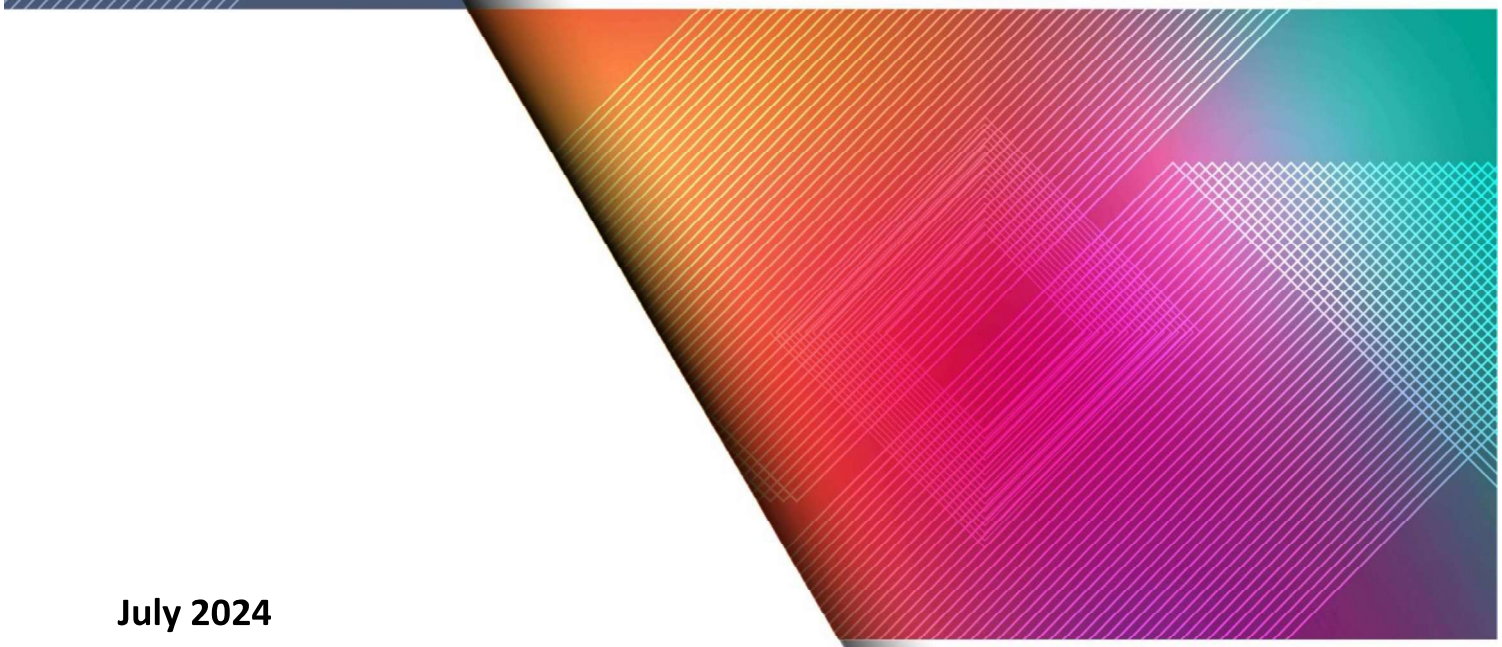
PTOLEMAIDA STORAGE M.A.E.

Sustainability proofing report for a stand-alone Battery Energy Storage System (BESS) with accompanying infrastructure, Greece



July 2024

eXergia
CLIMATE CHANGE CONSULTANTS

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1 INTRODUCTION

Ptolemaida Storage M.A.E. (the "Client") intends to construct a stand-alone Battery Energy Storage System (BESS) of 250 MW total power capacity with accompanying infrastructure, in Greece, Region of Western Macedonia, Regional unit of Florina, Municipality of Amynteo, Municipal units of Amynteo and Filota.

The key importance of the Project has already been recognized by the European Union, with ENTSO-e having included it in the final list of the Ten-Year Network Development Plan (TNYDP), and the European Commission including it in the Projects of Common Interest (PCI) 2021. In addition, it has been included in the 16 emblematic projects of lignite phase-out of the Just Development Transition Plan of the Ministry of Environment and Energy. The Project is expected to contribute decisively to facilitating the lignite phase-out process, by enhancing the capacity adequacy of the Hellenic Electricity Transmission System (HETS), the penetration of RES in the country's power generation mix and the stability and safe operation of the System.

The Project will therefore contribute towards the national and European climate and energy targets and commitments, as set by the current National Energy and Climate Plan (NECP). It will provide the system with the necessary power and energy reserves, ensuring the smooth and safe operation of the HETS, either in conditions of particularly increased RES penetration, or in conditions where even production from RES will not be sufficient to meet real-time demand. The project is included in the Updated Master Plan of the Ministry of Environment and Energy for the Just Transition of the lignite areas and will contribute to the smooth and fair transition to the post-lignite era for Western Macedonia and Megalopolis.

Within this context of Projects of Common Interest (TEN-E Regulations 2022/869), studies regarding the climate adaptation and compliance with environmental legislation and with the 'do no significant harm' principle (Regulation (EU) 2020/852) need to be conducted for the particular investment. The present report concerns the sustainability proofing of the Project, analysing the respective Climate and Environment dimensions, and providing input also for the required 'do no significant harm' reporting.

2 IDENTIFICATION OF THE PROJECT

The Project under study refers to a stand-alone Battery Energy Storage System (BESS) of 250 MW total power capacity with accompanying infrastructure, in Greece, Region of Western Macedonia, Regional unit of Florina, Municipality of Amynteo, Municipal units of Amynteo and Filota (Figure 2-1).

Figure 2-1 The location of the Project

The Project has been subjected to environmental licensing, according to Article 4 of Law 1650/1986 as replaced by Article 2 of Law 3010/2002, and according to Law 4014/2011 (Government Gazette 209 A/ 21-11-2011) "*Environmental licensing of projects and activities, arbitrary regulation in relation to the creation of an environmental balance and other provisions within the competence of the Ministry of Environment*", as amended and in force.

According to national Law 4014/2011 on the environment licensing of projects and activities, projects and activities, the construction or operation of which may have an impact on the environment, are classified into two categories (A and B) according to this impact. **Category (A)** includes those projects and activities which are likely to have a **significant impact on the environment** and for which **an Environmental Impact Assessment (EIA) study is required**, followed by the issuance of an environmental license, in this case, a **Decision Approving Environmental Conditions (DAEC). Category A is further categorized into two subcategories, A1 and A2**. Subcategory A1 refers to projects and activities likely to have a very significant impact on the environment, while subcategory A2 refers to projects and activities likely to have a significant impact on the environment.

Category B includes those projects and activities which can only cause a local and non-significant impact. For those projects, an **Environmental Impact Assessment (EIA) study is NOT required**, neither is a DAEC. Instead, subjection to **Standard Environmental Commitments (SEC)** (Πρότυπες Περιβαλλοντικές Δεσμεύσεις - in Greek) is required, which is the environmental license in this case. Subjection to SEC requires submission of an application/ solemn declaration, together with specific information on the characteristics of the project and the surrounding area.

For the specific classification of the projects, according to their environmental impacts, the Ministerial Decision 1958/2012 (G.G. 21 B/ 13.1.2012) "*Classification of public and private projects and activities in categories and subcategories according to article 1, paragraph 4 of Law 4014/21.9.2011* (G. G. 209/A/2011)" applies, as amended and in force.

More specifically, the project under study is environmentally classified as follows:

The **BESS station** is of **Activity type s/n 10 "Stand-alone Battery Energy Storage Systems"** under **Group 10th "Renewable energy sources and stand-alone Battery Energy Storage Systems"** and belongs to environmental **licensing category A1** (maximum injected power P > 200 MW, applicable legislative act is M.D. YPEN/DIPA/ 53510/3616 (G.G. 3327 B'/19.5.2023)). More specifically, the BESS station is of 292,95 MW power capacity and 1.174,1 MWh energy capacity which ensures a nominal power capacity of 250 MW and a nominal energy capacity of 1.000 MWh.

The **accompanying Substation (S/S) 33/400 kV** which will be constructed within the project area is of **Activity type s/n 11 "Individual extra high voltage centres and individual substations on the ground surface (extension of existing substations is included)"** under **Group 11th "Energy, fuels and chemicals transmission"** and belongs to environmental **licensing category A2** (voltage of the line between T > 150kV, applicable legislative act is M.D. YPEN/DIPA/ 17185/1069 (G.G. 841 B'/ 24.2.2022)).

The underground lines of 33 kV and control signal cables of 18 km estimated total length are not subject to environmental licensing.

Six (6) **High Voltage Overhead Lines (HVOHL)** of 400 kV and 60 m length each will also be constructed. Their starting point will be the new S/S and their endpoint will be at the existing HVOHL of 400 kV. This accompanying project is of **Activity type s/n 10 "Overhead electricity transmission lines with their accompanying facilities (substations and extra high voltage centers)**, under **Group 11th "Energy, fuels and chemicals transmission"** and belong to environmental **licensing category A2** (voltage of the line T > 150kV and length of the line L ≤ 20 km or 50 kV ≤ T ≤ 150 kV and L ≥ 15 km, applicable legislative act is M.D. YPEN/DIPA/ 64712/4464 (G.G. 3636 B'/ 11.7.2022)).

Expected improvement works on the existing road network will be limited and are not subject to environmental licensing.

The project as a total follows the category which is likely to have the most significant impacts on the environment, thus, the project belongs to environmental ***licensing category A1****.* An

integrated Environmental Impact Assessment (EIA) study has been elaborated and a Decision of Approved Environmental Terms (DAEC) had been issued. Moreover, Preliminary Hazard Analysis in the framework of the EIA has been carried out, and an Environmental Management Plan (1st edition) has been elaborated which will be updated regularly. The necessary input data required for this assessment is extracted from all supporting documentation provided by the Client.

Climate change mitigation

a stand-alone Battery Energy Storage System (BESS) of 250 MW total power capacity with accompanying infrastructure, is included in the screening list for which a detailed carbon footprint analysis is required. From the detailed climate change mitigation analysis which is presented in section 5.2 , the relative emissions of the Project are estimated to be +25.566,05 tCO2e/year (conservative estimation, actual emissions expected much lower).

Adaptation to climate change

An analysis was carried out to estimate the adaptation of the Project to Climate Change (section 5.3). During pre-screening, the proposed Project is analyzed for sensitivity, exposure and vulnerability to climate change. The vulnerability analysis shows that the Project is at least moderately vulnerable to the following sources of risk:

- Heat waves
- Cold waves
- Soil Erosion
- Humidity
- Lightnings
- Wildfire
- Flooding.

For this reason, additional adjustment measures are proposed (if possible), to reduce the acceptable level of residual risk. The additional adaptation measures include measures to reduce the risk of a possible forest fire, the installation of a lightning protection system, conduct an hydrological survey etc.

3 EXCLUSION SCREENING

As a preliminary step, an "exclusion screening" is performed to ensure that the investment does not fall within neither the excluded activities of section 9.II of article 6 of the Decision of the Deputy Minister of Finance – Government Gazette B' 1814 under number 47990 ΕΞ 2022/13.04.2022 (amending the Decision of the Deputy Minister of Finance – Government Gazette B' 4522 under number 120536 ΕΞ 2021/30.09.2021) nor the excluded activities ("exclusion list") of Annex V.B of the InvestEU Regulation.

As illustrated in the following Tables below, **the investment has successfully passed the "exclusion screening"** and does not fall to any type of activities listed in the following Tables.

Table 3-1 Screening of the investment against the "excluded activities" of the InvestEU Regulation (Annex V.B)

Excluded activities of Annex V.B - InvestEU Regulation	Is the Investment falling within the category?
› Activities forbidden by applicable national legislation.	No
› Activities which limit individual rights and freedoms or violate human rights.	No
› In the area of defence activities, the use, development, or production of products and technologies that are prohibited by applicable international law.	No
› Tobacco-related products and activities (production, distribution, processing and trade).	No
› Activities excluded from financing pursuant to the relevant provisions of the Horizon Europe Regulation: research on human cloning for reproductive purposes; activities intended to modify the genetic heritage of human beings which could make such changes heritable; and activities to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.	No
› Gambling (production-, construction-, distribution-, processing-, trade- or software-related activities).	No
› Sex trade and related infrastructure, services and media.	No
› Activities involving live animals for experimental and scientific purposes insofar as compliance with the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes cannot be guaranteed.	No
› Real estate development activity, such as an activity with a sole purpose of renovating and re-leasing or re-selling existing buildings as well as building new projects; however, activities in the real estate sector that are related to the specific objectives of the InvestEU Programme as specified in Article 3(2) of the InvestEU Regulation and to the areas eligible for financing and investment operations under Annex II of the InvestEU Regulation, such as investments in energy efficiency projects or social housing, shall be eligible.	No

Excluded activities of Annex V.B - InvestEU Regulation	Is the Investment falling within the category?
› Financial activities such as purchasing or trading in financial instruments. In particular, interventions targeting buy-out intended for asset stripping or replacement capital intended for asset stripping shall be excluded.	No
› The decommissioning, operation, adaptation or construction of nuclear power stations.	No
› Investments related to mining or to the extraction, processing, distribution, storage or combustion of solid fossil fuels and oil, as well as investments related to the extraction of gas. This exclusion does not apply to: (a) projects where there is no viable alternative technology; (b) projects related to pollution prevention and control; (c) projects equipped with carbon capture and storage or carbon capture and utilisation installations; industrial or research projects that lead to substantial reductions of greenhouse gas emissions as compared with the applicable EU Emission Trading System benchmarks.	No
› Investments in facilities for the disposal of waste in landfill. This exclusion does not apply to investments in: (a) on-site landfill facilities that are an ancillary element of an industrial or mining investment project and where it has been demonstrated that landfilling is the only viable option to treat the industrial or mining waste produced by the activity concerned itself; (b) existing landfill facilities to ensure the utilisation of landfill gas and to promote landfill mining and the reprocessing of mining waste.	No
› Investments in mechanical biological treatment (MBT) plants. This exclusion does not apply to investments to retrofit existing MBT plants for waste-to-energy purposes or recycling operations of separated waste such as composting and anaerobic digestion.	No
› Investments in incinerators for the treatment of waste. This exclusion does not apply to investments in: (a) plants exclusively dedicated to treating non-recyclable hazardous waste; (b) existing plants, where the investment is for the purpose of increasing energy efficiency, capturing exhaust gases for storage or use or recovering materials from incineration ashes, provided such investments do not result in an increase of the plants' waste processing capacity.	No

Table 3-2 Screening of the investment against the RRF Loan Exclusion List (if applicable)

RRF Loan Exclusion list (GG B' 1814/13.04.2022)	Is the Investment falling within the category?
› Activities and assets related to fossil fuels, as well as related transmission and distribution infrastructure. This exclusion does not apply to investments for the production of electricity and/or heat, as well as the related transmission and distribution infrastructure, using natural gas which comply with	No

RRF Loan Exclusion list (GG B' 1814/13.04.2022)	Is the Investment falling within the category?
the conditions set out in Annex III of the technical guidance on the application of the 'do no significant harm' under the Recovery and Resilience Facility Regulation (2021/C 58/01).	
› Activities and assets under the EU Emissions Trading System (ETS) to achieve target greenhouse gas emissions that are not lower than the relevant benchmarks set out in Commission Implementing Regulation (EU) 2021/447.	No
› Activities and assets related to landfills, incinerators and mechanical biological treatment plants. This exclusion does not apply to investments in: – plants exclusively dedicated to treating non-recyclable hazardous waste; – existing plants in case these investment aims to increase energy efficiency, **capture exhaust gases** for storage/use or recovering materials from incineration ashes, provided that these activities do not result in an increase of the plant waste treatment capacity or to an extension of its lifetime; – existing mechanical biological treatment units for increasing energy efficiency or retrofitting for recycling operations, provided that these actions do not result in an increase of the plant's waste processing capacity or to an extension of its lifetime.	No
› Activities and assets where long-term waste disposal can harm the environment.	No

4 SHORT DESCRIPTION OF THE SUSTAINABILITY PROOFING APPROACH

The sustainability proofing aims to encourage and reward projects that have positive climate, environmental (and social) impacts, whilst reducing their negative impacts. Sustainability proofing makes possible to (i) identify a project's impacts; (ii) introduce mitigation measures to address these impacts; and (iii) where possible, recognize opportunities to improve the project's sustainability performance.

The sustainability proofing does not replace the compliance check with legal requirements under EU legislation and national law. The assessments carried out under EU and national legislation (e.g., the EIA report developed for the Project) will provide the necessary input data (i.e., estimates of baseline emissions, descriptions of the likely significant effects of the project, positive effects, etc.) that will be used for the proofing, where applicable.

The sustainability proofing will identify whether there are any **residual impacts**. It will also **quantify** and, where possible, **monetize the residual impact** that has been assessed to be of a high and/or medium risk. Subsequently, the proofing will address any residual impacts in the project's economic appraisal, together with expected benefits stemming from the positive impacts of the project. This is the real added value of the sustainability proofing beyond compliance with legal requirements.

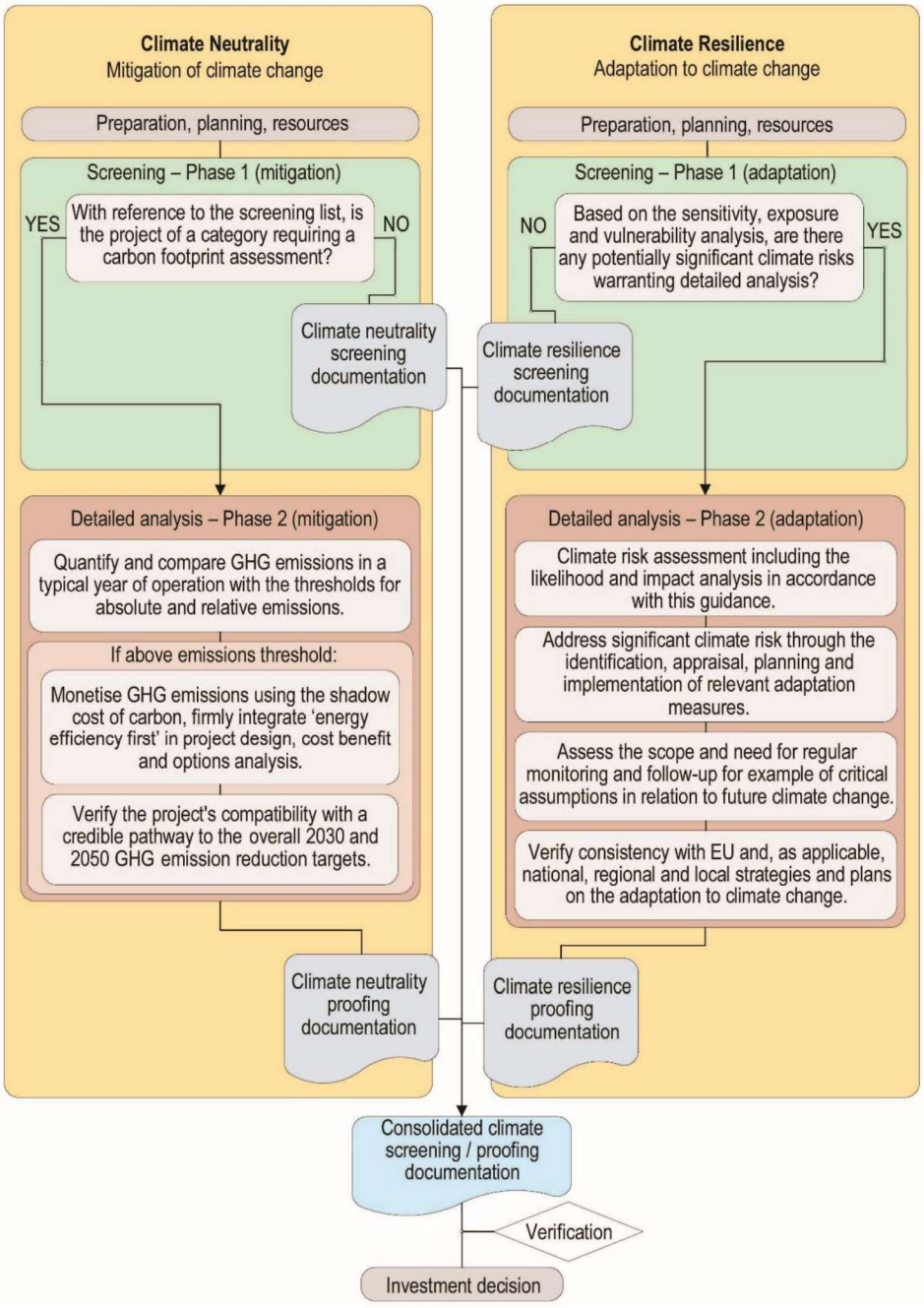
The methodology to perform the sustainability proofing for each of the sustainability dimension concerned by the process can briefly be described as follows:

- **1st step**: The compliance of the Project with EU and national legislation relevant to the sustainability dimension examined is assessed.
- **2nd step:** As the Project has a total investment above EUR 10M, a screening is performed to determine whether the Project has any negative and positive impact on the sustainability dimension.
- **3rd step:** Following the screening process, if it is concluded that the Project has an impact on the sustainability dimension, then the Project will undergo a sustainability proofing aiming to minimize the operation's detrimental impacts and maximize its benefits on the sustainability dimension.

