quantifying environmental impacts of enterprises and their value chains, a tier of the supply chain, a business unit, a product, an initiative or investment, a single production site or even a single material input. It was first applied for developing E P&L accounts of PUMA, a Kering group company. It involves three main phases:

- **Quantifying the emissions or resource use** in relation to the activities of the entity, e.g. tonnes of $PM_{2.5}$ released in urban centre, tonnes of nitrogen runoff to river
- **Estimating the likely environmental changes** that result from these emissions or resource use, e.g. change in air quality, additional eutrophication
- **Valuing the change in wellbeing**, i.e. consequences of these environmental changes for people's wellbeing in monetary terms, e.g. impacts to health visibility and agriculture, reduced recreation

10.2 Impact areas

Environmental impacts are categorised in:

1. **Air pollution**: Release of pollutants such as particulate matter, sulphur dioxide and nitric oxides reduce the quality of air, with negative consequences on people's health, as well as on the natural and built environment.
2. **Greenhouse gases (GHGs)**: The causal link between anthropogenic emissions of GHGs and changes in global climate is now well established. The impacts are expected to be far-reaching and will affect our health, economy and the natural environment.
3. **Land use and biodiversity**: Natural land areas provide essential services to society which regulate our environment, provide goods and services that support livelihoods, offer opportunities for recreation and provide cultural and spiritual enrichment. The conversion and degradation of natural areas results in a reduction of these services.
4. **Waste**: The disposal of waste can drive a number of impacts including the release of GHGs and other air pollutants, leachate of pollution into water bodies and soils, and disamenity around disposal sites.
5. **Water consumption**: Corporate water consumption can, in some circumstances, reduce the availability of clean water for local communities, resulting in increased consumption of dirty water, with associated impacts on people's health. Increasing water scarcity can also impact on agricultural productivity, and the quality of the natural environment, with associated reductions in ecosystem services.
6. **Water pollution**: The release of toxins to waterways can lead to impacts on people's health if the pollutants are ingested via drinking water or through bioaccumulation in food. Excess nutrient pollution leads to eutrophication which reduces environmental quality and can adversely affect fisheries productivity and recreation opportunities.

10.3 Steps for establishing an E P&L

E P&L are developed following a seven-step process[3]:

1. Decide what to measure (Identify scope of: the business, value supply chain, environmental impact).

2. Map the supply chain (Outline the production processes for each product within scope).

3. Identify priority data (Defining the data requirements and the strategy for collecting or estimating data). Five broad types of data are used:

   - Primary data from the company and its brands;
   - Primary data from suppliers surveys;
   - Secondary data from life cycle assessments, national and industry statistics;
   - Secondary data from material flow analysis;
   - Secondary data from economic models.

4. Collect primary data (Environmental and non-environmental data from suppliers and each brand).

5. Collect secondary data and combine the data (Completing gaps in the data using best available techniques).

   - Involves use of life cycle assessments, economic modelling data etc.
   - Impacts in different locations may be required to be adjusted / regionalised due to differences in impact intensities.

6. Determine valuation (Determine the changes in the environment and the resulting costs of these impacts on people. Generating valuation coefficients / value impacts per unit of emission of resource use).

7. Calculate and analyse the results (using quantities of emissions / resource use by location and valuation coefficients to determine EP&L results).

Example of EP&L results calculation (as provided by Kering) is shown in Figure 10-1. Step 7 brings together the quantities data (calculated in Step 5) and the valuation coefficients (calculated in Step 6) to estimate the E P&L.

Valuation of impacts in the six environmental impact categories use a variety of scientific and economic techniques to assess the changes in the environment and value the impact on people.

