TSKB

TURKEY

GEOTHERMAL DEVELOPMENT PROJECT (P172827)
ADDITIONAL FINANCE LOAN

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

FINAL

OCTOBER 2021

TABLE OF CONTENTS

LIST OF APPENDICES

ABBREVIATIONS

AF	Appraisal Form
°C	Degree Celsius
CIA	Cumulative Impact Assessment
COVID-19	Corona Virus Disease
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EPRP	Emergency Preparedness and Response Plan
ERET	Environmental and Social Risk Evaluation Tool
ESA	Environmental and Social Assessment
ESDD	Environmental and Social Due Diligence
ESF	Environment and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EU	European Union
FI	Finance Institution (TSKB)
FW	Framework
GBV	Gender-Based Violence
GDP	Geothermal Development Project
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Geographical Information Systems
GPP	Geothermal Power Plant
GRM	Grievance Redress Mechanism
GoT	Government of Turkey
IBRD	International Bank for Reconstruction and Development
IFC	International Finance Corporation
IFI	International Finance Institutions
JESDER	Geothermal Developers Association
MoEU	Ministry of Environment and Urban Planning
MSDS	Material Safety Data Sheet
MTA	General Directorate of Mineral Research and Exploration
MW	Megawatt
NCG	Non-Condensable Gases
NGO	Non-Governmental Organization
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policy
PAP	Project Affected Person
PDoEU	Provincial Directorate of Environment and Urbanization
PIF	Project Information File
PIU	Project Implementation Unit
PPE	Personal Protective Equipment

RAP	Resettlement Action Plan
RCIA	Rapid Cumulative Impact Assessment
RPF	Resettlement Policy Framework
SEP	Stakeholder Engagement Plan
SMS	Sustainability Management System
TCFD	Task Force on Climate-related Financial Disclosures
TOR	Terms of Reference
TSKB	Industrial Development Bank of Turkey
UNEP-FI	United Nations Environment Programme - Finance Initiative
VEC	Valued Environmental Component
WB	World Bank
WBG	World Bank Group

GEOTHERMAL DEVELOPMENT PROJECT

ADDITIONAL FINANCING

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

1. INTRODUCTION

Turkey has rich geothermal resources and is the world's 7th richest country in geothermal potential. Distribution of Turkey's geothermal potential is as follows: 78% in Western Anatolia, %9 in Central Anatolia, 7% in Marmara Region, %5 in Eastern Anatolia 5% and %1 is located in other regions of the country. Out of Turkey's total geothermal potential, around 94% is appropriate for thermal use (fields with temperatures less than 130 °C) and the remainder is suitable for electricity production (fields with temperatures more than 130 °C). The fields with reservoir temperatures more than 130 °C are given in the table below.

TABLE 1: THE FIELDS WITH TEMPERATURES MORE THAN 130 °C IN TURKEY

Fields with temperatures higher than 130 °C	Temperature (°C)	Region
Denizli-Kızıldere	242	South-Aegean Region
Aydın-Germencik-Ömerbeyli	232	South-Aegean Region
Manisa-Kavaklıdere	223	Center-Aegean Region
Aydın-Pamukören	187	South-Aegean Region
Manisa-Salihli-Göbekli	182	Center-Aegean Region
Aydın-Salavati	171	South-Aegean Region
Çanakkale-Tuzla	175	Marmara Region
Kütahya-Simav	162	Center-Aegean Region
Aydın-Umurlu	155	South-Aegean Region
İzmir-Seferihisar	153	Center-Aegean Region
Manisa-Salihli-Caferbey	150	Center-Aegean Region
Aydın-Sultanhisar	145	South-Aegean Region
Aydın-Hıdırbeyli	143	South-Aegean Region
İzmir-Balçova	142	Center-Aegean Region
Aydın-Yılmazköy	142	South-Aegean Region
Aydın-Nazilli-Bozyurt-Güzelköy	140	South-Aegean Region

Abundant geothermal energy sources of Turkey is due to its location in Mediterranean sector of Alpine Himalayan Tectonic Belt. Geothermal resources are available in almost every region of Turkey. A significant part of the high-temperature geothermal resources is located in the west of the country, particularly in Büyük Menderes and Gediz Grabens. In Denizli, Aydın and Manisa (located in Büyük Menderes and Gediz Grabens), geothermal energy activities are conducted densely.

Following figures (Figures 1, 2 and 3) show the geographical distribution of geothermal resources in Turkey, distribution of protected areas and other natural assets in Turkey, and distribution of erosion sensitive areas in Turkey, respectively. In Figures 4 and 5, both erosion sensitive areas and sensitive water bodies are presented for Western Anatolia (İzmir, Aydın, Manisa and Denizli) and Çanakkale Region, where both geothermal activities and agricultural activities are conducted densely. These figures provide an overview of environmental sensitivities or vulnerabilities of the potential geothermal areas.

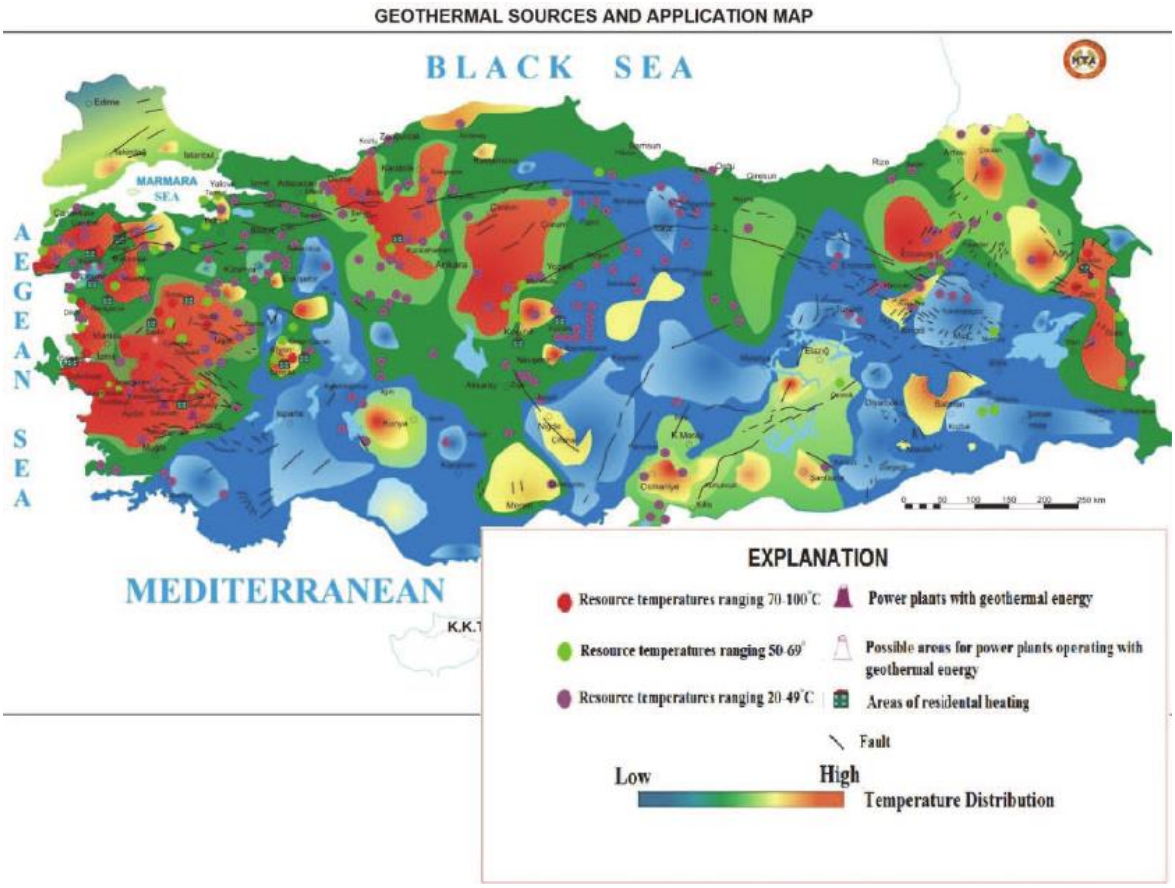

FIGURE 1: TURKEY'S GEOTHERMAL RESOURCES (MINISTRY OF ENERGY)

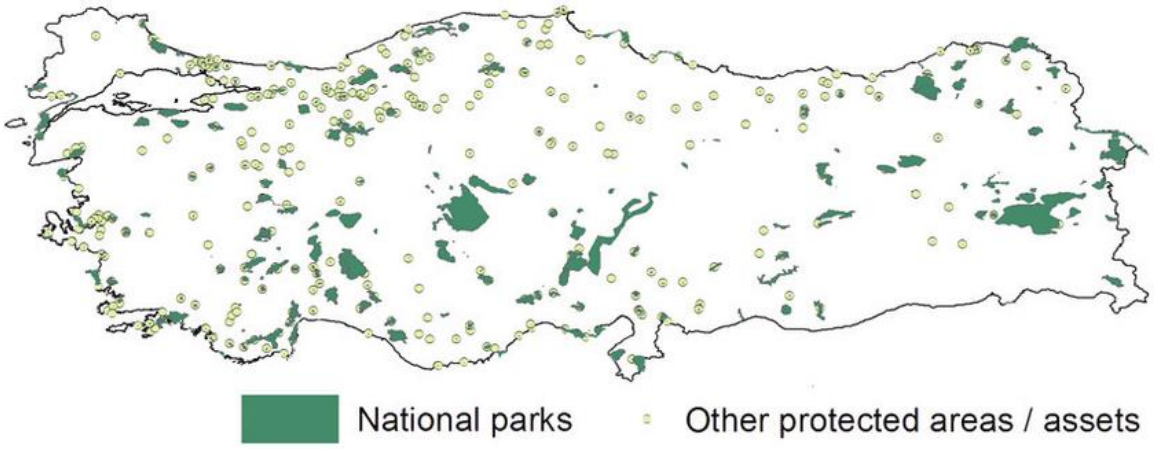

FIGURE 2: DISTRIBUTION OF PROTECTED AREAS AND OTHER NATURAL ASSETS IN TURKEY (2013 DATA FROM THE GENERAL DIRECTORATE OF NATURE CONSERVATION AND NATIONAL PARKS)[1]

Based on Figure 1 and 2, it can be concluded that there are national parks and protected areas around the geothermal sources and these areas should be carefully considered and protected during the development, analysis, design and implementation of each geothermal project in Turkey.

Figure 3, 4 and 5 show the erosion sensitive areas in Turkey, Western Anatolia and Çanakkale

Region, respectively. It should be noted that the brown areas shown in the figures are most prone to erosion. The figures also show the water bodies (with blue-gray color).

FIGURE 3: EROSION SENSITIVE AREAS IN TURKEY (RETRIEVED FROM ATLAS 2020 GIS PORTAL of MOEU[2])

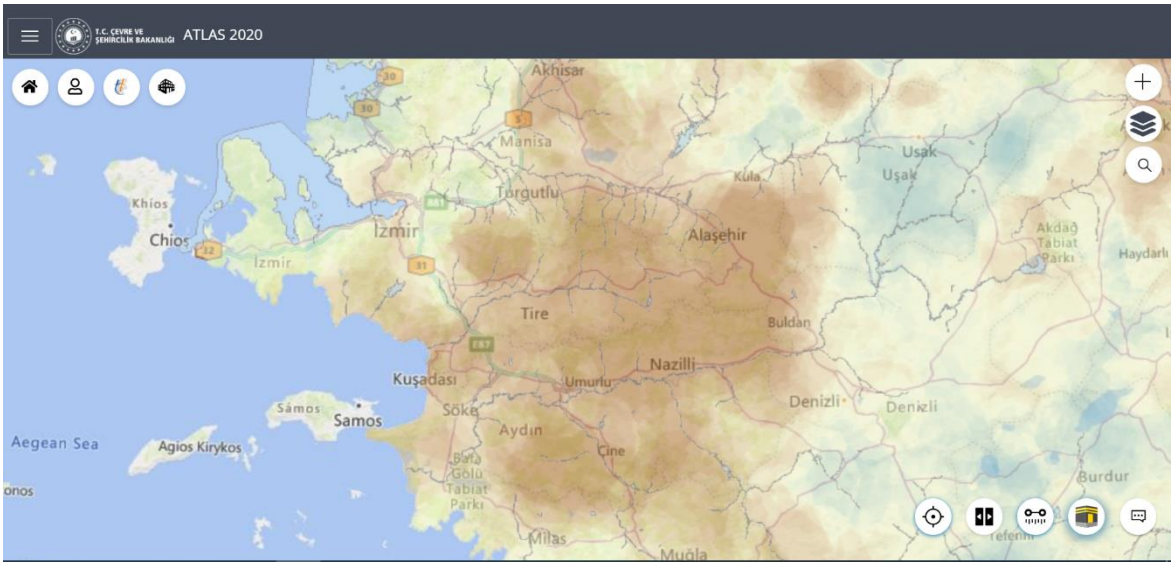

FIGURE 4: EROSION SENSITIVE AREAS AND WATER BODIES IN WESTERN ANATOLIA (IZMIR, AYDIN, DENİZLİ) (ATLAS 2020)

