European Bank
for Reconstruction and Development

Guidance note

EBRD Performance Requirement 3:

Resource efficiency and pollution prevention and control

November 2023

Contents

1. Introduction and objectives

1.1. Purpose of this guidance note

The European Bank for Reconstruction and Development (EBRD) is committed to promoting environmentally sound and sustainable development in the full range of its activities, pursuant to the Agreement Establishing the Bank.[1] The Environmental and Social Policy (ESP) is one of the Bank's three good governance policies and a key document that guides this commitment to promoting "environmentally sound and sustainable development" in the full range of its investment and technical cooperation activities.[2] The EBRD's Board of Directors approved the 2019 Environmental and Social Policy and its 10 related Performance Requirements (PRs) on 25 April 2019. They apply to projects started after 1 January 2020.

EBRD Performance Requirement 3 (PR3) sets out the Bank's approach to the project-level assessment of resource efficiency and pollution prevention and control.[3] It lists the overarching objectives and scope of application of PR3 and provides details on the individual requirements to be considered.

PR3 requires project-related risks and impacts associated with resource use and the generation of waste and emissions to be assessed in the context of project location and local environmental conditions. Appropriate mitigation measures, technologies and practices should be adopted for efficient and effective resource use and pollution prevention and control, including the reduction of greenhouse gas (GHG) emissions and climate impacts.

PR3 recognises the importance of using Best Available Techniques (BAT) as set out in the European Union (EU) BAT conclusions (BATc) and Good International Practice (GIP)[4] to optimise resource use and efficiently prevent and control pollution. PR3 also acknowledges the emerging concept and practice of circular economy and/or resource recovery, whereby useable and valuable products can be created or derived from what has previously been viewed as waste.

This guidance note provides EBRD clients and others with a practical guide to implementing the requirements of PR3 and expands on the key principles underpinning it. It also provides details on some of the key indicators for demonstrating compliance.

1.2 Key changes from the 2014 PR3 to the 2019 PR3

The updated version of PR3 took effect on 1 January 2020. It aligns largely with the 2014 version of PR3, but includes some significant changes:

- It now recognises the emerging concept and practice of circular economy.
- It further clarifies application of EU substantive environmental standards, including BAT.
- For projects that either (1) have, or are expected to have, gross emissions in excess of 100,000 tonnes of CO_2 equivalent (CO_2e) annually, or (2) are expected to result in a net change in emissions, positive or negative, of more than 25,000 tonnes of CO_2e annually post-investment, clients are required to quantify these emissions in accordance with the EBRD Protocol for Assessment of Greenhouse Gas Emissions.

1.3 Key objectives of PR3

PR3, paragraph 4 sets out its key objectives:

- Adopt the mitigation hierarchy approach to addressing adverse impacts on human health and the environment arising from the resource use and pollution released from the project.
- Avoid, minimise and manage project-related GHG emissions.
- Avoid, minimise and manage the risks and impacts associated with hazardous substances and materials, including pesticides.
- Identify, where feasible, project-related opportunities for resource efficiency improvements.

1 See EBRD (1990), Article 2.1(vii).

2 See EBRD (2019).

3 See EBRD (2019, p.20).

4 The exercise of professional skill, diligence, prudence and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally. The outcome of such exercise should be that the project employs the most appropriate techniques and standards in the project-specific circumstances.

2. Scope of application

PR3 applies to all projects financed by the EBRD as established in the ESP. The client will, as part of its environmental and social assessment process, identify the relevant requirements of this PR and how they will be addressed and managed through the project's design, construction, operation, decommissioning or closure, and reinstatement. The implementation of the actions necessary to meet the requirements of PR3 will be managed under the client's overall environmental and social management system (ESMS) and the project-specific environmental and social action plan (ESAP), which are covered in PR1 on the assessment and management of environmental and social risks and impacts.[5]

2.1 Context and current informers of PR3

When appraising a project against PR3, the assessment process for resource efficiency and pollution prevention and control should first identify the project boundaries, the activities to be performed, associated facilities and the appropriate techniques (methods, technologies and practices) to be applied to that project. The EBRD's ESP specifically requires projects to meet EU substantive environmental standards, where feasible, at project level. Where this is not feasible – which would be uncommon for a project or project component – the EBRD and the client will agree on the appropriate standards to be applied in accordance with national legislation and GIP. All projects should be designed to comply with applicable national laws and regulatory requirements. There may be cases where national law is stricter than EU standards and, in such circumstances, national law should prevail.

2.1.1 Substantive environmental standards

The range of EU substantive environmental standards that could apply to individual EBRD projects is broad. Some examples can be found in Annex 1, however, this is not an exhaustive list and the relevant EU standards for an individual project should be reviewed and determined on a case-by-case basis.

For PR3, compliance with BAT is often a key focus area, as it is specifically relevant to the assessment of pollution prevention and control for the most polluting industry sectors. Projects that, due to their nature and scale, would be subject to the EU Industrial Emissions Directive (IED)[6] are required to meet EU BAT standards (including associated emission levels), as set out in the BATc,[7] regardless of location. Further guidance on BAT and how to undertake a BAT assessment is provided in Section 2.2.

Guidance on the key areas to consider in relation to BAT is provided in Section 3. While, strictly speaking, BAT applies to those projects that would be captured by the IED, the topics in Section 3 should be reviewed for all EBRD projects, as they provide useful information on appropriate standards/best practices for all projects that have the potential to cause pollution.

2.1.2 National laws and regulatory requirements

All projects should meet national laws and regulations. These need to be clearly defined, along with any divergence from BAT requirements in the key PR3 topic areas. A critical area of divergence from BAT standards is where national law sets higher limits than those set out in the BAT requirements, as these may be needed to enable the receiving environment to recover and for the proposal to be considered "not significant pollution" (a fundamental requirement of the IED). In such circumstances, the regulatory authorities can impose stricter limits than BAT requirements. This would be detailed in the assessment against BAT requirements, for example, in the emissions to air for each pollutant against both national legislation and EU BAT conclusions.

2.1.3 Other appropriate standards

Where no EU substantive environmental standards exist at project level, the EBRD and the client will agree on the appropriate standards to be applied in accordance with GIP. Some subsectors where GIP guidance might be applied to EBRD projects include desalination plants, wind farms, solar farms and battery facilities.

5 See EBRD (2019), p.13.

6 See EU (2010b).

7 See European IPPC Bureau (n.d.).

2.2 Best available techniques

2.2.1 Introduction to BAT

Projects that fall under the remit of the IED (those listed in Annex I of the IED) must demonstrate BAT.[8] For these projects, the BAT assessment is the main approach for evaluating performance with regard to PR3.

The IED takes an integrated approach to controlling the pollution of air, water and land, and sets challenging industry standards for the most polluting industries. The IED aims to prevent and reduce harmful industrial emissions while promoting the use of techniques that reduce pollutant emissions and that are energy and resource efficient.

Industrial facilities under the remit of the IED are required to use BAT to reduce emissions to air, water and land. BAT refers to available techniques that are best at preventing or minimising emissions and impacts on the environment. "Techniques" include both the technology used and the way the installation is designed, built, maintained, operated and decommissioned.

The European Commission produces public BAT reference documents (BREFs) for each sector. There are, for example, separate BREFs for the food, drink and milk industries, large combustion plants and waste treatment. There are also cross-sectoral BREFs, such as those for energy efficiency and cross-media effects. A list of available BREFs is published on the European Commission's website.

Each BREF includes BATc, or the parts of a BREF document setting out the conclusions on BAT, a description, information on applicability, the emission levels associated with BAT, associated monitoring and associated consumption levels. The BREFs are reviewed and updated periodically, so it is important to access the most up-to-date versions available from the European Commission's website. It is also important to note that the techniques listed and described in BATc are neither prescriptive nor exhaustive. Other techniques may be used as long as they ensure that at least an equivalent level of environmental protection is provided and can be demonstrated to meet, for example, specified BAT-Associated Emission Levels (BAT AELs) or BAT-Associated Performance Levels (BAT APLs).

When undertaking a BAT assessment for the purposes of evaluating compliance with PR3, the scope of the assessment should be proportionate to the nature, scale and complexity of the project (for example, a simple timber treatment facility or a large complex refinery) and to its stage of development (for example, a new facility on a greenfield site or an upgrade to an existing facility). Furthermore, the purpose and approach to the BAT assessment should reflect the type of project the assessment is supporting, say, input to an environmental and social due diligence (ESDD) project or the provision of design advisory support. This is illustrated by the examples in Table 2.1.

8 See EU (2010b).

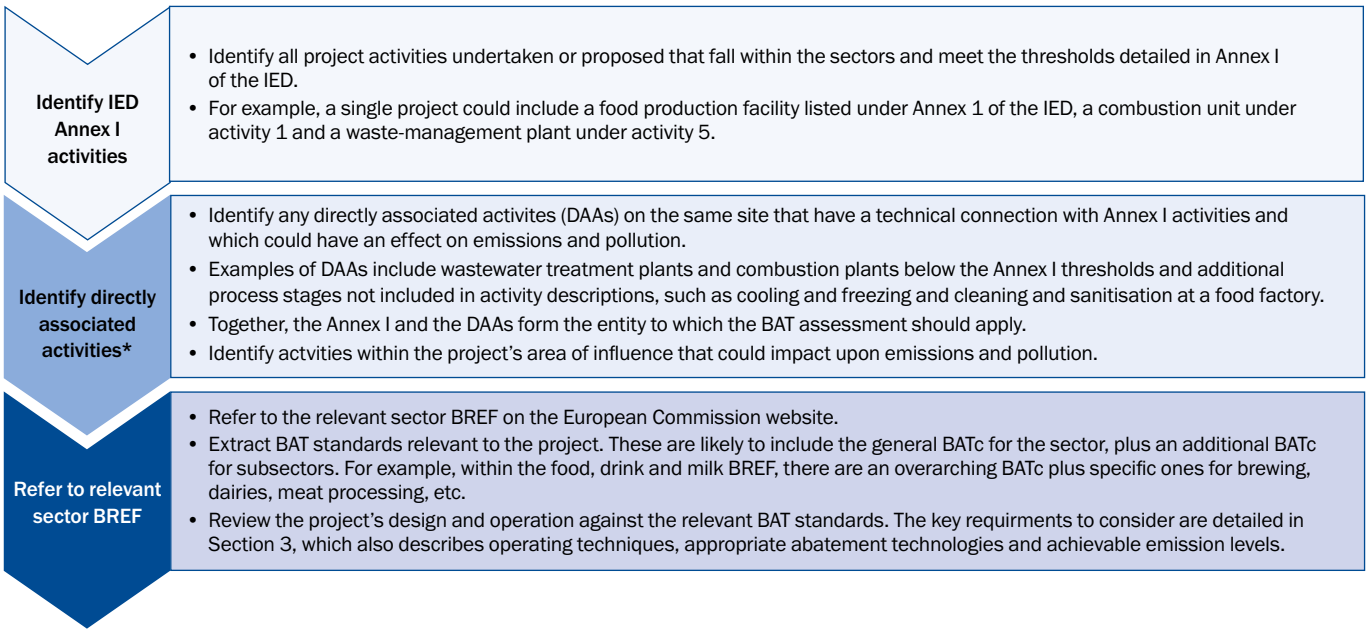
Table 2.1. Example of scope and approach to BAT assessments