[3] For example: https://keringcorporate.dam.kering.com/m/696b4ae960166525/original/Kering-EP-L-methodology-and-2013-Group-results.pdf

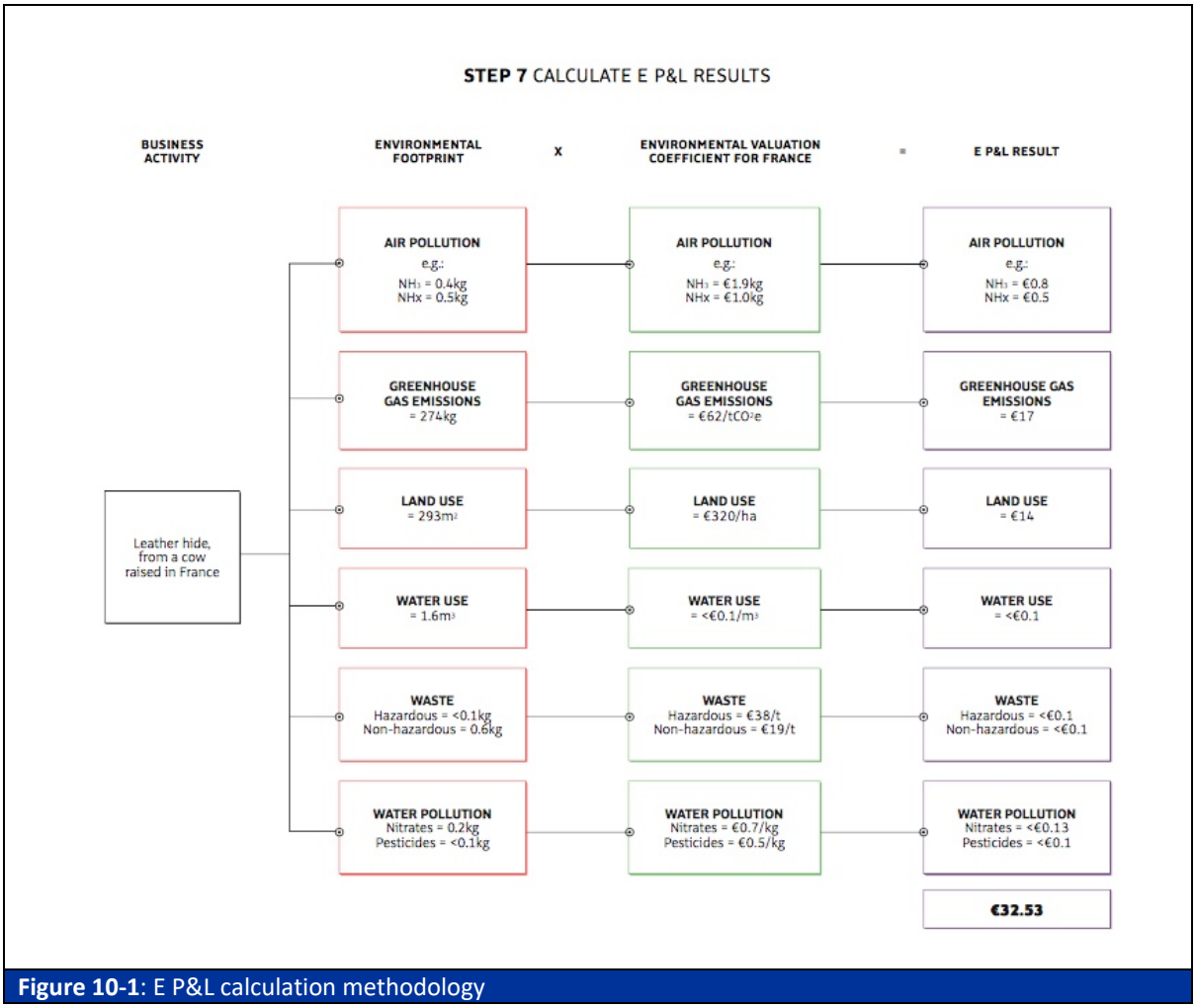

Figure 10-1: E P&L calculation methodology

10.4 Methodological principles

Given the breadth of the scope of the analysis a range of different data sources and methods are used for developing E P&L. To bring these methods together, while maintaining sufficient confidence in the comparability of their results, there are key methodological principles to be followed to challenge the acceptability of each data input or methodological decision.