5 CLIMATE DIMENSION

Climate proofing is a convenient shorthand for a process that integrates considerations of climate change adaptation and climate change mitigation into the development of existing assets and/or planned investment operations. Figure 5-1 illustrates the main steps of climate proofing.

Figure 5-1 Overview of the climate proofing process (Source: Commission Notice on Technical guidance on the climate proofing of infrastructure in the period 2021-2027(2021/C 373/01))



The diagram reflects the two pillars of climate proofing. The pillar to the right focuses on climate resilience and adaptation to climate change. The pillar to the left focuses on climate neutrality and mitigation of climate change.

Each pillar of analysis is divided into two phases. The first phase covers a screening step meant to identify on the one hand, the significance of potential climate risks for the investment under consideration (for adaptation) and, on the other hand, to assess consistency with EU climate commitments and to quantify respective GHG emissions (for mitigation). The outcome of the screening phase will determine whether a second phase of further detailed assessment is needed.

Following the check against legal compliance requirements related to the Climate dimension, climate proofing is performed for both adaptation and mitigation pillars, in accordance with the Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (Commission Notice on (2021/C 373/01)).

5.1 Legal compliance

5.1.1 Contribution to achieving EU and national climate ambitions and commitments

The EU climate ambitions and commitments include the objective of EU climate neutrality by 2050 and the Union's intermediate 2030 climate targets, which are summarized in the following Table.

Greece, as a Member State of the EU, is under the joint quantified economy-wide emission reduction target of the EU. Under the EU Governance Regulation (REGULATION (EU) 2018/1999), Greece prepared its first National Energy and Climate Plan (NECP) in 2019, outlining how the country will intend to address energy efficiency, renewables, GHG emission reductions, interconnections, and research & Innovation. A revised version of the NECP is expected to be presented within the year 2024 (see Article 14 of Governance Regulation), in which even more ambitious targets are set in order to meet the enhanced EU's new energy and climate targets for 2030 as part of the fit for 55 package.

Table 5-1 European and National Climate targets for 2030

Sectors	European Climate Targets for 2030	Enhanced European Climate targets for 2030	Greece climate targets for 2030
	European Green Deal, approved in 2020	European Climate Law (Fit for 55), July 2021	Draft updated NECP[1]
Cuts in GHG emission for all sectors (Compared to 1990) (Implemented by ETS, ESR and LULUCF Regulations)	**40% by 2030** (including LULUCF)[i]	At least **55% by 2030**	**54% by 2030,** (Total GHG, excluding LULUCF)
Cuts in EU-ETS (compared to 2005)	43% compared to 2005 levels	62% compared to 2005[2]	Not relevant at country level
Cuts in NON-EU-ETS under the ESR (Road transport, heating of buildings and agriculture)	30% compared to 2005	40% compared to 2005[3],[4]	46% compared to 1990
Share from renewable energy	32%[5],[6]	Not defined yet 40-45%[7],[8]	44%
EE	› 32.5% improvement in energy efficiency › primary energy consumption: 1273 Mtoe › final energy consumption: 956 Mtoe	Not defined yet (Currently proposed to be increased to 36–39 percent)[9],[10]	› primary energy consumption 18.2 Mtoe › final energy consumption: 15.4 Mtoe

In its first National Energy and Climate Plan (NECP 2019), Greece laid down ambitious objectives for 2030, which were further raised in the revised NECP to be presented in 2024.

[1]https://commission.europa.eu/document/download/83ffdc95-2d22-4c67-8d4c-a3e59f752921_en?filename=GREECE%20-%20DRAFT%20UPDATED%20NECP%202021-2030%20EN.pdf
[2] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7796
[3] https://commission.europa.eu/document/fd489be5-26f3-4615-be16-f3cfcfa8325d_en
[4] https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3543
[5]https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en RED
[6] the recast Renewable Energy Directive 2018/2001/EU
[7] https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en
[8] https://commission.europa.eu/news/commission-presents-renewable-energy-directive-revision-2021-07-14_en
[9]https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en
[10] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0558

The revised plan considers that emissions will primarily decline following **decreases from the power generation sector**, with emissions in non-energy sectors falling slightly.

The main measures considered include the **promotion of renewables** and natural gas, the interconnection of islands with the mainland grid and phasing out of lignite power units by 2028. More specifically, by 2030, the NECP aims to: reduce total GHG emissions, excluding those from LULUCF, by 54% compared to 1990 levels; reduce non-EU ETS emissions by 40% compared to 2005 levels; **raise the share of renewables in gross final energy consumption to at least 44%** and limit final energy consumption to 15.4 Mtoe.

The Project under study is expected to typically store electricity at periods when the grid's GHG emission intensity is low and injecting it back to the grid when the grid's GHG emission intensity is high, thus contributing to reducing the grid's GHG emission intensity when RES generation is low. Based on the above, the project enables better utilization of RES and will provide the necessary power and capacity reserves, ensuring the smooth and safe operation of the Greek Electricity Transmission System, either in conditions of particularly increased RES penetration, or in conditions that even the production by RES will not be sufficient to meet current demand. **As a result, it can be stated that the Project enhances the penetration of RES in the country's power generation mix and the stability and safe operation of the System.**

5.1.2 Compliance with Climate legal framework

According to Annex I of the Technical Guidance on sustainability proofing for the InvestEU Fund (Commission Note 2021/C 280/01), the legal compliance framework for the Climate dimension consists of the following directives:

- **ETS Directive** (Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC)
- **CCS Directive** (Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006).

The project under study does not fall within the categories of activities listed in Annex I of the ETS Directive. As a result, the **ETS Directive is not relevant to the Project** under study.

The **CCS Directive is also not relevant to the Project** under study, as the investment does not involve any carbon dioxide capture and geological storage (CCS) technology.

5.2 Climate neutrality and mitigation of climate change

Mitigation of climate change means making efforts to reduce GHG emissions or increase sequestration of GHGs. These efforts are guided by EU emission reduction targets for

2030 and 2050. Meeting the EU targets, and globally the goals of the Paris Agreement, requires a fundamental shift in our economies from high-carbon activities to the deployment of low-carbon and net-zero solutions such as renewable energy and CO2 sequestration, in combination with significant advances in energy and resource efficiency. The principle of 'energy efficiency first' emphasizes the need to prioritize alternative cost-efficient energy efficiency measures when making investment decisions, in particular cost-effective end-use energy savings, etc. The quantification and monetization of GHG emissions can support investment decisions based on that principle.

5.2.1 Screening for climate change mitigation - Phase 1

The screening of an investment with regard to GHG emissions aims to identify if a proposed project must undergo a carbon footprint assessment. This is relevant for determining the need for a deeper assessment in this respect and for the inclusion of monetary values of such externalities in the economic appraisal of the investment.

In line with the 'Guidance on the climate proofing of infrastructure in the period 2021-2027',[11] projects have to perform a carbon footprint assessment if are likely to entail:

- **Absolute emissions** greater than 20.000 tonnes CO2e/ year (positive or negative)
- **Relative emissions** greater than 20.000 tonnes CO2e/ year (positive or negative).

The stand-alone BESS project will be storing and discharging electrical according to the demand-supply needs of the HETS. The BESS charge-discharge process is characterised by inherent losses (round-trip efficiency and self-discharge rate), and given the substantial power capacity of the BESS, the Project's absolute/relative emissions are likely to exceed the respective emissions criteria, thus requiring further analysis.

With reference to the screening list of the Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (Commission Notice on (2021/C 373/01)), regarding the need of a carbon footprint assessment of a project, electricity storage projects are not included in any of the project categories either requiring or not requiring a carbon footprint assessment. Nevertheless, and in an effort to capture a 'conservative' scenario, a detailed analysis is performed for the BESS project in the following section, which includes quantifying and monetising GHG emissions (and reductions) as well as assessing consistency with the climate targets for 2030 and 2050.

[11]https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en

5.2.2 Detailed analysis: Carbon footprinting, monetization of GHG emissions & verification of project's compatibility with the overall targets for 2030 and 2050 - Phase 2

As a result from the initial screening of the project regarding mitigation of climate change and elaborated in section 5.2.1, a detailed analysis (phase 2), i.e. a carbon footprint assessment is followed, which includes the following steps (Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (Commission Notice on (2021/C 373/01)):

- Quantify GHG emissions in a typical year of operation using the carbon footprint method. Compare with the thresholds for absolute and relative GHG emissions. If the GHG emissions exceed any of the thresholds, carry out the following analysis:
- Monetise GHG emissions using the shadow cost of carbon and firmly integrate the 'energy efficiency first' principle in the project design, options analysis, and cost-benefit analysis.
- Verify the project's compatibility with a credible pathway to achieve the overall 2030 and 2050 GHG emission reduction targets. As part hereof, for infrastructure with a lifespan beyond 2050, verify the project's compatibility with operation, maintenance and final decommissioning under conditions of climate neutrality.

Quantification of GHG emissions

In this calculation, the EIB Project Carbon Footprint Methodologies[12] is followed, as recommended by the Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (Commission Notice on (2021/C 373/01)).

In order to quantify the GHG emissions associated with the BESS project, the following **assumptions** have been made:

- The BESS unit will be going through a charge-discharge cycle once per day, with a round-trip efficiency of 80% and DoD equal to 80%.
- The electricity grid's GHG emissions intensity (year's average) is the same during the BESS charging and discharging phases.

Considering the above, it is expected that the BESS project will be storing annually 292GWh from the grid and returning back 233.6GWh.

The project baseline scenario (or "without" project scenario) is defined as the expected alternative means to meet the output supplied by the proposed project.

Without the project under study, this energy would be produced through the national residual energy mix that includes fossil fuels. This calculation constitutes the baseline

[12] EIB Project Carbon Footprint Methodologies. Methodologies for the assessment of project greenhouse gas emissions and emission variations. European Investment Bank, Version 11.3, January 2023

emissions. Relative emissions will be calculated through baseline emissions and absolute emissions using the following equation:

Relative Emissions = "With" Project Emissions (Wp) – "Without" Project Emissions, or Baseline Emissions (Be)

or

Re = Wp – Be .

Thus, the baseline emissions can be calculated as follows:

CO_2 (t) = energy generated * country-specific emission factor for electricity combined margin.

Regarding electricity, in terms of calculating GHG emissions, the estimated production from the Project in the year of reference and the emission factor are required.

The emission factor for CO_2 (gCO_2/kWh) reported in the Annual report by RES & Guarantees of Origin Operator (DAPEEP SA) on the National energy mix[13] can be used, which corresponds to 436,889 gCO_2/ KWh, for the year 2021.

Emission factors for CH_4 and N_2O are not readily available and must be calculated, through the following general formula:

Emission factor $_{(CH_4,\ N_2O),\ year\ x}$ = National emissions from energy $_{(CH_4,\ N_2O),\ year\ x}$ / National residual energy mix $_{year\ x}$.

The national residual energy mix is retrieved from the Annual report by DAPEEP, as above, which corresponds to 52,63 TWh for the year 2021.

The national emissions of CH_4 and N_2O are retrieved from the National Inventory Report of Greece for Greenhouse and other gases by the Ministry of Environment and Energy[14]. More specifically, the CH_4 and N_2O emissions from public electricity and heat production for the year 2021 (the most recent year for which information is available) are used, which correspond to 0,34 kt and 0,14 kt, respectively.

CH_4 and N_2O emissions are converted to CO_2e, using the IPCC Global Warming Potential (GWP) factors of 100-year time horizon of the Fifth Assessment Report[15].

Based on the above, **the relative emissions of the Project will be +25.566,05 tCO_2e/year**.

It should be noted that the project's **absolute emissions are zero** during operation.

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[13] Energy mix 2021, RES & Guarantees of Origin Operator (DAPEEP SA), July 2022
[14] National Inventory Report of Greece For Greenhouse And Other Gases For The Years 1990-2021, Ministry of Environment and Energy, April 2023
[15] 'GWP 100-year' in Appendix 8.A: Lifetimes, Radiative Efficiencies and Metric Values of the IPCC fifth Assessment Report, WG I, the Physical Science Basis, https://www.ipcc.ch/assessment-report/ar5/

The positive quantity of relative emissions implies that, under the assumptions mentioned above, the BESS project will result in additional GHG emissions. However, it must be **noted the BESS project will typically be storing electricity at periods when the grid's GHG emission intensity is low (high RES penetration) and injecting it back to the grid when the grid's GHG emission intensity is high, thus contributing to reducing the grid's GHG emission intensity when RES generation is low**. This has not been factored in the estimation of the BESS project's relative emissions above, and **the Project's GHG emissions should be expected to be much lower under typical operational conditions**.

Monetization of GHG emissions

The "shadow cost of carbon", published by the EIB, can be the best available evidence[16] on the cost of meeting the temperature goal of the Paris Agreement (i.e. the 1,5 °C target), in terms of the economic appraisal of the Project. The shadow cost of carbon is measured in real terms and indicated in 2016 prices. The "shadow cost of carbon" is given in the table below.

Table 5-2 Shadow cost of carbon for GHG emissions and reductions in EUR/tCO2e, 2016 prices (for each year between 2021-2050)

Year	EUR/tCO2e	Year	EUR/tCO2e	Year	EUR/tCO2e
2020	80	**2031**	278	**2042**	579
2021	97	**2032**	306	**2043**	606
2022	114	**2033**	334	**2044**	633
2023	131	**2034**	362	**2045**	660
2024	148	**2035**	390	**2046**	688
2025	165	**2036**	417	**2047**	716
2026	182	**2037**	444	**2048**	744
2027	199	**2038**	471	**2049**	772
2028	216	**2039**	498	**2050**	800
2029	233	**2040**	525		
2030	250	**2041**	552		

[16] Further information is available in the EIB Group Climate Bank Roadmap 2021-2025, 14 December 2020, https://www.eib.org/en/ publications/the-eib-group-climate-bank-roadmap.htm

The above amounts correspond to money spent for the achievement of the goal of the Paris Agreement, thus entailing significant savings.

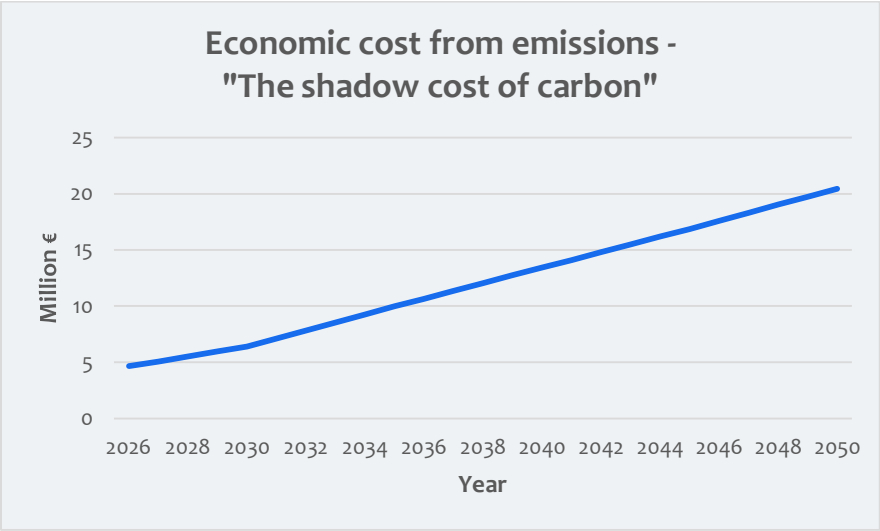
Since emissions are forecast for each year of operation, the above savings correspond to each year of the Project operation with the respective amount.

Based on the above and assuming the operation year of the Project as 2026, in the following table, the economic benefit derived from the avoided emissions due to the Project's operation is presented, for each year of operation between 2026-2050.

Table 5-3 Economic cost from emissions (million euro) for each year of operation between 2026-2050

Year	Economic cost from emissions (million euro)
2026	4,7
2027	5,1
2028	5,5
2029	6,0
2030	6,4
2031	7,1
2032	7,8
2033	8,5
2034	9,3
2035	10,0
2036	10,7
2037	11,4
2038	12,0
2039	12,7
2040	13,4
2041	14,1
2042	14,8
2043	15,5
2044	16,2
2045	16,9
2046	17,6
2047	18,3
2048	19,0
2049	19,7
2050	20,5

Figure 5-2 Economic cost from emissions - "The shadow cost of carbon"



Verification of project's compatibility with the overall targets for 2030 and 2050

The BESS project will contribute towards European and national climate and energy targets and commitments as set out since it will normally store electricity at periods where the grid's GHG emission intensity is low and injecting it back to the grid when the grid's GHG emission intensity is high, thus contributing to reducing the grid's GHG emission intensity when RES generation is low.

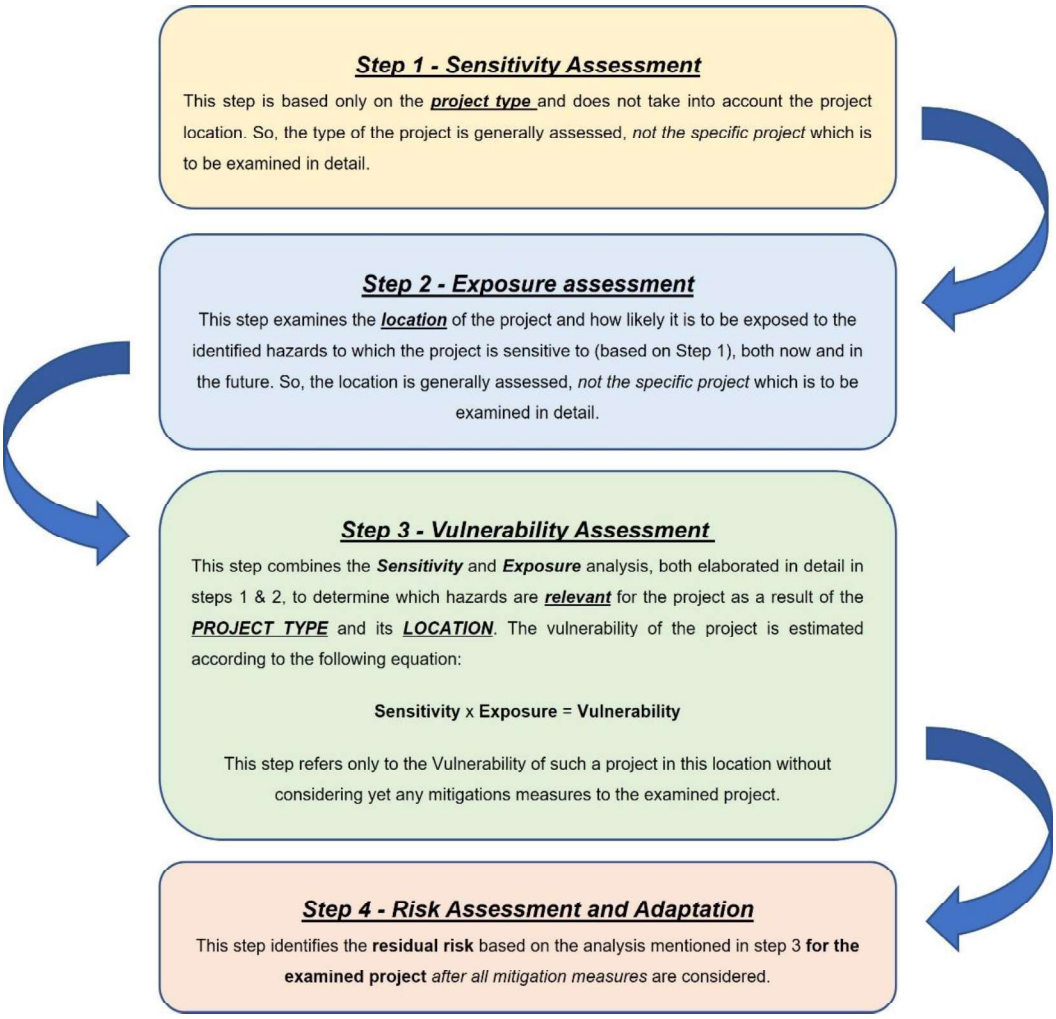
It can be argued, therefore, that the project enables better utilization of RES and will provide the necessary power and capacity reserves, ensuring the smooth and safe operation of the Greek Electricity Transmission System, either in conditions of particularly increased RES penetration, or in conditions that even the production by RES will not be sufficient to meet current demand.