Type of project	Approach to assessment
ESDD project	General review – A BAT assessment for an ESDD project typically involves a high-level review of BAT across the project, in accordance with the relevant BREF for that sector. For example, project information and data (either existing or proposed) on emissions to air and water, energy efficiency, raw material and water use, and waste management would need to be gathered and compared with any benchmarks, performance levels, techniques and BAT-AELs/APLs specified in the BREF. Any shortfalls, such as a lack of available data or a deviation from requirements, can be addressed via a condition in the ESAP, but in general, should be addressed as part of the ESDD/project development process. ESAP conditions should only be used as a last resort where there are either no data available or the shortcomings of the data or impact assessment are so significant that a further assessment is required. Further details of the key requirements to be considered in the BAT review are provided in Section 3. This would be undertaken for projects prior to submission to the board for approval.
Regulatory submission (for example, a permit application to the relevant in-country authority)	Options justification – A BAT assessment that forms part of a regulatory submission, for example, a permit application, follows the same general approach to that detailed above. However, while containing the same information, it would need to follow any specific in-country processes required by the relevant regulator. The outputs of the BAT assessment (for example, predicted or actual emissions) are more likely to feed into detailed risk assessments (such as dispersion models for emissions to air and water) in order to demonstrate to the regulator that the impact of the project on the environment is acceptable. Where abatement is required and there is a choice of options, a BAT options assessment will be necessary to justify the choice of technology. This would be undertaken to comply with national regulations and could be undertaken after board approval, especially for greenfield projects that are in design.
Detailed design (for example, to inform design of a new facility or an extensive retrofit to an existing facility)	Design support/advisory BAT assessments can also be undertaken to help inform the design of new facilities and/or extensive retrofits to existing facilities. In such cases, the BAT assessment is likely to focus on specific areas where the design and technology have implications for emissions to the environment (for example, emissions to air and water and the consideration of energy efficiency and GHG emissions). This would be undertaken to either inform the design process or to plan an upgrade and retrofit and is likely to be undertaken prior to the commencement of ESDD, especially for large complex projects.

2.2.2 BAT assessments

The approach detailed in Figure 2.1 should be followed for each project that would fall under the remit of the IED to determine whether it meets BAT.

Figure 2.1. Process for BAT assessment



* Note: The identification of DAAs is similar but not identical to the identification of associated facilities within the EBRD's ESP. Associated facilities are defined as "facilities or activities that are not financed by [the] EBRD as part of the project but which in the view of [the] EBRD are significant in determining the success of the project or in producing agreed project outcomes. These are new facilities or activities: (i) without which the project would not be viable, and (ii) would not be constructed, expanded, carried out or planned to be constructed or carried out if the project did not exist."[9]

The BAT assessment process is the starting point for any project, namely, to identify and review existing or proposed activities against the minimum sectoral BAT standards. For each sector, the BREF/BATc will include a combination of BAT-AELs (for example, emission limits for discharges to water), BAT-APLs (for example, energy efficiency standards) and narrative BAT (for example, requirements for secondary containment). As mentioned, the techniques listed and described in the BATc are neither prescriptive nor exhaustive. To demonstrate BAT, a project must either follow the techniques described in the BATc or, where the described techniques cannot be followed directly, propose alternative techniques. In most cases, the EBRD will only accept an alternative technique where the client can demonstrate that it will provide a level of environmental protection at least equivalent to the BAT, for example, by achieving BAT-AELs. In such cases, the BAT assessment will need to include a clear and robust demonstration of how the proposed technique provides equivalent environmental protection, for instance, through the provision of validated monitoring data from existing projects, manufacturers' guarantees for emissions or an assessment of cross-media effects.

There may be instances on specific projects where, due to local environmental conditions, it is necessary to implement stricter standards than those specified by BAT, that is, to reduce emissions even further than the BAT-AELs. Though not common, this can occur where baseline environmental pollution is already elevated (for example, there is a degraded airshed or a known problematic watercourse close to failing or failing water quality standards). In such cases, implementing BAT would not ensure environmental protection, so the project would need to achieve more stringent levels than BAT-AELs.

Where there are various technology options that can be employed in relation to a particular environmental aspect (for example, an abatement plant for emissions to air or water to ensure that BAT can be demonstrated), the project entity will be required to undertake a BAT options appraisal. The reviewer will need to take this into account in assessing whether the chosen option should be considered a BAT with regard to pollution control.

Any new projects must meet BAT from the outset. An ESAP is used to help with implementation to ensure compliance.

9 See EBRD (2019).

3. Requirements

PR3 defines pollution as "both hazardous and non-hazardous chemical pollutants in the solid, liquid, or gaseous phases, and includes other components such as thermal discharge to water, emissions of short- and long-lived climate pollutants, contamination of environmental media (including soil, air and water), nuisance odours, noise, vibration, radiation, electromagnetic energy and the creation of potential visual impacts, including light".[10]

It is based on the mitigation hierarchy and the principle that environmental damage should, as a priority, be rectified at source according to the "polluter pays" principle. It goes on to state that "the project related risks and impacts associated with resource use, and the generation of waste and emissions need to be assessed in the context of project location and local environmental conditions".[11]

Thus, if an airshed is deemed to be degraded, as it exceeds ambient air quality standards, or a river is deemed to be poor due to its chemical or ecological status, this could mean that the BREF-defined BAT may not be sufficient to prevent environmental harm and that, on a project level, the case-specific BAT may need to have more stringent limits to ensure the required level of environmental protection.

3.1 Emissions to air

Air emissions will occur on most projects through the following mechanisms:

- Point-source emissions (localised in origin) from stacks, for example, power stations and energy from waste plants, process vents and tank vents. Even smaller industrial projects or building projects/offices are likely to have some point-source emissions, for example, from boilers and/or generators.
- Point-source emissions from vehicles or non-road mobile machinery controlled through the adoption of appropriate specified vehicles, for example, EU Eurospec emissions standards.
- Fugitive emissions (from a diffuse source) – for example, dust from soil movement/ash piles, uncovered tanks, odour and bioaerosols from waste storage and degradation.
- To assess PR3 compliance with regard to emissions to air, it is necessary to:
- Review an inventory of emissions to air for the project (considering both point source and fugitive emissions).
- For each point and fugitive emission source, evaluate the:
    - Source of the emission (for example, stack number, fugitive).
    - Characterise the emission (pollutants released, abated/non-abated, emissions concentration, continuous/intermittent).
    - For point-source emissions, review the actual emissions from the process against the permitted limits in national legislation, as well as any sector-specific BAT-AELs. This would need to be reviewed for each emission point in accordance with the example in Table 3.1.
    - For fugitive emissions, rather than specific limits or BAT-AELs, the activity generating the emission should be reviewed for best practice, for example, appropriate techniques for minimising the emissions. For a project with the potential for significant fugitive emissions, a fugitive emissions management plan should be requested and, if not available, included as an ESAP requirement.

10 See EBRD (2019, p.20).

11 Ibid.

Table 3.1. Example of emissions-to-air inventory based on a power plant in Uzbekistan

Emission point reference, location and source	Pollutant	Large combustion plant BREF requirement	National legislation	Actual emissions	Compliant
For example: A1, A2 and A3 – from LCP 151, 152 and 153 – gas turbines fired on natural gas	NOx	10-30 mg/Nm^3 yearly average 15-40 mg/Nm^3 daily average	Nitrogen oxide: 82,059 tonnes per year Nitrogen dioxide: 327,002 tonnes per year		Yes/No
	CO	< 5–30 mg/Nm^3. For plants with a net electrical efficiency (EE) greater than 55 per cent, a correction factor may be applied to the higher end of the range, corresponding to [higher end] × EE/55, where EE is the net electrical energy efficiency of the plant determined at ISO baseload conditions.	1,073,959 tonnes per year		Yes/No

After the above inventory has been completed, the emission points that are minor in nature and/or primarily breathing losses[12] can be screened out if they are not subject to AELs. A fugitive emission plan may be more appropriate to control small releases from a significant number of vents.

To demonstrate that emission limits are achieved in line with both national legislation and the BAT-AELs, it is necessary to assess the mass release for each emission point in tonnes per annum, as well as the instantaneous emission concentration release for each pollutant in mg/m^3. The emissions should be assessed against the reference emission standards relevant to that project – namely, dry gas at a temperature of 273.15 K and a pressure of 101.3 kPa – and expressed in units such as mg/Nm^3, µg/Nm^3 or ng I-TEQ/Nm^3. Emissions data not in reference conditions will need to be adjusted accordingly. Some key oxygen reference conditions are detailed below, while the reference conditions for each IED sector are included in the BATc:

- combustion of solid fuel – 6 per cent O_2
- waste incineration – 6 per cent O_2
- combustion of liquid or gaseous fuels in a turbine or engine – 15 per cent O_2.

Any failure to meet or any deviation from national legislation or BAT-AELs will require further measures to be taken in the form of an upgrade or improvement plan, which will need to be fully corrective, reviewed and confirmed as a condition of the ESAP.

For fugitive emissions (see examples in Table 3.2), the ESIA, where available, should estimate the potential release associated with the activity (for example, ground preparation and soil removal for road, rail or building construction projects or bioaerosols from composting facilities). If this is unavailable, the reviewer should assess the potential release mechanisms, controls and mitigation in place and whether these are appropriate. If not, then an ESAP condition could be included to develop a fugitive emissions management plan for the project.

12 Which sources are considered minor should be determined by an environmental expert, based on their professional judgement, on a case-by-case basis.

Table 3.2. Fugitive emissions

Emission point source	Pollutant	Best practice requirement	Actual practice	Compliant with BAT
Soil pile from construction	Dust	Top soil should be set to one side for reinstatement after completion of the project. Any soil piles should be covered where appropriate and dampened down during warm conditions.		
Ash pile	Dust	Any ash piles should be either stored in buildings/silos or covered and dampened down during warm conditions, ensuring that any run-off is contained.		
Asbestos from the lagging of pipework, boilers, ceiling/wall insulation, etc.	Hazardous dust	All sites where asbestos is present should conduct a survey to identify where it is present. This assessment should also identify the condition of the asbestos.		
		All sites where asbestos is present should conduct a survey to identify where it is present. This assessment should also identify the condition of the asbestos. It should also identify where the asbestos is damaged and the review should include whether the asbestos should be encapsulated or removed by a suitably qualified contractor.		

A further consideration is the assessment of the project's impact on ambient air quality standards. This would normally be assessed by modelling the process contribution and comparing it with national ambient air quality standards (see Table 3.3 for an example). Where assessments are not included in an ESIA or are unavailable, it may be necessary to model the project emissions to air in cases where the emissions are likely to have a significant impact on ambient air quality standards or where the airshed is already degraded by the pollutants likely to be released. A screening exercise will need to be conducted to assess whether modelling is appropriate for the project.