- **Completeness**: Methods should allow to capture at least 95% of impacts by value. Completeness should be maintained at each level of the results where they are used to drive decision making. 95% completeness at the top level does not necessarily allow comparability at a lower level of granularity, such as comparing impacts of different materials. It is therefore essential that the completeness criterion is met at each decision level in the results.
- **Consistency**: Common assumptions across different data sources and methods in the results should be consistent, e.g. consistent conceptual framework based on the theory of environmental and welfare economics; consistent impact pathway approach to understand causality.
- **Transparency**: From each data input it should be possible to verify data sources and methods used, enabling scrutiny and re-performance. This is important to ensure consistency across third party data inputs. It should also highlight limitations and areas for further development.

- **Best available approaches**: Wherever practical, the data inputs and approaches used should be the best available to represent each specific impact or process. This includes using primary data wherever possible, and peer reviewed secondary data and estimation methods elsewhere.
- **Location specific**: All data must be specific to a location to allow the context of impacts to be taken into account. For example, spatial variation in the value of ecosystem services and environmental impacts should be taken into account, the approaches designed to be applicable at specific location, region or country level, dependant on company and contextual data. To deliver consistency in multi-scale assessments the approaches are designed to be 'nested' such that results for a specific location are compatible with results produced at a broader scale.
- **Data confidence ratings**: All data points should have a data confidence rating based on inputs, calculations and assumptions to ensure transparency for decision makers. Directly linked to environmental metrics which corporates can feasibly measure; able to produce approximate results based on limited data; sophisticated enough to produce more accurate results in more data rich situations.
- **Reflect impacts on people**: The data should allow estimation of the impacts on people in terms of changes of welfare.

10.5 Application for environmental proofing

As the use of E P&L as a decision-making tool is still evolving, its suitability in the context of environmental proofing still needs to be evaluated on a case by case basis. However, it can still provide useful insights into environmental impacts from a project finance perspective as it measures environmental impacts in monetary unit. Furthermore, it enables comparison and prioritisation between diverse impact areas and can be used to communicate the true environmental costs and benefits of an activity and can help in answering the essential question: Which environmental impacts matter most, and where?

E P&L valuation methodologies build on the existing body of peer reviewed literature and new research is continuously being published, this makes the methodological and data choices a challenge, in particular when applied across diverse economic sectors.

11 Conclusions

The selected case studies vary in scope, relevant economic sector and potential positive and significant environmental impacts. The underlying environmental assessment and the information generated by the project promoters and compiled by the IPs vary in quality too, although it should be noted that the appraisal presented in this case study report is based on the material made available by the IPs which, for some case studies, was fairly limited and may therefore not consider all identified impacts.

Nevertheless, the case study appraisal shows that the technical support guidance for the environmental proofing of projects to be financed through the InvestEU Programme may help IPs and project promoters in identifying impacts that have not been considered initially and may enable easier comparison between positive and negative impacts, by providing references to monetisation methodologies and sources of monetary values. Importantly, additional impacts may have been captured by following the checklists presented at steps 2.1 and 2.2 of the guidance document. A summary is presented in Table 11-1.

While no significant impact is expected from the application of the environmental proofing guidance on the financing timeline, as environmental screening and proofing are already mandatory elements of the planning and implementation processes for projects of this size (i.e. above €10 million), implementing partners with little or no experience on environmental proofing/assessment would be able to identify any outstanding post-mitigation impacts. However, for the quantitative assessment and possible monetisation of these impacts, these IPs may require additional resources or further help from the Investment Committee.