[2] https://www.atlas.gov.tr/

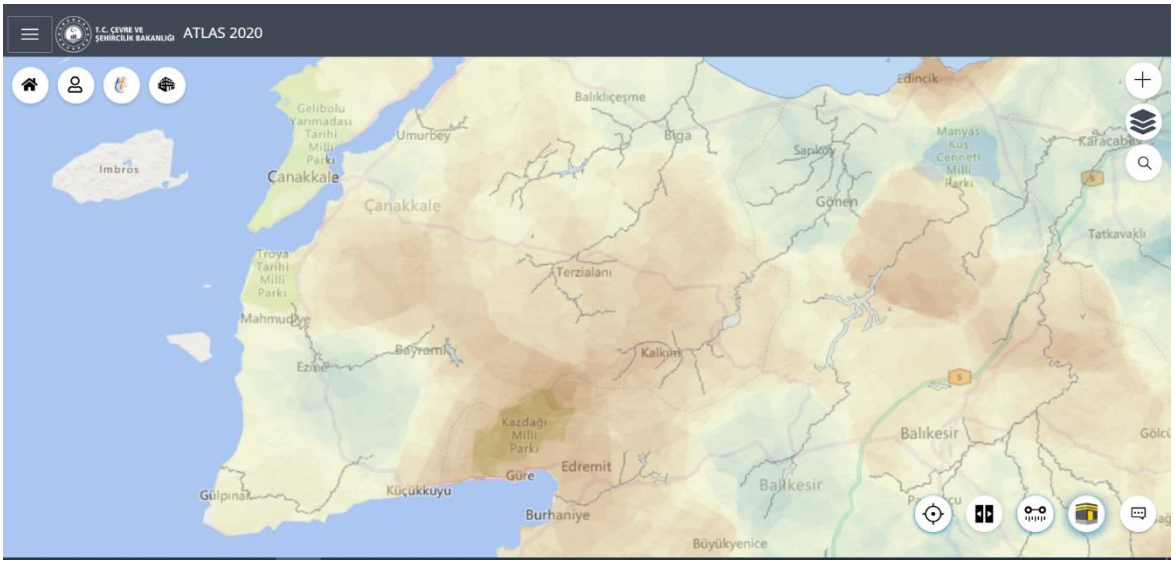

FIGURE 5: EROSION SENSITIVE AREAS AND WATER BODIES IN ÇANAKKALE REGION (ATLAS 2020)

As can be seen from the Figures 4 and 5, the erosion sensitiveness of Western Anatolia and Çanakkale Region, where agriculture is an important economic activity for the local communities, is high. Therefore, it is important to assess and manage the risk and impacts of geothermal projects on agricultural lands and water sources to ensure the protection of agricultural areas and to not harm related economical activities.

Within the scope of Cumulative Impact Assessment studies conducted by an Independent Consultant for the Ministry of Environment and Urbanization (MoEU) and the European Bank for Reconstruction and Development (EBRD), a sensitivity map for the Western Anatolia was developed based on weightings of Environmental and Social Components (VECs) including site areas (natural, archeological, urban and historical), other protected areas (natural parks, special environmental protection zone, natural monuments, wildlife improvement areas, important natural areas), farmlands, forest lands, wetlands, water structures and protected areas, areas for avoidance (fault lines, landslide areas, flood areas), economic structure and settlements. The results of Geographical Information System (GIS)-based weighted overlay analysis conducted by the Independent Consultant is given in Figure 6. Based on the results of the analysis, it can be concluded that both existing and planned geothermal power plants are located on the sensitive areas. Therefore, management of the cumulative impacts is also essential for the proposed projects in the region.

In this regard, social acceptance and perception management is also an important aspect that needs to be carefully examined for each geothermal energy investment in Turkey. The emerging social opposition to existing and new geothermal energy investments in Turkey has the potential to slow down the progress of new geothermal developments, which will move Turkey away from its national energy target for energy supply security as discussed in the following paragraphs.

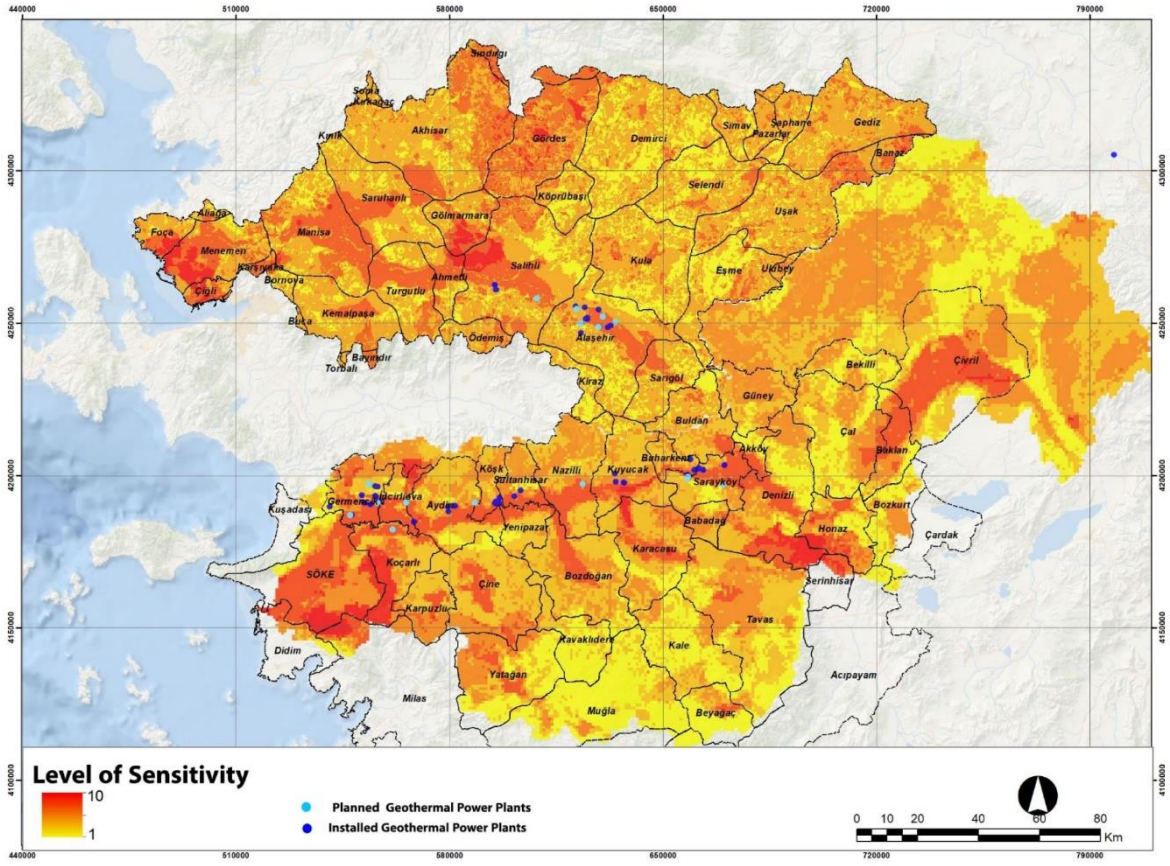

FIGURE 6: SENSITIVITY MAP (CIA REPORT, STANTEC, 2021)

Reducing the public response can be ensured by implementing an effective communication process from the beginning of the investment process and by informing the local communities regarding the measures to be taken in/around the project area during both construction and operation phases, as well as by the dissemination of these practices periodically. Within this scope, organizing public meetings, conducting facility on-site visits, preparation of informative brochures, videos and public spots is very important for the geothermal investors to overcome the public opposition to the geothermal investments.

This Environmental and Social Management Framework (ESMF) includes the measures that needs to be implemented by the beneficiaries in addition to the regulatory requirements to ensure that both environmental quality and socio-economic status of the projects' impact areas as well as communities' health and safety are preserved during the implementation of geothermal projects in line with the international best practices.

Maximizing exploitation of domestic primary energy resources and securing sufficient, reliable and affordable energy to a growing economy in an environmentally sustainable manner has been, and remains, the Turkish government's core energy policy priority. In this context, the government of Turkey set a target of developing 1,000 MW of geothermal electricity generation capacity by 2023 (National Renewable Energy Action Plan, 2023) and has put in place a supportive legal framework to facilitate geothermal development. This target has been achieved as installed capacity of the Geothermal Power Plants (GPPs) have reached to 1,650 MWe at the end of 2020.

Besides an enhanced supporting regulatory framework, the exploration activities conducted by the General Directorate of Mineral Research and Exploration of Turkey (MTA) have been a critical driver behind geothermal development in the country. However, despite the critical role played by MTA in development of the sector, it no longer has the resource and mandate to undertake

extensive geothermal exploration drilling and thus assume the significant resource risk associated to early stage geothermal exploration, including exploration drilling. This has resulted in a significant slowdown in new geothermal exploration activities since most private investors who have acquired exploration licenses have limited technical/geological expertise and financial capacity for taking on such risks and confirm the presence of a source of geothermal energy and validate its commerciality (i.e. a level of productivity measured as MW of energy per well sufficient to ensure a positive return on investment). The lack of commercial debt and equity financing not only for the exploration, but also for the resource development phase, makes many license holders unable to develop their geothermal prospects.

In this context, the Government of Turkey (GoT) is committed to support the private sector to further scale up geothermal development and aims to do so by creating a mechanism to share the resource risk associated to the validation of geothermal resources and to facilitate financing for the resource development and construction phases of geothermal project development. The Geothermal Development Project (GDP) has been conceived to support the GoT create and implement those mechanism.

Objectives of the Geothermal Development Project Additional Financing

The primary objective of the GDP is to scale up private sector investment in geothermal energy development in Turkey. This will be achieved (i) by reducing the risks taken on by the private sector in the exploratory phases, and (ii) by providing access to long-term financing for the resource development phases. The Loan Facility will be open to any geothermal development that has reached the capacity drilling stage, regardless of whether it benefited or not from the Risk Sharing Mechanism under Component 1 of GDP Project.

An additional Finance Loan in the amount ……. has been provided to TSKB with the Loan Agreement signed on……. with IBRD and TSKB. This ESMF will be applicable to this additional financing loan made available to the loan component (component II) of the Turkey Geothermal Development Project.

2. LESSONS LEARNED

The Geothermal Development Project (GDP – parent project) is being implemented since 2016. This section has been prepared to reflect the experiences gained to date. Table below highlights the significant revisions made on the GDP's ESMF, based on lessons learned to date, to ensure that Additional Finance (AF) Project's E&S performance meets the requirements of TSKB and WB.

E&S Aspects	**Specific elements which have been revised or added to the ESMF**	**Related Section**
Description of Potential E&S Impacts	Section 3.1. Description of Potential Impacts has been prepared by considering all the environmental and social aspects related to the geothermal developments. This ESMF, which is prepared for the AF Project, gives an additional emphasis to Gender Based Violence and Community Health and Safety issues as can be seen in Section 3.1. (Description of Potential Impacts) and Section 3.2. (Description of Potential Measures).	Section 3.1. Description of Potential Impacts
Implementation of the E&S Mitigation Measures	The mitigation measures listed in Section 3.2 named Description of Mitigation Measures has been prepared after the experiences gained to date considering the existing Turkish environmental, social and health and safety-related regulations, WB policies, WBG General EHS Guidelines, WBG EHS Guidelines for Geothermal Power Generation and COVID-19 guidance notes in addition to WHO technical guidance developed for addressing COVID-19 and other accepted Good International Industry Practice (GIIP) standards/requirements. The Section 3.2 also includes an indicative budget for the preparation of Environmental and Social (E&S) Impact Assessment (ESIA) and E&S Management Plans for the sub-projects to enable compliance with ESMF requirements as well as a general budget as a ratio of the total investment cost, which depends on the nature and size of the proposed sub-project, for the implementation of the E&S Management Plans. This indicative cost will give an idea to the Sponsors on E&S compliance with WB requirements.	Section 3.2. Description of Mitigation Measures
E&S Monitoring	Due to increased number of sub-projects and subsequent E&S issues to be followed up closely on individual project sites, the capacity of the Project Implementation Unit (PIU) has been enhanced for the AF Project as can be seen in Section 6 - Institutional Arrangements. The section shows the TSKB's commitment to monitor the sub-projects efficiently to ensure that all sub-projects achieve a good level of E&S performance.	Section 6. Institutional Arrangements.
E&S Management	As companies with dedicated E&S capacity within their organizational chart performed a good E&S performance during GDP while the companies that do not have sufficient internal E&S capacity confronted difficulties in taking actions in a timely manner and performed less well than expected although they have been obtaining external consultancy services during the implementation of the projects, TSKB will require the Sponsors to establish sufficient internal E&S organizational capacity for the implementation of this ESMF and RPF requirements.	Section 6. Institutional Arrangements.
Cumulative Impact Assessment	This ESMF incorporates the key take aways from the Geothermal Cumulative Impact Assessment of Geothermal Resources in Turkey, which has been prepared by an Independent Consultant for the Ministry of Environment and Urbanization (MoEU) and the European Bank for Reconstruction and Development (EBRD).	Section 3.1. Description of Potential Impacts (Cumulative Impact Assessment and Management) Section 3.2. Description of Mitigation Measures
Climate Change	This ESMF covers the requirements on GHG monitoring and encourages the sub-borrowers to seek ways to minimize/reduce emitted NCG on best effort basis.	Section 3.1. Description of Potential Impacts (Climate Change)

	This ESMF also provides information about the recent regulatory requirements on continuous H2S monitoring.	Section 3.2. Description of Mitigation Measures Section 4. Turkish and WB Requirements and Key Differences (Environmental Permit and Hydrogen Sulfide Monitoring Requirements for GPPs)

The ongoing four subprojects of 3 sponsors have been analyzed for their E&S performance of ESMF and RPF implementation. Takeaways and lessons learned from the parent project are listed below. The projects that will take place under the Additional Finance (AF) in the future, will take into account these valuable outcomes.