Based on the above, it can be stated that the Project is compatible with the overall targets for 2030 as elaborated in section 5.1.1 and also with the 2050 long-term strategy for climate-neutrality.

5.3 Climate resilience/adaptation

The aim of the climate change adaptation vulnerability and risk assessment is: i) the identification of the climate hazards to which the project is sensitive, due to its nature, design or location, ii) the determination of risk levels connected to the identified climate hazards and iii) the proposal of relevant adaptation measures which could result in the modification of the design of the project, if necessary, in order to reduce the relevant risks and to amplify the durability of the project, over time, taking into account the impacts of climate change.

Figure 5-3 Diagram showing the steps of the followed methodology



In the following section, the physical climate risks that are material to the activity will be identified with the following steps:

(a) screening of the activity for climate resilience to identify which physical climate risks may affect the performance of the economic activity during its expected lifetime (*vulnerability analysis*);

(b) where the activity is assessed to be at risk from one or more of the physical climate risks, a more detailed analysis will be performed to assess the materiality of the physical climate risks on the economic activity (*climate risk assessment*); and to assess adaptation solutions that can reduce the identified physical climate risk.

5.3.1 Screening for climate resilience – Vulnerability Analysis

Analysing the vulnerability of a project to climate change is an important step in identifying the right adaptation measures to take. The **vulnerability analysis** comprises four steps as follows:

- A sensitivity analysis,

- An assessment of current and future exposure, and then
- A combination of the two aspects for the vulnerability assessment.
- Proposing adaptation measures.

The aim of the vulnerability analysis is to identify the relevant climate hazards for the given specific project type at the foreseen location. The vulnerability of a project is a combination of two aspects: how sensitive the project's components are to climate hazards in general (sensitivity) and the probability of these hazards occurring at the project location now and in the future (exposure).

Sensitivity Assessment

The sensitivity assessment aims at identifying the climate hazards which are relevant to a specific type of project, **in this instance for the specific investments that constitute part of Battery Energy Storage System (BESS) Project, as well as the Substation and the Overhead Lines that accompany the Project.** In this assessment, four major hazard categories have been examined as per the EU Taxonomy Climate Delegated Act, Appendix A, "Classification of climate-related hazards" and focus on the relevant hazard types which are relevant to the project under each category. More specifically, the climate hazards are classified either chronic or acute in four categories as follows:

- Temperature-related changes in average temperatures and the frequency and magnitude of extreme temperatures (e.g., Heat stress, wildfire, frost)
- Wind-related changes in average wind speeds and maximum wind speeds (e.g., storm, tornado)
- Water-related changes in precipitation, relative sea level etc. (e.g., flooding, heavy precipitation etc.)
- Solid mass-related changes in the soil caused by erosion and degradation (e.g., subsidence, landslide etc.).

Changes in these factors result in a diverse set of climate hazards that may have impact on a BESS project. The climate hazards that were taken into account, to determine which could affect a BESS project, are listed in Table 5-5. The sensitivity score, impact and the exposure of these hazards is estimated based on relevant literature which is provided in the list below.

Each hazard type is then assigned a sensitivity score based on its impact severity. The description of the impact severity categorization is presented in Table 5-4.

Table 5-4 Description of the impact severity

Impact	Description
LOW	The hazard is not expected to influence the safety of the infrastructure. Batteries are not expected to be destroyed. Most issues are expected to supplementary infrastructures such as the grid connection, inverters etc. Any possible impact will require a relevant low restoration cost.
MEDIUM	The hazard can influence the safety of the infrastructure. Batteries could be destroyed. Supplementary infrastructures such as the grid connection,

Impact	Description
	inverters etc., are in risk. Any possible impact will require a significant restoration cost.
HIGH	The hazard will influence the safety of the infrastructure. Batteries and supplementary infrastructures will be destroyed. Any impact will require a major restoration cost.

1. Climate Change and Major Projects, Outline of the climate change related requirements and guidance for major projects in the 2014-2020 programming period, https://ec.europa.eu/clima/system/files/2016-11/major_projects_en.pdf
2. Commission Notice — Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (OJ C, C/373, 16.09.2021, p. 1, CELEX: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0916(03)),
3. COMMISSION NOTICE Technical guidance on sustainability proofing for the InvestEU Fund (2021/C 280/01) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0713(02))
4. TA-6598 BHU: Renewable Energy for Climate Resilience (Asian Development Bank, 2021);
5. Guidelines for Climate Proofing Investment in the Energy Sector (Asian Development Bank, 2013);
6. Environmental, economic and social impacts of climate change in Greece (Bank of Greece, 2011);
7. World Bank climate knowledge portal, http://sdwebx.worldbank.org/climateportal
8. Copernicus http://climate.copernicus.eu
9. European Environmental Agency (EEA) indicators
10. The submitted EIA study of the project.
11. Issued DAEC of the Project.
12. Judith A. Jeevarajan, Tapesh Joshi, Mohammad Parhizi, Taina Rauhala, and Daniel Juarez-Robles. 2022.Battery Hazards for Large Energy Storage Systems, ACS Energy Letters 2022 7 (8), 2725-2733, DOI: 10.1021/acsenergylett.2c01400
13. Conzen, J.; Lakshmipathy, S.; Kapahi, A.; Kraft, S.; DiDomizio, M. Lithium ion battery energy storage systems (BESS) hazards. J. Loss Prev. Process Ind. 2023, 81, 104932.
14. Sanij, A.R.D., Tharumalingam, E Dusseault, M.B. Fraser R. 2019. Study of energy storage systems and environmental challenges of batteries Renew. Sust. Energ. Rev., 104 (Apr. 2019), pp. 192-208
15. Y. Jin, Z. Zhao, S. Miao, Q. Sun, L. Wang, H. Lu. 2021. Explosion hazards study of grid-scale lithium-ion battery energy storage station. J Energy Storage, 42 (2021), 102987
16. Zalosh, R., Gandhi, P., Barowy A. 2021. Lithium-ion energy storage battery explosion incidents. J. Loss Prev. Process Ind., 72 (2021), Article 104560, 10.1016/j.jlp.2021.104560
17. Peng, R., Ping, . P., Wang, G. He, X. Kong, D. Gao W. 2023. Numerical investigation on explosion hazards of lithium-ion battery vented gases and deflagration venting design in containerized energy storage system. Fuel, 351 (2023), 128782

18. Solaun, K. and Cerda, E. 2019. Climate change impacts on renewable energy generation. A review of quantitative projections, Renewable and Sustainable Energy Reviews 116, 109415 https://doi.org/10.1016/j.rser.2019.109415
19. Energy Sector Climate Change Adaptation Guidance Note, (IsDB)
20. Climate Risk and Adaptation in the Electric Power Sector (Asian Development Bank, 2012);
21. Ahmad, N.I., Ab-Kadir, M.Z.A., Izadi, M., Azis, N., Radzi, M.A.M., Zaini, N.H., et al. 2018. Lightning protection on photovoltaic systems: A review on current and recommended practices Renew Sustain Energy Rev, 82, pp. 1611-1619
22. Anderson, G., and D. Klugmann, 2014. A European lightning density analysis using 5 years of ATDnet data. Nat. Hazards Earth Syst. Sci., 14, 815–829, doi:10.5194/nhess-14-815-2014
23. Enno, S. E., J. Sugier, R. Alber, and M. Seltzer, 2020. Lightning flash density in Europe based on 10 years of ATDnet data. Atmos. Res., 235, 104769,
24. Pytharoulis, I., Craig, G.C., Ballard, S.P., 2000. The hurricane-like Mediterranean cyclone of January 1995. Meteorological Applications 7, 261-279.
25. Zimbo, F.; Ingemi, D.; Guidi, G. The Tropical-like Cyclone "Ianos" in September 2020. Meteorology 2022, 1, 29–44. https://doi.org/10.3390/meteorology1010004
26. Gonçalves, M.C. Marques, S. Loureiro, R. Nieto, M.L. Liberato (2023). Disruption risk analysis of the overhead power lines in Portugal Energy, 263 (2023), Article 125583, 10.1016/j.energy.2022.125583
27. Chojnacki, A.L. (2021). Assessment of the Risk of Damage to 110 kV Overhead Lines Due to Wind. Energies 2021, 14, 556. https://doi.org/10.3390/en14030556
28. D.V. Bilionis, K. Vlachakis, D. Vamvatsikos, M.E. Dasiou, I. Vayas, K. Lagouvardos (2022). Risk assessment of rehabilitation strategies for steel lattice telecommunication towers of Greece under extreme wind hazard Eng. Struct., 267, 10.1016/j.engstruct.2022.114625
29. Xu, M. 2023. Wildfire, Power Shutoff, and Residential Energy Storage Adoption Available at SSRN: https://ssrn.com/abstract=4509545 or http://dx.doi.org/10.2139/ssrn.4509545

Most hazards can partially affect (and therefore are assessed with lower sensitivity score), the performance and the life expectancy of the photovoltaic panels, while extreme events (such as a wildfire or a flood) could even destroy the infrastructures (and are assessed with higher sensitivity score). The final outcome is presented in Table 5-5.

Table 5-5 Potential climate hazards (taken from Section II as set out in Appendix A to Annex I of the Taxonomy Regulation)

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
Incremental temperature increase	Chronic	Increases in average temperatures over time.	LOW	LOW	LOW	LOW	The climate hazard might reduce the life expectancy of the BESS.	LOW	12, 15, 16, 17
Solar irradiance	Chronic	Changes of solar power over some area.	N/A	N/A	N/A	N/A	N/A	N/A	
Water temperature	Chronic	Changes in the temperature of surface and ground water or marine water.	N/A	N/A	N/A	N/A	N/A	N/A	
Seawater temperature	Chronic	Modification of the sea water temperature.	N/A	N/A	N/A	N/A	N/A	N/A	
Heat Waves	Acute	Changes in the frequency and intensity of periods of high temperatures, including Heat	LOW	HIGH	MEDIUM	MEDIUM	The climate hazard may have an impact on the performance of BESS. Heatwaves could impact their	HIGH	12, 15, 16, 17

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
		waves (periods of extremely high maximum and minimum temperatures).					life expectancy or result in overheating the electromechanical equipment which may trigger fire		
Cold Wave/frost	Acute	Prolonged periods of extremely cold temperatures.	LOW	MEDIUM	LOW	LOW	This climate hazard might influence the performance and the life expectancy of BESS.	MEDIUM	12, 13, 14, 15, 16, 17
Wildfires	Acute	Unwanted, unplanned and damaging fires such as forest fires and fires of shrub and grasslands.	HIGH	HIGH	HIGH	HIGH	The climate hazard may have a significant impact on the BESS, since can totally destroy them and can cause irreversible damages.	HIGH	15, 16, 17, 29
Lightnings	Acute	A sudden electrostatic discharge	LOW	MEDIUM	MEDIUM	MEDIUM	Lightnings are a common cause of failures in BESS since the metallic structure of the	MEDIUM	21

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
							assets, can attract them		
Changing wind patterns	Chronic	Changes in average wind speeds over time.	N/A	N/A	N/A	N/A	N/A	N/A	
Strong Winds	Acute	Increases in the maximum force of gusts of wind.	N/A	N/A	N/A	N/A	N/A	N/A	
Extreme wind speed events (cyclone, hurricane, typhoon, tornado)	Acute	Extreme events of wind with high speed such as cyclone etc.	LOW	MEDIUM	MEDIUM	MEDIUM	This climate hazard might destroy OHL and part of a BESS Project.	MEDIUM	
Intense Saharan dust storms	Acute	Increases in the maximum force of gusts of Saharan dust.	MEDIUM	MEDIUM	MEDIUM	MEDIUM	The climate hazard may have an impact on the performance of BESS. Dust could impact their life expectancy or result in overheating the electromechanical	MEDIUM	15, 16, 17

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
							equipment which may trigger fire		
Storm surges	Acute	An abnormal rise of seawater generated by a storm, over and above the predicted astronomical tides.	N/A	N/A	N/A	N/A	N/A	N/A	
Incremental rainfall change	Chronic	Trends over time of either more or less precipitation (rain, snow, hail, etc.).	N/A	N/A	N/A	N/A	N/A	N/A	
Water stress	Chronic	Lack of water.	N/A	N/A	N/A	N/A	N/A	N/A	
Humidity	Chronic	Changes in the amount of water vapour in the atmosphere.	MEDIUM	MEDIUM	MEDIUM	MEDIUM	The climate hazard may have an impact on the performance of BESS. Humidity could impact their life expectancy or	MEDIUM	15, 16, 17

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
							result in overheating the electromechanical equipment which may trigger fire.		
Droughts	Acute	Prolonged periods of abnormally low rainfall, leading to shortages of water.	LOW	LOW	LOW	LOW	This climate hazard might influence the performance of BESS Project.	LOW	
Relative sea level rise	Acute	Caused by a combination of increased sea temperatures (expanding the volume of water) and melting ice sheets and glaciers.	N/A	N/A	N/A	N/A	N/A	N/A	
Saline intrusion	Chronic	Movement of salt water into freshwater aquifers, which can lead	N/A	N/A	N/A	N/A	N/A	N/A	

Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
		to contamination of drinking water sources and other consequences.							
Coastal erosion	Chronic	Erosion of the coastline.	N/A	N/A	N/A	N/A	N/A	N/A	
Flooding	Acute	Flooding from the sea or from rivers.	HIGH	HIGH	HIGH	HIGH	The climate hazard may have a significant impact on project. Flooding events could damage buildings and infrastructure, if the project is located near rivers.	HIGH	
Soil erosion	Chronic	The process of removal and transport of soil and rock by weathering, mass wasting, and the action of streams, glaciers,	MEDIUM	MEDIUM	MEDIUM	MEDIUM	This climate hazard might influence a BESS Project, if the area is located on steep slopes.	MEDIUM	

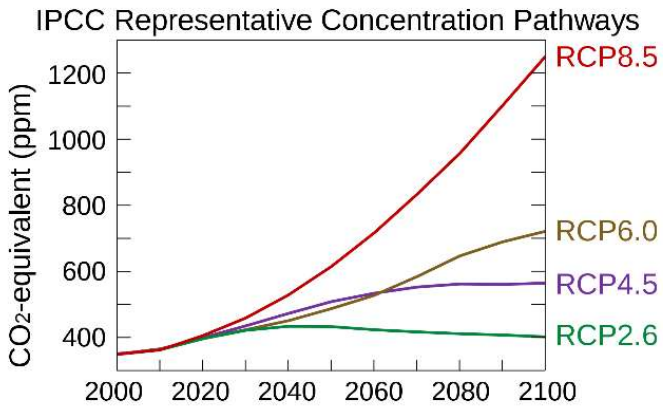
Hazard	Classification	Description	Construction	Operation	Product	Integration	Sensitivity description	Sensitivity with the project	Reference
		waves, winds and underground water.							
Ground instability / landslides / avalanche	Acute	Landslide: a mass of material that has slipped downhill by gravity, often assisted by water when the material is saturated.	HIGH	HIGH	HIGH	HIGH	This climate hazard might influence a BESS Project, if the area is located on steep slopes.	HIGH	

Exposure Assessment

The aim of the exposure analysis is to identify the relevant hazards for the foreseen project location, irrespective of the project type. In the present section of the Report, the **location** of the project and how likely it is to be exposed to the climate hazard to which the project is sensitive to, both now and in the future, is examined.

It is important to note here that the determination of the exposure level of the project to climate hazards depends on the climate scenario that is taken into account. The Representative Concentration Pathways (RCPs), developed by the IPCC, describe four different 21st century pathways, i.e., four different climate futures, all of which are considered possible depending on the volume of greenhouse gases (GHG) emitted in the years to come. The RCPs represent the range of GHG emissions in the wider literature; they include a stringent mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0), and one scenario with very high GHG emissions (RCP8.5).

Figure 5-4 All forcing agents' atmospheric CO2-equivalent concentrations (in parts-per-million-by-volume (ppmv) according to the four RCPs used by the fifth IPCC Assessment Report to make predictions



In the following, both RCP4.5 and RCP8.5 are taken into account. RCP4.5 may be viewed as a moderate-emissions-mitigation-policy scenario and RCP8.5 as a high-end emissions scenario.

Additionally, for a range of climate hazards it can be expected that the likelihood and impacts will change for the near-term future and longer-term future. As the lifespan of the project is about **25 to 35 years, indications up to 2050 -2060** will be presented in the section below, when such information is available.

It is noteworthy that in the following exposure assessment analysis, only those hazards for which the sensitivity analysis has resulted in a **medium** or **high** sensitivity will be analysed.

Exposure Assessment to Heat Waves

Current Exposure to Heat Waves

The Mediterranean basin is a region where hot conditions and particularly heat waves are common and relevant extreme climatic features during summer. Extreme summer temperatures are often experienced in Greece and have been increasing in the last years as result of Climate Change. Extreme temperatures might aggravate the exposure to a fire as well, as described further on. Additionally, in the region of Western Macedonia where the project is located, heatwaves are not rare (Figure 5-5). Moreover, based on the data provided by NECCA, the area experiences ~3 days with high temperatures per year (Figure 5-6). As a result, the **current exposure** of the project area to heatwaves can be estimated as **LOW**.

Figure 5-5 Number of heatwaves in Central Macedonia region from 1980 since now, derived from ERA 5 Analysis (Euroheat project)

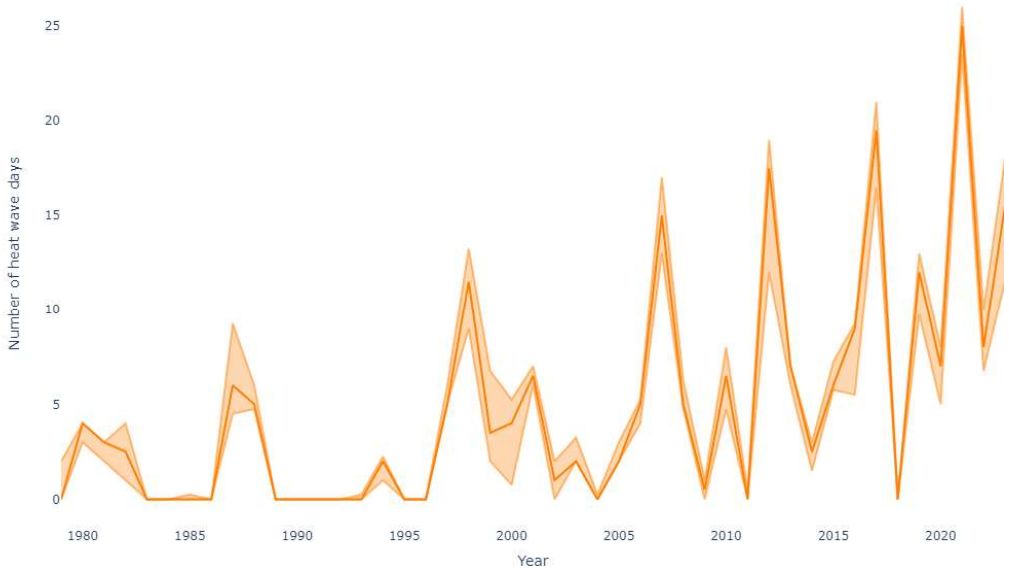
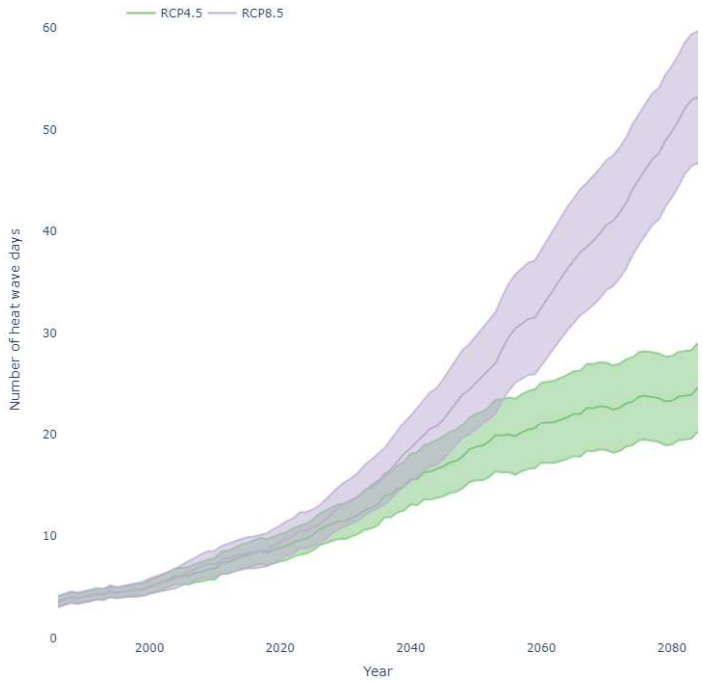


Figure 5-6 Days with high temperatures per year in the regional area, for the reference period (1971-2000).