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Air checklist negative impacts									
1) Will construction or decommissioning of the project involve actions which will cause impacts on air quality, e.g. due to dust emissions, energy consumption, emissions from manufacturing processes, or significant changes in transportation modes or infrastructure?	✔			✔	✔	✔	✔		
2) Will the project release pollutants or any hazardous, toxic or noxious substances to air?									
3) Are there any areas on or around the location which are densely populated or built-up, and which could be affected by a localised increase in air pollution?	✔					✔			
4) Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?	✔								
5) Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by changes in atmospheric emissions the project?									
6) Is the project located in an Air Quality Zone which does not meet the targets set under the regional/national Air Quality Plan? Would emissions from the project relate to those same targets?				✔					
7) Are there any other factors which should be considered such as consequential development which could lead to impacts on air quality or the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?	✔								
8) Would any other activities be required as a consequence of the project, which could lead to an increase in atmospheric emissions?									
Air checklist positive impacts									
Will the project result in improvements in energy efficiency? These could result from: - reduced energy intensity of manufacturing activities	✔		✔				✔		

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
- reduced energy intensity of transport requirements reduced transport / energy demand, etc.									
Will the project result in the use of renewable energy sources?	✔								
Will the project result involve the capture of energy in waste materials?	✔		✔				✔		
Will the project increase the potential for re-use or recycling of end products, thereby reducing the energy consumption associated with the production of virgin materials?	✔		✔						
Have production technologies been selected so as to minimise the potential for air emissions at source? Have production technologies been selected in line with the Ecodesign Directive and the Energy Labelling Regulations?	✔		✔						
Have production technologies and chemical inputs been selected so as to minimise the use of hazardous substances that would be emitted to air in waste gases, or through process emissions?									
Have other actions been taken as part of project design to limit emissions to air?	✔								
Other aspects that demonstrate environmental good practice in project operation as well as delivery? E.g. increase awareness of residents and other businesses, take advantage of an opportunity within a growing environmental sector									
Will the project result in improvements in energy efficiency? These could result from: - reduced energy intensity of manufacturing activities - reduced energy intensity of transport requirements - reduced transport / energy demand, etc.				✔	✔	✔			
Water checklist negative impacts									
Are there any inland, coastal, marine or underground water bodies (or features of the marine environment) on or around the location that could be affected by the Project?	✔				✔	✔			
Will construction or decommissioning of the project involve actions which will cause impacts on surface waters, groundwaters or marine waters or a temporary nature?	✔			✔	✔	✔			
Will construction or decommissioning of the project involve actions which will cause impacts on surface waters, groundwaters or marine waters of a permanent nature?	✔								

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Could the project itself, during its operational phase, have an impact on surface waters, groundwaters or marine waters? For example, will water be abstracted directly from water bodies or supplied by public/private sector operators, or could there be run-off from the project site?	✔						✔		
Will the Project lead to risks from contamination of the water environment from discharges of pollutants into surface waters, groundwater, coastal waters or the sea? Or, will it lead to significant discharges to waste water treatment works?	✔						✔		
Will the Project involve the use, storage, transport, handling or production of substances/mixtures (including biocides and pesticides) which could be harmful to the water environment? When answering this question, please take into account their hazard classification as well as any other classification under REACH (e.g. as a SVHC due to PBT/vPvB or Endocrine Disrupting properties)							✔		
Are there any other areas on or around the location that are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other waterbodies, or the coastal zone that could be affected by the project?									
Are there any wetlands, watercourses or other waterbodies, or coastal zone areas on or around the location that are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?	✔								
Are there any routes or facilities on or around the water bodies which may be affected by the project and that are used by the public for access to recreation or other facilities?									
Are there any areas or features of historic or cultural importance on or around the location that could be affected by the project due to changes in water quality, quantity or water body morphology?									
Are there any areas within or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, that could be affected by the Project?	✔								