E&S Management and Monitoring

Over the past years, changes in national legislation have led to enforcement of environmental and social regulations, which has helped create an awareness among sub-borrowers on E&S impacts and risks. Many parties have come to realize the advantages and opportunities generated by E&S risk mitigation for their projects. It is observed that the awareness created has not only increased among Creditors but also within Sponsors. Especially after the Multinational Development Banks began to finance renewable energy projects in Turkey directly or via TSKB, international practices are applied for most of the high risk geothermal projects in Turkey. This situation has resulted in setting a benchmark for other sponsors to apply these best practices. In projects to come, such practices will set an example and become widespread in the investment sector with the improvements made in the regulatory system.

During the GDP, the companies with dedicated E&S capacity within their organizational chart performed a good E&S performance while the companies that do not have sufficient internal E&S capacity confronted with difficulties in taking actions in a timely manner and performed less well than expected although they have been obtaining external consultancy services during the implementation of the projects. For the AF, TSKB will require the Sponsors to establish sufficient internal E&S organizational capacity for the implementation of ESMF and RPF requirements.

Due to increased number of sub-projects and subsequent E&S issues to be followed up closely on individual project sites, TSKB will conduct biannual E&S monitoring studies during the implementation of the AF. Within this scope, one site visit will be conducted by TSKB's environmental and social team annually during the construction phase and during the first two years of the operation phase.

PIU Capacity

TSKB is the first institution with an in-house technical specialist team in the Turkish finance industry. In the Engineering and Technical Advisory Department of TSKB, there are 15 engineers (in average) from different disciplines, such as environmental, mechanical, industrial, electronic, civil and chemical engineering. From the beginning of the parent project, all the sub-projects were studied with this experienced team which includes engineers from different branches. Thus, the PIU capacity has already been strengthened under the parent project. There are three engineers experienced in H&S, land acquisition and grievance management and monitoring issues within the PIU designed for AF.

Additionally, in order to further strengthen the PIU capacity, some developments are conducted

in the Sustainability Structure to enhance the capacity through E&S trainings. Social Impact Working Group including several members from the Engineering and Technical Advisory, Credit Evaluation and Marketing Departments was established 2 years ago. Members of this group (not limited with only WG members) took several trainings and experienced international good practices, which would help TSKB in the next phases of the project implementations. For the AF, PIU is further enhanced by the inclusion of the Vice President of Social Impact Working Group of TSKB and a team member from Project Finance Department.

Besides, the Climate Risks Working Group consisting of engineers, analysts and sector specialist was established in the beginning of 2020. The Working Group members closely follow the Task Force on Climate-related Financial Disclosures' (TCFD's) documents and sources, and participated in various sessions organized by UNEP-FI for the TCFD Pilot Project-2 on both physical and transition risks during 2020. The Climate Risks Working Group will be following the progress on Non-Condensable Gas abatement technologies.

It is to be noted that the PIU will coordinate the communications with the WB's Project Team as well as manage all the internal coordination processes regarding the AF. The PIU will also be guiding the project sponsors benefited from the AF on E&S requirements.

Cumulative Impact Assessment

Environmental and social impact assessment (ESIA) process is essential to assess and manage the environmental and social impacts of individual projects. During the process of identifying environmental and social impacts and risks, it should be recognized that actions, activities, and projects of the developers and project sponsors may contribute to cumulative impacts on valued environmental and social components (such as biodiversity, ecosystem services, natural processes, social conditions, or cultural aspects) on which other existing or future developments may also have detrimental impacts. It should be noted that the developments may be at risk because of an increase in cumulative impacts over ecosystem services they may depend on. Therefore, developers and project sponsors should avoid and/or minimize these impacts to the greatest extent possible.

In this context, cumulative impact assessment (CIA) and management is an essential framework for environmental and social risk management. CIA is an integral component of a good Environmental and Social Impact Assessment (ESIA), but it can also be a separate stand-alone process.

The "cumulative impact assessment" is part of the national EIA Regulation and included in the EIA General Format requirements. Although existing EIAs provide an assessment of environmental impacts, they do not include detailed and cumulative assessment of environmental, social and economic impacts on Valued Environmental Components (VECs) in practice. Where this is the case for EIA regulation and they do not base the study to the surrounding GPPs data, it becomes impossible to gather data from the other GPPs for an independent consultant when preparing CIA.

The best practices that can be applied by the stakeholders in Turkish geothermal sector have been recently defined and suggested in the (Draft) Geothermal Cumulative Impact Assessment of Geothermal Resources in Turkey (the Report) disclosed in July 2020, which has been prepared by an Independent Consultant for the Ministry of Environment and Urbanization (MoEU) and the European Bank for Reconstruction and Development (EBRD) with the financial support provided by the European Union (EU) to the EBRD through the Instrument for Pre-Accession Assistance

(IPA). (However, it is known that most of the companies abstain from sharing their data during the preparation of the Report.)

The Report can be used as a baseline for Denizli, Aydın and Manisa (located in Büyük Menderes and Gediz Grabens), where geothermal energy activities are most dense and local people are most sensitive. The Report has identified the legislative gaps and provided recommendations to improve legal framework in Turkey. Environmental and social recommendations and measures for drilling/testing, construction and operation phases of the geothermal projects are also included in the Report. It should be noted that TSKB has maintained regular communication with Geothermal Developers Association (JESDER) and other stakeholders during the preparation of the Report and the mitigation measures provided for the Sponsors in Section 3.2 are in parallel with the outputs of the Report. Therefore, this ESMF incorporates key take aways from the CIA Report's findings and recommendations when considering the mitigating measures proposed.

Land Acquisition

Participatory and timely engagement during the 'negotiation process' for land acquisition is an effective way of securing land acquisition results in minimal impact to land-based livelihoods while minimizing issues with local communities. Majority of the sub-borrowers in the parent project have chosen to negotiate with the landowners as they acknowledge the long-term relationship they will have with local communities and Project Affected Persons (PAPs). Efforts have been made to propose above market compensation fees (even above the Bank required replacement cost) for the lands and other assets lost to the sub-projects. Owners of such assets have expressed satisfaction towards efforts made to restore losses. Though majority of the land requirements for geothermal investments (well locations, pipeline routes and even for power plant location) emerge after the drilling phase, it is also important to closely manage and monitor the land requirements during the drilling of exploration wells. TSKB's review and screening process assesses the approach of the investor during this period, including how negotiations took place and if there was a system in place to collect any grievances on land use requirements of exploration wells. The process includes interviews with local people and village headman, investigation of the amount/percentage of lands acquired, the utilization of lands prior to acquisition or rental agreement, compensation of rental fee paid per m^2 and etc. For land acquisition processes that took place prior to TSKB's involvement, though there may be difficulties in gathering data or contacting landowners, a detailed ex-post study is put into practice to define land-based impacts that may have occurred in previous actions.

PAPs that were subject to land acquisition prior to TSKB's involvement in the projects have been interviewed under the Bank-approved ex-post social studies conducted by TSKB. The land use arrangements and the acquisition processes have been investigated to confirm that transactions took place on a voluntary basis with a willing buyer willing seller approach adopted by all investors. Research on market values of land at the time of acquisition have proven that payments made under willing transactions were above market value and satisfied Bank requirements in terms of compensating at replacement cost. All payments made were found to be inclusive of the amounts that would be necessary to cover any additional transaction costs including taxes to buy new land. Results of these investigations have been successfully documented in the ex-post social audits conducted by TSKB. In addition to compensation at replacement cost, the ex-post audits have also revealed that investors have made additional efforts under their Corporate Social Responsibility (CSR) activities to further improve and support the living conditions of the affected people and communities. As the CSR activities are continuous throughout the projects, investors are able to maintain meaningful support to livelihoods. TSKB continues to monitor the satisfaction of the PAPs and communities through site visits, and ensures that investors provide TSKB

additional information as it becomes available during the course of the project. Third party monitoring reports prepared by independent E&S consultants hired by the investors are and will be reviewed for each investor and TSKB will ensure that all investors have a functional GRM to inform project progress on any possible negative impact that may rise from project activities. These previous applications have proven to serve purpose and will continue to be adopted by TSKB in the Additional Finance for investments.

NCG Emissions

Due to some grievances from the region, Aydın Provincial Directorate of Environment and Urbanization requested all geothermal plants to monitor annual H_2S, NH_3, SO_2, NO_2, PM_{10} ambient air concentration levels for a duration of 2 months. But for CO_2, such monitoring is not mandatory by legislation. Currently, World Bank has conducted a study for prediction of lifetime emissions for Gediz and Menderes Grabens and TSKB will adapt its works according to the outputs of this study. Please see the details of the output the study as well as the arrangements made for GDP- AF project in Section 3.1 w) Climate Change.

Regular CO_2 emissions monitoring and reporting will remain a requirement for sub-projects financed by the AF. TSKB will continue to require the sponsors to carry out direct emission measurements at least twice a year as well as indirect measurements on a regular basis. This data will be included in TSKB's semi-annual progress reports.

Community Opposition to Geothermal Developments

Based on the Cumulative Impact Assessment (CIA) Report prepared for the MoEU and the EBRD in 2020, the distribution of negative news published on the internet between the years 2016 and 2019 (with a total number of 182) are as follows: Aydın (48%), Manisa (32%), Denizli (6%) and other provinces (14%), respectively. The common opposition issues in Turkey include odor problem (caused by Hydrogen Sulfide (H2S) with rotten egg smell), impacts on air quality (due to dust emissions during construction phase and Non-Condensable Gases (NCGs) emitted during operation phase), soil quality (potential for uncontrolled leakages and discharges, and uncontrolled disposal of drilling mud and waste), surface water quality (potential discharge of geothermal fluids into surface waters) as well as impact on agricultural activities (claimed decreases in the soil yield and product quality due to geothermal operations and potential discharge of geothermal fluids into irrigation channels) and public health (health concerns due to heavy metal accumulation in water resources, soil and air).

TSKB notes that reducing the public response can be ensured by implementing an effective communication process from the beginning of the investment process and by informing the local communities regarding the measures to be taken in/around the project area during both construction and operation phases, as well as by the dissemination of these practices periodically. Within this scope, organizing public meetings, conducting facility on-site visits, preparation of informative brochures, videos and public spots is very important for the geothermal investors to overcome the public opposition to the geothermal investments.

In order for the Sponsors to not confront with community opposition, the Sponsors are required to implement this ESMF to ensure that E&S risks and impacts are managed properly. The Sponsors should also consider the CIA Report and Best Practice Guide prepared for EBRD and MoEU in 2020 during the exploration, development and exploitation phases and also closely follow the recommendations and guidance documents prepared by JESDER and governmental bodies as well as other geothermal energy-related institutions. The Sponsors should also use

proactive communication with JESDER, governmental bodies, and other stakeholders in a proactive way to ensure that cumulative risks and impacts are effectively managed. TSKB will continue to encourage the Sponsor to implement good practices and proactive communication with the stakeholders for the management of cumulative impacts during the AF.

TSKB has not experienced a significant public opposition to the geothermal power plant projects that it financed under the GDP. Behind this success, there are the Stakeholder Engagement Plans (SEP) including Grievance Mechanism (GRM) required to be implemented for each sub-project. TSKB will ensure that a SEP including GRM is prepared and implemented effectively during the implementation of AF as well.