Future Exposure to Heat Waves

The climate simulations indicate that the temperature in Greece will increase over the coming decades, relative to the current period. Additionally, the number of heat waves that will be experienced until the 2050 (based on the Copernicus), are projected to increase drastically at a national level and reach up to ~26 days/year (for 2050) under the high GHG emission scenario for Western Macedonia (Figure 5-7). Notably, during 2024, based on the Copernicus Data store, approximately ~14 days of heat waves are expected. An increase is also observed in the days with high temperatures per year (Figure 5-8). As a result, the **future exposure** of the project area to heatwaves can be estimated as **MEDIUM**.

Figure 5-7 Number of heat wave days per year in Western Macedonia



Source: Figures were generated using the Copernicus Climate Data store

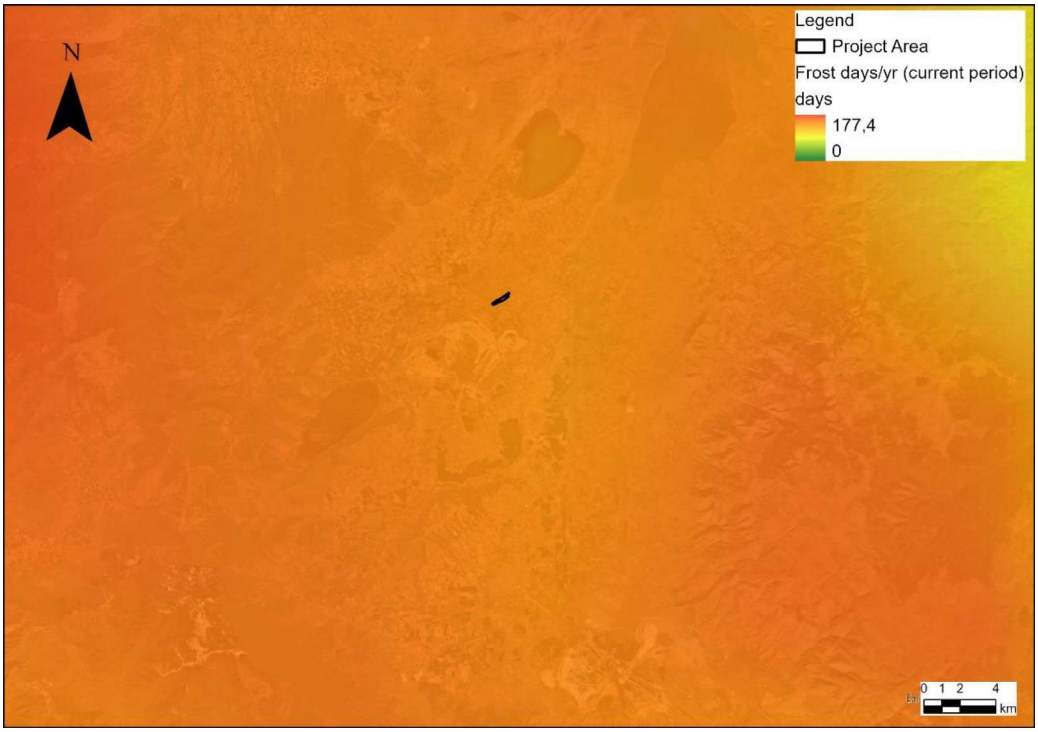
Figure 5-8 Days with high temperatures per year in the regional area, for the near future (2031-2060).

Exposure Assessment to Cold Waves/frost

Current Exposure to Cold Waves/frost

Based on the data provided by NECCA (https://geo.adaptivegreecehub.gr/), the average days with night frost per year in the Region of Western Macedonia for the current reference period is ~ 133 days, (2031-2060) (Figure 5-9). As a result, the **current exposure** of the project area to Cold Waves/frost can be estimated as **HIGH**.

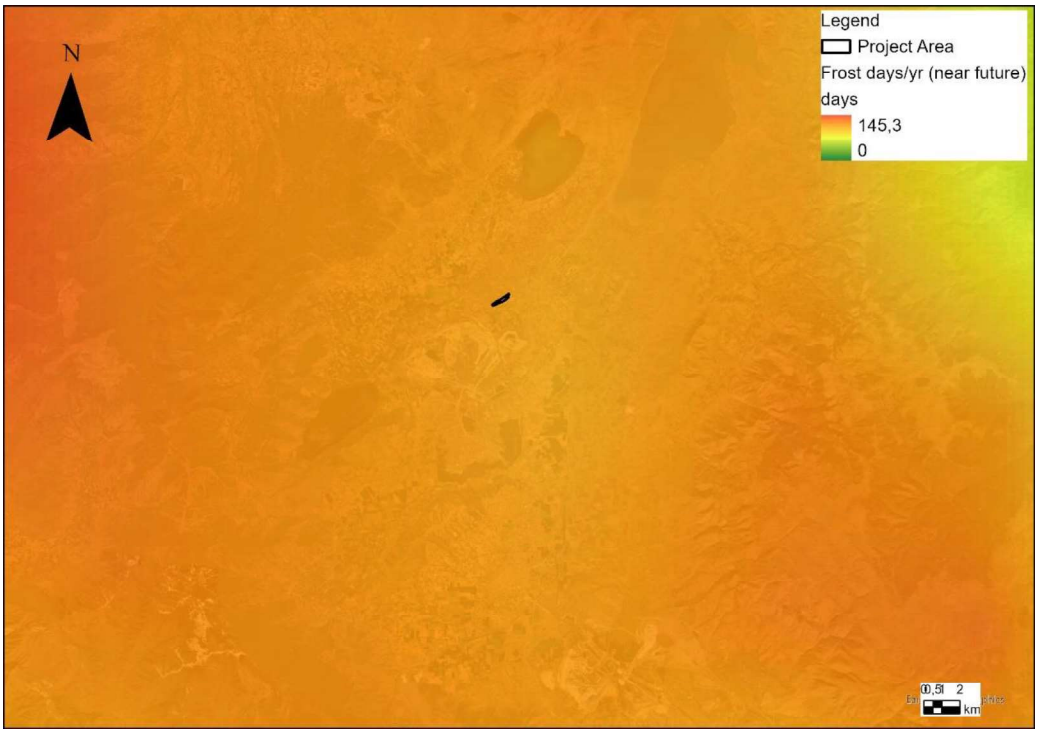
Figure 5-9 Number of days per year with night frost in the regional area, for the current reference period.



Future Exposure to Cold Waves/frost

Based on the data provided by NECCA (https://geo.adaptivegreecehub.gr/), the average days with night frost per year in the Region of Western Macedonia for the near future ~95 days, (2031-2060) (Figure 5-9). As a result, eventing that the total number of days with frost is expected to decrease, the **future exposure** of the project area to Cold Waves/frost can be estimated as **HIGH**.

Figure 5-10 Number of days per year with night frost in the regional area



Exposure Assessment to Wildfires

Current and Future Exposure to Wildfires

In order to assess the current and future exposure to wildfires of the Region of Western Macedonia, we use the Fire Weather Index[17],[18]. The Fire Weather Index (FWI) is a meteorologically based index used worldwide to estimate fire danger. It consists of different components that account for the effects of fuel moisture and wind on fire behaviour and spread. The fire weather index is calculated using the Canadian Forest Service Fire Weather Index rating system (FWI). The fire danger model used to produce the dataset is the Global ECMWF Fire Forecast model (GEFF). The fire danger model takes into account **temperature, relative humidity, wind speed, precipitation, drought conditions, fuel availability, vegetation characteristics and topography**. The higher the FWI is, the more favourable the meteorological conditions to trigger a wildfire are. The Fire Weather Index is mapped in 6 classes (very low, low, medium, high, very high and extreme), as illustrated in the Table below.

[17] Copernicus Emergency Management Service, 2019. Fire danger indices historical data from the Copernicus Emergency Management Service. In: Copernicus Climate Change Service (C3S) Climate Data Store (CDS). https://doi.org/10.24381/cds.0e89c522

[18] https://effis.jrc.ec.europa.eu/about-effis/technical-background/fire-danger-forecast

Table 5-6 Fire Weather Index classes

Fire Danger Classes	FWI
Very Low	< 5.2
Low	5.2 - 11.2
Moderate	11.2 - 21.3
High	21.3 - 38.0
Very High	38.0 - 50
Extreme	>= 50

As illustrated in Table 5-7, the current and forecasted fire danger lever (under both RCP4.5 and RCP 8.5 scenarios) in the overall district of Florina is 22 and can therefore be considered as HIGH. However, it is to be noted that those forecasts are estimates for the entire district of Florina and do not take into account local specificities.

Table 5-7 Fire Weather Index (FWI) in the examined regions providing fire danger information following the European Forest Fire Information System (EFFIS) classification

Region	FWI reference for current climate	2021-2040		2040-2060	
		RCP 4,5 Moderately ambitious mitigation policies	RCP 8,5 unambitious mitigation policies	RCP 4,5 Moderately ambitious mitigation policies	RCP 8,5 unambitious mitigation policies
Florina	11	14	14	15	16

To take into account the local specificities of the Project, several parameters have to be evaluated. Based on international literature among the most contributing factors that can influence the wildfire risk hazard assessment are:

The slope inclination,
The aspect slope,
The elevation,
The distance from the river/hydrographic network,
The distance from settlements and dumpsters,
The distance from the road network,
the distance from Overhead Power lines (OHL) and substations,
The vegetation coverage,
The Topographic wetness index (TWI) and,
The climatic conditions.

Each factor has higher or lower significance for the estimation of the Wildfire risk hazard. Therefore, for the estimation of the fire risk hazard the ArcGIS PRO toolbox (Weighted

Overlay) has been used. For each factor mentioned above, several researchers have provided weighted variables for the multi-criteria analysis (e.g Papanikolaou et al. 2012[19], Hassan et al., 2019[20], Maniatis et al., 2022[21] Arango et al, 2023[22]), based on which the final hazard risk can be estimated.

Among the aforementioned criteria, the most crucial factor is climatic conditions. As mentioned before, Fire Weather Index (FWI) is an indicator which takes under consideration the precipitation and near-surface air temperature, humidity, and wind speed of an area in order to estimate fire danger. Consequently, this index can be used to describe, not only the current but the projected impact of climatic conditions to wildfire hazard risk.

Based on the ArcGIS PRO toolbox mentioned above and the weighted variables for the multi-criteria analysis, the current and near future hazard risk can be estimated. The hazard risk has been classified to five different ranks from low to extreme, as it is shown in Table 5-8. Based on these results, the wildfire risk hazard has been described for the examined area (Figure 5-11).

Table 5-8 The wildfire risk assessment, as has been estimated through the multicriteria analysis

Fire Danger	Fire Danger Classes
1	Negligible
2	Low
3	Moderate
4	Significant
5	High

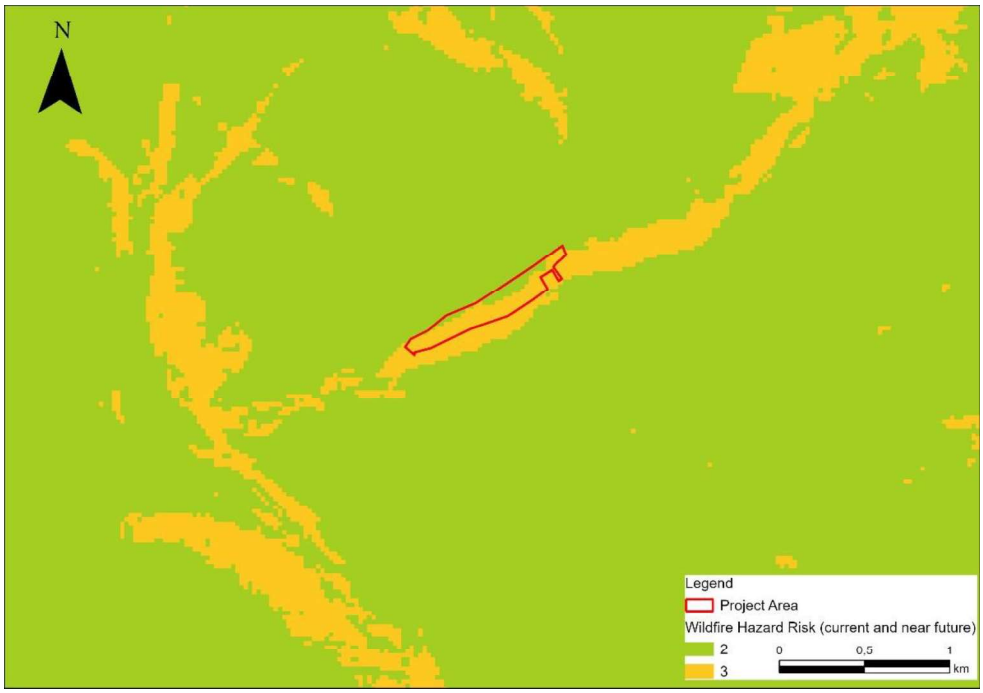
[19] Papanikolaou, D., Papanikolaou, I., and Deligiannakis, G., (2012). Life, Forest Cities, Guidelines - Development of Action Plans for Forest Fire Prevention . Athens, p.78

[20] Hassan Abedi Gheshlaghi, Bakhtiar Feizizadeh & Thomas Blaschke (2019): GIS-based forest fire risk mapping using the analytical network process and fuzzy logic, Journal of Environmental Planning and Management, DOI: 10.1080/09640568.2019.1594726

[21] Maniatis, Y.; Doganis, A.; Chatzigeorgiadis, M. Fire Risk Probability Mapping Using Machine Learning Tools and Multi-Criteria Decision Analysis in the GIS Environment: A Case Study in the National Park Forest Dadia-Lefkimi-Soufli, Greece. Appl. Sci. 2022, 12, 2938. https://doi.org/10.3390/app12062938

[22] E. Arango, M. Nogal, H. Sousa, J.C. Matos, M.G. Stewart, GIS-based methodology for prioritization of preparedness interventions on road transport under wildfire events, Int. J. Disaster Risk Reduct. 99 (2023) 104126, https://doi.org/10.1016/j.ijdrr.2023.104126.

Figure 5-11 Wildfire Risk assessment for the current period (and for the near future (2030-2060) since no differences between the periods can be described), as has been estimated by the multicriteria analysis, for the wider area of the examined Project



As it shown in the Figure above, the wildfire risk is estimated as low to moderate for the Project. As a result, the **current and future exposure** of the project area to wildfires can be estimated to be **MEDIUM.**

Exposure Assessment to Lightnings

Current and Future Exposure to Lightnings

Lightnings are a common phenomenon in the wider Mediterranean area, including Greece, affecting the entire country. Lightning phenomena are constantly monitored by the NOA, (project ZEUS), and are most commonly noticed during rainfall events (e.g. references 21, 22, 23). Researchers (e.g., Price 2009) mention that in a future warmer climate, as the model studies show, may result into less more intense thunderstorms which may increase the amount of lightning by 10% for every one-degree global warming. Additionally, a lightning might trigger a fire either on vegetation areas or on infrastructures and therefore is a prominent source of ignition. Therefore, the estimated current and future exposure to Lightnings events is estimated as **MEDIUM**.

Exposure Assessment to Extreme wind speed events (cyclone, hurricane, typhoon, tornado)

Current and Future Exposure to Extreme wind speed events (cyclone, hurricane, typhoon, tornado)

Even though storm events with high wind speed phenomena might occur in Greece, phenomena such as cyclones, hurricane, tornados etc., are not common something that is also indicated in future forecasts (e.g., Zimbo et al., 2022). Historically, several events have been recorded the last decades at the general area of Mediterranean, described in international literature as Medicane (for Mediterranean Hurricanes). In general, during these events surface winds are higher than 100 $km \cdot h^{-1}$, but even though, can barely reach the hurricane intensity (i.e., higher than 63 kt or 117 $km \cdot h^{-1}$) (e.g. Zimbo et al., 2022; Pytharoulis et al., 2000). Notably, these phenomena are more common in Italy, Tunisia, or Spain. Several events have influenced Greece as well, especially Central and Northern Greece. Events like this occurred in 2017, (characterized as the "Zorbas cyclone"), or in 2020 (characterize as the "Ianos cyclone"). During such phenomena, extreme rainfall might occur aggravating the flooding hazard of the area. Consequently, events like these may have a greater impact on the flooding hazard of the area and less to the exposure of the area to extreme wind events. Therefore, **current, and future exposure** to extreme wind events is estimated as **LOW** and no further investigation is required.

Exposure Assessment to Saharan dust storms

Current and Future Exposure Saharan dust.

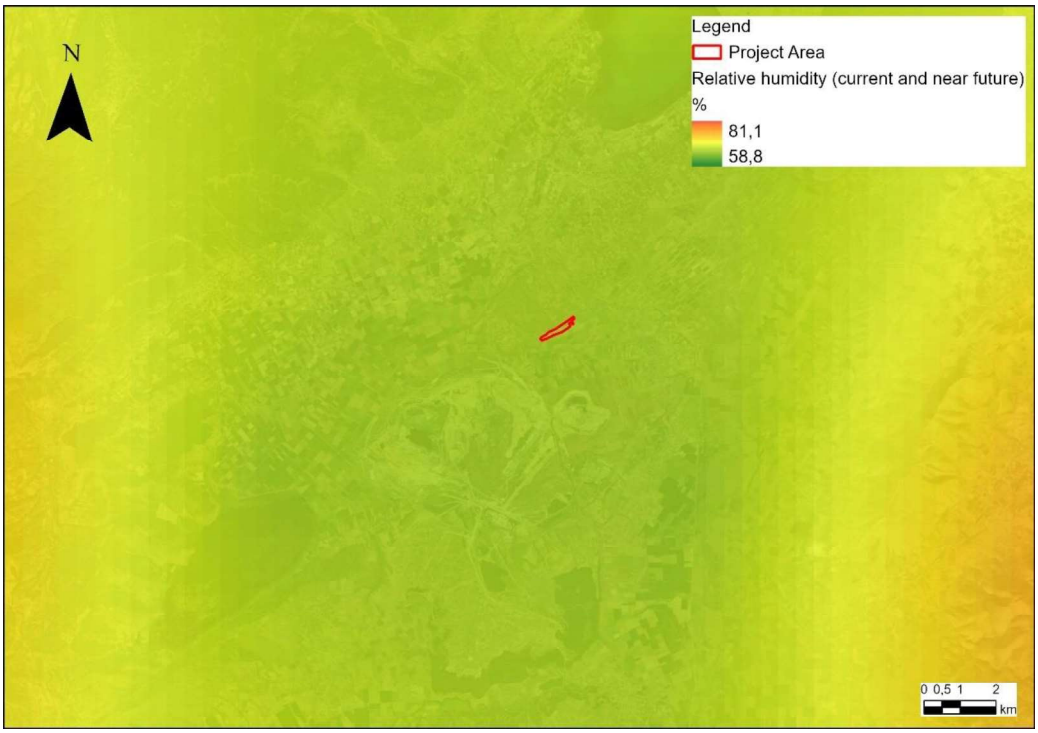
Phenomena just as Saharh dust storms are not unlikely in the regional area but not very common. The phenomenon is monitored by the University of Athens, issuing a daily dust concentration bulletin. The analysis of the events so far shows that in the future there are expected to be fewer episodes in number, but with a greater extent and intensity. Therefore, the **current, and future exposure** to Saharh dust storms events is estimated as **LOW** and no further investigation is required.

Exposure Assessment to Humidity

Current and future Exposure to Cold Waves/frost

Based on the data provided by NECCA (https://geo.adaptivegreecehub.gr/), the average daily relative humidity in the Region of Western Macedonia for the current reference period is ~65 %, while no significant increase is expected during the near future (2031-2060) (Figure 5-12). As a result, the **current** and **future exposure** of the project area to Humidity can be estimated as **MEDIUM**.