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Are there any other factors which should be considered such as consequential development which could lead to impacts on water quality or the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?									
Are there any areas within or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, that could be affected by the Project?									
Is the project location susceptible erosion, flooding or drought conditions, which could give rise to impacts on the water environment?	✔								
Water checklist positive impacts									
1) Will the project result in improvements in water efficiency? These could result from: - changes in production technologies to more efficient technologies - installation of other water saving measures - increased re-use or recycling of water resources?				✔	✔				
Will the project result in reduced abstractions from water environment in areas suffering from over-abstraction (seasonal or annually)? e.g. construction of a winter storage reservoir									
Will the project result in reductions in discharges to the water environment, either via sewer or direct?							✔		
Will the project increase the potential for re-use or recycling of end products, thereby reducing the demand for high water intensity virgin materials?									
Have production technologies and chemical inputs been selected so as to minimise the potential for releases of hazardous substances to the water environment?							✔		
Have other actions been taken as part of project design to limit impacts on the water environment?									
Other aspects that demonstrate environmental good practice in project operation as well as delivery? E.g. increase awareness of residents and other businesses, take advantage of an opportunity within a growing environmental sector?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Land checklist negative impacts									
1) Will construction, operation or decommissioning of the project involve actions which may cause erosion? This may result from: - soil disturbance e.g. ploughing up-and-down slopes - Removal of vegetative soil cover and/or hedgerows - Inappropriate use of heavy machinery	✔								
2) Will construction, operation or decommissioning of the project involve actions which may cause decline in soil organic matter? This may result from: - conversion of land use - Drainage of wetlands - Deforestation	✔								
3) Will construction, operation or decommissioning of the project involve actions which may cause compaction? This may result from: - Inappropriate use of heavy machinery - High livestock densities - Large construction works	✔								
4) Will construction, operation or decommissioning of the project involve actions which may cause salinization? This may result from: - Poor irrigation technology - Inappropriate drainage - Overexploitation of groundwater									
5) Will construction, operation or decommissioning of the project involve actions which may cause landslides? This may result from: - Rupture of topography due to construction works - Land use changes, e.g. deforestation - Extraction of materials	✔								

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
6) Will construction, operation or decommissioning of the project involve actions which may cause soil contamination? This may result from: - industrial installations - Mining installations - Storage of chemicals - Atmospheric deposition of dangerous chemicals									
7) Will construction, operation or decommissioning of the project involve actions which may cause sealing? This may result from: - urban sprawl - increased transport	✔								
Will construction, operation or decommissioning of the project involve actions which may cause loss of soil biodiversity?									
Are there any other areas on or around the location that are important or sensitive for reasons of their ecology e.g. wetlands, forests or woodlands, that could be affected by the Project?	✔								
Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the Project?									
Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the Project?									
Is the Project in a location in which it is likely to be highly visible to many people?									
Are there any areas or features of historic or cultural importance on or around the location that could be affected by the Project?									
Is the Project located in a previously undeveloped area where there will be loss of greenfield land?									
Are there existing land uses within or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying that could be affected by the Project?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Are there any areas on or around the location which are densely populated or built-up, and which could be affected by a Project land take?									
Are there any areas within or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, that could be affected by the Project?									
Are there any areas on or around the location which are already subject to pollution (e.g. air, water, soil) or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?									
Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the Project to present environmental problems?	✔								
Are there any other factors which should be considered such as consequential development which could lead to impacts on land take and the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?									
Would any other activities be required as a consequence of the project, which could lead to land and soil use?	✔								
Land checklist positive impacts									
1) Will the project contribute to stop erosion? These could result from: - reforestation									
Will the project improve the soil organic matter quality and quantity?									
Will the project reduce or stop salinization?									
Will the project reduce the hydrogeological risk?									
Will the project contribute to the remediation of contaminated sites?									
Will the project restore industrial/urban sites to natural sites?									
Will the project enrich soil biodiversity?									
Will the project contribute to the protection of sensitive natural areas?									
Will the project contribute to the high landscape or scenic value on or around the location of the project?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Will the project create or protect routes or facilities on or around the location which are used by the public for recreation?									
Will the project protect areas or features of historic or cultural importance on or around the location of the project?									
Will the project improve the quality or increase the quantity of scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries?									
Will the project improve the quality of air or contribute to compliance with national emission ceilings for air pollutants?									
2) Does the project qualify as environmentally sustainable under the EU Taxonomy Regulation? This means that the project is contributing substantially to at least one of the objectives: - climate change mitigation; - climate change adaptation; - sustainable use and protection of water and marine resources; -transition to a circular economy; -pollution prevention or control; -protection and restoration of biodiversity and ecosystems. In addition, the project activities also enable other activities to make a substantial contribution and do not significantly harm any of the environmental objectives.			✔ ✔		✔				
Biodiversity checklist negative impacts									
Are there any designated sites that could be affected by the project?	✔								
Will construction or decommissioning of the project involve actions which will cause temporary impacts on a designated site?	✔								
Will construction or decommissioning of the project involve actions which will cause impacts on protected sites or locally important sites?	✔								
Could the project itself, during its operational phase, have an impact on a designated site or locally important site?	✔								
Will the Project lead to risks from contamination of designated sites?	✔								