Table 3.3. Example of comparison against ambient air quality standards in Uzbekistan

Boiler	Substance	Emission limit (background and calculated norms, g/s)	Measured emissions (g/s)	Compliant
TC1				
Boiler 1	NO_2	1.428	0.2022	Yes
	NO	0.232	0.0328	Yes
	SO_2	0.257	0.1132	Yes

Any deviation from achieving national background limits will require further measures to be taken. This may involve an upgrade or improvement plan that could be reviewed through a condition within the ESAP.

In some countries with sanitary protection zones, the monitoring of emissions is required within those zones to demonstrate that emissions to air will not have an impact on local receptors.[13] However, in instances where occupied buildings within the sanitary protection zone could be affected by the air emissions, the highest level of controls will need to be adopted.

Air quality modelling is likely to be undertaken for projects included in Annex I of the IED and occasionally for Annex II projects, in accordance with the Environmental Impact Assessment (EIA) Directive for EU countries, to which the EBRD adheres.[14] Detailed dispersion modelling could be undertaken for projects on a case-by-case basis as part of enhanced ESDD and usually for a relevant ESIA, where there are air quality considerations.

Emissions monitoring should be undertaken in accordance with the requirements of the appropriate BREF guidance document. For example, for large combustion plants, this needs to be in accordance with BAT condition 4, which stipulates the pollutants that must be assessed for combustion plants. For example:

- nitrous oxide (NOx) – a continuous emissions monitoring system (CEMS) (except for combustion plant on offshore platforms where it is once per year)
- carbon monoxide (CO) – CEMS (except for combustion plants on offshore platforms, for which extractive testing is needed once per year)
- hydrogen fluoride (HF) – CEMS for waste incineration, once per year for solid biomass peat combustion and once every three months for coal/lignite or process fuels from chemical industry boilers.

These would need to be reviewed for each pollutant emitted from each major emission point.

Monitoring arrangements must be reviewed for competency. Both continuous and periodic monitoring should be in accordance with the relevant standard for that pollutant, for example, dust, in accordance with generic EN standards and EN 13284-1 and EN 13284-2.

13 The term “receptor” is used to describe features of the biophysical and social environment that may be affected by or interact with the project. This may include, for example, water resources, land, air, habitats, species, communities, individuals and cultural heritage.

14 See EU (2014).

3.2 Emissions to water

Emissions to water can occur through the following mechanisms:

- point-source emissions (localised in origin) from pipes, for example:
  - waste water from effluent plant outlet pipes
  - discharge to sewers via pipelines
- fugitive emissions (from a diffuse source), for example:
  - surface water run-off from sites (clean, non-operational and/or operational, contaminated areas) or roads
  - leaks to ground or underlying groundwater (this is covered further in Sections 3.7 and 3.12).

To assess compliance with emissions to water in the context of PR3, it is necessary to:

- Review an inventory of emissions to water for the project (taking into account both point-source and fugitive emissions). This should be backed up by observations from a site visit and a review of the site layout, drainage and local environmental sensitivity plans, as any fugitive emissions will not always be identified by the client and they are not always obvious.
- For each point and fugitive emission source, evaluate the:
  - Source of the emission, for example, uncontaminated surface water, leachate, treated process effluent, etc.
  - Characterisation of the emission – from monitoring data, for example, volume, flow, pH, suspended solids and other potential parameters, such as metals and microbiology, as necessary, bearing in mind the source.
  - For point-source emissions to surface water or sewers, review the actual emissions from the process against the permitted limits in national legislation, as well as any sector-specific BAT-AELs. These will need to be reviewed for each emission point in accordance with the example in Table 3.4.
  - Any treatment provided prior to the discharge should also be reviewed for BAT compliance against any relevant standards in the sector and/or waste treatment BREFs, for example. The BREFs usually state that in order to reduce emissions to water, BAT should use an appropriate combination of techniques from a defined list, for example, primary treatment comprising equalisation, neutralisation or physical separation; secondary treatment comprising aerobic or anaerobic processes; and tertiary treatment for final solids removal by coagulation, flocculation or filtration.
  - For fugitive emissions to surface water or underlying groundwater, rather than specific limits or BAT-AELs, the activity generating the emission should be reviewed for best practice, that is, appropriate techniques for minimising the emissions. Some of the key techniques to consider, which apply to many projects, include the segregation of water streams, so that those not needing treatment (for example, uncontaminated cooling water or run-off water) are segregated from wastewater that must undergo treatment, appropriate site surfacing and adequate drainage infrastructure.
  - For projects with the potential for significant fugitive emissions to surface water or groundwater, a fugitive emissions management plan should be requested and, if not available, be included as an ESAP requirement.

Table 3.4. Example of emissions-to-air inventory based on a power plant in Uzbekistan

Emission point reference, location and source	Pollutant	Food, drink and milk BREF requirement	National legislation	Actual emissions	Compliant
W1 – uncontaminated surface water drainage from interceptor and attenuation pond – discharge to River X	Chemical oxygen demand (COD) Total suspended solids (TSS)	25-100 mg/l daily average 4-50 mg/l daily average			Yes/No
W2 – treated process water from the onsite wastewater treatment plant – discharge to sewer	Total nitrogen (TN) Total phosphorus (TP)	2-20 mg/l daily average 0.2-2 mg/l daily average			Yes/No

It is important to note that the BAT-AELs apply at the point where the emission leaves the installation, that is, prior to discharge and dilution in the receiving watercourse. Any failure to meet or any deviation from either national legislation or BAT-AELs will require further measures to be taken in the form of an upgrade or improvement plan, which could be reviewed as a condition of the ESAP. This could include an options assessment to determine secondary and tertiary treatment options, as the technology cannot be deemed to be BAT if it fails to meet the BAT-AELs.

A further consideration is the assessment of the project's impact on water quality standards. This would normally be assessed by modelling the process contribution and comparing it with national water quality standards, per the above example on air emissions. Any deviation from achieving national background limits would require further measures to be taken, potentially in the form of an upgrade or improvement plan, which could be reviewed as a condition of the ESAP. As above, this could lead to an options assessment for secondary and tertiary treatment in order to meet water quality standards.

A water quality assessment is likely to be undertaken for projects that are included in Annex I of the IED, and occasionally for Annex II projects, in accordance with the EIA Directive,[15] and projects that have point-source discharge directly to water (that is, not via a sewer discharge). Assessments should incorporate site-specific data for the receiving watercourse, including flow and background concentrations.

Emissions monitoring should be undertaken in accordance with the requirements of the appropriate sector BREF. The monitoring arrangements will need to be reviewed for competency, in that both continuous and periodic monitoring should be in accordance with the relevant standard for that pollutant. For example, suspended solids must be in accordance with EN 872.

For fugitive emissions, the ESIA should estimate the potential releases associated with the activity and whether these are likely to cause any significant impacts. It should also consider what mitigation measures should be adopted to prevent this occurring.

15 See EU (2014).

3.3 GHG emissions

GHG emissions will be generated by every project to a greater or lesser degree. Some examples include:

- carbon dioxide (CO_2) – stationary combustion of fossil fuels, indirect use of electricity, oil/gas production and processing, flue gas desulphurisation (limestone based), aluminium production, iron and steel production, nitric acid production, ammonia production, adipic acid production, cement production, lime production, glass manufacture, municipal solid waste incineration, transport (mobile combustion)
- methane (CH_4) – biomass decomposition, oil/gas production and processing, coal mining, municipal). solid waste landfill, municipal waste water treatment
- nitrous oxide (N_2O) – stationary combustion of fossil fuels/biomass, nitric acid production, adipic acid production, municipal solid waste incineration, municipal waste water treatment, transport (mobile combustion)
- hydrofluorocarbons (HFCs) – refrigeration, air conditioning, insulation industry
- perfluorocarbons (PFCs) – aluminium production, for example
- sulphur hexafluoride (SF_6) – electricity transmission systems, specific electronics industries (such as liquid crystal display (LCD) manufacture)
- nitrogen trifluoride (NF_3) – plasma and thermal cleaning of chemical vapour deposition reactors.

To assess a project's GHG emissions, it is essential to perform a competent GHG assessment. This can be undertaken and made available as part of the ESIA. A GHG assessment should be carried out in accordance with EBRD guidance.[16]

The 2019 EBRD ESP states that "for projects that either (1) have, or are expected to have, gross emissions in excess of 100,000 tonnes CO_2-equivalent annually, or (2) are expected to result in a net change in emissions, positive or negative, of more than 25,000 tonnes of CO_2-equivalent annually post-investment, the client will quantify these emissions in accordance with EBRD Protocol for Assessment of Greenhouse Gas Emissions".[17]

The scope of the GHG assessment must include all direct emissions from the facilities, activities and operations that form part of the project (Scope 1), as well as indirect emissions associated with the production of energy used by the project (Scope 2).[18]

Projects in EU countries will need to ensure compliance with the EU Emissions Trading Scheme. The system covers the following sectors and gases, focusing on emissions that can be measured, reported and verified with a high level of accuracy:

- carbon dioxide (CO_2) from
  - o power and heat generation
  - o energy-intensive industry sectors, including oil refineries, steel works and the production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals
  - o commercial aviation
- nitrous oxide (N_2O) from the production of nitric, adipic and glyoxylic acids and glyoxal
- perfluorocarbons (PFCs) from aluminium production

In line with the EBRD's ESP, projects with a net change in annual emissions of 25 kt CO_2e per year or with gross emissions of more than 100,000 tonnes of CO_2-equivalent per annum are required to report such emissions annually to the Bank. The scope of this report will typically be limited to the boundaries of the EBRD-financed project and will align with the scope of the GHG assessment carried out during project appraisal.

Annual reporting of GHG emissions should form part of the project's normal environmental and social reporting to the EBRD.

3.4 Energy use and efficiency

Energy will be used by every project, ranging from sectors that are high consumers of energy to those with lower levels of energy consumption. Projects in the power and renewables sector will generate energy for export to an electrical grid or to third parties, and own energy consumption at the project site (parasitic load) may be met by the energy they generate.

To assess project energy use, the sources of energy and their annual consumption should be identified. The energy data can be collated using Table 3.5:

Table 3.5. Example of energy consumption data requirement

Energy source	Units	Energy consumption
Natural gas		
Diesel/petrol		
Gas oil		
Coal		
Electricity		
Biomass		
Steam purchased		

16 See EBRD (2017).

17 See EBRD (2019).

18 See Annex 2 for further detail on GHG reporting and how to define the scope of the assessment.

Per Table 3.5, the energy source is where the data can be broken down into the different energy sources within the project, for example, grid electricity, oil, gas and heat purchased. Typically, energy data should be available by project site, although it may be broken down into more than one activity within a project.

Where benchmarking data are available, a comparison of energy use data with GIP should be determined to establish the relative level of efficiency of the project site. Where the sectoral BREF notes have a specific benchmark indicator for energy efficiency in a specific sector, this becomes a specific BAT consideration under PR3. For example, the food and drink BREF states the following:

Table 3.6. Example of specific energy consumption (SEC) benchmark

Main product (at least 80 per cent of production)	Unit	SEC (yearly average)
Market milk	MWh/tonne of raw materials	0.1-0.6
Cheese		0.10-0.22(1)
Powder		0.2-0.5
Fermented milk		0.2-1.6

Note: (1) The specific energy consumption level may not apply when raw materials other than milk are used.

Where the BREF has not been updated recently, SEC benchmarks in line with GIP for the sector should be taken into consideration.