Figure 5-12 Daily relative humidity %, for the regional area



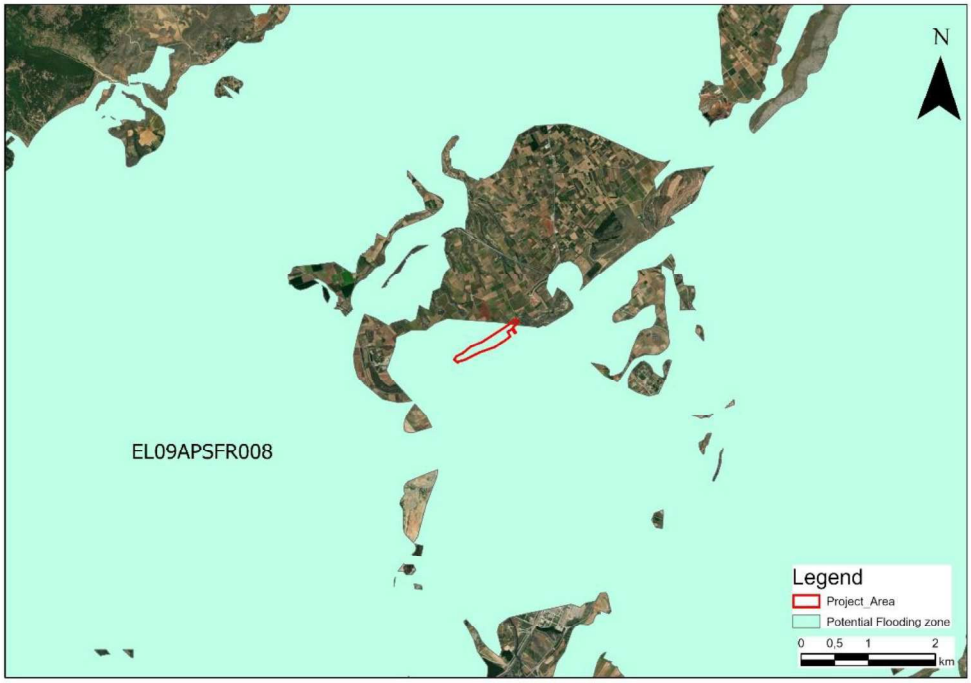
Exposure Assessment to Flood events

Current Exposure to Flooding

The examined project is located in Western Macedonia. The Flood Risk Management Plans approved by decision of the National Water Commission (Official Gazette 2689 B/06.07.2018) describe all Hazard Maps and Flood Risk Maps for the area EL09 "Basin District of Western Macedonia". According to this decision, the management, the evaluation, and the mitigation of impacts from the risk of flooding are ensured according to the requirements of Community Directive 2007/60/EC.

Figure 5-13 illustrates the hydrographic network and potential flooding zones of EL09. As can be seen, the project under examination is in the potential flooding area of Low zone of the closed basin of Ptolemaida, lakeside areas of lakes Zazari, Heimaditita, Petron and south of lake Vegoritida (EL09APSFR008).

Figure 5-13 The potential flooding zones of the examined Project area (based on the data Flood Risk Management Plans of the Western Macedonia Basin District)



Consequently, the **current exposure** of the project area to flooding can be estimated as **HIGH.**

Future Exposure to Flooding

According to the results of the climate model simulations, annual precipitation levels in Central Macedonia and Thessaly are projected to decline.

Regarding the risk of flooding in a future climate, flash flooding could be a concern, especially if its frequency was to increase on account of climate change. Together with the projected decrease in total annual rainfall, this means that extreme precipitation events will increase in intensity, thereby raising the flood risk. A case like this is the relatively rare event of a Medicane (Mediterranean hurricanes), where higher levels of precipitation can be recorded (e.g., during the Ianos Medicane in 2016, which influenced the Central Greece, Zimbo et al., 2022). However, as concluded by the IPCC, there remains **considerable uncertainty in the projection of flood changes,** especially regarding their magnitude and frequency. More precisely, they concluded that there is low confidence in flood magnitude and frequency derived from river discharge simulations. On the other hand, there is medium confidence that projected increases in heavy rainfall would contribute to increases in rain-generated local flooding, in some catchments or regions[23].

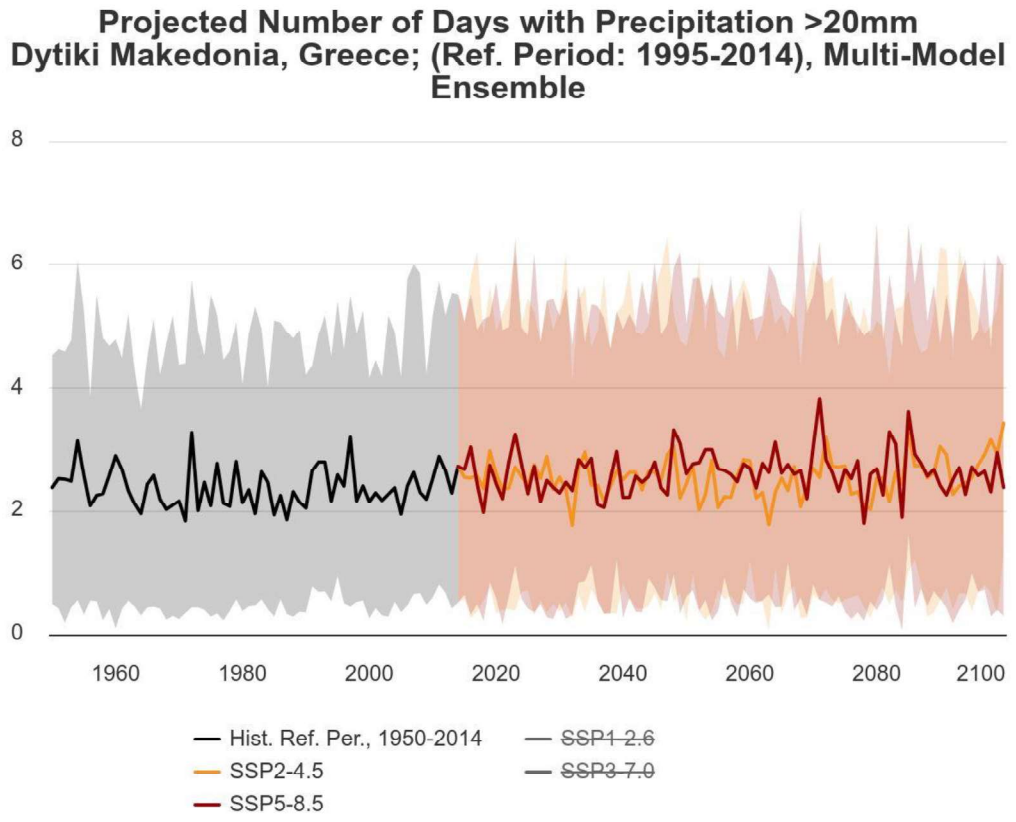
Still, in the examined areas the projected change in the number of days with high precipitation (>20 mm) is not estimated to vary significantly in the future (compared to

[23] https://www.climatechangepost.com/greece/river-floods/

1995- 2014) under both RCP 4.5 et RCP 8.5 scenarios (Figure 5-14) thereby the exposure of the project to flooding risk is expected to remain constant. However, as discussed previously, this forecast is prone to significant uncertainty.

As a result, the **future exposure** of the project area to flooding can be estimated to be **HIGH**, similar to the current exposure.

Figure 5-14 Projected days with Precipitation >20mm in Western Macedonia (Ref Period: 1995-2014), Multi-Model Ensemble



Note: Future climate information is derived from 35 available global circulation models (GCMs) used by the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report.

Exposure Assessment to Soil erosion

Current Exposure to Soil erosion

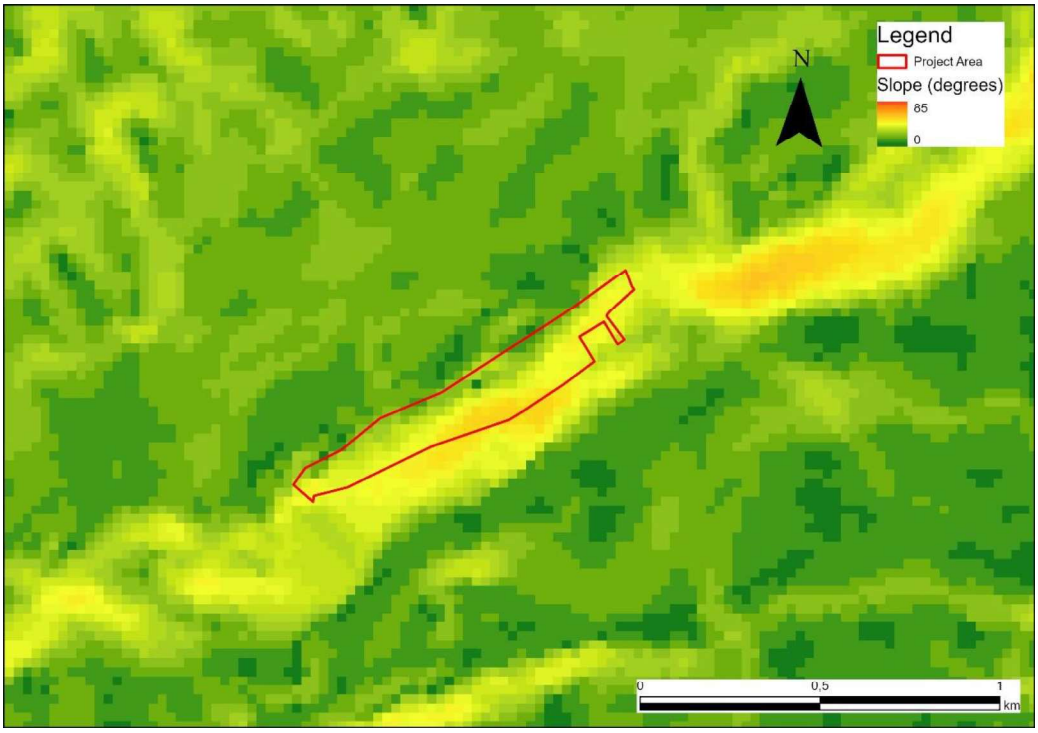
Based on the Revised Universal Soil Loss Equation (RUSLE) methodology that has been followed for the estimation of the soil loss of Greece (YPEN (Vulnerability of Soil Erosion of Greece)), the land plot is characterized by medium soil loss, (10<SE≤20, Figure 5-15)[24]. Considering as well that the examined plots are characterized by low to medium slopes

[24] https://floods.ypeka.gr/sdkp-lap/maps-1round/sdkp-el09-1round/ (access May 2024)

(5° to 20 °, Figure 5-16), then the **current exposure** of the project area to erosion and ground instability can be estimated as **MEDIUM.**

Figure 5-15 Screenshot from the Vulnerability of Soil Erosion of Greece map, as provided by YPEN. The area of the Project is in the red box.

Figure 5-16 Slope map of the examined area



Future Exposure to Soil erosion

Data from the Joint Research Centre European Soil Data Centre (Esdac)[25] indicate that extreme rainfall events will have a significant impact on global rainfall erosivity. Based on the report, projections for 2050 and 2070 show that additional erosional phenomena will

[25] https://esdac.jrc.ec.europa.eu/content/global-rainfall-erosivity-projections-2050-and-2070

increase between 26.2 and 28.8% for 2050 and 27–34.3% for 2070 respectively, in worldwide scale. Even though, since the general slope inclination of the area is not expected to change in the near future, the **future exposure** of the project area to soil erosion can be estimated to be **MEDIUM**, similar to the current exposure.

Exposure Assessment to Ground instability / landslides / avalanche

Current Exposure to Ground instability / landslides / avalanche

The area of the projects is not characterized by steep slopes (more than 25°)[26] and therefore less capable to cause landslides phenomena (e.g., Çellek, 2020). Nonetheless, small scale slides might occur, considering the geological formations of the area (fluvial conglomerates to sands). Therefore, the **current and the future exposure** of the project area to ground instability and landslides can be estimated as **MEDIUM**.

Overview of the Exposure Assessment

The exposure assessment elaborated in the present Report for the project area, taking into account the data presented above, is displayed in the table that follows. Future exposure refers to the period 2021-2050.

As regards the selection of the global warming scenario, it is usually recommended that the vulnerability and risk assessment should be based on an increase in the global average temperature of indicatively 2°C above pre-industrial level by 2050 (Climate change and major projects, European Union, 2016). Based on the projections for global surface warming according to the different climate scenarios (Figure 5-17) the following assessment is mainly based on the RCP8.5. However, it should be taken into account that this is the worst-case scenario, where emissions continue to rise throughout the 21st century.

[26] According to the data mentioned in the relevant EIAs of the Projects.

Figure 5-17 Global temperature increase used in IPCC-AR5 presented by the RCPs (Source: Knutti and Sedlácek, 2013)

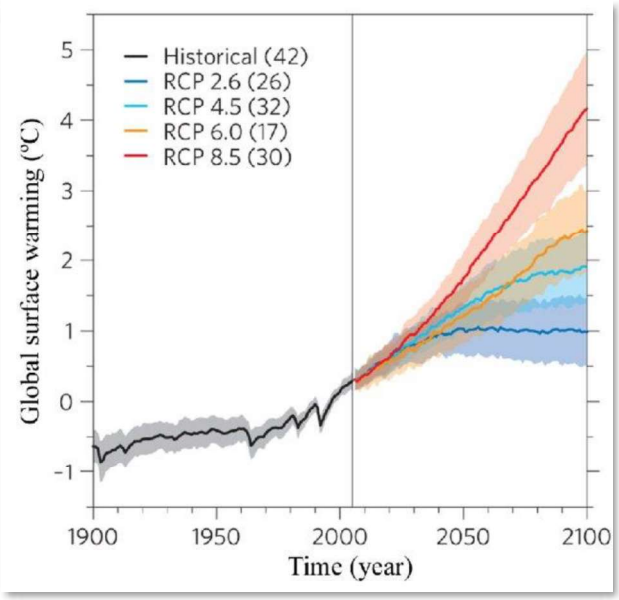


Table 5-9 Exposure assessment elaborated for the Project areas

Hazard	Current exposure (A)	Future exposure (B)	Explanation / justification
Heat Waves	LOW	MEDIUM	Extreme summer temperatures are often experienced in Greece and the examined regions is among the country's regions that is most exposed to heatwaves. The number and severity of heatwaves is expected to increase as a result of Climate Change.
Cold Wave/frost	HIGH	HIGH	Cold waves are common in the region of Western Macedonia
Wildfires	MEDIUM	MEDIUM	The Project is located in an area with moderate wildfire risk.
Lightnings	MEDIUM	MEDIUM	Lightings are a common phenomenon in Greece that can pose a threat.
Extreme wind speed events (cyclone, hurricane, typhoon, tornado)	LOW	LOW	Phenomena such as tornados, cyclones etc., are rare in Greece.
Intense Saharan dust storms	LOW	LOW	Intense Saharan dust storms are less common in the region of Western Macedonia
Humidity	MEDIUM	MEDIUM	The area is characterized by average humidity levels

Hazard	Current exposure (A)	Future exposure (B)	Explanation / justification
Flooding	HIGH	HIGH	The Project is located within a zone of potential flooding. The impact of climate change to flood risk is uncertain, however, the projected change in the number of days with high precipitation (>20 mm) is not estimated to vary significantly in the future.
Soil erosion	MEDIUM	MEDIUM	As mentioned before, the area of the project is characterized by medium exposure to erosion phenomena.
Ground instability / landslides / avalanche	MEDIUM	MEDIUM	As mentioned before, the area of the project is characterized by medium exposure to ground instability phenomena.

Vulnerability Assessment

The vulnerability assessment combines the sensitivity and exposure analysis, both elaborated in detail above, to determine which climate hazards are relevant for the project as a result of the project type and its location. The vulnerability of the project was estimated according to the following equation:

Sensitivity x Exposure = Vulnerability

The results of the vulnerability assessment elaborated for the project are presented in the following table.

Table 5-10 Vulnerability to climate hazards

Hazard	Sensitivity (A)	Current exposure (B)	Future exposure (C)	Current Vulnerability (A*B)	Future Vulnerability (A*C)	Further analysis required
Heat Waves	HIGH	LOW	MEDIUM	MEDIUM	HIGH	Yes
Cold Wave/frost	MEDIUM	HIGH	HIGH	HIGH	HIGH	Yes
Wildfires	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	Yes
Lightnings	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	Yes
Extreme wind speed events (cyclone, hurricane,	MEDIUM	LOW	LOW	LOW	LOW	No

Hazard	Sensitivity (A)	Current exposure (B)	Future exposure (C)	Current Vulnerability (A*B)	Future Vulnerability (A*C)	Further analysis required
typhoon, tornado)						
Intense Saharan dust storms	MEDIUM	LOW	LOW	LOW	LOW	No
Humidity	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	Yes
Flooding	HIGH	HIGH	HIGH	HIGH	HIGH	Yes
Soil erosion	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	Yes
Ground instability / landslides / avalanche	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	Yes

In the following section, a detailed analysis of climate risks is performed for heatwaves, cold waves/frost, wildfires, lightnings, humidity, flooding and soil erosion, as the project has been estimated as vulnerable to those hazards.

Extreme strong wind events, intense Saharan dust storms, and ground instability won't be part of the detailed analysis, as their vulnerability has been estimated as **LOW**.

5.3.2 Detailed analysis – Climate risk assessment and Adaptation to climate change

Climate risk assessment

The aim of the risk assessment is to assess in a greater level of detail the likelihood and impact of the relevant climate hazards. The vulnerability assessment, presented above, identified the hazards that the project may be vulnerable to. These hazards are, then, assessed in more detail to understand the level of risk they pose to the project, its objectives and its components. Therefore, the aim is to quantify the significance of the risks to the project, currently and in the future, as a result of climate change.

Methodology

Likelihood

The likelihood part of the risk assessment focuses on how likely the identified climate hazards are to occur within a given timescale, e.g., the lifetime of the project, using the following scale:

- Rare

Meaning highly unlikely climate hazard incident to occur or 5% probability of occurring.

- Unlikely

Meaning, given current practices and procedures, climate hazard incident is unlikely to occur or 20% probability of occurring.

- Moderate

Meaning climate hazard incident occurred in a similar country/setting or 50% probability of occurring.

- Likely

Meaning likely climate hazard incident to occur or 80% probability of occurring.

- Almost certain

Meaning very likely climate hazard incident to occur, possibly several times, or 95% probability of occurring.

Severity/Impact

The severity part of the risk assessment, referred to also as magnitude of the impacts of the climate hazards to which the project may be vulnerable, focuses on what would happen if the identified climate hazard incident did occur, what would be the consequences. This will be assessed on a scale of severity per hazard:

- Insignificant

Refers to minimal impacts that can be mitigated through normal activity. The components of the project will not be affected, and the operation will continue without any impact on the trainees.

- Minor

An event which affects the normal project operation, resulting in localized impacts of a temporary nature. The components of the project will be impacted but will continue to operate, therefore the operation of the project will continue without impact on the trainees.

- Moderate

Refers to a serious event, requiring additional actions from the manager, resulting in moderate impacts. Malfunctioning of components of the project may occur resulting in the need for local repairs. The operation of the project may stop for a limited time period. However, the operation of the simulator will be fully recovered (adaptive measures).

- Major

A critical event requiring extraordinary actions, resulting in significant, widespread or long-term impacts. Components of the project/site may need to be replaced as a result of malfunctioning. The operation of the project will stop for a period of time which could be up to days.

- Catastrophic

Disaster with the potential to lead to the complete destruction of the project, injuries etc.

Assessment of risk

Having estimated the severity and probability of each hazard occurring, the significance level of each potential risk can be determined through a combination of the two factors. The risks can be plotted on a risk matrix to identify the most significant risks and those where future action is needed in terms of adaptation measures.

		Likelihood				
		Rare (1)	Unlikely (2)	Moderate (3)	Likely (4)	Almost Certain (5)
Severity	Insignificant (1)	1	2	3	4	5
	Minor (2)	2	4	6	8	10
	Moderate (3)	3	6	9	12	15
	Major (4)	4	8	12	16	20
	Catastrophic (5)	5	10	15	20	25

1-3	Negligible Risk
4-6	Low Risk
7-10	Medium Risk
11-19	High Risk
20-25	Extreme Risk

The methodology described above, is applied to assess the risks earmarked for further analysis in Table 5-11. Probability and severity of the risks are identified in qualitative terms, and the relevant justification is provided.