Community Engagement and Benefit Sharing Mechanisms[3]

All sub projects financed by TSKB have shown efforts to include corporate social responsibility (CSR) projects within their investments. Project sponsors are generally receptive to community needs that would benefit a certain vulnerable group (children, farmers, people with limited access to certain services etc.) and provide support in areas that create a value added in local development. Though these activities may mostly have target groups there are also activities that are designed for the entire community. Such projects consider inclusion of women however it is not always possible to encourage women (villagers) to participate and voice their needs. Thus, to the extent possible, such obstacles are overcome with robust stakeholder engagement strategies. Under the parent project, all subprojects had Stakeholder Engagement Plans prepared by the Sponsor and are implemented. Focus groups meetings and discussion held for particular groups have proven to succeed in involving vulnerable groups including women of rural communities. Hence, targeted and repetitive consultation with such groups are key for inclusion. In addition to this, the geothermal investors association of Turkey (JESDER) has initiated a new platform for investors on how to improve the environmental and social outcomes as well as strategize the community participation in geothermal investments.

The new AF will strengthen measures to include vulnerable groups and have women-specific meetings as part of meaningful and continuous stakeholder consultations as detailed in the Stakeholder Engagement Framework (SEF) for the Project. Although no community opposition was recorded in any of subprojects supported by TSKB with WB funds, still the local communities have low social acceptance levels for the geothermal investments in the country in general. This is due to lack of accurate information about the investments and its benefits as well as lack of sustainable benefit sharing mechanisms that involve more local needs and aim increasing the buy-in of local communities. Many of the sponsors do pay attention to increase local supply and local employment in their projects and have continuous CSR activities to support local communities but this has not been in the form of a shared-value system but rather an in-kind or a social aid-type of assistance to the affected communities. Based on the WBG GIIPs, WB-IFC report[4] and EBRD and MoEU's latest Best Practice Guide for Geothermal Investments[5] in Turkey shows that the more the geothermal investments increase their direct use proportion the more accepted they

[3] According to World Bank and IFC's joint report *'Improving the Investment Climate For Renewable Energy Through Benefit Sharing, Risk Management and Local Community Engagement*, good-practice definition of "benefit sharing" is the proactive, systematic effort to identify, maximize, and equitably distribute benefits to directly or indirectly affected communities. The goal of benefit sharing is to increase and share the wide-ranging benefits of investments with local communities and ensure socially inclusive and sustainable development.

[4] World Bank and IFC. 2019. Improving the Investment Climate For Renewable Energy Through Benefit Sharing, Risk Management and Local Community Engagement

[5] EBRD and Ministry of Urbanization and Environment, 2020, Cumulative Impact Assessment of Geothermal Resources in Turkey: Best Practices Guide http://www.jeotermaletki.com/en/announcement/2015/draft-best-practice-guide-has-been-published

are by the local communities and hence, stir the local economy. Therefore, the potential sponsors under the new AF will be encouraged to consider the following (either one or more), but not limited to, in their geothermal investment planning:

- Ensure direct use of geothermal resources that are available, affordable and accessible for the local communities to engage in livelihood generation options (ie. especially in agricultural use for greenhouse heating, drying of agricultural crops, fish farming, milk pasteurizing etc)

- Allocate a certain percent of their revenues to the local economic development (the EBRD and MoEU's best practice guide and the CIA advises around 1 percent as good practice)

- Include a Community Investment Program and assign a budget for this under the Project budget

Grievance Mechanism

Previously financed sub projects have established a project GRM in line with the project's Stakeholder Engagement Plans in order to collect grievances of PAPs in particular and other stakeholders. Sub borrowers have been encouraged to have designated communications officers on site to enhance and maintain continuous dialogue with local community. While the GRMs employ various tools to collect grievances it has been observed in majority of the sub projects that written communication is not preferred that much in Turkish culture. The local people in sub-projects prefer to transmit their suggestions or complaints verbally since people think it is time-consuming as the feedback would not be immediate. Thus, grievance forms or grievance boxes installed have not been used as anticipated. Having a community liaison officer or a public relations staff on board has been preferred in many of the sub projects financed up to date. Still, TSKB and sub-borrowers show utmost effort to create awareness on other means of communication and encourage written communication via announcements, grievance boxes, forms, dedicated staff etc. TSKB is very well aware the implementation of the GRM effectively and will continue to require that, all grievances received (including ones verbally communicated) by the sponsors are all recorded in a grievance log for proper and timely monitoring during the AF.

Hybrid Projects

Energy Market Regulatory Board (EMRA) published a new regulation that enables the use of hybrid technology in power plants in the 2nd half of 2020. With the regulation, renewable energy facilities will also be able to establish auxiliary power plants.

Especially in geothermal energy-based power plants established in agricultural regions, solar panels or biomass-based auxiliary resource units can be established which will increase the electricity production.

TSKB will keep on following closely the developments in hybrid projects and will give best effort to guide and confront sub-borrowers to develop such projects.

Regulative Obstacles

Regarding the possible cases that are not defined by law and/or in the regulations, TSKB and E&S Consultant (if assigned) are guiding the Sponsors for alternative solutions considering the

best practices. The main obstacle here is, these kinds of works may not be officially documented, and can only be reported in monitoring reports and verified by TSKB during the site visits and document review process.

Gender Aspects

No sexual harassment and sexual abuse and exploitation issue has been occurred and reported in the sub-projects during the implementation of the GDP.

The lessons learned on women-specific engagement meetings show that more efforts to reach out to women and consider culturally appropriate venues for women consultations need to be put in place by Sponsors. Given that direct-use of geothermal resources in greenhouse is being promoted for drying fruit and is becoming an important source of women employment for the local communities, more gender specific actions will be integrated in the AF project.

The Gender Gap Assessment prepared by the Bank has been finalized and actions to reduce the gender gap in the geothermal sector has been integrated into Project design. TSKB, an FI experienced in gender-equality related project financing, will commit to fulfil the Project's corporate requirements in gender and citizen engagement.

3. ENVIRONMENTAL AND SOCIAL FRAMEWORK

An Environmental and Social Management Framework (ESMF) sets a technical guidance in organizing and handling environmental and social assessment and management for projects whose specific location and characteristics (e.g. dimensions, design) are yet to be defined. The ESMF presents the necessary compliance requirements for prospective investments to achieve approval of national laws as well as the provisions of the World Bank Environmental and Social Operational Policies (4.01 and 4.04, a separate Resettlement Policy Framework is prepared under OP 4.12 safeguard policy).

Geothermal energy is a renewable source of energy, which reduces pressure on declining fossil fuel sources while contributing to protection of ambient air quality by helping reducing emissions of pollutants. Geothermal energy, like other renewable energy sources, also has potential adverse environmental and social impacts as detailed in the following headings.

3.1. DESCRIPTION OF POTENTIAL IMPACTS

Resource Development and Power Plant Development Phases

The main components of a geothermal power project are production wells, reinjection (or recharge) wells, brine and condensate pipelines, pumping station(s), and the power plant. There will be also new access roads and land clearing as necessary to facilitate development. Opening production and reinjection wells requires deep drilling. Well depth can vary greatly depending on the characteristics of the reservoir and the location of the resource from about 1,000 m to over 2,500 m.

Most potential environmental and social impacts of geothermal development are associated to the resource and power plant development phases. A summary of such impacts is presented below:

a) Fluids Involved in Geothermal Drilling and Production

Effluents of geothermal development projects can be classified as i) drilling fluids; ii) spent geothermal fluids; iii) reject water from injection wells; iv) well cleaning water (for clogging); and v) domestic wastewater.

i. *Drilling Fluids:* Freshwater is commonly used as a drilling fluid (circulation water) during drilling in the production zone of the reservoir. The purpose of the drilling fluid is to cool and lubricate the drilling equipment and carry rock cuttings out of the well. In some cases, synthetic drilling polymers are injected to form high-viscosity polymer slugs to facilitate clean-out. Commonly used drilling polymers include xanthan gum and starch and cellulose derivatives. Geothermal water extracted during well testing period is also considered as a drilling fluid. In some cases, geothermal water may be saline and contain elevated concentrations of components such as Arsenic and Boron.
ii. *Spent Geothermal Fluids:* These effluents consist of water from steam separators and condensate derived from spent steam condensation following power generation.
iii. *Reject Water from Injection Well:* These effluents are produced during reinjection of geothermal water. This is a small amount, which is rejected by the geothermal source due to pressure.
iv. *Cleaning Water:* During the operation of wells, periodical cleaning is sometimes done using chemicals including strong acids, most commonly hydrochloric acid. The acids dissolve and remove mineral deposits from the wells and the surroundings. Before wells are subjected to acid treatment, it needs to be ensured that the well casings are leak proof to prevent any leakage of the acids to shallow groundwater aquifers. The acids are partially neutralized by dissolving the deposited minerals and then diluted through post-injection of fresh water or geothermal brine and finally by mixing with geothermal fluids in the reservoir before discharge.
v. *Domestic Wastewater:* These effluents are produced as a result of daily activities of workers during surface exploration, drilling and operation of a geothermal project.

b) Drilling Mud

Water based drilling mud (please note that oil-based drilling mud is prohibited in WB funded projects) is sometimes used as a drilling fluid in geothermal drilling, particularly when drilling through the cap rock of the reservoir. Drilling mud typically consists of water mixed with bentonite (a natural clay). Additives are used to control the viscosity and density of the mud. These additives include xanthan gum and starch and cellulose derivatives for viscosity control and solid barium sulfate for density control. The drilling mud is recycled during drilling and the rock cuttings are separated from the mud on shaker boards. Drilling muds are processed with activated carbon, and reused.

If the rock cuttings consist of environmentally benign rock types they can be disposed of in landfills. This is a practical and economical way to dispose of solid waste materials that can be used in most cases. Reuse opportunities such as brick making according to characteristic of the drilling mud may also be evaluated. However, cuttings may be classified as hazardous depending on the concentration and potential for leaching of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals. In such cases, cuttings need to be disposed of appropriately.

c) Groundwater

Potential impacts on groundwater during the different phases of a geothermal project can range from low to high. Survey activities would typically have little or no impact on groundwater. If geothermal drilling is carried out according to best practices regarding use of drilling fluids and well casing, it is very unlikely that geothermal water can contaminate ground water aquifers. However, casing failures in either production or reinjection wells may create pathways for geothermal fluids to mix with groundwater at shallow levels. The depth of the casing leak will determine whether the geothermal fluids will flow out of the well or groundwater will flow into it. Casing leakages will, in both cases, reduce the productivity of the geothermal wells and may degrade the quality of shallow groundwater aquifers. If important freshwater aquifers overlie geothermal reservoirs that are under production it is important to install monitoring wells to monitor ground water composition and temperature. It is particularly important to ensure that well casings are leak proof in wells that undergo acid treatment for mineral deposit removal.

Extracting geothermal fluids could also cause drawdowns in connected aquifers, potentially affecting flow from geothermal springs. The potential for these types of adverse effects is moderate to high depending on the hydrological conditions. This impact can be reduced through extensive aquifer testing and proper geothermal development planning. Monitoring wells should also be opened to monitor water levels. In terms of the quantity of resource, cumulative impacts that are caused by multiple producers (i.e. sponsors) using the same reservoir are important, and should be taken into consideration when there are two or more geothermal projects in same geothermal reservoir. In such cases, Cumulative Impact Assessment, which is detailed in the following heading (d), should consider the impacts from the multiple geothermal developments on the reservoir.

d) Cumulative Impact Assessment and Management

During the process of identifying environmental and social impacts and risks, it should be recognized that actions, activities, and projects (can be defined as geothermal developments) of the developers and project sponsors may contribute to cumulative impacts on valued environmental and social components (VECs) (such as biodiversity, ecosystem services, natural processes, social conditions, or cultural aspects) on which other existing or future developments may also have detrimental impacts. It should be noted that the developments may be at risk because of an increase in cumulative impacts over ecosystem services they may depend on. Therefore, developers and project sponsors should avoid and/or minimize these impacts to the greatest extent possible.

Geothermal developments may have impact on air quality, soil quality, surface water quality and groundwater quality, climate change as well as on economic activities such as agriculture and tourism if the impacts are not properly managed. Impacts on VECs will be higher in the areas where multiple developments exist as observed in Aydın, Manisa and Denizli provinces. However, their positive impacts can be enhanced and negative impacts can be minimized by using and implementing the best practices in the sector. Within this scope, the International

Finance Corporation (IFC) Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (IFC Good Practice Handbook) as well as the outputs of the Cumulative Impact Assessment of Geothermal Resources in Turkey project detailed in the section Lessons Learned can be used as guide documents to implement best practices for identifying, assessing and managing the cumulative impacts.

The "Cumulative Impact Assessment (CIA)" is part of the national EIA Regulation and included in the EIA General Format requirements identified for the projects listed under Annex I of the EIA Regulation. Although existing EIAs provide an assessment of environmental impacts, they do not include detailed and cumulative assessment of environmental, social and economic impacts on VECs in practice. Therefore, preparation of a CIA as a component of an Environmental and Social Impact Assessment (ESIA) or a separate stand-alone study will be required as mentioned in IFC Good Practice Handbook.