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Will the Project involve the use, storage, transport, handling or production of substances/mixtures (including biocides and pesticides) which could be harmful to flora and fauna?									
Are there any other areas on or around the location that are important or sensitive for reasons of their ecology that could be affected by the project?									
Are there any habitats that are important (e.g. for nesting) or sensitive, which are not designated but which could be affected by the project?									
Are there any other factors which should be considered such as consequential development which could lead to impacts on the surrounding biodiversity?									
Are there any designated areas or locally important habitats within or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, that could be affected by the Project?									
Biodiversity checklist positive impacts									
1) Will the project result in physical changes in the locality that: - assist with the control or removal of alien species? - assist with the conservation of native species or genetic diversity? - assist with the conservation of biodiversity rich and/or protected areas?									
Will the project result in new processes/systems whereby the use of substances or materials that are hazardous or toxic to the environment (flora, fauna) is decreased or avoided?									
Will the project result in reductions in the production of solid wastes? Or improved quality of wastes that are applied to the land (e.g. sewage sludge)?									
Will the project decrease the risk of protected sites or areas rich in biodiversity becoming contaminated by pollutants?									
Have other actions been taken as part of project design to limit impacts on biodiversity?	✔								
Other aspects that demonstrate environmental good practice in project operation as well as delivery? E.g. increase awareness of residents and other businesses, take advantage of an opportunity within a growing environmental sector?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Noise or vibrations									
Thresholds for identifying significant impacts, where no national thresholds exist: • Environmental noise: noise levels greater than 55 decibels (dB) for day-evening-night levels (L_{den}); noise levels greater than 50 decibels for night levels and (L_{night}); noise levels greater than the above as an equivalent continuous sound levels (L_{Aeq}) for transport schemes such as rail projects. • Vibration: The potential for an increase in human annoyance and sleep disturbance, as measured by the change in the percentage population of highly annoyed/disturbed, annoyed/disturbed and slightly annoyed/disturbed.									
1) Will construction or decommissioning of the project involve actions which will could give rise to noise and vibration levels above the levels which cause annoyance or health effects? Please consider both daytime and night-time effects. 2) Will the project be located in an urbanised or residential area, and result in significant increases in day-time or night-time noise levels during its operation? 3) If the project involves changes in transport infrastructure or rolling stock, have noise and vibration issues been considered as part of project design or equipment design? 4) Are there any transport routes on or around the location which are susceptible to high levels of traffic or congestion or which cause environmental noise problems, and which could be affected by the project? 5) Are there any other factors which should be considered such as consequential development which could lead to the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in traffic or other industrial manufacturing activity as part of the creation of a manufacturing cluster)? 6) Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Are there any areas on or around the location which are already subject to excessive noise pollution or vibration related impacts, e.g. where existing EU objectives are not being achieved and which could be affected by the project?									
As odour impacts are a cross-cutting issue, it may be most appropriate to look at guidance that is specific to the type of project being proposed/promoted (e.g. sewage treatment works, waste management and recycling centres, food processing facilities, etc.). 1) Will operation of the project give rise to offensive odorous emissions? 2) Is there the potential for the odours to be of a nature and at an intensity that could give rise to annoyance or to health impacts? 3) Will the site be located in an area that, taking into account wind directions etc., there is the potential for residential and other vulnerable populations as receptors to be affected? 4) Are there any other factors which should be considered such as consequential development which could lead to the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in activity as part of a cluster)?									
Light									
As light impacts are a cross-cutting issue, it may be most appropriate to look at guidance that is specific to the type of project being proposed/promoted (e.g. transport infrastructure, large industrial developments, etc.). 1) Will the resulting infrastructure give rise to the potential for light pollution? 2) Is there the potential for increased lighting levels to be of a nature and at an intensity that could give rise to annoyance or to health impacts? 3) Will the site be located in a residential area or near vulnerable populations? 4) Are there any other factors which should be considered such as consequential development which could lead to the potential for cumulative light impacts with other existing or planned activities in the locality (e.g. through increases in activity as part of a cluster)?									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Major hazard-related safety issues									