Table 5-11 Assessment of climatic risks

Hazard	Likelihood	Severity
Heat Waves	The Likelihood of Heat Waves is **almost certain** in the summer period.	The severity is considered **Insignificant**. Under normal circumstances Heat Waves has no major impact and no damages on the infrastructures are expected.
Cold Wave/frost	The Likelihood of Cold Waves is **almost certain** in the winter period.	The severity is considered **Insignificant**. Under normal circumstances Cold Waves has no major impact and no damages on the infrastructures are expected.
Wildfires	The Likelihood of wildfire is considered as **Unlikely**, since the	The severity is considered **Catastrophic**, as a wildfire may

Hazard	Likelihood	Severity
	majority of the examined area is cultivated with no significant forest areas nearby.	result in damaging part or all of investment assets and need for repairs. It is worth mentioning that all assets of the Project (OHL, substation, batteries) are considered to be potential triggering factors for wildfire. Therefore, additional measures have to applied, to prevent wildfire events. Notable though, during the operation of the project, the OHL are under the jurisdiction of HEDNO and NOT under the project developer.
Lightnings	The Likelihood of Lightnings falling on the Project is **Likely** especially during the winter period (if no lightening protection measures were in place).	The severity is considered **Moderate**. It may result in damaging part of investment assets and need for repairs but is expected to affect only a small portion of the infrastructures. Additionally, lightnings have a temporary nature and they are usually predicted by the meteorological services a few days in advance.
Humidity	The Likelihood of Humidity is **almost certain,** especially in the winter period.	The severity is considered **Insignificant**. Under normal circumstances humidity has no major impact and no damages on the infrastructures are expected.
Flooding	The Likelihood of Floods is considered **Moderate**.	The severity is considered **Moderate**, since it may result in damaging part or all of investment assets and need for repairs
Soil erosion	The Likelihood of Soil erosion is considered **Unlikely**.	The severity is considered **Minor**, since it may result in damaging part or all of investment assets and need for repairs
Ground instability / landslides / avalanche	The Likelihood of these phenomena is considered **Rare**.	The severity is considered **Moderate**, since it may result in damaging part or all of investment assets and need for repairs

The significance of each potential risk associated with the climate hazards identified for the project, is presented in the table that follows.

Table 5-12 Risk matrix for the project

Severity \ Likelihood	Rare	Unlikely	Moderate	Likely	Almost Certain
Insignificant					Heat waves, Cold waves, Humidity (5)
Minor		Soil erosion (4)			
Moderate	Ground instability / landslides / avalanche (3)		Floods (9)	Lightnings (12)	
Major					
Catastrophic		Wildfires (10)			

1-3	Negligible Risk
4-6	Low Risk
7-10	Medium Risk
11-19	High Risk
20-25	Extreme Risk

According to the above presented estimation, the project is associated with **lightning, wildfire, and flooding climate hazard risks, to a less extent to heat waves, cold waves, humidity and even lesser to soil erosion.** Adaptation measures are proposed to be incorporated in the design of the project, in order to increase the resilience of the project in the long term and to minimize the need for repairs. Since for Ground instability

phenomena the risk is describe as Negligible, no additional adaptation measures are proposed.

Adaptation measures

Adaptation is about dealing with the inevitable consequences of climate change and attempting to lower the risks and improve resilience. Significant risks to the project deriving from the effects of climate change should be managed and reduced to an acceptable level. For each climate risk identified relevant adaptation measures will be considered and assessed. The preferred measures should then be integrated into the design and/or operation of the project to enhance the resilience of the project.

The following general adaptation measures **have already been incorporated in the design of the project**, according to the relevant environmental documentation (i.e. Preliminary Hazard Analysis (PHA), EIA and DAEC, Environmental Management Plan), in order to increase its resilience in time:

- **Lightning**: During operation phase of the Project, all necessary measures will be taken to mitigate the hazard from a lightnings such as Grounding and Lightning Protection System (e.g. DAEC Section 5, Environmental Management Plan, PHA).
- **Wildfires**: All necessary measures will be taken to mitigate the hazard from a wildfire. For example, according to the DAEC (Section 5) , before operation, an appropriate planning will be complied for the installation of a fire extinguishing system, in order to suppress any fire incidents. Fire extinguishing systems will meet both the specifications of the equipment manufacturer and the requirements of the competent Fire Services. In areas indicated by the competent Fire Service, detailed instructions for dealing with fire incidents and the relevant flow charts will be posted (e.g. alarm signs in cases of fire or smoke detection, information to the Fire Service and personnel in the project site, use of Personal Protective Equipment, deactivation of electricity supplies, use of fire extinguishing systems, etc.). Additionally, A 10m zone will be maintained around the Project area to ensure maximum safety (Environmental Management Plan).
- **Flooding**: According to the Environmental Management Plan and the DAEC of the Project (Section 5) all necessary measures will be taken to mitigate the hazard from flooding, such as avoid the installation inside streams, earthwork activities should not act as an obstacle (barrier) to the passage of the flood phenomenon, but the free flow and anti-flood protection of the area will be ensured etc.
- **Heat Waves**: During the operation phase of the Project, all necessary measures will be taken to mitigate the hazard from a heat wave such as, implementation of a air conditiong system that will allow the facility to operate safely in all environmental conditions expected for the site (e.g. PHA).
- **Cold Waves/frost:** During the operation phase of the Project, all necessary measures will be taken to mitigate the hazard from a cold waves/frost such as, implementation of a air conditiong system that will allow the facility to operate safely in all environmental conditions expected for the site (e.g. PHA).
- **Humidity:** During the operation phase of the Project, all necessary measures will be taken to mitigate the hazard from increased humidity such as implementation of a

cooling system that will allow the facility to operate safely in all environmental conditions expected for the site (e.g. PHA).

- **Soil erosion:** During the operation phase of the Project, all necessary measures will be taken to mitigate the hazard from soil erosion such as the control of erosion and deposits of transported materials.

Notably the issued DAEC mentions that before the construction, an emergency response plan must be compiled which will mention the relevant accident prevention policy, as well as the conditions and methods for ensuring the correct implementation of the plan. It should be designed in such a way as to ensure a high level of protection of human health and the environment and be proportionate to the accident risks. It will include the general objectives and principles of action of the Project Authority, the role and responsibility of the management by the Project Authority, as well as its commitment to continuous improvement of the control of accident risks and ensuring a high level of protection.

Moreover, the issued DAEC mentions that an analytical risk assessment study for the planning and installation phases of the Project should be compiled, to assess the potential risks to human health, the natural and human environment. If it is deemed appropriate, in the risk assessment study, should include the provisions of the M.D. 172058/2016 (B' 354).

Additionally, the issued DAEC mentions that regular inspections should be promoted throughout the operation of the Project.

Additional measures that are foreseen and that are proposed to be incorporated into the final design are the following:

- In order to adapt to **Cold waves/Frost, Heatwaves** and **increased humidity** additional measures that could be included are:
  - More effective air conditioning systems for the features of the Project;
  - Use of certified materials resilient to higher/lower temperatures;
  - Avoid overcharging of the electricity transmission network in periods of increased temperatures.
- In order to adapt to **Wildfires**, additional measures that could be included are:
  - Implement a Maintenance management plan especially for more vulnerable infrastructures (e.g. substations and inverters);
  - Increase of the rated design temperature standard of overhead lines to accommodate projected temperature rises;
  - Avoid overcharging of the electricity transmission network in periods of increased temperatures.
- In order to adapt to **Flooding**, additional measures that could be included is:
  - to perform a Hydrological survey to determine the flood line of the hydrographic network of the area. Nonetheless since the Project has been found to be within the boundaries of a Potential flooding Zone, it is recommended.

Conclusions

The risk associated with the climate hazards that could impact the project has been estimated to be from "high" to "low". The adaptation measures incorporated in the design of the project ensure that the project will continue to operate normally, taking into account the projections for the evolution of climate hazards.

According to the climate change vulnerability, adaptation and risk assessment elaborated for the project under study in the present report, the project has been found to be vulnerable mainly to the following climate hazards, both currently and in the future:

- Lightnings (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.
- Wildfires (may result in damaging part or all of investment assets and need for repairs). However, if all precaution measures are applied, the hazard is significantly mitigated.
- Flooding (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.
- Heatwaves (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.
- Cold waves/frost (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.
- Humidity (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.
- Soil Erosion (may result in damaging part of investment assets and need for repairs). Even in that case, if all precaution measures are applied, the hazard is significantly mitigated.

Residual Impact

Hazard	Risk (Score)	Mitigation measures	Residual Risk (Score)
Soil Erosion	Low (4)	Described above	Negligible (3)
Heat Waves	Low (5)	Described above	Negligible (3)
Cold Waves	Low (5)	Described above	Negligible (3)

Hazard	Risk (Score)	Mitigation measures	Residual Risk (Score)
Humidity	Low (5)	Described above	Negligible (3)
Wildfire	Medium (10)	Described above	Low (5)
Floods	Medium (9)	Described above	Low (5)
Lightnings	High (12)	Described above	Low (4)

The significance of these climate hazards if adaptation measures already included in the preliminary project design are implemented is found to be "**LOW**" or "**NEGLIGIBLE**".

6 ENVIRONMENT DIMENSION

More detailed information regarding the environmental dimension will be provided in this section, as applicable and relevant to the project:

- Compliance with the regulatory and legal framework applicable to the project, EIA Directive (available EIA or screening decisions), other relevant Directives, situation of permitting and authorizations necessary, any compliance issues (if any);
- If the information necessary to carry out the proofing was taken over from formal reports required by the legislation and/or if additional studies were required by the implementing partner;
- Short description of the identified impacts for any of the environmental elements detailed in this guidance, assessment of alternatives, cumulative impacts, the proposed mitigation and compensation measures and their costs, quantification and monetisation of the residual risks as included in the project economic appraisal, where applicable;
- Justification of why the residual risks or identified/mitigated impacts are considered acceptable and description of any mitigation measures identified and implemented (beyond those needed due to legal compliance);
- Voluntary measures based on the positive checklist in Annex 3 that were undertaken by the project promoter/final recipient to improve the project's environmental performance and their costs, as well as a confirmation of their inclusion in the project's economic appraisal.

The checklist for screening and proofing for environment dimension is provided in Annex 2.

6.1 Legal Compliance with EU and national Environmental directives

Infrastructure investments, whether subject to sustainability proofing or not, must comply with applicable EU and national legislation. Legal compliance is a prerequisite for any support. The legal compliance check was performed following the respective checklist, Commission notice 2021/C280/01, available here as Annex 1 of the present report. This section presents the compliance the environmental legislation and regulations that are relevant to the project.

As illustrated in the Table 3-1 and Table 3-2, the investment has successfully passed the "Compliance screening" and does not fall to any of the type of activities listed in the "Exclusion lists" of InvestEU Regulation and the Decision of the Deputy Minister of Finance under number 47990 2022/13.04.2022 (G.G. B' 1814).

6.1.1 Compliance with Directive 2011/92/EU of the European Parliament and of the Council (the 'EIA Directive') as amended

The project under study does not belong to the projects listed neither to Annex I nor to Annex II of the EIA Directive, except for the six (6) High Voltage Overhead Lines (part of the accompanying infrastructure) of 400 kV and 60 m length each which could be considered that falls under Annex II[27].

However, an integrated EIA study has been elaborated for the project under study and the accompanying infrastructure and a DAEC decision has been issued, based on the national legislation (see Chapter 2).

It is to be noted that adherence to the DAEC terms is a prerequisite for operation of the project and is borne by the operating entity, while non-compliance with the conditions resulting in its environment degradation entail the imposition of sanctions under the current legislation.

In accordance with the national legislation on the classification of the projects according to their environmental impacts, the Ministerial Decision 1958/2012 (G.G. 21 B/ 13.1.2012) "*Classification of public and private projects and activities in categories and subcategories according to article 1, paragraph 4 of Law 4014/21.9.2011* (G. G. 209/A/2011)" applies, as amended and in force at the time of permitting procedure.

The **BESS station** is of **Activity type s/n 10 "Stand-alone Battery Energy Storage Systems"** under **Group 10th "Renewable energy sources and stand-alone Battery Energy Storage Systems"** and belongs to environmental **licensing category A1** (maximum injected power P > 200 MW, applicable legislative act is M.D. YPEN/DIPA/ 53510/3616 (G.G. 3327 B'/19.5.2023)).

The **accompanying Substation (S/S) 33/400 kV** is of **Activity type s/n 11 "Individual extra high voltage centres and individual substations on the ground surface (extension of existing substations is included)"** under **Group 11th "Energy, fuels and chemicals transmission"** and belongs to environmental **licensing category A2** (voltage of the line between T > 150kV, applicable legislative act is M.D. YPEN/DIPA/ 17185/1069 (G.G. 841 B'/ 24.2.2022)).

The accompanying **High Voltage Overhead Lines (HVOHL)** are of **Activity type s/n 10 "Overhead electricity transmission lines with their accompanying facilities (substations and extra high voltage centers)**, under **Group 11th "Energy, fuels and chemicals transmission"** and belong to environmental **licensing category A2** (voltage of the line T > 150kV and length of the line L ≤ 20 km or 50 kV ≤ T ≤ 150 kV and L ≥ 15 km, applicable legislative act is M.D. YPEN/DIPA/ 64712/4464 (G.G. 3636 B'/ 11.7.2022)).

[27] 3b. Industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Annex I) - under Energy Industry

The project as a total follows the category which is likely to have the most significant impacts on the environment, thus, the project belongs to environmental ***licensing category A1****.*

As also mentioned in Chapter 2 , **Category (A)** includes those projects and activities which are likely to have a **significant impact on the environment** and for which **an Environmental Impact Assessment (EIA) study is required**, followed by the issuance of an environmental license, in this case, a **Decision Approving Environmental Conditions (DAEC)**. **Category A is further categorized into two subcategories, A1 and A2**. Subcategory A1 refers to projects and activities likely to have a very significant impact on the environment, while subcategory A2 refers to projects and activities likely to have a significant impact on the environment.

Category B includes those projects and activities which can only cause a local and non-significant impact. For those projects, an **Environmental Impact Assessment (EIA) study is NOT required**, neither is a DAEC. Instead, subjection to **Standard Environmental Commitments (SEC)** (Πρότυπες Περιβαλλοντικές Δεσμεύσεις - in Greek) is required, which is the environmental license in this case. Subjection to SEC requires submission of an application/solemn declaration, together with specific information on the characteristics of the project and the surrounding area.

National Legislation

- **Law 4014/2011** Environmental licensing of projects and activities, arbitrary regulation in relation to the creation of an environmental balance and other provisions within the competence of the Ministry of Environment (G.G. 209 A/ 21-11-2011).
- **Law 4685/2020** Modernization of environmental legislation, integration into Greek law of Directives 2018/844 and 2019/692 of the European Parliament and Council and other provisions (G.G. 92 A'/7.5.2020)
- **Joint Ministerial Decision 5688/2018** Amendment of the annexes of law 4014 /2011 (G.G. 209 A'), in accordance with article 36A of this law, in compliance with the Directive 2014/52/EU "amending the Directive 2011/92/EU on the assessment of the impact of certain public and private projects on the environment "of the European Parliament and of the Council of 16 April 2014 (G.G. 988 B'/21.03.2018).

6.1.2 Compliance with Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora and Birds Directive with Directive 2009/147/EC; assessment of effects on Natura 2000 sites

The Project is **NOT** located **within a Natura 2000 Site**. More specifically, the nearest protection zone is located approximately 3.1 km to the northeast (GR1340004, Lake Vegoritida and Petron), while ~6.1 km to the southwest from the Project, the Natura 2000 protection zone of Lake Cheimaditida and Zagari (GR1340004), is located (Figure 6-1). Moreover, the Wildlife refuge of "Ampelia of Amyntaio Municipality" (K715) is located approximately 3.1 km to the northeast, while the Wildlife refuge of "Hinchko and

Chemaditita of the Municipality of Aetos and the Communities of Lehovo and Varikos" (K712), is located mora than 6 km southwest from the Project.

Based on Corine 2018 (as modified in 2020) land cover, land uses are non-irrigated cultivations (211) and pastures (231), as it is shown in Figure 6-2. Finaly, as it shown in Figure 6-3, based on the final reformed forest maps of the area, the Project is located in non-Forest or Forest type areas.

Figure 6-1 Protected areas near the Project

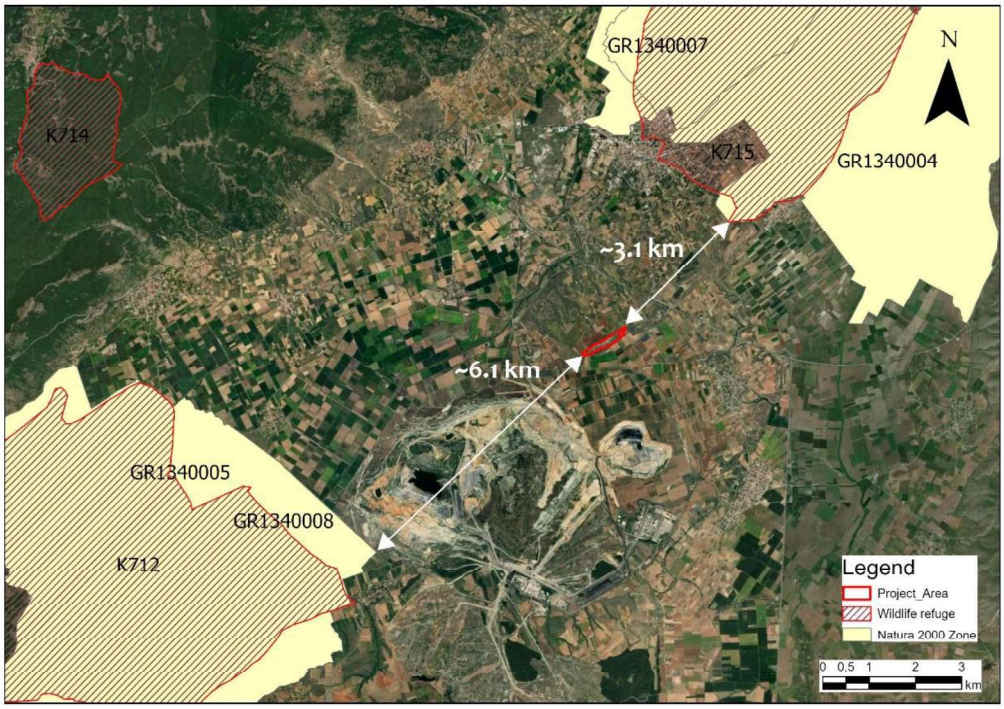


Figure 6-2 Corine Land Cover of the examined area

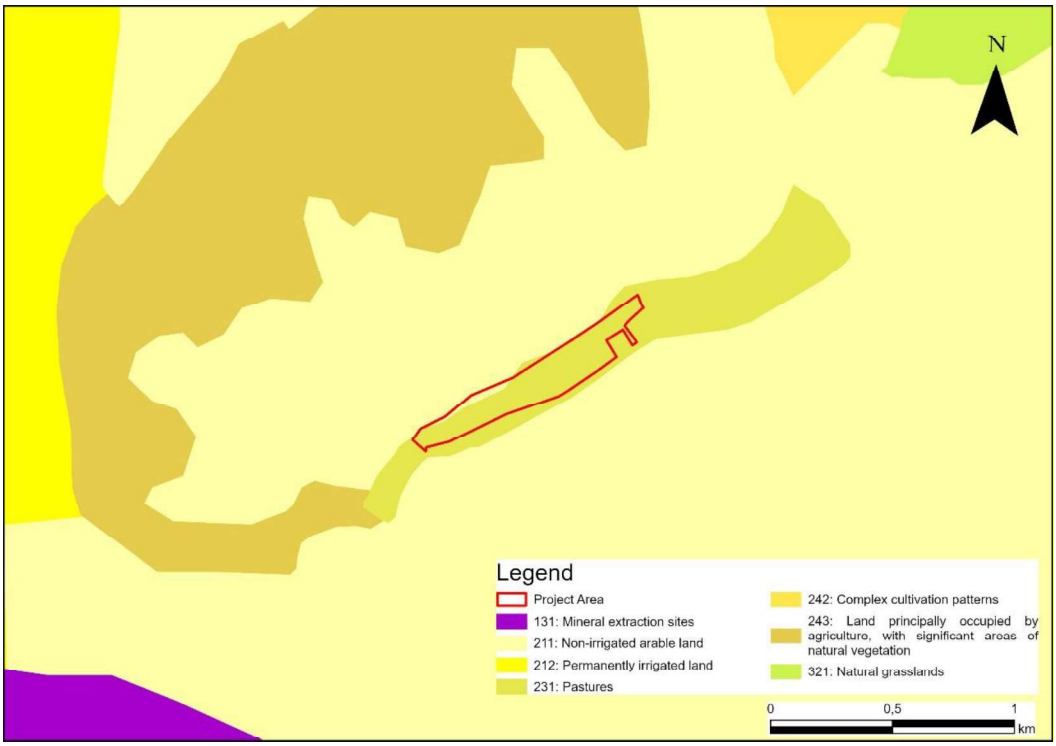
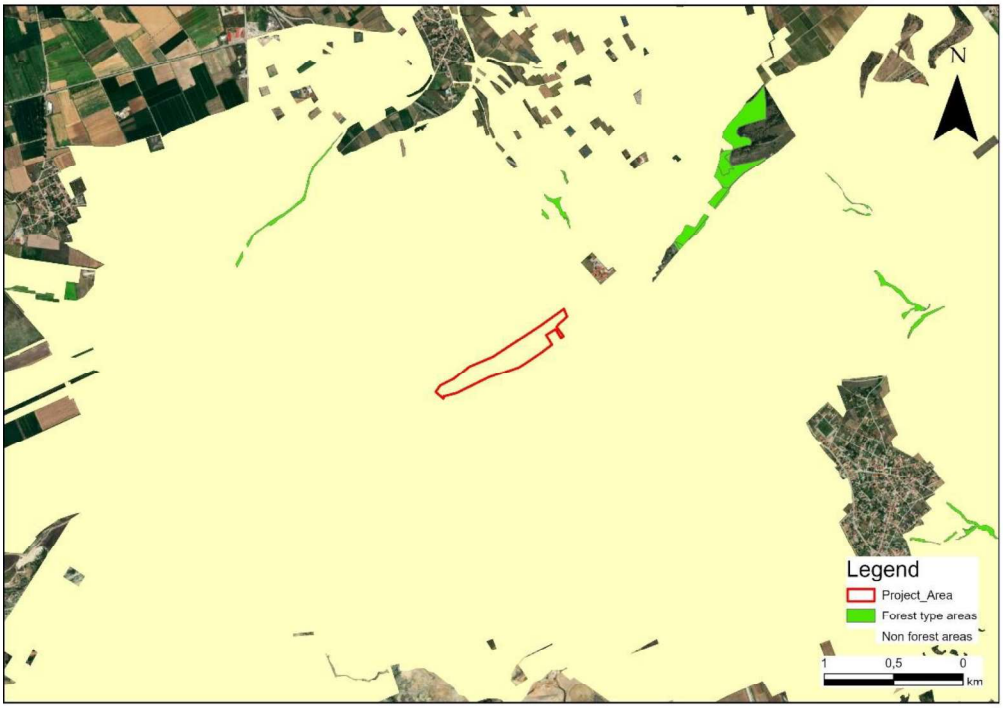


Figure 6-3 Forest and Forest type cover in the examine area



Moreover, the issued DAEC of the project mentions several terms and mitigation measures, to avoid any disturbances to the natural environment during construction, operation and after cessation of the project. Indicatively only, a few of those terms are mentioned in the following:

- It is prohibited to pollute surface and underground waters from any kind of runoff from the construction, as well as the disposal of any non-biodegradable substances on the ground.
- Earthworks should be carried out in such a way as to prevent leakage of soil materials into the flow lines.
- Washing of concrete transport vehicles should be carried out in a special area with a waterproof floor, prediction of leachate concentration and reuse of water after clarification by sedimentation.
- A Biodiversity Monitoring Program must be carried out with an emphasis on the activity of fauna and avifauna. Monitoring should cover the pre-construction period (at least one year before the start of construction), the construction period and the first year of operation.