An assessment should also be conducted to determine whether measures for minimising the consumption and improving the efficiency of energy use are being implemented for older, high-energy-use project sites. For such sites, an energy balance and energy efficiency audit should have been conducted, identifying opportunities to improve energy efficiency at the project site. If not, this can be addressed by way of an upgrade or improvement plan, which could be reviewed as part of an ESAP condition.

Note that other energy efficiency-related EU Directives may also apply in addition to the IED, for example, the Energy Performance of Buildings Directive.[19]

The energy data can be used to calculate GHG emissions (see Section 3.3) for the project site.

3.5 Water use

Water will be used by almost every project to a greater or lesser degree. Some examples include:

- road/rail construction projects – for soil pile dampening, welfare activities and road cleaning
- solar projects – for cleaning panels (unless self-cleaning) and welfare activities
- energy projects – for steam systems and cooling requirements
- industrial projects – in processing, cleaning and cleaning in place (CIP), and potentially within the product itself.

To assess project usage, it is essential to identify the overall use of water within the confines of the project. Project usage can be collated using Table 3.7:

Table 3.7. Example of water consumption data requirement

Project site/use	Volume used (m^3)	Source of water

In Table 3.7, the "project site" column is where the data can be broken down into more than one project activity. However, water usage may be monitored at project level only.

The source of water needs to be identified in order to assess whether it is from a sustainable source, also when the impacts of climate change are taken into account.[20] It should be ascertained from the EIA/ESIA, where available, that the source of any water used is sustainable and that project requirements will not hamper the ecological flow or interfere with the use of the water source by other actors in the area, for example, for farming, fishing or leisure activities. Where ground abstraction is concerned, the question is whether it will affect the aquifer and whether there is sufficient recharge to avoid it becoming depleted, as aquifers typically provide baseflow to local rivers. The ESDD process needs to consider whether the site is subject to water scarcity, how much water is being used and the measures in place to minimise water use.

Each project should consider the water they use in terms of the volumes required and the quality. Thus, opportunities could be sought to use wastewater from one process as feed water for another. Any examples of the reuse of water would be in accordance with BAT and meet circular economy principles, while protecting water resources, especially in water-scarce areas.

EBRD PR3 guidance defines a project to be a high water user if it exceeds 5,000 m^3 per day. For such projects, additional requirements need to be reviewed.

19 See EU (2010a).

20 The definition of a sustainable water source should be determined by expert judgement on a case-by-case basis.

Table 3.8. PR3 requirements for high water users

PR3 requirement	ESDD requirement example
A detailed water balance must be available for the project, updated and reported annually to the EBRD	Review the water balance for accuracy and omissions or errors
A specific water-use key performance indicator (KPI) must be assessed and reported annually	Review the KPI for whether it is appropriate to the parameter being assessed and relevant to the project site, for example: • m^3/tonne of product (food sector) • m^3/MWh (energy sector) • m^3/tonne of waste processed (waste treatment sector)
The project activity must be compared against best industry practice for water usage within that sector	Review the reported KPI both against previous years, where data are available, and against best practice and GIP for the sector Where a sector BREF is available, it may contain BAT benchmarks for water use
Water usage should be continually reviewed to look for opportunities to reduce consumption	Review water minimisation audits previously undertaken for recommendations; if this has not been carried out, it can be considered an ESAP condition

Any shortcomings identified in a greenfield project can be addressed at the design stage and the revised design can be reassessed. If the site is operational, further mitigation measures or improvements can be developed as part of an upgrade or improvement plan, which could be reviewed as a condition of the ESAP.

3.6 Waste generation

Waste will be generated by almost every project to a greater or lesser degree. Some examples include:

- road/rail projects – construction and demolition waste, including soil and stones (potentially contaminated and non-contaminated), rubble, wood, metal and other mixed materials, maintenance waste during the operating phase
- energy projects (combustion plants) – bottom ash, fly ash, waste oil, packaging, used parts and other maintenance waste, boiler blowdown and hazardous waste, such as asbestos
- non-ferrous metal plants (for example, the production of copper, aluminium and precious metals) – furnace slags and drosses, furnace maintenance waste, such as insulation and refractory, sludges from wastewater treatment plants, and transport and packaging waste, including drums
- slaughterhouses – animal waste from the abattoir process, refrigerants and oil from chilling and freezer units, and packaging from portioning and trimming.
- To assess project waste generation and management, it is essential to obtain and review a waste inventory for all significant waste generation within the confines of the project. The key data on waste generation that need to be collected to allow assessment of PR3 compliance are illustrated in Table 3.9:

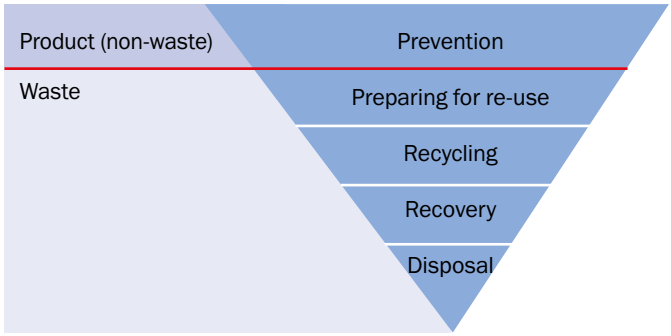
The collection of such data will allow an assessment of whether waste is being managed in accordance with the waste hierarchy set out in Article 4 of the Waste Framework Directive,[21] illustrated in Figure 3.1. The waste hierarchy gives top priority to preventing waste generation in the first place, for example, by using less material in design and manufacture, keeping products for longer or re-using materials. When waste is created, the hierarchy gives priority to preparing it for re-use, then recycling, then recovery and, last of all, disposal (for example, in landfill).

Table 3.9. Example of waste inventory data requirement

Waste type	Origin	Storage details	Method of transfer and recovery or disposal	Annual generation (tonnes)	Justification for choice of disposal or recovery option
Sludge					
Waste oil					
Cardboard packaging					

21 See EU (2008a)

Figure 3.1. Waste hierarchy of the EU Waste Framework Directive



Source: EU (2008a).

When waste is transferred off site and/or managed by third parties, chain-of-custody documentation should be completed to enable the tracking of the waste to its final destination. Only waste contractors that are licensed by the relevant regulatory authorities should be used to transport waste. Evidence of this documentation and licences should be reviewed during the project.

Additional precautions should be taken for any hazardous waste generated by the project, such as asbestos, chemicals, batteries, solvents or pesticides. These include:

- appropriate classification and labelling
- separate and safe storage (no mixing or dilution)
- the use of authorised businesses for collection and final recovery/disposal
- additional documentation – consignment notes must include details of the waste's hazardous properties and special handling requirements.

Any shortcomings identified in relation to the implementation of the waste hierarchy and/or the completion of appropriate documentation can be addressed in a condition of the ESAP. However, it should be taken into account that recycling and recovery options for specific waste streams may be limited in some countries if the appropriate infrastructure is not in place. An ESAP condition can be included to improve long-term recycling and recovery options where there are deemed to be alternative recycling and recovery options.

3.7 Hazardous substances and materials

The EBRD ESP does not define hazardous substances. However, the IED defines them as substances or mixtures set out in Article 3 of Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulations).[22] It should also be noted that there may be substances or materials used in EBRD projects that, while not meeting this strict definition of hazardous, could have significant consequences if released into the aquatic environment, for example, the uncontrolled release of manure from farming activities, digestate from waste activities or milk from dairy facilities.

Both of these categories are considered in this section with regard to compliance with PR3 and pollution prevention and control. There is also a separate definition of hazardous waste, as defined in point 2 of Article 3 of the Waste Framework Directive,[23] and hazardous wastes are considered further in Section 3.6.

The consideration of hazardous substances and materials is separate to the consideration under EU Regulation 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH),[24] whereby substances have to be authorised for use. However, the inventory to be compiled under REACH requirements (Section 3.10) is also relevant to this section, as it details all of the hazardous materials to be used within the confines of a project. BAT for resource efficiency and raw materials is to establish, maintain and regularly review (including when significant changes occur) a raw material inventory, which should include details of the hazardous nature and properties of each substance.

This section also does not consider hazardous substances with regard to safety data sheets and workplace risk assessments, as this is more relevant to health and safety and is covered under PR4.[25]

In addition to the general requirement to maintain a raw material/hazardous substance inventory for each project, additional sector-specific BAT requirements for minimising the use of hazardous substances and materials are detailed in the BREFs. Table 3.10 provides some examples of BAT with regards to hazardous materials management. These are generally in relation to:

- management controls
- operational controls
- storage and handling controls.

22 See EU (2008b).

23 See EU (2008a).

24 See EU (2006a).

25 See EBRD (2019, p.23).

Table 3.10. Example of BAT requirement for hazardous material management

Example BAT requirement	Demonstration of best practice	ESDD example requirement
Food sector		
Proper selection of cleaning chemicals and/or disinfectants	Avoidance or minimisation of the use of cleaning chemicals harmful to the aquatic environment	It can be reviewed from the chemical inventory and safety data sheet that the chosen chemical is appropriate for use and, where possible, not harmful to the aquatic environment if released
Reuse of cleaning chemicals in CIP	Collection and reuse of cleaning chemicals in CIP; food hygiene and safety standards need consideration	A review of CIP practices to determine how chemicals and water are reused as pre-rinses before the next chemical clean cycle
Oil and gas		
Maintenance programme including corrosion monitoring, prevention and control	A management system including leak detection and operational controls to prevent overfilling, inventory control and risk-based inspection procedures on tanks at intervals to prove their integrity, and maintenance to improve tank containment	Review of management practices demonstrating how storage vessels are inspected and maintained for integrity
Double-bottomed tanks	A second impervious bottom that provides a measure of protection against releases from the first material	Review of tank construction to demonstrate protection of land
Impervious membrane liners	A continuous leak barrier under the entire bottom surface of the tank	Review of impervious liners demonstrate protection of land; this is also relevant to the construction of lagoons for the storage of manure/slurry or landfill leachate
Sufficient tank farm bund containment	A tank farm bund is designed to contain large spills potentially caused by a shell rupture or overfilling (for both environmental and safety reasons)	Review of total tank farm capacity and capacity of the bund allowing for sufficient headroom; this is relevant for all bulk storage.

Any shortcomings identified on a greenfield project can be addressed at the design stage and the revised design can be reassessed. If the site is operational, then further mitigation measures or improvements can be developed as part of an upgrade or improvement plan, which could be reviewed as a condition of the ESAP.

3.8 Pesticides

The production of or trade in pharmaceuticals, pesticides/herbicides and other hazardous substances is on the Bank's ESP Exclusion List:

- the EU Regulation on the export and import of hazardous chemicals[26]
- the United Nations Consolidated List of Products whose Consumption and/or Sale have been Banned, Withdrawn, Severely Restricted or not Approved by Governments[27]
- the Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention)[28]
- the World Health Organisation Recommended Classification of Pesticides by Hazard.[29]

Notwithstanding project sites that produce or trade in pesticides, as above, to assess the implications of the use pesticides in a project, it is essential to understand that they can potentially have the following impacts:

- In general, highly hazardous pesticides can cause extensive damage to the environment and to human health and, therefore, some pesticides are banned.
- Without effective management and application, pesticides can contaminate surface water, groundwater and soil, thereby impacting biodiversity and human health (drinking water).