Information on the types of accidents that may occur at facilities regulated by the Seveso Directive, and their associated impacts, is available from the eMARS database . This provides access to chemical accident reports from investigations, with the aim of raising awareness of the potential failures that could cause major accidents on sites using dangerous substances. The eMARS site includes statistics on accidents by industry type and lessons learned, which may help project promoters identify both the potential types of impacts relevant to their project and measures for minimising the risks of an event. 1) Would the project involve the use of hazardous substances in the qualifying quantities as listed in Part 1 of Annex I, or listed in Part 2 of Annex I of the Seveso Directive? 2) Is there the potential for the accidents involving hazardous substances to occur at the site, in particular a fire, explosion or toxic spill? 3) Is there the potential for this to lead to fatalities or injuries, other than single or minor injuries? 4) Is there the potential for this to lead to damage to infrastructure off-site, or to significant damage to onsite plant and equipment? 5) Is there the potential for this to lead to environmental damages and the need for environmental clean-up operations? 6) Will the project be located in an urbanised or residential area, or within a less than a kilometre of such developments? 7) Are there other facilities within the nearby vicinity that also fall under the Seveso Directive?									
Noise or vibrations									
1) Will the project result in reductions in noise and/or vibration related impacts? These could result from: - specific measures to reduce noise and vibration - indirect reductions in night-time or day-time noise due to changes in activities - improvements in infrastructure, leading to reductions in vibration related effects									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Will the project result in the movement of noise generating activities out of a residential area or location surrounded by vulnerable populations, e.g. a hospital?									
Will the project include specific measures to reduce noise or vibration?									
Have production technologies been selected so as to minimise the potential for impacts at source?									
Have other actions been taken as part of project location and or design to limit impacts?									
Odour									
Will the project result in reductions in odorous emissions through the installation of new plant? If so, would this affect the nature of the odour, the frequency or the duration, etc.?									
Will the project result in the movement of odour generating activities out of a location surrounded by large, sensitive and/or vulnerable populations?									
Will the project include specific measures to reduce odorous emissions?									
Have production technologies been selected so as to minimise the potential for impacts at source?									
Have other actions been taken as part of project location and or design to limit impacts, e.g. the use of local ventilation systems together with exhaust gas treatment methods?									
Light									
Will the project result in reductions in light emissions through the installation of new equipment? If so, would this affect the level of light pollution?									
Will the project result in the movement of light generating activities out of a location surrounded by large, sensitive and/or vulnerable populations?									
Will the project include specific measures to reduce light emissions?									
Has lighting been selected so as to minimise the potential for impacts at source?									
Have other actions been taken as part of project location and or design to limit impacts?									
Will the project result in reductions in light emissions through the installation of new equipment? If so, would this affect the level of light pollution?									
Major hazards									

Table 11-1: Negative and positive impacts which have not been considered in the environmental assessments/ proofing and which could have been identified by following the guidance checklists									
Checklists for negative and positive impacts	**Case study 1**	**Case study 2**	**Case study 3**	**Case study 4**	**Case study 5**	**Case study 6**	**Case study 7**	**Case study 8**	**Case study 9**
Will the project result in reductions in the use of hazardous substances, to the extent that a site currently falling under the Seveso Directive will no longer do so?									
Will the project result in the relocation of a site falling under the Directive to a less built up or environmentally sensitive location, such that the severity of the potential consequences from an accident would be reduced?									
Will the project include specific measures to improve safety at an existing site?									

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by Freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by email via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from: https://publications.europa.eu/en/publications. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

Open data from the EU

The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.


Publications Office
of the European Union