Preparation of a Cumulative Impact Assessment (CIA) is appropriate whenever there is a concern that a project or activity under review may contribute to cumulative impacts on one or more VECs. CIA is also appropriate whenever a proposed geothermal development is expected to have significant or irreversible impacts on the future condition of one or more VECs that also are, or will be, affected by existing and planned developments.

As noted in the IFC Good Practice Handbook, a CIA involves a complex governance structure and consultation with several parties and stakeholders to determine the VECs to assess, the baseline data requirements and sampling methodology, acceptable future conditions of VECs, indicators and thresholds, mitigation measures, monitoring protocols, and supervision mechanisms. The CIA study will be conducted in close coordination with governmental authorities, community and the other developments located around the proposed project.

When a government-led CIA exists, or when there are clear requirements related to a specific management unit (e.g., watershed, airshed, flyway, or landscape) resulting from regional, sectoral, or integrated resource or strategic planning efforts, private sector actors simply need to comply with the overarching requirements of the existing CIA. Although, the Report Cumulative Impact Assessment of Geothermal Resources in Turkey suggesting recommendations and measures to minimize the impacts of geothermal developments on their impact area is in place, it is not binding for geothermal developers and investors at this stage. However, the outputs of the study will be integrated into the environmental and social assessment process of the subprojects.

During the project implementation, if a CIA assessment is needed to be prepared in line with the project, the methodology for the CIA will follow the Rapid Cumulative Impact Assessment (RCIA) process suggested by IFC Good Practice Handbook[6]. The Handbook recommends the use of a RCIA tool as an alternative to CIA. RCIA requires a desk review that should be conducted in consultation with the affected communities and other stakeholders. RCIA will enable the developer to determine whether its activities are likely to significantly affect the viability or sustainability of selected VECs. RCIA is a valuable tool for emerging markets like Turkey where there are many challenges associated with managing a good CIA process include lack of basic baseline data, uncertainty associated with anticipated developments, limited government capacity, and absence of strategic regional, sectoral, or integrated resource

planning schemes.

RCIA consists of six-steps including:

- Scoping phase I – VECs, spatial and temporal Boundaries
- Scoping phase II – Other activities and environmental drivers
- Establish information on baseline status of VECs
- Assess cumulative impacts on VECs
- Assess significance of predicted cumulative impacts
- Management of cumulative impacts – design and implementation

In addition to the preparation of a RCIA to assess the potential cumulative impacts, the Sponsors are responsible for preparing and implementing project-specific E&S management plans to manage their impacts on the environment in line with the regulatory requirements as well as the mitigation measures provided within this ESMF, which is prepared in line with the Cumulative Impact Assessment Report and Best Practice Guide prepared for MoEU and EBRD.

The Cumulative Impact Assessment Report highlights the importance of the proper management of individual impacts of geothermal projects on air quality, odor, surface/ground water quality, soil quality, noise, visual impacts, flora and fauna and archeological sites to limit the cumulative impacts from other developments, sectors and activities. The Best Practices Guide provides examples of good practices from different parts of the world and recommendations to manage geothermal resources in a sustainable way and to maximize the public benefit. Best environmental practices on energy consumption, water consumption, waste management, air quality and odor management, noise management and visual impacts management, are provided within the Best Practices Guide.

The MoEU has placed a special emphasis on geothermal investments due to the public oppositions and closely monitors the geothermal projects. In 2019, Aydın Provincial Directorate of Environment and Urbanization required all geothermal plants to monitor ambient air concentration levels of Hydrogen Sulfide as well as Ammonia, Sulphur dioxide, Nitrogen dioxide and Particulate matter for a duration of 2 months. Besides, odor emissions were required to be monitored by the Directorate. The MoEU has made important amendments (recently, in November 2020) on the related regulations for the management of environmental impacts of the geothermal investments (Please see Section 4 for details). The Sponsors shall follow and implement the requirements of the amended regulations. It should be also noted that the Sponsors shall apply to the related governmental organizations to conduct further environmental analysis (for example, drilling a groundwater quality observation well) as per ESIA and ESMP of their projects.

Regarding the responsibilities for the management of cumulative impacts, the Sponsors should also consider the CIA Report and Best Practice Guide during the exploration, development and exploitation phases and also closely follow the recommendations and guidance documents prepared by JESDER and governmental bodies as well as other geothermal energy-related institutions. The Sponsors should use proactive communication with JESDER, governmental bodies and other stakeholders in a proactive way to ensure that cumulative risks and impacts are effectively managed.

TSKB will continue its E&S monitoring studies for each sub-project to ensure that the ESMF requirements are implemented and also encourage the Sponsors to implement good practices and proactive communication with the stakeholders for the management of cumulative impacts during the AF.

e) Surface Water Sources

Impacts on water resources during the different stages of project development would range from low to high. Surface exploration activities would have little or no impact on surface water.

Temporary impacts on surface water may also occur as a result of the release of geothermal fluids during well testing, if they are not contained. Geothermal fluids are hot and often highly mineralized and, if released to surface water, could cause thermal changes and changes in water quality. Accidental spills of geothermal fluids could occur due to well blowouts during drilling, leaks in piping or wellheads, or overflow from sump pits.

Additionally, surface or groundwater use can be necessary during exploration, well drilling and facility operation. Furthermore, depending on the operation of facility, water can be used in cooling system. Cumulative impacts will also be taken into account by the sub-borrower during the environmental and social impact assessment studies considering that some of the geothermal projects could be considered as large water users. Surface and groundwater quality may also be adversely affected due to direct discharge of wastewater. Treatment or connection to municipal network should thus be made where necessary.

f) Solid and Hazardous Waste

Geothermal exploratory drilling projects do not generate substantial amounts of solid waste. Apart from drilling mud, other wastes produced by drilling include used oil and filters, spilled fuel, spent and unused solvents, scrap metal, pipe dope, etc.

Similar waste will be produced during construction (including capacity drilling) and operation of a geothermal project. Sulfur, silica, and carbonate precipitates are other typical wastes collected from cooling towers, air scrubber systems, turbines, and steam separators.

Domestic solid waste, packaging waste, non-hazardous wastes (e.g. paper, plastic and glass) can be generated as well. These types of waste can also result in deterioration of soil and groundwater quality unless they are stored separately, and disposed of properly. Solid and hazardous wastes should be managed in line with Turkish legislation and World Bank Group (WBG) General and Sector-specific EHS Guidelines. In this context, circular economy opportunities will be assessed before the construction of projects.

g) Noise

Primary sources of environmental noise associated with exploration and drilling wells include drill rig operations, seismic surveys, blasting, earth-moving equipment (related to road, well pad, and sump pit construction), and vehicle traffic. During well operations steam flashing and venting is another source of noise source.

In construction phase, increase in environmental noise will occur during cut and fill works, construction activities and drilling activities. Procurement of equipment and materials, procurement of water to be used for construction activities, procurement of drinking water, disposal of domestic wastewater and solid waste by related authorities and firms' disposal trucks will temporarily increase environmental noise levels due to increased traffic load.

In operation phase, some plant components (cooling tower fans, ejector, binary turbine expander, compressors, pumps, generators etc.) will contribute to environmental noise levels in the vicinity of the project area. Also, procurement of equipment and materials such as drinking water, disposal of domestic wastewater and solid waste by related authorities and firms' disposal trucks will increase environmental noise levels due to increased traffic load.

Consequently, restrictions will be applied through-traffic in residential areas by a good delivery schedule in both construction and operation periods of projects. Any grievance received from the stakeholders will be followed up through project GRM and via implementation of the Stakeholder Engagement Plan in order to ensure that project does not represent any risk on nearby residents.

In order to assess impacts on noise levels, baseline noise surveys should be conducted and potential increase in the existing noise levels during construction and operation phases should be assessed considering national legislation and WBG EHS guidelines during the environmental and social impact assessment studies by the sub-borrowers together with any possible cumulative impacts on this issue. Noise monitoring programs near sensitive receptors could also be established depending on the E&S assessment results.

h) Air Emissions

Major air emissions resulting from activities of geothermal resource utilization are CO_2, H_2S, CH_4, NH_3, N_2, H_2 emissions (also called as Non-condensable Gas (NCG) emissions). Among these, CO_2 and H_2S have the highest ratio whereas other emissions are released in trace amounts.

Presence and concentration of potential air pollutants varies depending on the characteristics of the geothermal resource. Some of the toxic air pollutants such as hydrogen sulfide and mercury can be contained in geothermal fluids. Besides these chemicals, geothermal fluids can also contain environmentally sensitive gases such as carbon dioxide and methane. Mainly release of these gases can lead to occupational health and safety problems, especially in confined spaces within power plants and wellhead cellars and during initial discharge. However, depending on the chemical characteristics of geothermal resource, release of these gases can lead major air emissions and corresponding impacts. Greenhouse gas (GHG) emission from geothermal projects is commonly smaller as compared to fossil fuel combustion sources. Some geothermal fields can, however, have high GHG emissions as a result of specific geological conditions. During preparation of the Project, it became clear that geothermal power plants located in the Menderes and Gediz grabens in Turkey have relatively high CO2 emission factors. Assessments based on nine active geothermal plants in the Aegean region show emissions ranging from 400 to 1,300 g/kWh, with a weighted average of 1050 g/kWh. These values are about an order of magnitude higher than the global average emission factor for geothermal power plants, 122 g/kWh. This is a result of the unique and unusual geological setting of the Turkey's Aegean region geothermal systems, where high temperatures are present in carbonate rock dominated geology. In all likelihood, based on available data, this problem will not arise to a similar extent outside of those two grabens. Since geothermal is largely considered a non-CO2 emitting renewable energy source, there are currently no emission standards in Turkey that constrain CO_2 emissions from geothermal power plants and developers are not required to monitor or report their gas emissions either. In the AF of Geothermal Development Project, rather than setting a higher limit for such projects, monitoring of CO_2 emissions will be more meaningful as conducted in the first part of the Project (GDP), in which the main obligation there was to monitor all the financed projects emissions regularly.

Air emissions can occur during well drilling and flow testing activities. The open contact condenser / cooling tower systems is another source of air emissions during operation of the power plant. Well-field and plant-site vent mufflers can also be potential sources of hydrogen sulfide emissions, primarily during upset operating conditions when venting is required.

i) Odor

Double fluid (Binary Cycle System) technology and re-injection method used in plants, due to the target giving all geothermal fluid back to reservoir. Under the pressure, the H_2S gas is in melt form inside the geothermal fluid and comes off when the pressure drops and it is released outside from the transmission lines bluff. Thus, odor emissions at geothermal power plants are basically sourced from H_2S gas release.

Irritating H_2S odor can cause exposed people to feel uncomfortable and anxiety. This problem can be prevented by regulating the pressure in the supply line.

H_2S has an odor detection threshold of 0.2-2.0 $\mu g/m^3$ depending on its purity. It also leads to odor-related disturbances at concentrations below concentrations that pose health risks. The World Health Organization (WHO) recommends that the concentration of H_2S gas in the air should not exceed 7.0 $\mu g/m^3$ on average of 30 minutes in order to avoid odor disturbance.

The scope of the planned sub-projects should comply with the Provisions of Regulation of the "Odor Creator Emission Control" which has been published on date 19.07.2013 and in Official Gazette numbered 28712. However, the regulation does not provide limit values for H_2S emissions. Therefore, within the scope of odor assessments WHO guidelines should be complied with.

Odor emissions can be controlled by using abatement measures and monitoring studies should be conducted. In case of any grievance the frequency of monitoring should be increased and comprehensive measures should be taken. During the cumulative impact assessment and management studies, air quality (smell) should also be considered as one of the VECs.

j) Well Blowouts and Pipeline Ruptures

Although not common, well blowouts can occur during the drilling and operation stages of a geothermal sub-project. These accidents can cause release of toxic fluids containing chemicals and heavy metals, and gases (i.e. hydrogen sulfide). Pipeline ruptures can also occur during drilling and operation. Such failures may also result in precipitation of minerals (silica and calcium carbonate) and release of geothermal liquid and steam containing heavy metals, acids, and other pollutants into the surface environment. Well blowouts and pipeline ruptures need to be assessed and addressed through the Emergency Preparedness Response Plan.

k) Natural Resources and Natural Habitats

Geothermal projects must comply with the EU Habitat Directive on the protection of natural habitats and wild fauna and flora. As per the paragraph 3 of Article 6 of the Directive, if the project proposals are considered to have a significant impact on the objectives of protecting community areas, an appropriate assessment is required. As an eligibility criteria, the projects in critical habitats as well as the projects having adverse impacts on natural habitats (based on E&S assessment) will be avoided (National protected areas are defined as critical habitats).

In general, impacts on ecological resources can be low to moderate and localized during exploration, drilling and plant operations. Activities such as site clearing and grading, road

construction, well drilling, ancillary facility construction, and vehicle traffic have the potential to affect ecological resources by disturbing habitat, increasing erosion and runoff, and creating noise at the sub-project site.

