

Environmental and Social Data Sheet

Overview

Project Name: *ARIADNE ATTICA CRETE INTERCONNECTION*

Project Number: *2020-0122*

Country: *Greece*

Project Description: The project concerns the electricity interconnection between the island of Crete, in Greece, and Attica, the region of the Greek capital, Athens with a bipolar High Voltage Direct Current (HVDC) link with a rated capacity of 1,000 MW and rated voltage of ± 500 kV.

EIA required: yes

Project included in Carbon Footprint Exercise¹: yes
(details for projects included are provided in section: "EIB Carbon Footprint Exercise")

Environmental and Social Assessment

The project includes two AC/DC converter stations, two submarine DC cables approx. 335 km long, from the landing point in Attica, to the landing point on Crete, two underground DC cables approx. 32 km long in the area of Attica, from the landing point to the converter station, one underground DC circuit approx. 11 km long from the landing point on Crete, to the second converter station and two shoreline pond electrodes connected with MV cables

The Project to be financed by the Bank comprises the following sections:

Attica section: a converter station close to the existing high voltage substation Koumoundouros (in the area of Aspropyrgos) and mainly underground assets in the Attica area from the landing point of the submarine cable (Pachi, Megara) to the converter substation and the connection to the existing high voltage network.

Subsea section: the subsea cables of the interconnection including the assets related to the two electrodes.

Crete section: a converter station, underground assets on Crete from the landing point of the submarine cable (Korakia) to the converter substation (Damasta) and the connection to the existing high voltage network.

Additionally, associated facilities such as assets for the connection of the HVDC link to the existing transmission network will be constructed in the coming period including 150 kV overhead lines on Crete. The three sections including the assets for the connection of the HVDC link to the existing transmission network were grouped to a common EIA procedure.

¹ Only projects that meet the scope of the Pilot Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: above 20,000 tons CO₂e/year absolute (gross) or 20,000 tons CO₂e/year relative (net) – both increases and savings.

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Environmental Assessment

Some of the schemes (overhead lines on Crete) fall under Annex II of Directive 2014/52/EU amending the EIA Directive 2011/92/EU transposed to national legislation with law 4014/2011, leaving it to the competent authority to determine whether or not an Environmental Impact Assessment (EIA) is required. Environmental studies including Appropriate Assessments and public consultations have been, however, carried out in the context of the licensing processes.

The project is part of the national 10-year Grid Development plan 2017-2026 that underwent Strategic Environmental Assessment approved by the Ministry of Environment and Energy on May 26th, 2017.

The three sections were grouped to a common EIA procedure and one decision of approval of environmental terms was issued by the Ministry of Environment and Energy on April 4th, 2020. Underground and submarine cables are not subject to the EIA according to national legislation. However, the promoter included all the schemes of this component in the EIA integrating the AA for the parts that cross a Special Protection Area (SPA GR3000020 which hosts the specie *Phalacrocorax aristotelis desmarestii*).

According to the EIA study and the conditions under the decision of approval of environmental terms, subject to the implementation of the specified mitigating measures, the project neither has significant adverse effects on the environment nor adversely affect the integrity of any European site on view of the site's conservation objectives. According to the EIA study, the impact of the project is low for the specie in the SPA and only during construction.

Part of the underground cables in Attica will cross a regional park that belongs to the national network of protected areas. Furthermore, assets in Crete will be constructed either close or within a Wildlife Refuge; the impact of the project in the areas of the national protection network is deemed low subject to mitigation measures.

Mitigation measures as determined in the relevant permits include the use of appropriate work and waste management practices during construction to prevent any pollution at land and sea, to protect vegetation from fire and to minimise disturbance during construction (noise, dust).

All earthworks including excavation will be supervised by the relevant Ephorates of Antiquities. In case of antiquities, works shall be suspended and a rescue excavation and survey shall be carried out.

Signs will be used to prevent the collision of birds with the overhead lines in certain parts of the route and the restoration of the sites condition following works. Furthermore, appropriate environmental restoration studies will be conducted as part of the environmental management plans. Environmental monitoring reports should be produced on a six-month basis.

All schemes have been designed to comply with EMF exposure limits as well a noise limits as defined in national legislation. An EMF study was carried out and shows that the project electromagnetic fields are well the acceptable limits. Measurements of noise will be taken during operation to certify that noise limits are within the boundaries set by legislation.

Next, a more detailed presentation of the schemes is given.