National Legislation

Governmental Gazette 1289 B'/28-12-1998 Defining measures and procedures for the conservation of natural habitats (habitats) as well as wild fauna and flora (as amended).

Law 3937/31-03-2011 Biodiversity preservation and other provisions (as amended).

Governmental Gazette 1495 B'/09-06-2010 "Establishment of measures and procedures for the conservation of wild birds and their habitats, in accordance with the provisions of Directive 79/409 / EEC "On the conservation of wild birds" of the European Council of 2 April 1979, as codified by Directive 2009/147/EC".

Governmental Gazette 415 B'/23-02-2012 "Amendment and supplementation of no. 37338 / 1807/2010 of joint ministerial decision "Definition of measures and procedures for the conservation of wild birds and its habitats / habitats, in compliance with Directive 79/409 / EEC ...." (B 1495), in compliance with the provisions of the first subparagraph of Article 4 (1) of Directive 79/409 / EEC "On the conservation of wild birds" of the European Council of 2 April 1979, as codified by Directive 2009/147/EC".

6.1.3 Compliance with Directive 2000/60/EC of the European Parliament and of the Council (the 'Water Framework Directive'); assessment of effects on water bodies

The investment is not expected to deteriorate the status of a water body or cause failure to achieve good water status/potential, as described in the Environmental Impact Assessment of the Project.

More precisely, the EIA mentions that during the construction and operation of the project under study, the water environment of the area is not directly affected. More specifically, it will not cause direct interventions and indirect changes in the hydrographic network of the region. Furthermore, no changes are expected in the qualitative and quantitative characteristics of the groundwater. In order to ensure that the project will not influence the surface or the underground water, a detailed Hydrological survey will be performed to determine the flood line of the hydrographic network of the area. Moreover, as mentioned in chapters 6.2 and 5.3.2, measures will be applied to ensure that no leakages and/or pollution will occur, in case of an accident.

National Legislation

Law 3199/ 09-12-2003 Water protection and management - Harmonization with Directive 2000/60 / EC of the European Parliament and of the Council of 23 October 2000.

Governmental Gazette 54A/08-03-2008 Establishment of measures and procedures for integrated water protection and management in accordance with the provisions of Directive 2000/60 / EC "establishing a framework for Community action in the field of water policy" of the European Parliament and of the Council of 23 October 2000.

6.1.4 Compliance with Directive 2008/98/EU - the Waste Framework Directive

The regulatory framework for waste management in Greece comprises of several pieces of legislation that are based on EU Law. The main driver has been Directive 2008/98/EC on waste, which has been transposed into Greek legislation with Law 4042/2012 on Waste Management. Law 4819/2021 was issued on an "Integrated framework for waste management - Incorporation of Directives 2018/851 and 2018/852 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste and Directive 94/62/EC on packaging and packaging waste, organizational framework of the Hellenic Recycling Organization, provisions for plastic products and the protection of the natural environment, spatial planning, energy and related emergency regulations".

In the issued DAEC, specific terms for the waste management during construction, operation, and decommissioning of the project are given in order to ensure compliance with the WFD.

National Legislation

Law. 4042/2012 (A΄24) Protection of the environment through criminal law - Harmonization to Directive 2008/99/EC - Framework of waste generation and management - Harmonization to Directive 2008/98/EC - Regulation of issues falling within the Ministry of Environment, Energy and Climate Change.

Law 4819/2021 (GG A 129/23.7.2021) "Integrated framework for waste management - Integration of Directives 2018/851 and 2018/852 of the European Parliament and of the Council of 30 May 5 2018 amending Directive 2008/98/EC on waste and Directive 94/62/EC on packaging and packaging waste, organizational framework of the Hellenic Recycling Organization, provisions for plastic products and the protection of the natural environment, spatial planning, energy and related urgent arrangements".

6.1.5 Compliance with other EU directives

- **Directive 2001/42/EC – the Strategic Environmental Assessment:** The investment under question is included within the 16 emblematic projects of lignite phase-out of the Just Development Transition Plan of the Ministry of Environment and Energy which has been subjected to an environmental assessment in line with SEA Directive 2001/42/EU.

- **Directive 2010/75/EU – the Industrial Emissions Directive:** Not relevant to the investment under question, as mentioned in the DAEC decision.
- **Directive 2012/18/EU– the Seveso-III Directive:** Not relevant to the investment under question, as mentioned in the DAEC decision.

Overall, no material issues related to no-compliance with EU Directives and national legislation have been identified.

6.2 Screening for environmental dimension

For projects that undergo an EIA or are subject to the determination of the necessity of an EIA, it is expected that this process and work will provide a key contribution to the InvestEU screening and proofing process because the Directive requires that for projects requiring an EIA, a description of the features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment, is part of the EIA report.

As already elaborated, for the project under study, an EIA study has been performed and a DAEC decision has been issued.

For this case, the InvestEU screening step would **review the residual impacts** identified in the EIA report (after mitigation measures identified during the environmental procedure) for the four environmental elements (air, water, land and soil, biodiversity), as well as for the cross-cutting themes of noise and odour. The residual impact refers to the impact of the construction or operation after mitigation measures identified during the environmental procedure.

As a first step, environmental impacts are reviewed with the use of the Checklist of Annex 2, where Column (1) reflects the existence or absence of residual impacts.

As already mentioned, this review will be carried out on the basis of the environmental documentation provided by the project developer.

The issues which are checked are the following:

- Has information been provided to explain at which project development stages climate change adaptation/resilience issues have been considered, and how this was done?
- Is there a description of the methodology used for the vulnerability and risk assessment process, and does this methodology appear logical and complete, and ultimately in line with the SPG guidance?
- Are there references to relevant climate forecasts and data sources, covering both current and future climate? Does this cover both short-term and long-term scenarios where relevant (i.e. covering the project lifetime and/or analysed period)?
- Have all relevant hazards (climate change factors) been taken into account?
- Has the vulnerability of the project (and its components) been assessed (based on the project type and where the project is located)?

The environmental screening is based on the review of the EIA which, among others, describe the environmental impacts of the project and the mitigation measures to be applied. More specifically, the parameters examined concern the following:

- Climatic and bioclimatic characteristics
- Morphological and landscape features
- Geological, seismic and soil features
- Natural environment
- Anthropogenic environment
- Socio-economic environment
- Technical infrastructure
- Anthropogenic pressures
- Air quality
- Noise and vibration
- Electromagnetic fields
- Surface and underground water
- Vulnerability.

As a first step to this screening, an overview of the environmental impacts and mitigation measures identified during the environmental licensing procedure are illustrated in the following Tables.

The DAEC decision has also imposed measures/ terms to mitigate the environmental impacts deriving from the construction and the operation of the project. In the two following tables, the mitigation measures imposed through environmental terms with the DAEC decision for the six environmental elements examined (air, water, land and soil, biodiversity, noise and odour), are presented.

Table 6-1 Residual impacts during the construction phase of the project

Impact	Residual	References: Respective DAEC
Air	YES (From dust emissions, exhaust emissions from construction machinery and vehicles)	DAEC env. term 3.1 (legislation relevant to air emissions), 5.2.7.4 (materials transportation plan shall be elaborated and implemented) and 5.2.7.5 (best available practices, relevant procedures and appropriate equipment that will ensure the drastic reduction of air emissions to be established).
Water	NO	DAEC env. term 3.2 (legislation relevant to solid and liquid waste), 5.1.9 (PCBs and other hazardous substances are prohibited, the pollution of surface and underground water and soil by any type of oil or fuel is prohibited) and 5.2.6.1 (sewage shall be managed appropriately).
Soil/Land	NO	DAEC env. term 5.2.5.14 (Absorbent materials, in sufficient quantities must be available to deal

Impact	Residual	References: Respective DAEC
		with any leaking fuels and lubricants) and 5.1.9 (PCBs and other hazardous substances are prohibited, the pollution of surface and underground water and soil by any type of oil or fuel is prohibited) and 5.2.6.1 (sewage shall be managed appropriately).
Biodiversity	NO	DAEC env. Term 5.2.8.1 (several measures on the pollution of surface and underground water, the prevention of leakage of soil materials into the flow lines from earthworks, the washing of concrete transport vehicles etc), 5.2.8.2 (measures on the development and maintenance of planted vegetation as part of the restoration works, sufficient care), 5.2.11.22 (during the earthworks, the soil layer containing the topsoil shall be collected in piles and kept separately, in order to be used in the environmental restoration works) and 5.2.11.27 (restoration of the vegetation and the landscape shall be performed, the plant species to be used must be indigenous, planting operations to begin immediately in each section in which the final surfaces have been formed, earthworks shall be minimized and important surfaces with low vegetation cover should be preserved).
Noise	YES (From the construction procedure, machinery, etc.)	DAEC env. term 3.1 (legislation relevant to noise from the construction equipment), 3.3.1 (legislation relevant to noise level restrictions for the construction site) and 5.2.7.1-5.2.7.3 (other mitigation measures on construction site noise).
Odor	NO	-

Table 6-2 Residual impacts during the operation phase of the project

Impact	Residual	References: Respective DAEC
Air	NO	DAEC env. terms related to construction phase also apply for the maintenance works during operation phase.
Water	NO	DAEC env. term 5.1.9 (PCBs and other hazardous substances are prohibited, the pollution of surface and underground water and soil by any type of oil or fuel is prohibited).
Soil/Land	NO	DAEC env. term 5.1.9 (PCBs and other hazardous substances are prohibited, the

Impact	Residual	References: Respective DAEC
		pollution of surface and underground water and soil by any type of oil or fuel is prohibited).
Biodiversity	NO	DAEC env. term 5.3.5.1 (a Biodiversity Monitoring Program must be carried out with an emphasis on the activity of fauna and avifauna. Monitoring should cover the pre-construction period (at least one year before the start of construction), the construction period and the first year of operation).
Noise	NO	DAEC env. terms related to construction phase also apply for the maintenance works during operation phase. Also, DAEC env. term 3.3.2 (legislation relevant to noise level restrictions for the operation phase).
Odor	NO	-

Additionally, several terms are imposed related to **waste management** for both the construction and the operation phases. Waste management is related to multiple environmental elements, i.e. **water**, **soil/land** and **biodiversity**.

Moreover, in the EIA study, an additional measure regarding the protection of the **biodiversity** is proposed: sufficient distance from the ground of the fencing at specific points or a sufficient number of "gates" along the fencing which allow free movement and communication of species of the fauna.

The 1st edition of the Environmental Management Plan has also been elaborated which describes the way/ means each environmental term of the DAEC is applied.

Regarding **biodiversity**, the specifications of the **Biodiversity Monitoring Programs of the fauna and avifauna** (amphibians, reptiles) are set within the Environmental Management Plan.

In the Environmental Management Plan, the specifications of the **Noise Emissions Monitoring Program** for the construction phase are also set.

For the project under study, according to the approved EIA study and the issued DAEC, residual impacts are expected on the air and the noise environment during the construction phase of the project. In general, no residual impact is expected to the aquatic environment, to the soil or to the biodiversity of the area. Additionally, no odor emissions are expected during the construction of the project and the quality of the air environment will not be affected.

Regarding the operation phase of the project, no residual impacts are expected.

As a second step, residual environmental impacts are reviewed with the use of Checklist 1 (Annex 2: Environmental dimension – Screening and proofing for environmental elements

– Checklist 1), where Column (1) reflects the existence or absence of residual impacts. This review is carried out on the basis of the environmental documentation.

As it also appears from Checklist 1, residual impacts are expected on the air and the noise environment during the construction phase of the project.

Once a residual impact is identified, then this impact should be qualified in terms of risk by considering the combination of its significance and its likelihood of occurrence. Therefore, three qualifications to indicate the significance of the (residual) impact (column 2 of Checklist 1) will be used, **MINOR - MODERATE - SIGNIFICANT**. Additionally, the likelihood of each impact is categorized as **LOW** (not likely to happen), **MODERATE** (even chances of happening or not), **HIGH** (likely to happen).

The significance of each impact and its likelihood has been identified, based on the environmental documentation. Based on these data, the level of risk (mentioned in column 4 of Checklist 1) for each impact is assessed by combining its identified significance and its likelihood, as it is shown in Table 6-3.

Table 6-3 Example of the risk qualifications for each identified impact (from the Taxonomy Regulation)

		Impact		
		Minor	**Moderate**	**Significant/Adverse**
Likelihood	**Low**	Low Risk	Low Risk	Medium Risk
	Moderate	Low Risk	Medium Risk	High Risk
	High	Medium Risk	High Risk	High Risk

Table 6-4 Risk qualifications for each identified residual impact

Element	Residual Impact	Likelihood	Risk
Air	**Minor** (From dust emissions, exhaust emissions from construction machinery and vehicles, from dust emissions)	**Moderate** (if all necessary measures described in the EIA study and the DAEC are applied)	**Low**
Noise	**Minor** (From the construction procedure, machinery, etc.)	**Moderate** (if all necessary measures described in the EIA study and the DAEC are applied)	**Low**

For medium-risk and/or high-risk impacts, the implementing partner must proceed with proofing, but no further proofing is necessary for low-risk impacts. For this project, no important residual impacts (medium or high-risk) are expected.

6.3 Proofing for environmental dimension: Mitigation, Quantification and Monetisation

For the examined project, for each of the residual impacts identified as medium risk and/or high-risk, additional (for instance mitigation) measures that could reduce the residual risk to a lower level are required.

Based on the data presented in section 6.2, no residual impacts with medium or high-risk are expected during the construction and operation of the project.

6.4 Positive Agenda

Potential actions that could help reinforce the project's positive effects are described as positive agenda.

The positive agenda checklist may include but is not limited to:

- Air Environment
- Water Environment
- Land and Soil
- Biodiversity
- Noise.

In Annex 3 Screening and Proofing checklists, positive impact is described for the air environment. More specifically, the Project under study is expected to typically store electricity at periods when the grid's GHG emission intensity is low and injecting it back to the grid when the grid's GHG emission intensity is high, thus contributing to reducing the grid's GHG emission intensity when RES generation is low. Based on the above, the project enables better utilization of RES and will provide the necessary power and capacity reserves, ensuring the smooth and safe operation of the Greek Electricity Transmission System, either in conditions of particularly increased RES penetration, or in conditions that even the production by RES will not be sufficient to meet current demand. As a result, it can be stated that the Project enhances the penetration of RES in the country's power generation mix and the stability and safe operation of the System.

ANNEX 1: ENVIRONMENTAL DIMENSION – LEGAL COMPLIANCE – CHECKLIST 0

	Yes/No
A.1. Consistency of the operation with a planning framework[28]	
A.1.1. Is the operation part of a plan/programme/strategy at local, regional or national level?	**Yes**
A.1.2. If yes, was this plan/programme/strategy subject to an environmental assessment in line with SEA Directive 2001/42/EU?	**Yes**
A.2. Application of Directive 2011/92/EU of the European Parliament and of the Council (the 'EIA Directive') as amended	
A.2.1. Is the operation listed in EIA Directive annexes:	
- Annex I to the EIA Directive (go to question A.2.2)	**No**
- Annex II to the EIA Directive (go to question A.2.3)	**No (except for the six (6) High Voltage Overhead Lines (part of the accompanying infrastructure) of 400 kV and 60 m length each which could be considered that falls under Annex II [29])**
- Neither of the two Annexes (go to question A.2.4)	**Yes (except for the six (6) High Voltage Overhead Lines (part of the accompanying infrastructure) of 400 kV and 60 m length each which could be considered that falls under Annex II)**
A short justification should be provided why the operation is considered not to be listed in any of the Annexes: ***Installation of BESS stations is not listed in any of the Annexes. Moreover, neither the Substations are listed in any of the two Annexes. Regarding the electrical power lines, the underground lines of 33KV are not included in any of the two Annexes, while the Six (6) High Voltage Overhead Lines (HVOHL) of 400 kV and 60 m length each could be***	

[28] *(The IP will rely on a self-declaration from the project promoter)*
[29] 3b. Industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Annex 1) - under Energy Industry

	Yes/No
considered that fall under Annex II. For the project under study which include the BESS station and the above accompanying infrastructure, an EIA study for the issuance of a DAEC has been elaborated.	
A.2.2. When covered by Annex I to the EIA Directive, include the EIA report, Non-Technical Summary and the Decision of Competent Authority concluding the EIA process (1), and use the text box below for additional information and explanations:	**N/A for the total project but the Six (6) High Voltage Overhead Lines (HVOHL) of 400 kV and 60 m length each could be considered that fall under Annex II.**
1. Was the EIA Report prepared pursuant to Article 5(1) and Annex IV of the EIA Directive?	**Yes**
2.Were consultations with environmental authorities, authorities with regional and local competencies concerned by the project, the public and, if applicable, consultations with other Member States, carried out in accordance with Articles 6 and 7 of the EIA Directive?	**Yes**
3.Was the decision of the competent authority (if already adopted), made available to the public?	**Yes**
A.2.3. When covered by Annex II of the EIA Directive:	
1. If an EIA has been carried out, please include the necessary documents listed under point A.2.2	**Yes-please see above**
2. If an EIA has not been carried out, please include the determination required in Article 4(5)(b) (2) of the EIA Directive (often referred to as 'a screening decision') and confirm that it was made available to the public and that Annex III criteria were considered.	**N/A**
3. If a determination has not been carried out, please provide the thresholds or criteria used according to the national law and Article 4(2)(b) of the EIA Directive	**N/A**
A.2.4. When the operation is not covered by the EIA Directive Annexes, please provide the construction permit (or other relevant approval permit), if available.	**The project is permitted by a DAEC.**
A.3. Application of Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (1) (Habitats and Birds Directive); assessment of effects on Natura 2000 sites	
A.3.1. Was the operation subject to an appropriate assessment as required by Article 6(3) (3) of the Habitats Directive?	**No**
A.3.2. If the reply to question A.3.1 is 'Yes', please provide:	
1. the appropriate assessment carried out according to Article 6(3) of the Habitats Directive;	**N/A**
2. a copy of the standard notification form 'Information to the European Commission according to Article 6(4) of the Habitats Directive', as notified to the Commission (DG Environment), if applicable and/or;	**N/A**

	Yes/No
3. an opinion of the Commission under Article 6(4) of the Habitats Directive for projects having significant impacts on priority habitats and/or species and justified by imperative reasons for overriding public interest other than human health and public safety or beneficial consequences of primary importance for the environment	**N/A**
A.3.3. If the reply to question A.3.1 is 'No', please provide:	
1. the justification for why an appropriate assessment was not deemed necessary (as part of EIA decisions or as a stand-alone document);	**The project is not subject to an appropriate assessment as required by Article 6(3) of the Habitats Directive, as it does not fall within Natura 2000 protected areas.**
2. map (at scale of 1:100 000 or the nearest possible scale) indicating the location of the operation and Natura 2000 sites concerned.	Check Figure 6-1 and Figure 6-2 in chapter 6.1.2.
A.4. Application of Directive 2000/60/EC of the European Parliament and of the Council (the 'Water Framework Directive'); assessment of effects on water bodies	
A.4.1. Will the operation deteriorate the status of a water body or cause failure to achieve good water status/potential?	**No**
1. If the reply to question A.4.1 is 'Yes', (4) please provide the assessment and a detailed explanation of how all the conditions under Article 4.7 of the Water Framework Directive were/are to be fulfilled.	**N/A**
2. If the reply to question A.4.1 is 'No', please provide a justification of why using the exceptions listed under Article 4(7) is not deemed necessary (e.g. all potential effects of the operation have been shown to be temporary or insignificant in WFD terms at the scale of the water body and no possible in-combination effects have been identified or no residual impact on the water body if the identified mitigation measures will be implemented, etc.)	**The EIA of the project mentions that it is not expected to modify or impact the Groundwater and River Water Systems of the intervention area.**
A.5. Where applicable, information on compliance with other environmental directives	
A.5.1. Application of Directive 2010/75/EU of the European Parliament and of the Council (the 'Industrial Emissions Directive')	**N/A**
A.5.2. Any other relevant environmental directives (please explain below)	**Yes**
Application of Waste Management Directive 2008/98/EC	**As mentioned in the EIA of the project, and the issued DAEC, the management of the waste produced during the construction and operation of**

	Yes/No
	the project will follow the international and national legislation.