It is, therefore, necessary to identify whether pesticides are used in the defined project area. The main uses of pesticides are to kill or control pests. For example, pesticides are used:

- extensively in the agribusiness sector to prevent damage to crops and improve yield
- in industries such as forestry, aquaculture, and food and drink
- in smaller quantities for grounds maintenance.

Pesticides can be used in multi-varied projects and are not just specific to agricultural applications. The uses of pesticides include:

- crop and fruit protection in fields and orchards, and rodenticides during storage and transport
- topical applications for verge control on road or rail projects
- topical applications beneath solar panels
- topical applications on the landscaped areas of industrial facilities.

The project should develop an inventory of pesticides stored and used on an annual basis, in accordance with the details set out in Table 3.11:

Table 3.11. Example of waste inventory data requirement

Pesticide	Material data sheet available	Quantity stored	Quantity used annually	Banned or phased out

26 See EU (2012).

27 See UNDESA (2009).

28 See UN (1998).

29 See WHO (2020).

Considerations with regard to the sustainable use of pesticides and evidence of best practice are detailed in Table 3.12.

Table 3.12. Example of PR3 requirements for pesticides

PR3 requirement	Demonstration of best practice	ESDD requirement
Avoiding and, if not possible, minimising the impacts of pesticides on biodiversity, human health and the broader environment	An evaluation of the types of pesticide for the project and the minimum level of treatment to meet the required outcome	Review the pesticides used for suitability to the intended outcome and train staff in the use of the relevant pesticides
Reducing the levels of harmful active substances by replacing the most dangerous ones with safer (including non-chemical) alternatives	An evaluation of the types of pesticide used and a comparison with alternatives to assess which would have the lowest environmental impact	Ascertain that the pesticide is not a banned pesticide or due to be phased out and find out whether an assessment has been undertaken with a view to justifying the pesticide as most appropriate for use
Selecting pesticides that are low in toxicity, known to be effective against the target species, and have minimal effects on non-target species, such as pollinating insects and the environment	As part of the evaluation of the types of pesticide and alternatives, projects should consider what pests need to be controlled and the efficacy of the pesticide against those pests	In combination with the above, demonstrate that the pesticide used does no harm
The promotion of low-input or pesticide-free crop farming that relies on integrated pest management (IPM) and integrated vegetation management (IVM) strategies	An integrated programme to address multiple pests and vectors (fungal/bacteria); most relevant to agricultural uses	Assess the IPM and IVM for appropriateness
Minimising damage to natural enemies of target pests and preventing the development of resistance in pests	This would consider how various pest control options might affect the sensitive biodiversity identified, both in terms of direct impacts and what it means for the receptor population (on an appropriate scale); the output from this stage should be pest control measures that will not affect sensitive biodiversity (and are, therefore, compliant in PR6 terms)	Assess how the IPM and IVM strategies take into account impacts on the natural sensitive biodiversity present in the area to be treated
The client will handle, store, apply and dispose of pesticides in accordance with GIP	All pesticides should be stored in a controlled manner in accordance with manufacturer recommendations; this is generally in a cool, dry location away from heat and sunlight and not in proximity to other chemicals	Review storage and handling practices; this should include proximity to incompatible chemicals

Sector-specific considerations

Methyl bromide continues to be used as a phytosanitary treatment for the control of pests and pathogens of quarantine importance in various traded goods, including perishable commodities, such as food, fresh fruit and vegetables, and durable commodities, such as grain and pulses, wood products, cotton and other materials. Other than this quarantine and pre-shipment use, there is a critical use exemption if a sector or region does not have technically or economically viable alternatives to methyl bromide. These exemptions are granted annually.

3.9 POPs

The production, use of or trade in persistent organic pollutants (POPs) is on the ESP Exclusion List, in line with the Stockholm Convention on Persistent Organic Pollutants (POPs), as amended in 2009.[30]

POPs are poisonous chemical substances that persist in the environment, as they break down slowly and can enter the food chain as a result. It is necessary to confirm that POPs are not being used by the project facility. Well-known POPs include polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT) and dioxins. It is important to understand whether such chemicals are still being used or produced at project sites that have old equipment or outdated practices. Examples include:

- PCBs can be found in old electrical transformers and large capacitors, such as hydraulic and heat exchange fluids, and as additives to paints and lubricants.
- DDT has historically been used as a pesticide and applied extensively to agricultural crops. It is still used today in some parts of the world to control mosquitoes that carry malaria.
- Dioxins and furans[31] can be produced unintentionally, for example, in the combustion of municipal and medical waste in waste incineration plants. It may be that irregular practices are being used, including openly burning rubbish, which can also produce dioxins.

The production of PCBs was banned in 2001, so any pre-2001 transformers have the potential to contain PCBs. This will be found in test certificates of transformer oil. Transformers are often present in the power sector (combustion and renewable), the food and drink industry, industrial, tram or railway projects, and even in building projects that need to step down the voltage from the main transmission network.

DDT is covered in Section 5.8 on pesticides. Dioxins and furans can be controlled by ceasing the open and illegal burning of waste and by using activated carbon abatement on energy from waste plants. They are subject to BAT requirements.

In accordance with the Stockholm Convention,[32] there are 16 new POPs, which can be seen in Table 3.13 and will need to be considered on projects that could use or produce them.

30 See UNEP (2009).

31 Furans are by-products of natural and industrial processes that are considered pollutants, as they remain in the environment for long periods.

32 See UNEP (2009).

Table 3.13. New POPs and the sectors in which they are used

New POPs	Description	Projects
Alpha hexachlorocyclohexane	This chemical has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.	Most projects as an insecticide
Beta hexachlorocyclohexane	This chemical has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.	Most projects as an insecticide
Chlordecone	Chlordecone has been used in various parts of the world for the control of a wide range of pests. It has been used extensively in the tropics for the control of banana root borer. It has been used as a fly larvicide, as a fungicide against apple scab and powdery mildew, to control the Colorado potato beetle, the rust mite on non-bearing citrus, and the potato and tobacco wireworm on gladioli and other plants. Chlordecone has also been used in household products, such as ant and roach traps.	Most projects as an insecticide Agricultural projects
Decabromodiphenyl ether (commercial mixture, c-decaBDE)	This chemical is used in: - aircraft for which approval was applied for before December 2018 and received before December 2022 and spare parts for those aircraft - textile products that require anti-flammable characteristics, excluding clothing and toys - additives in plastic housings and parts used for heating home appliances, irons, fans, immersion heaters that contain or are in direct contact with electrical parts or are required to comply with fire retardancy standards, at concentrations lower than 10 per cent by weight of the part - polyurethane foam for building insulation.	Aviation projects Textile projects Housing/building projects
Dicofol	Dicofol is used as a pesticide.	Agricultural sector
Hexabromobiphenyl	Hexabromobiphenyl was used as a fire retardant in three main commercial products: acrylonitrilebutadiene-styrene (ABS) thermoplastics for constructing business machine housings and in industrial (such as motor housing) and electrical (such as radio and TV parts) products; as a fire retardant in coatings and lacquers; and in polyurethane foam for auto upholstery.	Automotive sector
Hexabromocyclododecane (HBCDD)	The main uses of HBCDD are in flame-retarded expanded and extruded polystyrene foam for insulation and construction, with other uses in textile applications and electric and electronic appliances (high impact polystyrene).	Textiles sector Electrical and electronic manufacturing Construction/building sector

Table 3.13. New POPs and the sectors in which they are used

New POPs	Description	Projects
Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octabromodiphenyl ether) (c-octaBDE)	c-octaBDE has been used as an additive flame retardant, mainly in the plastics industry for polymers used for housings of equipment containing electronics.	Plastics manufacturing Electronic equipment
Hexachlorobutadiene	Hexachlorobutadiene (HCBD) is unintentionally formed and released from the production of certain chlorinated hydrocarbons, magnesium, polyvinyl chloride, ethylene dichloride and vinyl chloride monomer, the incineration of acetylene, and chlorine residues caused by poor abatement control.	Chemical sector Oil sector Hazardous waste incineration
Lindane	Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.	Use in most projects as an insecticide
Pentachlorobenzene (PeCB)	PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate, for example, previously for the production of quintozene. PeCB might still be used as an intermediate. PeCB is also produced unintentionally during combustion, thermal and industrial processes. It also present as impurities in products such as solvents or pesticides.	Chemical sector Hazardous waste incineration Waste incineration
Pentachlorophenol and its salts and esters	Pentachlorophenol is used in utility poles and cross arms.	Chemical sector Treatment of wood
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)	Intentional uses of PFOS can be found in electric and electronic parts, fire-fighting foam, photo imaging, hydraulic fluids, leather, paper and textiles.	Foam fire-fighting equipment Manufacture of electric and electronic components Use of hydraulic fluids Textile sector Paper sector
Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds	PFOA, its salts and PFOA-related compounds are used widely in the production of fluoroelastomers and fluoropolymers for the manufacture of non–stick kitchenware and food processing equipment. PFOA-related compounds, including side-chain fluorinated polymers, are used as surfactants and surface treatment agents in textiles, paper and paints, and firefighting foams.	Foam fire-fighting equipment Manufacture of kitchenware (non-stick) Paint sector Textile sector Paper sector Waste incineration
Polychlorinated naphthalenes	PCNs have historically been used in many applications, including: as a wood preservative, as additive to paints and engine oils, and for cable insulation and in capacitors. PCNs are unintentionally generated during high-temperature industrial processes in the presence of chlorine. Of the known releases, combustion (primarily waste incineration) is considered the most significant current source.	Wood treatment applications Paint sector Engine oils Waste incineration Generated along with dioxins and furans in other industrial processes.

Table 3.13. New POPs and the sectors in which they are used

New POPs	Description	Projects
Short-chain chlorinated paraffins (SCCPs)	This chemical is used in a wide variety of applications.	Additives in the production of transmission belts in the natural and synthetic rubber industry Spare parts for rubber conveyor belts in the mining and forestry industries Leather industry, in particular, for the fatliquoring of leather Lubricant additives, in particular, for automobile engines, electric generators and wind power facilities, and for drilling in oil and gas exploration and petroleum refining to produce diesel oil Tubes for outdoor decoration bulbs Waterproofing and fire retardant paints Adhesives Metal processing Secondary plasticisers in flexible polyvinyl chloride, except in toys and children's products
Technical endosulfan and its related isomers	Endosulfan is used on a very wide range of crops. Major crops to which it is applied include soy, cotton, rice and tea. Other crops include vegetables, fruits, nuts, berries, grapes, cereals, pulses, corn, oilseeds, potatoes, coffee, mushrooms, olives, hops, sorghum, tobacco, and cacao. It is used on ornamentals and forest trees, and has been used in the past as an industrial and domestic wood preservative, and for controlling earthworms in turf.	Agricultural sector
Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether) (C-pentaBDE)	C-pentaBDE is or has been used almost exclusively in the manufacture of flexible polyurethane (PUR) foam for furniture and upholstery in homes and vehicles, packaging, and non-foamed PUR in casings and electronic equipment.	Plastics sector Manufacture of furniture Automotive sector Manufacture of electronic equipment

In projects where POPS are identified and where the controls are not sufficient to demonstrate effective management of the issue, a management programme should be developed, which can be reviewed as a condition of the ESAP.