Depending on the project location, critical habitats and natural habitats may be important concerns in terms of project impacts and a major constraint for site selection.

Critical habitats and natural habitats around the project area must be well defined during the E&S assessment and any indirect impacts on them must be avoided. Site investigations should be conducted in the convenient season for critical habitat and natural habitat designation as defined by the WB policies. This investigation must be done before site selection or at earlier stages of construction in order to avoid impacts on critical habitats and natural habitats, if exist any. When correct season is missed for designation, site investigations make no use therefore, early steps should be taken for designation and site selection should be done accordingly for effective preservation of natural habitats.

The projects in critical habitats and projects having adverse impacts on natural habitats are not eligible for financing. In projects with natural habitat components, project preparation, appraisal, and supervision arrangements include appropriate environmental expertise to ensure adequate design and implementation of mitigation measures.

A comprehensive biodiversity assessment is needed within the content of E&S assessment studies in order to avoid the disturbance of natural habitats and critical habitats and impacts on endemic species near the project area. Interaction with Key Biodiversity Areas and EU Habitats Directive are useful to address the risks regarding threatened, endangered and sensitive (https://www.wfrc.org/new_wfrc/crmp/threatened-endangered-sensitive-species/) flora and fauna species. Depending on the results of biodiversity assessment studies, biodiversity management plan may be required from the investors.

l) Land Use

In general, impacts on land use due to geothermal activities are temporary and localized. These activities could create a temporary disturbance in the immediate vicinity of surveying or drilling sites. The magnitude and extent of impacts from constructing access roads would depend on the current land use in the area. All other uses of land under well pads would be precluded as long as they are in operation. Surface exploration activities are unlikely to affect mining, energy development activities or livestock grazing on surrounding lands.

Land clearance and stripping may result in loss of vegetation and topsoil. Hence, good management practices should be implemented in order to minimize such impacts, and reinstatement should be made where necessary. Loss of vegetation and significant alteration of topography during excavation for site leveling may cause soil erosion and transport of soil into surface water bodies. The latter may result in increased turbidity and hence poor aquatic habitat quality.

Alternatives should be considered to avoid or minimize physical and economic displacement; and effective mechanisms should be established to minimize displacement, to the extent possible, during project implementation. Where it is not possible to avoid economic displacement, which may be the main concern for the upcoming geothermal subprojects in Turkey, relevant activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits.

m) Well Abandonment and Site Restoration/Reclamation

At the end of operation of a well or if a well fails to provide thermal groundwater, well should be closed with concrete. This will protect other aquifers and living things from adverse impacts of hazardous gases and other hazardous substances that may originate from well.

If well abandonment process is not carried out with respect to international good practices, it could present risks to health and local environment. Such situations could harm groundwater and ecosystems. It is also possible for abandoned wells to be significant emitters of methane into the atmosphere. Furthermore, brine present in wells dug into shale formations can contain some radioactive and toxic substances that contaminate groundwater if the well leaks. Plugging wells can reduce the risk of explosions and protect groundwater. Environmental impacts due to leakages can also pose risk for community health and safety. Hence, a community health and safety plan covering these risks and well closure plans and procedures for well abandonment may be required depending on the E&S assessment results. Well closure plans and procedures should be in line with national legislation and WBG EHS Guidelines.

n) Cultural Resources

The term 'cultural heritage' encompasses tangible and intangible heritage, which may be recognized and valued at a local, regional, national, or global level.

Geothermal development activities may cause impact on physical cultural resources known to be of local, regional or national significance based on proposed national or provincial lists identified during public consultation with local affected groups. A baseline study will be carried out on cultural resources to identify risks of the Sub-project and adverse impacts on cultural heritage will be avoided.

Also, "Chance Find Procedure" should be established in the construction phase to avoid any adverse impact on cultural heritage. A protocol should be signed with Ministry of Culture and Tourism related with the actions to follow and excavation studies to perform in case of incidental findings are met during construction phase of the planned facility.

o) Expropriation

From social point of view, development of geothermal resources may involve occupation of large areas depending on the scale of sub-project (i.e. number of wells, length of pipelines, and size of power plant and separator stations). Hence, a land acquisition process is implemented. Where the sub-project area is not government property, expropriation is required, which may be among the major impacts associated with geothermal development, similar to the case in other energy generation investments.

When third parties (such as renters, squatters or other users of land) are affected, informal/illegal land users should be compensated for lost assets and provided with assistance in relocating, if needed, as noted in the Resettlement Policy Framework of the project.

p) Other Social Impacts

The construction period may create impacts on the current infrastructure such as roads and irrigation. Also, access to public services may be limited in case road infrastructure is damaged especially during construction of pipelines. There may also be labor influx to sub-project area during construction. Sub projects are likely to create new job opportunities and support local economy through local procurement which may have positive impact on livelihoods.

The construction of geothermal plants can cause visual intrusion if not carefully planned. The sub-project area should be thoroughly assessed in this respect during the planning and design stage. Using equipment with neutral, non-reflective colors that blend with the surrounding rocks or trees can reduce the visual impacts. During drilling and construction of the plant, the visual impact may be temporary, though notable. Costs and means of minimizing these impacts must be determined prior to implementation.

Majority of the geothermal sources are also located among agricultural lands which constitutes an important percentage of livelihood sources in these areas. Loss of such land to geothermal investments should be carefully examined and if possible, avoided during project design. However, where inevitable, mitigation measures to compensate for and restore land-based livelihoods should be in place. Land based impacts will be defined in sub project specific land acquisition plans prepared in line with RPF and assessed via ex post social reviews so that certain livelihood measures can be planned ahead.

Positive aspects of geothermal development sub-projects may be enhanced through employing certain benefit sharing activities that enable investors to provide certain services to nearby communities. These services may include but not be limited to providing geothermal heating to the nearest settlements and/or industries or farms. This may also be advantageous in terms of sub-project costs if it results in removal of condenser from sub-project formulation.

q) Sexual Harassment (SH) and Sexual Abuse and Exploitation (SEA)

The environmental and social risks posed by geothermal energy sub-projects can affect men and women differently. By such risks, geothermal sub-projects may inadvertently lead to adverse outcomes that disproportionately disadvantage women. Sub-project developers must ensure that prevention and response measures for SH/SEA and other concerns are adopted across the sub-project cycle to minimize negative impacts on women and men.

The sub-borrowers must sensitize contractors and the local community to the potential risks associated with a large influx of male construction workers in the sub-project area, ensure the adoption of codes of conduct agreements with workers, and support regular safeguards monitoring and reporting, along with a robust Grievance Redress Mechanism (GRM). In high-risk sub-project areas, developers may consider partnering with service providers who can provide health and counseling services and access to contraception for reducing transmission of sexually transmitted diseases.

r) Gender

The lessons learned on women-specific engagement meetings show that more efforts to reach out to women and consider culturally appropriate venues for women consultations need to be put in place by Sponsors. Given that direct-use of geothermal resources in greenhouse is being promoted for drying fruit and is becoming an important source of women employment for the local communities, more gender specific actions will be integrated in the AF project.

The Gender Gap Assessment prepared by the Bank has been finalized and actions to reduce the gender gap in the geothermal sector has been integrated into Project design. TSKB, an FI experienced in gender-equality related project financing, will commit to fulfil the Project's corporate requirements in gender and citizen engagement. Proposed actions are i) to provide awareness training on gender-biased actions in geothermal companies ii) request developers to collect gender-disaggregated data in their project monitoring activities and iii) increase number of women in technical and managerial positions in companies supported by the Project.

s) Occupational Health and Safety

The OHS measures will be designed and implemented for drilling, construction and operation phases to address: identification of potential hazards to sub-project workers, particularly those that may be life-threatening; provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; training of sub-project workers and maintenance of training records; documentation and reporting of occupational accidents, diseases and incidents; emergency prevention and preparedness and response arrangements to emergency situations; and remedies for adverse impacts such as occupational injuries, deaths, disability, and disease.

Major health and safety issues in geothermal sub-projects comprise the potential for exposure to i) geothermal gases; ii) confined spaces; iii) heat; iv) noise, v) working at heights and vi) working in remote locations. In addition, the use of acids for well cleaning should be conducted by taking all precautionary measures and by using protective equipment. Storage of these substances at the site should be done according to hazardous waste control regulation.

For the drilling phase, electrical maintenance and repair work is one of the main hazards which may result to serious accidents. Physical and chemical hazards are the main issues to be managed with a comprehensive approach by the companies and TSKB. Fall prevention and protection measures should be implemented for drilling, construction and operational phases.

Trainings are one of essential elements of OHS management. The workers should be informed about job descriptions, responsibilities and risks about OHS. They also should be provided with the necessary personal protective equipment and information on works and occupational safety through regular trainings.

t) Community Health and Safety

Major community health and safety issues in geothermal sub-projects include i) exposure to geothermal gases; ii) facility safety; iii) impacts on water resources and iv) traffic safety.

As mentioned under sub-section q) as per World Bank's good guidance note on Gender Based Violence in major civil works of the projects, labor influx could create an issue for the host communities, such as communicable disease risks (COVID 19, and other) and risks on sexual exploitation and abuse/sexual harassment. Certain mitigation measures would need to cover in the ESMP and other relevant mitigation plans (i.e. Occupational Health and Safety and Community Health and Safety Plans) on;

(a) Share information on SH/SEA risks and grievance mechanism during public consultations and related support services.
(b) Based on risks identified, continually identify the corresponding mitigation measures and implement actions suggested to mitigate project related risk of SH/SEA in the project area.
(c) SH/SEA and CoC training should be part of the OHS and/or relevant training programs
(d) Monitor the effectiveness of the mitigation measures and adapt as appropriate.
(e) Ensure that SH/SEA grievances are received, recorded and addressed through the project GRM in a confidential manner.
(f) Report case through the GRM as appropriate keeping survivor information confidential and anonymous
(g) Refer SH/SEA survivors to existing, identified service providers and ensure that they are provided services promptly.

Regarding the latest pandemic outbreak on COVID 19, site-level health and safety measures which are required by the Ministry of Health and Ministry of Family, Labor and Social Services and in line with the World Health Organization guidelines, would be required both during construction stage and in operation stage, and thus need to be reflected in the mitigation plans (Occupational Health and Safety Plan and Community, Health and Safety Plan) by the sub-borrower/investor as relevant.

TSKB will evaluate the risks and impacts of the sub-project on the health and safety of the affected communities during the sub-project life cycle, including those who, because of their particular circumstances, may be vulnerable. TSKB will identify risks and impacts and propose mitigation measures in accordance with the mitigation hierarchy.

u) Exposure to Diseases

The workforce will be recruited from the local communities to a large extent; therefore, worker influx to the area is expected to be negligible during construction phase. However communicable and vector borne diseases may still present a risk for the communities due to their interaction with the workforce from other regions. Considering the measures, (i.e. local employment targets and code of conduct measures) the impact is considered to be of negligible significance and temporary, as the worker influx is small and limited only to the construction phase since operation phase personnel requirement for geothermal sub-projects is very limited.

v) Traffic Safety

Traffic and road safety risks can arise in a wide variety of sub-projects, including geothermal sub-projects. Any geothermal sub-project which generates or relocates traffic (including bicycle or pedestrian traffic), influences travel speeds, travel modes, traffic composition or traffic patterns, and is likely to result in new or changed road safety risks, needs to be assessed. During drilling and construction phase of a geothermal sub-project, heavy vehicles might damage the roads and they fear that heavy vehicles may cause closure of narrow roads and that residents may not be able to use roads in the emergency situations. Furthermore, communities are concerned that gaseous emissions and dust from heavy vehicles may cause community health issues and may pose safety issues especially on children.

All possible impacts of traffic issue can be listed as,

- Damage to soil structure due to material storage, traffic, etc.
- Dust emission due to site activities, arrangement of drilling rig area, traffic etc.
- Safety concerns
- Damage on existing roads
- Increase in traffic

w) Climate Change

Almost all geothermal fluids contain a certain amount, variable on a case-by-case basis, of Non-Condensable Gases (NCGs) where CO_2 (the most important Greenhouse Gas (GHG)) is the prevalent component. Therefore, climate change impacts should be assessed within the environmental and social impact assessment process of the sub-projects. Within the scope of the GDP – AF, the geothermal developers will be requested to provide alternatives assessment for viable NCG/CO_2 reduction options in the sub-project specific environmental and social assessment documents. Depending on the results of the alternatives assessment, the applicable option will be included in the sub-project specific ESMP.

The sub-projects will lead to releases of NCG such as carbon dioxide (CO_2), hydrogen sulphide (H_2S) and traces of other gases such as hydrocarbons (CH_4) and hydrogen (H_2) mainly during operation phase.

CIA of Geothermal Resources in Turkey Report highlighted that NCG rate decreases over time as a result of the interventions of re-injection water and the reduction is based on how strong the hydraulic connection between injection and production wells is. In order to determine the magnitude of the effect of reinjected water, several research studies are ongoing for the existing geothermal power plants in Turkey.