A. Attica section

- A.1 400 kV AC underground cable of 300 m length for the connection of the 400/150/30 kV Koumoundouros substation with the Koumoundouros converter substation.
- A.2 Koumoundouros converter substation: new AC/DC (400 kV/±500 kV) VSC² bipolar converter station of 2 x 500 MW power transmission capacity.

² Voltage Source Converter

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- A.3 Two underground ± 500 kV DC cables (two poles), approx. 32 km long, from the Koumoundouros converter station to the landing point of the submarine cable in Attica region (Pachi, Megara). They will come along with (a) a MV DC underground cable to connect the Koumoundouros converter substation with the Shoreline Pond Electrode on the island of Stachtoroi and (b) three fibre optic cables (in the same trench with the above cables).

These are schemes to be financed by the Bank. Additionally, for the connection of the HVDC link to the existing transmission system the following investments will be made:

- A.3 Upgrade of the existing 400/150/30 kV Koumoundouros substation: replacement of the 400 kV AIS technology with GIS technology and addition of two bays for the underground connection with the Koumoundouros converter substation.
- A.4 Modifications (either undergrounding or rising) in nine existing 150 kV overhead lines that cross the 400/150/30 kV Koumoundouros substation and the Koumoundouros converter substation. The modifications concern approx. 600 m of lines.

Part of the underground cables will cross a regional park that belongs to the national network of protected areas³. This regional park contains a wetland. The underground cables will go underneath the highway that is within the regional park. The works will take place within one of the zones of the regional park (as defined in the national legislation) and are in line with the activities allowed in this zone. According to the EIA study, the project is compatible with the objectives of this protected area; the Management Body of the regional park has provided a positive opinion for the project.

B. Subsea section

- B.1 A submarine ± 500 kV DC circuit (two cables,) approx. 335 km long, from the landing point in Attica (Pachi, Megara) to the landing point in Crete (Korakia). They will come along with two fibre optic cables.
- B.2 A MV DC subsea cable approx. 19 km long to connect the Koumoundouros converter substation with the Shoreline Pond Electrode on the island of Stachtoroi and a fibre optic cable for electrode station monitoring; it is the extension of the MV DC underground cable from the Koumoundouros converter station to the landing point of the submarine cable in Attica region (Pachi, Megara).
- B.3 A shoreline pond electrode on the island of Stachtoroi; the total area of the site will be approx. 6,000 m² (subject to the final design). The site may include a small building.
- B.4 A shoreline pond electrode in the area of Korakia on Crete; the total area of the site will be approx. 6,800 m² (subject to the final design). The site may include a small building.
- B.5. Landing points in Attica region (Pachi, Megara) and on Crete (Korakia).

Part of the subsea cables (5.2 km) cross SPA GR3000020⁴ which hosts the specie *Phalacrocorax aristotelis desmarestii* which is a specie referred to in Article 4 of Directive 2009/147/EC⁵ and listed in Annex II of Directive 92/43/EEC.

A survey conducted for a period of year on the island of Stachtoroi, where one of the electrode substations will be built, showed no signs of breeding. According to the EIA study the impact of the project is low for the specie and only during construction. To mitigate this impact, among others measure, construction works shall take place outside the breeding period (January – February). A birds monitoring programme for the island of Stachtoroi will be

³ Regional Park Vourkariou

⁴ ΝΗΣΙΔΕΣ ΣΑΡΩΝΙΚΟΥ ΚΟΛΠΟΥ ΚΑΙ ΘΑΛΑΣΣΙΑ ΠΕΡΙΟΧΗ

⁵ Directive 2009/147/EC Annex I: Species that shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Member States shall classify territories as special protection areas for the conservation of these species.

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implemented; it will start before the start of works and it will continue for at least one year after the end of works. Lighting within the SPA should be limited to minimize the disturbance for the night species.

The shoreline pond electrodes are protected against possible wave damage by a permeable breakwater. The area is also protected by a fence. A study will be conducted for the design of the electrode to minimize chlorine gas emissions. The study will take into account industry standards regarding the design of electrodes of this type (pond type electrode) and appropriate thresholds for chlorine as defined in international standards including the World Health Organisation guidelines.

The Shoreline Pond Electrode of Stachtoroi is within a shooting field for the Greek Navy; appropriate measures have been taken to ensure safety during construction and operation; the relevant authorities have provided their consent and they will be notified during the project implementation.