ANNEX 2: ENVIRONMENTAL DIMENSION – SCREENING AND PROOFING FOR ENVIRONMENTAL ELEMENTS – CHECKLIST 1

Checklist for identifying potentially significant negative impacts on Air						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Will the project/ operation involve actions which will affect on air quality, e.g. due to dust emissions, energy consumption, emissions from manufacturing processes, or significant changes in transportation modes or infrastructure?	Construction phase: **YES** (Dust emissions, exhaust emissions from construction machinery and vehicles) Operation phase: **NO**	**Minor**	Construction phase: **High** Operation phase: **NO**	Construction phase: **Medium** Operation phase: **NO**	› Any sediments disposal should be performed from lower heights › Surface wetting via spraying system	**Low**
2. Is the project/operation located in an Air Quality Zone which does not meet the targets set under the regional/national Air Quality Plan? Would emissions from the project relate to those same targets?	**NO**					
3. Are there any other factors which should be considered such as consequential development which could lead to impacts on air quality or the potential for cumulative impacts with other existing or planned activities in the locality (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?	**NO**					

Checklist for identifying potentially significant negative impacts on Air						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
4.Would any other activities be required as a consequence of the project, which could lead to an increase in atmospheric emissions?	**NO**					

Checklist for identifying potentially significant negative impacts on the Water environment						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Will the project involve actions which will affect surface waters, groundwaters or marine waters (temporarily or permanently)?	**NO**					
2. Will the project lead to risks from contamination of the water environment from discharges of pollutants into surface waters, groundwater, coastal waters or the sea? Or, will it lead to significant discharges to waste water treatment works?	**NO**					

Checklist for identifying potentially significant negative impacts on the Water environment						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
3. Will the project involve the use, storage, transport, handling or production of substances/ mixtures (including biocides and pesticides) which could be harmful to the water environment? When answering this question, please take into account their hazard classification as well as any other classification under REACH (e.g. as a SVHC due to PBT/vPvB or Endocrine Disrupting properties)	**NO**					
4. Are there any other factors which should be considered such as consequential development which could lead to impacts on water quality or the potential for cumulative impacts with other existing or planned activities in the locality/area (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?	**NO**					
5. Are there any areas within or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded that could be affected by the project?	**NO**					

Checklist for identifying potentially significant negative impacts on the Water environment						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
6. Is the project location susceptible to erosion, flooding or drought conditions, which could give rise to impacts on the water environment?	**Yes** (susceptible to flooding)	**High**	**Medium**	**High**	Implement a detailed study to define the floodlines of the streams that might affect the examined location.	**Low**

Checklist for identifying potentially significant negative impacts on Land and Soil						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Will the project/operation involve actions which may cause erosion? This may result from: › soil disturbance e.g. ploughing up-and-down slopes › removal of vegetative soil cover and/or hedgerows › inappropriate use of heavy machinery	**NO**					
2. Will the project/operation involve actions which may cause decline in soil organic matter? This may result from: › conversion of land use	**NO**					

Checklist for identifying potentially significant negative impacts on Land and Soil						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
› drainage of wetlands › deforestation						
3. Will the project/operation involve actions which may cause compaction? This may result from: › inappropriate use of heavy machinery › high livestock densities › large construction works	**NO**					
4. Will the project/operation involve actions which may cause salinisation? This may result from: › poor irrigation technology › inappropriate drainage › overexploitation of groundwater	**NO**					
5. Will the project/operation involve actions which may cause landslides? This may result from: › rupture of topography due to construction works › land use changes, e.g. deforestation › extraction of materials	**NO**					

Checklist for identifying potentially significant negative impacts on Land and Soil						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
6. Will the project/operation involve actions which may cause soil contamination? This may result from: › industrial installations › mining installations › storage of chemicals › atmospheric deposition of dangerous chemicals	**NO**					
7. Will the project/operation involve actions which may cause sealing? This may result from: › urban sprawl › increased transport	**NO**					
8. Are there any areas or features of historic or cultural importance on or around the location that could be affected by the project?	**NO**					
9. Does the project affect communities' use of or access to natural resources?	**NO**					
10. Are there any other factors which should be considered such as consequential development which could lead to impacts on land take and the potential for cumulative impacts with other existing or	**NO**					

Checklist for identifying potentially significant negative impacts on Land and Soil						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
planned activities in the locality/area (e.g. through increases in other industrial manufacturing activity as part of the creation of a manufacturing cluster)?						
11. Would any other activities be required as a consequence of the project, which could lead to land and soil use?	**NO**					

Checklist for identifying potentially significant negative impacts on Biodiversity						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Are there any designated sites that could be affected by the project?	**NO**					
2. Will construction or decommissioning of the project involve actions which will cause temporary impacts on a designated site or natural ecosystem?	**NO**					
3. Will construction or decommissioning of the project involve actions which will cause impacts on protected sites or locally important sites or natural ecosystem?	**NO**					

Checklist for identifying potentially significant negative impacts on Biodiversity						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
4. Could the project itself, during its operational phase, have an impact on a designated site or locally important site or natural ecosystem?	**NO**					
5. Will the Project lead to risks from contamination of designated sites or natural ecosystem?	**NO**					
6. Will the Project involve the use, storage, transport, handling or production of substances/mixtures (including biocides and pesticides) which could be harmful to flora and fauna?	**NO**					
7. Are there any other areas on or around the location that are important or sensitive for reasons of their ecology that could be affected by the project, including presence of threatened species?	**NO**					
8. Are there any habitats or natural ecosystem that are important (e.g. for nesting) or sensitive, which are not designated but which could be affected by the project?	**NO**					
9. Are there any other factors which should be considered such as consequential development which could lead to impacts on the surrounding biodiversity?	**NO**					

Checklist for identifying potentially significant negative impacts on Biodiversity						
	SCREENING of residual impact				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
10. Are there any designated areas or locally important habitats or natural ecosystem within or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, that could be affected by the project?	**NO**					

Checklist for identifying potentially significant negative impacts on noise						
	SCREENING				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Will the project/operation involve actions which could give rise to noise and vibration levels above the levels which cause annoyance or negative health effects? Please consider both daytime and night-time effects.	Construction phase: **YES** (From the construction procedure, machinery, etc.) Operation phase: **NO**	**MINOR**	**MODERATE**	**Low**	Usage of silencers for the machinery, vehicles etc is recomended	**Low**

Checklist for identifying potentially significant negative impacts on noise						
	SCREENING				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
2. Will the project be located in an urbanised or residential area, and result in significant increases in day-time or night-time noise levels during its operation?	**NO**					
3. If the project involves changes in transport infrastructure or rolling stock, have noise and vibration issues been considered as part of project design or equipment design?	**NO**					
4. Are there any transport routes on or around the location which are susceptible to high levels of traffic or congestion or which cause environmental noise problems, and which could be affected by the project?	**NO**					
5. Are there any other factors which should be considered such as consequential development which could lead to the potential for cumulative impacts with other existing or planned activities in the locality/area (e.g. through increases in traffic or other industrial	**NO**					

Checklist for identifying potentially significant negative impacts on noise						
	SCREENING				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
manufacturing activity as part of the creation of a manufacturing cluster)?						
6. Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project? Are there any areas on or around the location which are already subject to excessive noise pollution or vibration related impacts, e.g. where existing EU objectives are not being achieved and which could be affected by the project?	**NO**					

checklist for identifying potentially significant negative impacts on odour						
	SCREENING				PROOFING	
Question	**Yes / No / Brief description [1]**	**What is the significance of the impact [2]**	**What is the likelihood of the impact [3]**	**What is the Risk level of the impact [4]**	**Proposed (additional) mitigation [5]**	**Residual Risk level after (additional) mitigation [6]**
1. Will operation of the project give rise to offensive odorous emissions?	**NO**					
2. Is there potential for the odours to be of a nature and at an intensity that could give rise to annoyance or negative health impacts?	**NO**					
3. Will the site be located in an area that, taking into account wind direction etc., there is potential for residential and other vulnerable populations as receptors to be affected?	**NO**					
4. Are there any other factors which should be considered such as consequential development which could lead to the potential for cumulative impacts with other existing or planned activities in the locality/area (e.g. through increases in activity as part of a cluster)?	**NO**					

ANNEX 3: ENVIRONMENTAL DIMENSION – POSITIVE AGENDA- CHECKLIST 2

Positive Agenda – Air Quality			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
1. Will the project result in improvements in energy efficiency? These could result from: › reduced energy intensity of manufacturing activities; › reduced energy intensity of transport requirements; › reduced transport/energy demand; › etc.	**NO**		
2. Will the project result in the use of renewable energy sources?	**YES**	The project will result in the better utilization of RES, contributing to reducing the grid's GHG emission intensity and enhancing the penetration of RES in the country's power generation mix and the stability and safe operation of the System.	
3. Will the project involve the capture of energy in waste materials?	**NO**		
4. Will the project increase the potential for re-use or recycling of end products, thereby reducing the energy consumption associated with the production of virgin materials?	**NO**		

Positive Agenda – Air Quality			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
5. Have production technologies been selected so as to minimise the potential for air emissions at source?	**NO**		
6. Have production technologies been selected in line with the Ecodesign Directive and the Energy Labelling Regulations?	**NO**		
7. Have production technologies and chemical inputs been selected so as to minimise the use of hazardous substances that would be emitted to air in waste gases, or through process emissions?	**NO**		
8. Have other actions been taken as part of project design to limit emissions to air?	**NO**		
9. Are there other aspects that demonstrate environmental good practice in project operation as well as delivery? E.g. increasing the awareness of residents and other businesses, taking advantage of an opportunity within a growing environmental sector, etc.	**NO**		

Positive Agenda – Water Environment			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
1. Will the project result in improvements in water efficiency? These could result from: › changes in production technologies to more efficient technologies;	**NO**		

Positive Agenda – Water Environment			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
› installation of other water saving measures; › increased re-use or recycling of water resources?			
2. Will the project result in reduced abstractions from the water environment in areas suffering from over-abstraction (seasonal or annually)? e.g. construction of a winter storage reservoir.	**NO**		
3. Will the project result in reductions in discharges to the water environment, either via sewer or direct?	**NO**		
4. Will the project increase the potential for re-use or recycling of end products, thereby reducing the demand for high water intensity virgin materials?	**NO**		
5. Have production technologies and chemical inputs been selected so as to minimise the potential for releases of hazardous substances to the water environment?	**NO**		
6. Have other actions been taken as part of project design to limit impacts on the water environment?	**NO**		
7. Are there other aspects that demonstrate environmental good practice in project operation as well as delivery? E.g. increasing awareness of residents and other businesses, taking advantage of an opportunity within a growing environmental sector?	**NO**		

Positive Agenda – Land/Soil			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
1. Will the project contribute to stop erosion? This could result from: — reforestation	**NO**		
2. Will the project improve the quality and quantity of soil organic matter?	**NO**		
3. Will the project reduce or stop salinisation?	**NO**		
4. Will the project reduce hydrogeological risk?	**NO**		
5. Will the project contribute to the remediation of contaminated sites?	**NO**		
6. Will the project restore industrial/urban sites to natural sites?	**NO**		
7. Will the project enrich soil biodiversity?	**NO**		
8. Will the project contribute to the high landscape or scenic value on or around its location?	**NO**		
9. Will the project create or protect routes or facilities on or around the location which are used by the public for recreation?	**NO**		
10. Will the project protect areas or features of historic or cultural importance on or around its location?	**NO**		
11. Will the project improve the quality or increase the quantity of scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries?	**NO**		
12. Will the project improve the quality of air or contribute to compliance with national emission ceilings for air pollutants?	**NO**		

Positive Agenda – Biodiversity			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
1. Will the project result in physical changes in the locality that: › assist with the control or removal of alien species? › assist with the conservation of native species or genetic diversity? › assist with the conservation of biodiversity rich and/or protected areas and/or wild native species, in particular protected and/or threatened species? — assist with the creation of protected areas? › assist with the restoration of natural ecosystems	**NO**		
2. Will the project result in new processes/systems whereby the use of substances or materials that are hazardous or toxic to the environment (flora, fauna) is decreased or avoided?	**NO**		
3. Will the project result in reductions in the production of solid wastes? Or improved quality of wastes that are applied to the land (e.g. sewage sludge)?	**NO**		
4. Will the project decrease the risk of protected sites or areas rich in biodiversity or natural ecosystem becoming contaminated by pollutants?	**NO**		
5. Have other actions been taken as part of project design to limit impacts on biodiversity?	**NO**		
6. Does the project integrate nature-based solutions in its design? (e.g. green roofs, green walls, etc.)	**NO**		
7. Are there other aspects that demonstrate environmental good practice in project operation as	**NO**		

Positive Agenda – Biodiversity			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
well as delivery? E.g. increasing awareness of residents and other businesses, taking advantage of an opportunity within a growing environmental sector?			

Positive Agenda – related to the reduction of Noise, Vibration and Odour			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
Questions for identifying positive impacts on the reduction of noise or vibration			
1. Will the project result in reductions in noise and/or vibration related impacts? These could result from: › specific measures to reduce noise and vibration; › indirect reductions in night-time or day-time noise due to changes in activities; › improvements in infrastructure, leading to reductions in vibration related effects.	**NO**		
2. Will the project result in the movement of noise generating activities out of a residential area or location surrounded by vulnerable populations, e.g. a hospital?	**NO**		
3. Will the project include specific measures to reduce noise or vibration?	**NO**		
4. Have production technologies been selected so as to minimise the potential for impacts at source?	**NO**		
5. Have other actions been taken as part of project location and or design to limit impacts?	**NO**		

Positive Agenda – related to the reduction of Noise, Vibration and Odour			
Question	**Yes / No / Brief description**	**Is this likely to result in a significant positive impact? Yes / No – Why**	**Voluntary commitment for incorporating additional measures to improve the operation's environmental performance**
Questions for identifying positive impacts on the reduction of odour			
Will the project result in reductions in odorous emissions through the installation of a new plant? If so, would this affect the nature, the frequency or the duration of the odour, etc.?	**NO**		
Will the project result in the movement of odour generating activities out of a location surrounded by large, sensitive and/or vulnerable populations?	**NO**		
Will the project include specific measures to reduce odorous emissions?	**NO**		
Have production technologies been selected so as to minimise the potential for impacts at source?	**NO**		
Have other actions been taken as part of project location and or design to limit impacts, e.g. the use of local ventilation systems together with exhaust gas treatment methods?	**NO**		

ANNEX 4: SCREENING AND PROOFING CHECKLISTS – CLIMATE DIMENSION

Climate resilience – adaptation to climate change		
Screening Phase		
Checklist:	**Yes / No**	**Comments and Info to be provided by the implementing partner in the SPG documentation to the Investment Committee**
Has information been provided to explain at which project development stages climate change adaptation/resilience issues have been considered, and how this was done?	**Yes**	
Is there a description of the methodology used for the vulnerability and risk assessment process, and does this methodology appear logical and complete, and ultimately in line with the SPG guidance?	**Yes**	
Are there references to relevant climate forecasts and data sources, covering both current and future climate? Does this cover both short-term and long-term scenarios where relevant (i.e. covering the project lifetime and/or analyzed period)?	**Yes**	
Have all relevant hazards (climate change factors) been taken into account?	**Yes**	
Has the vulnerability of the project (and its components) been assessed (based on the project type and where the project is located)?	**Yes**	
Please provide the detailed conclusions of the vulnerability assessment and a detailed justification on the choice to a) stop the proofing process or b) proceed to the risk assessment phase.	**Yes, please check chapter 5.3**	
Climate risk assessment		
If the project was assessed as vulnerable to certain climatic factors (i.e. the screening phase concluded that there are potential climate risks), has a risk assessment been undertaken (assessing both probability and impact of climate change adaptation risks)?	**Yes**	

Climate resilience – adaptation to climate change		
Have significant climate change adaptation risks been identified for the project?	**Yes**	
If so, have relevant measures been implemented into the project (incorporated into design and/or operation and maintenance)?	**Yes**	
Are the measures proven to reduce the risks to an acceptable level?	**Yes**	
Please provide the detailed conclusions of the climate risk assessment.	**Yes, please check chapter 5.3**	
Has the consistency with EU and, as applicable, national, regional and local strategies and plans on the adaptation to climate change, and other relevant strategic and planning documents been verified and confirmed?	**Yes**	

Climate neutrality – climate change mitigation		
Screening Phase		
Checklist:	**Yes / No**	**Comments and Info to be provided by the implementing partner in the SPG documentation to the Investment Committee**
Does the project fall under one of the project categories with limited expected emission levels and for which carbon footprint assessment WILL NOT be required?	**No**	
Are absolute and/or relative emissions expected to be below 20 000 tonnes CO_2e/year (positive or negative)?	**No**	
Please provide the detailed conclusions of the screening and a detailed justification on the choice to (a) stop the climate mitigation proofing process; or (b) proceed to the estimation and monetization of GHG emissions.	**Yes, please check chapter 5.2**	
Consistency with EU climate objectives and carbon footprinting		
Is the project compatible with EU climate neutrality objectives based on the application of the Taxonomy DNSH criteria or other internationally accepted methodology? Please provide details on the methodology used to confirm compatibility and, on the conclusions, reached.	**Yes**	The DNSH assessment has been performed following the European Commission Notice (2021/C 58/01) "Technical guidance on the application of 'do no significant harm' under the Recovery and Resilience Facility Regulation". According

Climate neutrality – climate change mitigation		
		to the DNSH assessment performed, the investment is compliant with the DNSH principle.
Have the project's GHG emissions been calculated in accordance with an internationally recognized methodology? Please provide details as required in the SPG guidance.	**Yes, please check chapter 5.2**	
Have the estimated annual greenhouse gas emissions of the project in a standard (or average) year of operation been provided, in both (a) absolute; and (b) relative terms (i.e. compared to a baseline, 'without project' scenario), in tonnes of CO_2 equivalent per year?	**Yes, please check chapter 5.2**	
Have the incremental GHG emissions associated with the project been monetised (using a standard shadow price of carbon) and were they included in the economic appraisal or CBA?	**Yes, please check chapter 5.2**	
Does the project result in an increase or reduction of GHG emission? Please provide details.	**The project is expected to result in reduced GHG emissions.**	BESS projects in general facilitate the integration of RES, contributing to reducing the grid's GHG emission intensity and enhancing the penetration of RES in the country's power generation mix.
Has the project's compatibility with a credible pathway towards the overall 2030 and 2050 GHG emission reduction targets been verified and confirmed? As part hereof, for infrastructure with a lifespan beyond 2050, has the project's compatibility with operation, maintenance and eventual decommissioning under conditions of climate neutrality been verified and confirmed?	**Yes**	

[i] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en