Direct NCG measurement is needed to identify the baseline emissions at the beginning stage of the sub-projects. In addition, for the operational phase, periodic (biannually) measurements/monitoring should be performed by the sub-borrowers as NCG emissions per kWh. The measurement results are going to be compared with the national grid emission factor to address the contribution of the sub-projects to climate change.

The sub-borrowers should seek ways to minimize/reduce emitted NCG on best effort basis. Please note that further research is also needed in this regard as summarized below.

There are completed and ongoing research studies for reinjecting the NCG back into the geothermal reservoir along with a mixture of brine and condensate from the geothermal power plants (by dissolving at high pressures). However, the studies are mostly conducted in the fields in USA, New Zealand and Italy where NCG contents are much lower than in Turkey and mostly at a pilot-scale. Therefore, further research and development is needed for large-scale NCG reinjection systems for the geothermal power plant developments in Turkey.

There are a few examples of geothermal CO_2 capture in Turkey such as the use of CO_2 for the production of commercial dry ice and carbonated beverages. However, the study named Assessing the Use of CO_2 from Natural Sources for Commercial Purposes in Turkey commissioned by EBRD showed that the domestic CO_2 market is saturated with existing gas capture plants. Geothermal CO_2 can also be used to enhance photosynthesis in green houses, production of paint and fertilizer, fuel synthesis, and for enhanced oil recovery. As noted in ESMAP's technical report, the cost and economic feasibility of CO_2 capture from geothermal NCG depends on NCG composition, the pressure of the NCG at the outlet from the power plant, and the desired purity and pressure of the end product.

Revision of CO_2 emissions limit for Development Sub-projects in GDP-AF[1]: The sub- projects in the Menderes and Gediz grabens with estimated average annual lifetime emissions[2] below the grid emission factor announced in by Ministry of Environment and Natural Resources in 2020 (i.e. 540 gCO_2/kWh)[3] the year in which the investment is approved, will be considered low emissions projects and thus be eligible for financing, while projects whose estimated average annual lifetime emissions are above the said grid emission factor, will not be eligible for financing. The regions outside Gediz and Menders grabens will be considered separately as there is currently insufficient data to establish a separate model to assess, or predict, the average lifetime emissions from geothermal power generation. In addition, a maximum of 20 percent of the IBRD AF loan per FI will be allowed for financing sub-projects outside the Menderes and

[1] This revision has already been applied to the undisbursed TSKB loan amount under the parent project, through a Loan Amendment signed on September 2, 2021

[2] Calculated with the respective predictive models for each graben developed under the World Bank CO2 study (see Annex 4 for a summary of the study)

[3] Grid emission factor for 2018

Gediz grabens whose initial emissions are above 540 gCO_2/kWh. In all cases, TSKB will continue to require all sponsors to carry out regular CO_2 emissions monitoring. In addition, any investments in CO_2 capture or reduction technologies that are or potentially become commercial during the project implementation period will continue to be eligible for financing under the credit lines. The updated Operational Manual (OM) will include a detailed description of procedures and acceptable methodologies for CO_2 monitoring.

Declining CO_2 emissions trend. There are indications that CO_2 concentrations are declining significantly in most, if not all, geothermal reservoirs that are currently used for power production in Turkey. The decline in CO_2 concentration at the reservoir level has resulted in a corresponding decline in CO_2 emissions on a per-kWh basis. This indicates that many of the geothermal power plants in Turkey will, ultimately, have life-time emissions (in terms of Gram per kilowatt-hour (g/kWh)) considerably below the average grid emission factor in the country, despite relatively high emissions at commissioning. The main reason for this decline is thought to be the return of gas-free, reinjected brine to the production wells. This possibility was already entertained in the Project Appraisal Document (PAD) for the parent project but, at the time of appraisal, there was not sufficient documented evidence in the scientific literature to predict how wide-spread and strong this decline process would be. The PAD, however, noted that the project activities would help "elucidate uncertainties regarding if and how CO_2 emissions from geothermal power plants will decrease with time". This decline was confirmed by a study conducted by the World Bank team in 2020 for the Menderes and Gediz grabens in the report "*Characterizing the declining CO2 emissions from Turkish geothermal power plants*", see LiveWire[4]. The study identified the parameters that affects the rate of CO_2 decline and developed predictive models to estimate the average life-time emission factors for geothermal projects in these locations. The total working capacity of the geothermal power plants studied is 385 MW (about 40 percent of total installed capacity), with information from around 100 producing wells. The study confirmed that carbon dioxide emission rates from these geothermal power plants have declined considerably over time, with many of them emitting now close or below the grid emission factor. The team will use the findings and conclusions from the study to inform the sub-project eligibility criteria under the AF.

The EU is funding research and innovation for Carbon Capturing and Storage and geothermal technology through the Horizon 2020 program. Horizon 2020 supports more than 30 programs in these two categories which aim at reducing emissions by looking at new technologies or approaches. Zorlu Enerji, one of the main geothermal developers in Turkey, participates in several these Research & Development programs. One of these programs aims at reducing emissions from geothermal power plants: GECO (lead by Carbfix[5]) aims to provide a clean, safe and cost efficient non carbon and sulfur emitting geothermal energy and is currently operating a plant in Iceland reinjecting 30 percent of CO_2 and 70 percent H_2S emission from Hellisheidi Geothermal Power plant and is planning a pilot demonstration in, Iceland (new location), Germany, Italy and Turkey. These research projects have not reached the stage of commercially feasibility, but the team will continue to closely monitor the progress to identify any developments that might provide an opportunity to finance implementation of any successful abatement technologies during Project implementation.

[4] *https://openknowledge.worldbank.org/bitstream/handle/10986/36083/Understanding-CO2-Emissions-from-Geothermal-Power-Generation-in-Turkey.pdf?sequence=1*
[5] https://www.carbfix.com/research--development

3.2. DESCRIPTION OF MITIGATION MEASURES

The mitigation measures listed below in Table 2 and Table 3 can be implied for any case that can occur in a geothermal sub-project within the financed Geothermal Development Project and prepared in line with Turkish regulations, WB policies, WBG General EHS Guidelines, WBG EHS Guidelines for Geothermal Power Generation and COVID-19 guidance notes[7] in addition to WHO technical guidance developed for addressing COVID-19 and other accepted Good International Industry Practice (GIIP) standards/requirements. After the evaluation of each sub-project in line with their environmental and social impacts, the required mitigation measures will be set accordingly. Mitigation measures should be identified and carried out in accordance with WBG EHS Guidelines.

It should be also noted that the preparation of the ESIA and project specific E&S Management Plans will cost about 75,000 – 100,000 EURO, depending on the nature and size of the proposed sub-project. Adequate budget (about 3-5% of the total investment cost) should be included in project budgets for the implementation of E&S Management Plans to enable compliance with ESMF requirements.

TABLE 2: ENVIRONMENTAL AND SOCIAL ISSUES AND RELATED MITIGATION MEASURES FOR DRILLING ACTIVITIES

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Effluent discharge	• Discharge of drilling fluids including extracted water from exploration and operational wells during testing. • Discharge of extracted water during well testing. • Cleaning Water • Discharge of domestic wastewater from camp site	• Storage of drilling fluids in a storage tank or sumps. These tanks/ sumps will be located in a confined zone in the project area. If an earth based pond/sump is used for the storage, pond/sump should be lined with an impervious and leakproof membrane or in the case of a concrete pond, it will be a sealed one. Drilling fluids will be tested for defined parameters according to relevant legislation. • Reuse of drilling fluids where possible. • Depending on chemical, biological and physical characteristics of drilling fluids, non-hazardous material could be discharged when a receiving body is available. Discharge should comply with pertinent regulations and World Bank EHS Guidelines. Alternatively, the fluids after reuse must be transferred to appropriate storage facilities and according to their chemical, biological and physical characteristics must be disposed as hazardous or non-hazardous material by carrying off-site with licensed tankers to an appropriate wastewater treatment plant. Treatment plants of nearby organized industrial zones or municipalities can be receiving facilities for these material. For hazardous material hazardous waste treatment plants at accessible distances must be used for disposal.

- Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings, issued on March 20, 2020
- ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects, issued on April 7, 2020

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Final pH needs to be monitored for the cleaning waters before their discharge. • If the sumps or tanks will not be used during operation, as in the case of decommissioning phase, removal of sumps or tanks and restoration of the site should be provided in order to eliminate future release of the materials into soil and water resources and avoid contamination. Treatment/disposal of contents as hazardous or non-hazardous waste depends on its characteristics. Therefore, after determination of its characteristics as hazardous or non-hazardous, it will be disposed/treated at a licensed disposal/treatment facility in accordance with national legislation and World Bank EHS Guidelines. • For all cases, periodic testing to effluent water will be performed in order to monitor any surface / ground water contamination which may lead to community health and safety problems. • Storage and disposal of domestic wastewater in line with related regulations. • It is recommended as a best practice to cover the unused/abandoned wells with blind flanges to prevent leakage.
Drilling Mud	• Storage and disposal of drilling mud including cuttings	• The drilling mud should be stored in a pit covered with membrane or in a concrete pit to provide impermeability. • After the drilling mud settled in the pit, the water formed above could be removed to be reused or discharged in line with related regulation. Remaining solid/mud should be disposed depending on its chemical characteristics. • Analysis of the mud should be done in order to determine whether it is hazardous or non-hazardous and disposal of it should be carried out accordingly in line with related legislation. • Transfer, treatment and disposal of mud should be in accordance to Waste Management Regulation and Landfilling Regulation.
Groundwater	• Contamination of fresh groundwater resources in case of percolation of thermal groundwater during drilling and testing.	• Preliminary impact analysis and related mitigation measures (i.e. double casing) depending on literature survey about aquifer structure and groundwater use at exploration area as a part of PIF prepared in accordance to EIA Regulation. • Existing groundwater users in the vicinity of the exploration well(s) (e.g. 1 km) should be identified. In addition, some of technical information about existing groundwater wells (e.g. depth, flow, etc.) should be collected. • If important freshwater aquifers overlie geothermal reservoirs that are under production, monitoring wells should be installed to monitor ground water composition and temperature. • Proper well casing and well casing material selection for groundwater aquifer section(s).
Solid and Hazardous Wastes	• Storage and disposal of solid and hazardous wastes.	• Hazardous wastes, waste oil, used accumulators and batteries, electrical and electronic wastes, recyclable wastes, domestic waste, medical wastes and etc. should be classified, separately stored and disposed in accordance to pertinent regulations and World Bank EHS Guidelines. • Provide adequate and appropriate temporary storage areas.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• The temporary waste storage Area should have the properties defined in national and international standards. Such as; • Roof and sides of the storage areas will be properly covered and drainage will be provided to prevent surface water and rainfall from contacting the wastes. • Reinforced concrete or similar impermeable materials such as epoxy will be used on the floors of storage areas. • Proper drainage will be provided to collect any leakage. • Adequate ventilation will be provided, in case storage of volatile wastes is required. • Storage areas' access will be controlled by gates. • Cautionary signage and boards with name and contact number of authorized personnel will be in place. • Separate storage areas/compartments will be designated for diverse types of wastes. • Secondary containment in line with related legislation and standards will be in place for related wastes. • Absorbents, spill kits, firefighting equipment, etc. will be kept ready at a close location for immediate response in case of an emergency such as spills, fires. • Ensure container types, labelling, classifying, etc., in the storage areas are in in line with sub-project standards. • Segregate hazardous and non-hazardous wastes at source. • Separate recyclable and non-recyclable solid waste and store separately until the related Municipality/ licensed firm collects it. • Ensure the firms that will conduct transport/ recovery/ disposal of waste are licensed. • Ensure that all excavation activities are implemented in line with the cut and fill program to minimize excavation waste. • Provide trainings and to personnel on waste reduction, general waste management and housekeeping. • Organize drills to personnel for emergency cases. • Under no circumstances, dispose of or bury waste on site. • Prepare and implement a Waste Management Plan in line with the national regulations.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Noise	• Seismic studies, drilling rig, generators, traffic, etc.	• Conduct baseline noise measurements at sensitive receptors prior to site works to distinguish the project induced noise from already existing sources in the vicinity • Time work to minimize disturbance • Use appropriate construction methods & equipment • Restrict through-traffic in residential areas • Careful siting and/or design of plant, provide noise barriers e.g. embankments of waste soil • Use of hearing protective devices such as silencers and earmuffs to workers in line with related legislation will be ensured. • Occupational noise measurements should be conducted periodically for monitoring purposes. • Establish monitoring programs at nearby sensitive receptors, if needed as a result of E&S impact assessment studies. • Use of commercially available acoustic shields to prevent high noise levels for any operation close to settlements, as appropriate.
Air Emissions	• Possible toxic gas emissions during drilling and well testing (hydrogen sulfide, mercury etc.) • Dust emission due to site activities, arrangement of drilling rig area, construction of access roads, traffic etc.	• Depending on the characteristics of the source, implement on site toxic gas measurements, (i.e. hydrogen sulfide) and include related risks in Emergency Preparedness Response Plan. Appropriate design, training in O&M, safety • Safety planning and measures for uncontrolled gas releases • Control of dust with water suppression • Timing of works, vehicle speeds • Minimization of major works inside communities • The geothermal developers will be requested to provide alternatives assessment for viable NCG/CO2 reduction options in the sub-project specific environmental and social assessment documents. Depending on the results of the alternatives assessment, the applicable option will be included in the sub-project specific ESMP.
Odor Emission	• Odor emission due to release of H_2S	• H_2S measurements at predetermined sensitive receptors for monitoring purposes • Check grievance mechanism records related with odor • Site inspections • Use best available technologies • Preparation and implementation of H_2S Management Plan • Use of plantation/afforestation as natural odor barriers