3.10 EU REACH chemical safety regulation

To review REACH compliance with PR3, a chemical inventory of substances and mixtures used on the project site must be compiled using the following example:

Table 3.14. Example of chemical inventory data requirement

Chemical name	Chemical Abstracts Service (CAS) number	European Community (EC) number	Tonnes used per year	Use of the substance on site

Note: The chemical name, CAS and EC numbers can be found on the European Chemicals Agency (ECHA) website.

REACH registration

Under REACH, all chemicals manufactured in or imported into the EU must be registered.[33] In most cases, where chemicals are legally placed on the EU market, either the supplier or the supplier's supplier has a registration that can be requested – although it is only necessary to request the registration number to demonstrate chemical compliance. This is only relevant to projects in EU Member States.

Bans and phase-outs

A company should avoid chemicals subject to bans and phase-outs. To demonstrate compliance, it is necessary to check the European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern (SVHC) against the chemical inventory presented above.[34] Substances on the SVHC list are known to be carcinogenic, mutagenic and toxic to reproduction (CMR), or persistent, bioaccumulative and toxic to aquatic life (PBT). Chemicals on this list will eventually be subject to authorisation (phase-outs) and it is important to flag this for the future of the project. The ECHA's authorisation list provides a current list of substances that are subject to phase-outs, along with the specific circumstances under which an authorisation to use the chemical in the EU can be granted.

Restriction of hazardous substances in electrical and electronic equipment

The EU has adopted directives to limit hazardous substances (certain heavy metals and persistent organic chemicals) in electrical and electronic equipment.[36] The full list of restricted substances can be found in Annex II of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The scope (where it applies and what is exempt) of Directive 2011/65/EU and its amendment, Directive 2017/2102,[37] is set out in Article 2. The legislation does not apply to large-scale stationary tools, large-scale fixed installations (such as wind turbines), transport or photovoltaic panels used in a professional system at a defined location.

REACH implications

Typical considerations with regard to REACH include:

- Are the substances in the project entity registered in accordance with the requirements of the jurisdiction(s) of the country(ies) in which they are being sold (for example, REACH in the EU and Toxic Substances Control Act (TSCA) registration in the United States of America)?
- Do the substances comply with requirements related to specific end-use applications, such as cosmetics, toys and biocides?

However, the following important questions also need to be answered:

- Is the required registration paperwork up to current standards?
- Do the regulatory agencies foresee additional testing?
- Are the substances likely to be subject to restrictions or authorisation under REACH in the foreseeable future?

The above is by no means an exhaustive list, but does indicate potential areas for investigation.

Any projects that require authorisations for the use of chemicals or which use phased-out or banned substances need to be addressed through a condition of the ESAP.

33 See EU (2006a).

34 See ECHA (n.d.a).

35 See ECHA (n.d.b).

36 See EU (2011).

37 See EU (2017a).

3.11 Refrigerants

To assess the implications of refrigerants in a project, it is essential to understand that there are two key areas of impact:

- ozone layer depletion
- global warming potential (addressed under GHG emissions, above).

It is, therefore, necessary to identify every area where refrigerants are used in the defined project area. The main uses of refrigerants are:

- refrigeration systems for the preservation of food
- refrigeration systems for air conditioning
- in process chilling applications.

Once the potential applications and areas of use for refrigerants have been identified, an inventory of refrigerants must be identified. This can be done in accordance with Table 3.15.

This can be used to identify all refrigerants that need to be replaced and quantify how much needs to be replaced. It also details how much has been lost through system top-ups.

While the EU is a signatory to the Kigali Amendment to the Montreal Protocol,[38] and EU agreements and regulations have primacy over EBRD investments, the following link shows whether a the project location country is also a signatory to the agreement: https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-2-f&chapter=27&clang=_en. The agreement added hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs) to the list of refrigerants to be phased out.

Banned and phased-out substances are detailed in Annexes A, B and C of the Montreal Protocol.[39] Annex A substances can be found at the following link: https://ozone.unep.org/treaties/montreal-protocol/articles/annex-controlled-substances.

Table 3.15. Example of refrigerant inventory data requirement

Equipment/ asset number	Refrigerant	Quantity in equipment	Quantity topped up and when	Banned or phased out

Note: The chemical name, CAS and EC numbers can be found on the European Chemicals Agency (ECHA) website.

Sector-specific considerations

The food sector has tended to use ammonia as a large-scale refrigerant, as it does not have ozone depletion or global warming potential. However, there are other significant concerns surrounding ammonia. The Occupational Safety and Health Administration of the US Department of Labor writes the following:

"Ammonia is considered a high health hazard because it is corrosive to the skin, eyes, and lungs. Exposure to 300 parts per million (ppm) is immediately dangerous to life and health. Ammonia is also flammable at concentrations of approximately 15% to 28% by volume in air."[40]

Thus, sites that use ammonia need to consider both the health and safety, as well as the fire emergency implications, of its use, which we address under PR4 on health, safety and security.[41]

Methyl bromide can be used in older equipment as a refrigerant or in fire-fighting.

38 See UNEP (2016).

39 See UNEP (1987).

40 See OSHA (n.d.).

41 See EBRD (2019, p.23).

3.12 Contaminated land

Contaminated land is likely to be of concern for brownfield redevelopments or projects upgrading existing facilities.

The first task is to identify whether the project has activities within it, its area of influence or its historical operations that could potentially contaminate or have contaminated the land and/or groundwater. If so, then these could have been assessed as part of an ESIA or local EIA (where available). These should be reviewed with a view to determining whether contaminated land has been identified and appropriately mitigated or remediated and whether the reviewer agrees with these findings.

If a contaminated land assessment has not been performed as part of a regulatory submission for a brownfield site or site proposing a major upgrade of an existing facility and there is due cause for concern, this should be undertaken as part of an ESAP condition to appropriately identify current liabilities associated with any contamination. This would include a general review during an ESDD site visit to look for signs of spills or leaks to ground, but may also need to include a site investigation and chemical testing of soil and groundwater where the risk profile justifies it.

This could be undertaken in the form of an upgrade or improvement plan, which could be reviewed as an ESAP condition and would help to develop a baseline for the project prior to investment.

Contaminated land risks associated with operational facilities would include the following:

- the dismantling of buildings and pipework with asbestos lagging; this is especially relevant in combustion, waste incineration and other sectors with high heat equipment
- tank farms without bunding
- tank farms or isolated tanks with bunds, but with cracks or situated on earthen floors
- tank farms with incompatible substances co-located (for example, caustic and acids)
- drainage pipework and fill points not within bunds and with no secondary containment
- drainage networks with obvious deficiencies, such as missing pieces of pipe or cracks that would allow releases to ground
- waste storage and treatment on ground with no hardstanding
- fuel storage and use without appropriate spill kits available
- storage of slurries/leachate in unlined lagoons
- waste oils drums on unmade ground without bunds or drip trays.

These examples would need to be identified as part of the site visit assessment. Any obvious signs of risk or contamination, such as deficiencies in storage infrastructure and drainage or obvious signs of leaks and spills, would need to be addressed by way of an upgrade or improvement plan, which could be reviewed as a condition of the ESAP.

3.13 Noise

Noise can be generated in most project sectors, as can be seen from the following examples:

- road and rail projects – vehicle movements and horns by operation and earth-moving machinery during construction
- power generation or industrial activities – by large-scale process equipment and turbines
- Food and drink – by refrigeration or processing equipment (pumps, drives and milling equipment).
- Noise can be a problem, depending on the source, which can include:
- continuous – a continuous hum or level of noise that is likely to cause nuisance
- discontinuous – a frequent but not continuous noise that can cause nuisance through its intermittency with quieter periods
- tonal – this can be a quieter noise, but be concentrated around a wavelength that can cause nuisance, for example, at the higher or lower end of the range.

The first task is to identify whether the project has activities within it or in its area of influence that could potentially generate noise. If so, these could have been assessed as part of an ESIA or local EIA (where available). These should be reviewed for the presence of noise risk receptors and to determine whether noise has been assessed effectively, whether consideration has been given to the overall findings and whether the reviewer agrees with these findings.

If a noise assessment has not been performed as part of any regulatory submission, the first task is to review the potential proximity of receptors (such as houses, public buildings, schools, hospitals) to the project site and its operations. If there are potential receptors in close proximity, it may be necessary to review project practices with regard to noise to establish whether site operations will cause a risk to those nearby.

Examples of BAT with regard to noise are shown in Table 3.16.

Table 3.16. Example of BAT requirements with regard to noise

BAT	ESDD example requirement
Undertake an environmental noise assessment and formulate a noise management plan, as appropriate to the local environment	Review noise assessment for any shortcomings and deficiencies. If no assessment has been undertaken, this can be resolved through an ESAP condition. If the reviewer believes that the noise assessment does not accurately reflect the risk to nearby receptors and that further mitigation is required, this can be resolved by way of an upgrade or improvement plan, which could be reviewed as an ESAP condition.
Enclose noisy equipment/ operations in a structure/unit	All noisy activities/operations can be reviewed on site visits to establish whether they are controlled within a building or acoustic enclosure and to ensure that the building or enclosure provides enough noise protection when considering nearby receptor locations. Any recommendations, such as upgrading building infrastructure or moving a process into a building, can be done by way of an upgrade or improvement plan, which could be reviewed as an ESAP condition.
Use embankments to screen the source of noise	Review where embankments have been used for noise attenuation on a project and consider whether they are sufficient. Where they have been used, it may be necessary to visit the nearest receptor on site to see whether the project can be heard and ensure that the embankment works.
Use noise protection walls	Review where noise protection walls have been used on a project to provide noise attenuation and consider whether they are sufficient. Where they have been used, it may be necessary to visit the nearest receptor on site to see whether the project can be heard and ensure that the noise protection wall works.
Noise-control equipment, including: • noise-reducers • equipment insulation • enclosure of noisy equipment • soundproofing of buildings	If the predominant noise source is from a stack, an embankment/noise protection wall will not be suitable due to the height of release. Other measures, such as silencers, should be used in such circumstances. If the project includes an operation with high noise levels, control measures can be either adopted and designed at the start of the project or retrofitted at a later date to mitigate a specific noise issue.
Operational measures, including: • improved inspection and maintenance of equipment • closing doors and windows of enclosed areas, where possible • equipment operated by experienced staff • avoidance of noisy activities at night, where possible • provisions for noise control during maintenance activities	sites with operations/activities with high level noise levels, operational control measures should be in place for the control of noise through the ESMS. Should these not be in place, or there are further recommendations, these can be addressed through an ESAP condition.

Note: The above measures are illustrative requirements taken from the Large Combustion Plant and Food and Drink BREFs.[42]
The appropriate BREF or BATc document would need to be reviewed to identify the exact BAT requirements of a project.

Generally speaking, the above BAT conditions would apply to all sectors, but the specifics of mitigation may change. For example, while structures or buildings might not be suited to mitigating the noise on road and rail projects, the use of embankments and acoustic fencing might be beneficial to those along the route.