Regarding the submarine cables, no impact is expected on *Posidonia oceanica* fields, which are not present along the route of the cable. The route of the submarine cables was selected by the Promoter with the objective to avoid Natura 2000 sites; the path of the submarine cable will be finalised by the contractor and the cable laying method will be selected so that the impact to the seabed is minimum.

C. Crete section

- C.1 Two underground ± 500 kV DC cables (2 poles) and a MV DC cable for ground return, approx. 11 m long, from the landing point on Crete, Korakia, to the Damasta converter station. They will come along with (a) three fibre optic cables (in the same trench with the above cables)
- C.2 Damasta converter substation: new AC/DC (150 kV/ ± 500 kV) VSC bipolar converter station of 2 x 500 MW power transmission capacity and coupling substation for the connection to the 150 kV AC network of Crete. The coupling substation is of GIS type and includes a double busbar and six 150 kV bays.
- C.3 A subsea MV DC cable approx. 4 km long from the Crete electrode station to the landing point of Korakia and a fibre optic cable for electrode station monitoring.

These are schemes to be financed by the Bank. Additionally, for the connection of the HVDC link to the existing transmission system the following investments will be made:

- C.4 The following upgrades of the existing 150 kV network on Crete:
 - a. New 150 kV overhead lines single and double circuit from the Damasta converter station to the existing 150 kV overhead lines Linoperamata-Chania and Linoperamata-Chania/II (total length: 5.4 km).
 - b. For the connection of the Damasta converter substation to the existing Linoperamata substation:
 - i. upgrade of the existing 150 kV overhead lines Linoperamata-Chania and Linoperamata-Chania/II from single circuit to double circuit for the part starting from the coupling facilities in the Damasta converter substation (total length: 15.1 km) and
 - ii. a new 150 kV underground cable (double circuit), 3.15 km long, to replace an existing 150 kV line; this ends at the existing Linoperamata substation.
 - c. Demolition of existing 150 kV lines, 5.24 km long.

The entirety of the sub-schemes on Crete are outside of areas of residential use. The nearest point of the converter station of Damasta to the nearby settlement is 850 m. The extension of the 150 kV substation Linoperamata will take place within the site of the power station of

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Linoperamata which is at the border of Wildlife Refuge⁶. A 150 kV overhead line of 1,160 m length which will be upgraded (single circuit to double circuit) and a new underground cable of 360 m length are also within the Wildlife Refuge. Mitigations measures include the use of signs to prevent the collision of birds.

The Promoter is experienced as developer of electricity transmission infrastructures and they have the capacity to manage the project.

EIB Carbon Footprint Exercise

The source of CO₂ equivalent (CO₂e) emissions for the project is the ohmic losses of the new network equipment being installed. At programme completion, the corresponding absolute emissions are estimated at 26.7 kt CO₂e per year. These absolute emissions are however, offset by savings enabled by the project in comparison to the do-nothing alternative. The savings in CO₂ equivalent emissions are based on the fact that the project (a) will enable the connection of additional intermittent generation that will displace existing oil-fired generation on Crete and (b) oil-fired generation on Crete will be displaced by more efficient generation from mainland Greece. Over the economic life of the Project the corresponding average relative emissions are estimated at -134.3 kt CO₂e per year. For the annual accounting purposes of the EIB Carbon Footprint, the project emissions will be prorated according to the EIB lending amount signed in that year, as a proportion of project cost.

Public Consultation and Stakeholder Engagement

Public consultation was carried out within the EIA process. Publications were made in local and national newspapers. The EIA was published in the national Electronic Environmental Register (publication in November 2018 and stakeholder input, as presented in the environmental permit, received until September 2019). The Promoter engaged with communities to address their concerns about safety and the project design took into account the issues raised (including the undergrounding of the cable system on Crete which was originally planned to be overhead)

Public consultation was carried out also for the Strategic Environmental Assessment for the national 10-year Grid Development plan 2017-2026.

Conclusions and Recommendations

Based on the results of the Bank's assessment, no significant long term impacts are expected to result from the construction and the operation of project. Based on the information available, and with appropriate environmental conditionality (see below), the programme is expected to be acceptable to the Bank in environmental terms.

The Promoter undertakes to provide, to the satisfaction of the Bank, as soon as available, the electrode design study demonstrating that the environmental impact of the electrode is within the limits as set in international standards for the different operational modes of the HVDC link (monopolar, bipolar).

⁶ Αλμυρός ποταμός – Κέρη, Δήμων Γαζίου και Τυλίσσου – K075