In addition to the implementation of BAT (for example, in accordance with the examples in Table 3.16 above), where significant noise emissions are unavoidable and there are sensitive receptors close to the project area, it may be necessary to restrict operations to certain hours of the day (for instance, not operate at night).

42 See European IPPC Bureau (2017; 2019).

3.14 Odour

Odour has the potential to be released from a number of different activities, including:

- waste – anaerobic digestion, landfill, waste storage and treatment
- food and drink processing operations, wastewater treatment and sludge disposal, rendering facilities
- agriculture – manure/slurry storage, land spreading
- chemical – process releases
- combustion processes that are poorly maintained and operated, for example, partial or incomplete combustion.

As is the case for emissions to air, odour may arise from point sources or fugitive release points.

The first task is to identify whether the project or its area of influence include activities that could potentially generate odours. If so, these may have been assessed as part of an ESIA or local EIA (where available). These should be reviewed to establish whether the issue of odour has been assessed effectively. The reviewer should consider the overall findings to see whether they concur.

If an odour assessment has not been performed as part of any regulatory submission, the first task is to review the potential proximity of those affected to the project site and its operations. If there are potential receptors in close proximity, it may be necessary to review project practices with regards to odour to establish whether site operations could carry a risk for those nearby.

Table 3.17 details good practices with regard to odour management and control and how this applies to various sectors.

Table 3.17. Examples of good practice with regard to odour

Good practice	Applicability	ESDD example requirement
Substitution of raw materials or other process inputs to prevent or reduce odour generation	Chemical, food and drink, paint/solvent, timber treatment, oil and gas, industrial	Review chemical inventory and raw material inventory for odorous substances
Adjustment of process parameters such as temperature, duration, pressure and venting to reduce formation and/or release of odorous by-products	Chemical, food and drink, paint/solvent, timber treatment, oil and gas, industrial	Review emissions data for releases and measures adopted by the project to reduce overall releases Some process vents may be subject to a mass release limit
Contain odorous air within process machinery to avoid contaminating the much larger volumes of “ventilation air” within buildings	Chemical, food and drink, paint/solvent, timber treatment, oil and gas, industrial	Review emissions data for releases and measures adopted by the project to reduce overall releases Excessive flow may be indicative of air dilution from within a building
Maintain the integrity of process buildings by keeping windows and doors shut Remotely operated roller doors can minimise the amount of time that doors are open, while flexible industrial curtains can be used across doorways	Chemical, food and drink, paint/solvent, timber treatment, industrial, transport	Inspect the structure of the buildings containing odorous processes for integrity
In the case of open-air operations, observe good practice relating to the covering of odorous materials, housekeeping, mixing of materials, venting, design, etc.	Waste, wastewater treatment plant, agricultural (especially land spreading)	Review practices with regard to open air manure/waste piling and coverings
Vapour balance lines should be installed for tanker loading or offloading of odorous materials and also for tank transfers Tankers should use dry break couplings to minimise the potential for spillages	Chemical, waste, timber treatment- other sectors that have bulk deliveries of potentially malodorous material (for example, asphalt/bitumen in the road sector)	Review delivery procedures to ensure effective control

Table 3.17. Examples of good practice with regard to odour (continued)

Good practice	Applicability	ESDD example requirement
Cover tanks/lagoons of odorous waste where possible Fill from the bottom with submerged pumps to avoid disturbing the surface	Waste, agricultural (especially land spreading)	Review filling operations and coverage of lagoons
Maintain seals, glands, pumps and other potential fugitive release points within a planned programme of preventative maintenance and implement a leak test regime	Oil and gas, chemical, timber treatment, industrial	Review leak detection and planned preventative maintenance programme to ensure it includes potential fugitive release points
Avoid mixing incompatible materials that may produce malodorous breakdown products		Observe storage arrangements during site inspection and chemical usage procedures especially with regard to CIP systems
Ensure raw materials, products and wastes are stored appropriately The condition of incoming material may need to be monitored, putrescible materials should be rotated on a first-in, first-out basis and refrigerated where appropriate	All sectors	Observe storage arrangements during site inspection Review controls on materials to ensure they are dealt with on a first-in, first-out basis
Avoid conditions that encourage anaerobic breakdown	All sectors	Review storage times for materials that could potentially degrade Consider practices that would prevent degradation, such as turning the material
Good housekeeping – avoid the build-up of malodorous materials and waste except in designated (and appropriately managed) areas	All sectors	Review site inspection and cleaning procedures
There may be opportunities to adjust operating times to avoid weekends or evenings, or to run a particular process only when the wind is favourable	Waste, agricultural (especially land spreading)	Review waste treatment practices/procedures or land spreading procedures to identify any potential risks
Ensure that staff receive suitable and sufficient training on odour control and are aware of relevant licence conditions and emission limits relating to their work	All sectors	Review training record of staff to ensure odour training is included

Note: The examples in Table 3.17 are indicative and not exhaustive. Project practices should be considered on a case-by-case basis.

In addition to the implementation of good practice techniques (as in Table 3.17), where significant emissions are unavoidable, containment and end-of-pipe abatement are likely to be necessary. In such cases, the relevant sector BREF should be used to identify potential odour abatement options. These may include chemical absorption, adsorption, biological treatment and/or thermal or catalytic oxidation. When selecting odour abatement techniques, it is necessary to have a good understanding of the flow rate, temperature, humidity, and the particulate and contaminant concentrations of the odorous emission. Once a shortlist of appropriate odour abatement options has been developed (that is, after screening out any that are not suitable for the particular emission being considered), a more detailed BAT options assessment can be undertaken. When reviewing odour abatement for an ESDD project, the suitability of the proposed or operational odour abatement technology should be reviewed in accordance with the above.

BAT for the control of odour also requires the adoption of an odour management plan (OMP) as part of the environmental management system developed to comply with PR1. This should include, at a minimum:

1. process description
2. odour inventory – likely sources of any odours
3. pathways for atmospheric dispersion – for example, high winds aid the dispersal of odours, so establish the prevailing or historical meteorological conditions for the site
4. identification of potential receptors
5. procedures for preventing or minimising odours – for each of the sources identified in Step 2
6. odour monitoring procedures
7. odour complaints procedure
8. contingency arrangements – for example, in the event of a delivery of excessively odorous waste, plant or equipment failure, containment failure or adverse weather conditions.

An OMP should be developed where an odour nuisance can be expected on projects that have yet to be implemented or on projects where there have been substantiated complaints. Reviewing the complaints history will help to assess whether a formal method of odour control needs to be adopted through the OMP.

In some countries with sanitary protection zones, the monitoring of emissions and the sanitary protection zone boundary is necessary to demonstrate that odours will not have an impact on locals. However, there are instances where residences have been developed, either formally or informally, within the sanitary protection zone and could be impacted by odour emissions, so the highest level of controls will need to be adopted.

3.15 Circular economy

The EBRD understands the importance of integrating circular economy techniques into its projects. Specifically, as referenced in its ESP, the EBRD "recognises the emerging concept and practice of Circular Economy and or resources recovery where usable and valuable products can be created or derived from what has been previously viewed as waste."[43] The EBRD encourages the application of circular economy principles to projects.

43 See EBRD (2019).

Annex 1. Examples of EU environmental standards (non-exhaustive list)

Table A.1.1. Examples of EU environmental standards and how they apply to EBRD projects

EU environmental standards	Applicable EBRD projects
EU Industrial Emissions Directive (IED)[44]	Any projects involving activities within the sectors and above the thresholds (where relevant) listed in Annex I of the IED. The IED recasts seven earlier pieces of industrial emissions legislation (such as the Integrated Pollution Prevention and Control Directive and the Large Combustion Plant Directive) into one integrated framework. It takes an integrated approach to controlling pollution to air, water and land, and sets challenging industry standards for the most polluting industries. The IED aims to prevent and reduce harmful industrial emissions while promoting the use of techniques that reduce pollutant emissions and that are energy and resource efficient. Example projects include those in the energy, chemicals, metals and food and drink sectors. These projects will be required to demonstrate sector-specific BAT.
EU Waste Framework Directive (WFD)[45]	Projects in the waste management sector and all projects subject to the IED should implement the requirements of the WFD in relation to the efficient use of resources and minimisation of waste and its impacts on the environment. However, other projects not captured by the IED should also consider the WFD, as it sets out the basic concepts and definitions of waste management and lays down some key waste management principles. It requires that waste be managed without endangering human health and harming the environment and, in particular, without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. The WFD is, therefore, relevant to most projects, including road, rail, solar and wind-farm projects that are not otherwise subject to the IED/BAT.
EU Landfill Directive (LFD)[46]	Projects involving the landfilling of waste should comply with the requirements of the LFD, which sets stringent technical requirements for waste and landfill, including: • the classification of landfills for hazardous, non-hazardous or inert waste • the requirement for strict waste acceptance procedures, so as to avoid risks to the environment, including pre-treatment and the exclusion of prohibited wastes • operating permits for landfills, which must contain, among other things, information on methods for pollution prevention and abatement, fire prevention and control, operating, monitoring and control measures and plans for closure and aftercare procedures.

44 See EU (2010b).

45 See EU (2008a).

46 See EU (1999).

Table A.1.1. Examples of EU environmental standards and how they apply to EBRD projects

EU environmental standards	Applicable EBRD projects
Basel Convention[47]	Any projects that involve the generation, management and/or movement of "hazardous waste" and/or "other waste" comprising household waste and incinerator ash. These projects should have regard for the overarching objectives of the Basil Convention and, in particular, aim to demonstrate: • the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal • the restriction of transboundary movements of hazardous wastes, except where it is perceived to be in accordance with the principles of environmentally sound management • a regulatory system applying to cases where transboundary movements are permissible.
Rotterdam Convention[48]	Any projects that involve the import or export of hazardous chemicals (specifically those listed in Annex III of the Convention). These projects should have regard for the overarching objectives of the Rotterdam Convention, which promotes the exchange of information on a very broad range of chemicals. Its objectives are: • to promote shared responsibility and cooperative efforts in the international trade of certain hazardous chemicals in order to protect human health and the environment • to contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions. Examples include projects where pesticides are used, energy projects where PCBs may be present, energy projects with asbestos or wood treatment processes.
Stockholm Convention[49]	Any projects that involve the manufacture, use or management of POPs, or chemicals that remain in the environment for long periods. POPs can become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. These projects should have regard for the overarching objectives of the Stockholm Convention and, in particular, aim to: • prohibit, eliminate and/or restrict the production and use, as well as the import and export, of intentionally produced POPs • reduce or eliminate releases from unintentionally produced POPs • ensure that stockpiles and wastes consisting of, containing or contaminated with POPs are managed safely and in an environmentally sound manner • target additional POPs. Examples include projects where pesticides are used, energy projects where PCBs may be present and some industrial activities.

47 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal of 22 March 1989. See UNEP (2019).

48 The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade of 10 September 1998. See FAO, UNEP and Secretariat of the Rotterdam Convention (2019).

49 The Stockholm Convention on Persistent Organic Pollutants of 22 May 2001. See UNEP (2009).

Table A.1.1. Examples of EU environmental standards and how they apply to EBRD projects

EU environmental standards	Applicable EBRD projects
EU Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)[50]	Any projects that involve the manufacture, importing or downstream use of chemicals as raw materials or finished products (not only the chemical industry). The requirements depend on the types of product being placed on the market or used, for example, substances on their own (including metals), mixtures or articles. These projects should identify the specific requirements based on the company's role in the supply chain, which could include: • the provision of information and knowledge on chemicals' properties, hazards, uses and possible risks • using chemicals safely, including the implementation of operational controls and risk management measures included in safety data sheets • the classification of mixtures and specific labelling and packaging requirements. Examples include projects in the chemicals and manufacturing sectors.
EU Euratom Directive[51]	Any projects using radiation or radioactive substances, including the nuclear fuel cycle. These projects should implement the requirements of the Directive, which aims to protect workers and the general public against the dangers arising from ionising radiation by detailing basic safety standards.
Espoo Convention[52]	Any projects that are likely to have a significant adverse environmental impact across boundaries should comply with the requirements of the Espoo Convention, which aims to prevent, reduce and control the adverse transboundary impact of certain activities on the environment. These projects should ensure that the environmental impacts are assessed at an early stage of planning and consult with relevant stakeholders. Examples include projects that cross boundaries, are located close to boundaries or that are in hydraulic continuity with downstream sites across boundaries. This is particularly relevant for hydropower projects and power station projects that are located near to national borders.
EU Taxonomy Regulation[53]	The EU Taxonomy Regulation entered into force on 20 July 2020. It sets out an EU-wide framework (a classification system known as a "taxonomy") according to which investors and businesses can assess whether certain economic activities are "sustainable". To qualify as green, an investment needs to contribute to at least one of the following six objectives: • climate change mitigation • climate change adaptation • sustainable use of water and marine resources • circular economy • pollution prevention • health ecosystem. The Regulation applies to all EBRD projects and, at some point in the future, all projects will be required to comply with the EU-wide framework.

50 See EU (2006a).

51 See EU (2013).

52 The Espoo Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991. See UNECE (2017).

53 See EU (2020).

Table A.1.1. Examples of EU environmental standards and how they apply to EBRD projects

EU environmental standards	Applicable EBRD projects
EU Categorisation System for the Circular Economy[54]	Implementing circular economy should be a consideration for all EBRD projects, from those subject to BAT and the IED to road and other infrastructure projects. The EU categorisation system lists the nine Rs: strategies or principles through which sustainable resource management can be delivered – refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose and recycle.
EU Pesticides Directive[55]	Any projects that involve the use of pesticides should comply with the requirements of the Pesticides Directive. The Directive aims to achieve the sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of Integrated Pest Management (IPM) and of alternative approaches or techniques, such as non-chemical alternatives to pesticides. There are a number of actions to consider which relate to the training of users, advisors and distributors of pesticides, the inspection of pesticide application equipment, the prohibition of aerial spraying, the limitation of pesticide use in sensitive areas, and information and awareness raising on pesticide risks. Examples include projects involving cultivation in the agribusiness sector and other projects where weeds are managed, such as on solar farms.
EU Water Framework Directive[56]	Any projects with the potential for impact on water quality are required to comply with the Water Framework Directive, which sets out to protect surface water and groundwater. It aims to provide a common approach with common objectives, principles and basic measures designed to prevent any further deterioration of surface and groundwater and to protect and enhance the quality and quantity of aquatic ecosystems and, with regard to water needs, terrestrial systems. Examples include projects that have direct discharges to water, for example, from process effluent treatment plants or surface water management systems, but also those that have the potential for diffuse run-off, for example, from roads or agricultural land.
EU Drinking Water Directive[57]	For projects where water quality is required to be of sufficient quality, for example, in the food sector or for water distribution systems. The Drinking Water Directive concerns the quality of water intended for human consumption. Its objective is to protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean. The Drinking Water Directive applies to: • all distribution systems serving more than 50 people or supplying more than 10 cubic metres per day, but also distribution systems serving less than 50 people/supplying less than 10 cubic metres per day if the water is supplied as part of an economic activity • drinking water from tankers • drinking water in bottles or containers • water used in the food-processing industry, unless the competent national authorities are satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in its finished form.

54 See European Commission, Directorate-General for Research and Innovation (2020).

55 See EU (2009).

56 See EU (2000).

57 See EU (1998a).

Table A.1.1. Examples of EU environmental standards and how they apply to EBRD projects

EU environmental standards	Applicable EBRD projects
EU Urban Wastewater Treatment Directive[58]	Projects involving the treatment of waste water (predominantly municipal) are required to comply with the Urban Wastewater Treatment Directive. Its objective is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors. It concerns the collection, treatment and discharge of: • domestic waste water • mixtures of waste water • wastewater from certain industrial sectors Specifically, the Directive requires: • the collection and treatment of wastewater in all agglomerations >2,000 population equivalent • the secondary treatment of all discharges and more advanced treatment for larger agglomerations and sensitive areas • pre-authorisation of discharges • monitoring of the performance of treatment plants and receiving waters • control of sewage sludge management and disposal and reuse and treated effluent reuse. Examples of EBRD projects include those involving municipal wastewater treatment plants.
EU Sewage Sludge Directive[59]	For projects where sewage sludge is used for agricultural benefit. The aims of the Sewage Sludge Directive are: • to protect humans, animals, plants and the environment by ensuring that heavy metals in soil and sludge do not exceed set limits • to increase the amount of sewage sludge used in agriculture The Directive also • sets limits for the concentration of seven heavy metals in sewage sludge intended for agricultural use and in sludge-treated soils (cadmium, copper, nickel, lead, zinc, mercury and chromium) • bans the use of sewage sludge that results in concentrations in soil of these heavy metals exceeding these limit values
EU Medium Combustion Plant Directive[60] (MCPD)	Any projects that include the combustion of fuel in plants with a rated thermal input equal to or greater than 1 Megawatt thermal (MWth) and less than 50 MWth will have to comply with the MCPD. The Directive fills the regulatory gap at EU level between large combustion plants (> 50 MWth), covered by the IED, and smaller appliances (heaters and boilers <1 MWth), covered by the Ecodesign Directive. It regulates emissions of SO_2, NOX and dust to air and aims to reduce those emissions and the resultant risks to human health and the environment. Examples of EBRD projects can be found where combustion plant is used and can include a wide variety of applications (for example, electricity generation, domestic or residential heating and cooling, providing heat or steam for industrial processes).
EU Groundwater Directive[61]	Projects that could involve an intended or unintended discharge to ground, which could impact groundwater. The objective of the Directive is to protect the environment as a whole, and human health, in particular, from detrimental concentrations of harmful pollutants in groundwater.

Note: The project examples in Table A.1.1 are not an exhaustive list of the types of project to which each EU standard applies. The EU standards that apply to each project should be determined on a case-by-case basis. All of the EU laws in Table A.1.1 can be accessed through the EUR-Lex website: https://eur-lex.europa.eu/homepage.html.

58 See EU (1991; 1998b).

59 See EU (1986).

60 See EU (2015).

61 See EU (2006b).

Annex 2. GHG reporting and the GHG Protocol

The GHG Protocol divides an organisation's GHG emissions into three scopes:[62]

- Scope 1 – Direct emissions resulting from the organisation's own operations. This can include:
  - fossil fuel-burning plant (such as boilers, generators, furnaces)
  - company-owned vehicles
  - emissions from chemical processes.
- Scope 2 – Emissions from purchased electricity.
- Scope 3 – Indirect emissions incurred by the organisation from sources outside the organisation's control, for example, embedded carbon in purchased building materials. Scope 3 reporting is not obligatory under PR3 in most cases (see EBRD Protocol for Assessment of Greenhouse Gas Emissions).[63]

Every GHG has a different degree of global warming potential. Therefore, to ensure clarity and consistency, non-CO_2 GHG emissions should be converted to CO_2 equivalent (CO_2e) for reporting purposes.

62 See Greenhouse Gas Protocol (n.d.).

63 See EBRD (2017).

Annex 3. BAT assessments: examples of key areas where errors can occur

The following are areas where errors can occur during the assessment of data for PR3 compliance. Consequently, they need to be reviewed carefully:

- Not comparing like-for-like and conversions – For example, parts per million to mg/m^3 or mg/l. Even µg/l to mg/l.
- Reference conditions for air emissions – The standard reference conditions for combustion plant can be seen below, while for other IED sectors, the reference conditions can be found in the BATc. Any data not in the reference conditions will need to be converted to these oxygen percentages prior to comparison with emission limits:
  - combustion of solid fuels, combustion of solid fuels in combination with liquid and/or gaseous fuels, or waste co-incineration – all 6 per cent volume
  - combustion of liquid and/or gaseous fuels when not taking place in a gas turbine or an engine – 3 per cent volume
  - combustion of liquid and/or gaseous fuels when taking place in a gas turbine or an engine, combustion in integrated gasification combined cycle (IGCC) plants – 15 per cent volume.

The calculation can be seen below:

$$\mathbf{Ex = (21\text{-}OR) \times EM}$$
$$\mathbf{(21\text{-}\ OM)}$$

Where: Ex is the emission concentration at the reference oxygen level, OR is the reference oxygen level in percentage volume, EM is the measured emission concentration and OM is the measured oxygen level in percentage volume terms.

The calculation based on a measured oxygen volume of 8.5 per cent to 3 per cent and an emission of 50 mg/m^3 for a gas turbine can be seen below:

$$\mathbf{Ex= (21\text{-}3) \times 50 = 72\ mg/m^3}$$
$$\mathbf{(21\text{-}8.5)}$$

- Monitoring point locations – The locations where emissions are monitored should be away from bends, branches, obstructions, fans and leaks, all of which can cause undesirable variations in the velocity profiles, which may affect monitored results.
- MWth/MWe – In some instances, when data are being provided, they are merely stated as MW. It needs to be ascertained as to whether this is thermal or electrical, as the difference can be significant. For an engine with 40 per cent electrical conversion efficiency, the MWth with be 2.5 times that of the MWe.
- MWh/gJ – Sometimes combustion unit capacity is given in gJ. The conversion from gJ to MWh is 1gJ=0.28 MWh.
- Calculation of MWth – This can be taken from the manufacturer's equipment datasheet or calculated by using the Association of Manufacturers of Power Generating Systems Determination of thermal input power of an engine driven generator 2016 methodology.
- Higher heating value (HHV) versus lower heating value (LHV) – LHV is the net calorific value of the energy used, and the net basis is used when considering compliance with BAT. For natural gas, the conversion from HHV to LHV is 1.108. Therefore, 10 HHV would be 9.02 LHV.
- Biomass misconceptions as to waste – The use of biomass should be reviewed closely, as virgin material and clean waste woods, such as sawdust and off cuts from timber processes, could be co-mingled with treated woods or other sources of contaminated wood, which could render them either as waste for waste incineration or even as hazardous waste.
- Hazard status of waste – The hazard status of each waste stream needs to be clearly identified and characterised in order to ensure that hazardous waste is disposed of appropriately and not disposed of as non-hazardous waste.
- Reliability of monitoring/laboratory data and limit of detection – Laboratories should be accredited to ISO/IEC 17025 in order to ensure the validity of any results obtained.

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