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Natural Resources	• Disturbance of natural habitats from construction, e.g. dust, noise, un-seasonal working, poor siting of new works, disposal of untreated wastes, etc.	• Careful siting, alignment, design of rig sites, and/or timing of works (seasonal) • Selection of proper disposal areas and methods in line with related regulations • Protect sensitive areas within/close proximity to site • Avoid adverse impacts on natural habitats defined in OP 4.04 and prepare Biodiversity Management Plan if deemed necessary as a result of initial E&S risk assessments. (The projects in critical habitats or having adverse impact on natural habitats are not eligible for financing.) • Must comply with the EU Habitat Directive on the protection of natural habitats and wild fauna and flora • Distribution of natural habitats and critical habitats within the sub-project area will be determined and if needed an assessment study will be carried out to avoid and monitor adverse impacts of the sub-project. • Mud pits should be covered/fenced as appropriate to avoid contact of fauna species.
Land Use and Soils	• Loss of topsoil during preparation of rig sites, construction ofaccess roads or disposal of excavated materials • Damage to soil structure due to material storage, traffic, etc. • Erosion due to uncontrolled surface run-off where vegetation is cleared • Landslips on embankments or hillsides • Soil contamination due to accidental spills and leakages, and improper hazardous materials & wastes (including drilling mud) handling	• Stripping topsoil (up to 300 mm depth) where necessary, temporary store separately in designated storage areas, and replace post construction • Design hazardous waste storage area to prevent soil contamination, prevent from the accumulation of storm water provided with drainage. • Hazardous materials and chemicals will be handled properly in accordance with national and international standards, related management plans of the sub-project and take necessary measures defined in Material Safety Data Sheets for different type of materials (fire extinguishers, spill kits etc.) • Drilling mud will be kept in impermeable area • Waste management plan will be implemented accordingly in order to mitigate the spill out risks of wastes from storage areas to soil. • Manage accidental spills and leakages through implementation of Emergency Preparedness and Response Plan • Minimize project footprint be demarcating non-construction areas • Avoiding work in sensitive areas in case highly adverse conditions • Providing temporary haul roads as appropriate • Restoration and reinstatement of damaged areas • Design of drainage and other disposal facilities to ensure soil stability and appropriate treatment • Design of slopes & retaining structures to minimize risk, provide appropriate drainage, soil stabilization/vegetation cover • Take/dispose of materials from/at approved sites

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Include hazardous wastes and materials management as a subject in EHS and OHS trainings to be provided to personnel.
Well Blowouts	• Well blowout during drilling	• Design of emergency response for well blowout and pipeline rupture including measures for containment of geothermal fluid spills through the Emergency Preparedness and Response Plan (EPRP). • EPRP should contain necessary trainings of communities for the preparedness to potential accidents. • Regular maintenance of wellheads and geothermal fluid pipelines, including corrosion control and inspection; pressure monitoring; and use of blowout prevention equipment such as shutoff valves. • An emergency/discharge pond to collect geothermal fluids in cases of emergencies and during maintenance. • Implementation of good drilling practices such as appropriate project planning, good design, appropriate personnel training, and right selection of blow out equipment and standards to avoid well blow outs.
Water Resources	• Possible over flow from mud pit. • Discharge of test water. • Contamination/pollution of resource, drilling chemicals, fuel & oil, hazardous wastes, wastewater, etc.	• Determination of sustainable use/yield (test as required) in order to assess impact on neighboring projects. • Resource planning and management, in conjunction with authorities & communities • Careful design – maintaining of natural drainage where possible, provide suitable wastewater drainage, safe/sanitary disposal of hazardous wastes • For the sub-projects which apply to TSKB for power plant construction and operation, TSKB will make sure that sub-borrower fully complied with this ESMF and national regulations (drill mud disposal, test water discharge, etc.) during exploration drilling and capacity drill (test) phase. • Possible over flow from mud pit can cause localized soil contamination, which should be removed, restored and disposed off as hazardous or non-hazardous waste depending on its characteristics in line with related legislation. Over flow and effluent discharge risks should be included in EPRP. • The capacity of the mud pit should be determined to avoid over flow and regular monitoring activities on site should be conducted. • Geothermal fluids and test waters will be handled in accordance with national regulations. They will be analyzed and necessary permits will be obtained from authorities before discharge, if possible. • Discharge pond having a storage capacity equivalent to one hour flow should be constructed at wells and be connected to emergency ponds (cool pit) at the power plant. Emergency pond capacity will be identified proper to sectoral average breakdown durations of GPPs and censors will be installed in the pond to monitor the water level variations. • Baseline water quality analysis and periodic monitoring activities will be carried out. • Waste storage will be done in dedicated and appropriate areas

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Wastewaters will be collected in leakproof septic tanks • Hazardous materials such as fuels, chemicals etc. will be stored in dedicated and appropriate areas that prevents any contamination with soil and water resources. • Collected & stored rainwater can used for the preparation of mud and cement slurry in the drilling stage.
Social Components	• Land based impacts including loss of livelihoods • Concerns and complaints of affected communities • Local employment and local procurement • Labor influx • Labor management • Sexual Harassment (SH) and Sexual Abuse and Exploitation (SEA)	**Land based impacts including loss of livelihoods** • Where needed, prepare sub project specific land acquisition plans or ex-post studies in line with project RPF for possible land impacts of investments. Prepare ex post social audits in line with project RPF for investments that have completed any kind of land acquisition process. Assess potential land-based livelihood impacts to take additional measures for livelihood restoration, if necessary. **Concerns and complaints of affected communities** • Ensure training is given to project workers to avoid miscommunication among project workers and communities, prepare code of conduct that will be shared with project workers during employment. • Consultation on risks and adverse impacts of the sub-project and creation of opportunities to receive affected communities' views on sub-project. • Establishment of grievance mechanism to collect and facilitate resolution of affected communities' concerns, including workers' and grievances regarding the sponsor's environmental and social performance. • Transparent public disclosure to inform each phase of the sub-project through web site, notice boards, telecommunication tools and public meetings. • Assign designated staff for the implementation of Stakeholder Engagement Plan (SEP) and to conduct engagement activities with stakeholders by taking into account the Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings, issued on March 20, 2020. • Establishing well designed and structured public questionnaire to receive feedback from affected communities. • Avoid gender-based violence by taking appropriate measures such as informing/training workers, ensuring sub-borrowers have a code of conduct in place and having a robust GRM. • Encourage benefit sharing mechanisms developed to benefit the local community's economic and social development and improve social acceptance of the project **Local employment and local procurement** • Make public announcements to inform local community and businesses on employment opportunities and procurement needs of the sub-project. **Labor Influx**

Environmental and Social Issues	Possible Impacts	Mitigation Measures

		• Screen and assess the type and significance of potential social and environmental impacts that may be generated by labor influx;
		• Development of a management plan for social and environmental impacts in consultation with affected communities (if needed);
		• Implementation of appropriate mitigation and monitoring programs, which includes development and implementation of a stakeholder engagement program;
		• Establishment of a grievance redress mechanism (GRM) for workers and host community
		Labor management
		• Recruit unskilled or semi-skilled workers from local communities to the extent possible. Where and when feasible, worker skills training, should be provided to enhance participation of local people.
		• Provide adequate lavatory facilities (toilets and washing areas) in the work site
		• Raise awareness of workers on overall relationship management with local population, establish the code of conduct in line with international practice and strictly enforce them, including the dismissal of workers and financial penalties of adequate scale
		• Introduce a requirement in the procurement for the contractors to;
		  • adopt CoC, which stipulates norms and regulations of conduct and which also addresses SH/SEA
		  • have it signed and understood by all the contractors' staff with a physical presence at the project sites, and
		  • train its staff on the obligations under the CoC.
		Sexual Harassment (SH) and Sexual Abuse and Exploitation (SEA)
		• Share information on SH/SEAS risks during public consultations
		• Based on risks identified, continually identify the corresponding mitigation measures and implement actions suggested to mitigate project related risk of SH/SEA in the project area.
		• SH/SEA and CoC training should be part of the OHS and/or relevant training programs
		• Monitor the effectiveness of the mitigation measures and adapt as appropriate.
		• Ensure that SH/SEA grievances are received, recorded and addressed through the project GRM in a confidential manner
		• Report case through the GRM as appropriate keeping survivor information confidential and anonymous
		• Refer SH/SEA survivors to existing, identified service providers (*) and ensure that they are provided services promptly.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		* *These are usually referred to national referral systems. Basically, the person dealing with GRM, if s/he receive such sensitive complaint, s/he should keep the survivor's info confidential and direct her/him to the national referral system and should not get into any detail or analyses on its own. If the survivor prefers to directly go the national service provider (police, health clinic etc) and does not report anything to the project GRM then the project GRM is not expected to chase or track anything. The point here is that if such confidential/sensitive issues come to project this is dealt in full confidentiality and the GRM focal point, directs this to national authorities/service providers.*
Aesthetics and Landscape	• Local visual impact of completed works and some intrusions into general manmade and natural landscape, loss of trees, vegetation, etc. • Noise, dust, wastes, etc., during drilling operations	• Careful siting and design of works, screening of intrusive items with soft landscaping, where possible. • Replantation and afforestation will be implemented based on landscape management plan (if needed) and/or actions identified within the content of environmental and social management plan considering the vegetation of the region to mitigate visual impacts. Minimizing the areas requiring the removal of vegetation, and upon finalization of works, replace/restore removed vegetation. Special measures if needed to avoid damage to protected trees or species. • e-commissioning of drilling rig areas in accordance with the decommissioning management plan to be prepared and careful disposal of wastes. • Waste – will be collected in dedicated areas preventing any visual disturbance in accordance with national and international standards. • Dust - Close or cover trucks for the transport of materials. Use of water suppression where dust is generated, disposing of excess material and cleaning the location upon the finalization of works. Protective covers or curtains for zone where the largest amounts of dust are generated. • Noise - Imposing time constraints for works (works in the course of daytime (e.g. 7AM to 5 PM). Establish schedules and/or other forms of specific limitations for work.
Occupational Health and Safety	• Toxic gas emissions during drilling • Working at heights • Non-routine exposures include potential blowout accidents during drilling • Noise and vibration • Working in remote locations	• Development of a site specific OHS risk assessment and respective management plans and training of personnel regarding the risks • Define an adequate OHS organizational structure as defined by the national legislation • Installation of hydrogen sulfide monitoring and warning systems. • Development of a contingency plan for hydrogen sulfide release events, including all necessary aspects from evacuation to resumption of normal operations • Provision of an emergency response teams, and workers at drilling rig, with personal hydrogen sulfide monitors, self-contained breathing apparatus and emergency oxygen supplies, and training in their safe and effective use • Provision of adequate ventilation of occupied buildings to avoid accumulation of hydrogen sulfide gas • Providing workers with a fact sheet or other readily available information about the chemical composition of liquid and gaseous phases with an explanation of potential implications for human health and safety • Shielding surfaces where workers come in close contact with hot equipment, including generating equipment,

Environmental and Social Issues	Possible Impacts	Mitigation Measures

		pipes etc.;
		• Use of personal protective equipment (PPE) as appropriate, including insulated gloves and shoes, masks
		• Implementing appropriate safety procedures during the exploratory drilling process
		• Strict health and safety standards will be implemented including traffic management plan to reduce road related accidents.
		• Frequent checks of eye hazard protection equipment prior to use to ensure mechanical integrity
		• Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures should be taken into account.
		• **Noise and Vibration (noise and vibration caused by drilling activities)**
		  • Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.
		  • Ensure use of hearing protective devices such as silencers and earmuffs to workers as required
		  • Periodic medical hearing checks for the workers exposed to high noise levels
		  • Consider changing equipment or implementing time limits in case of a grievance regarding vibration
		• **Working at Heights and Falling Objects (working at heights and objects falling on individuals working below)**
		  • Provide specialized OHS trainings.
		  • As possible to the extent and as considered feasible, assemble structures and carry out other suitable work at ground.
		  • Allow only competent and trained personnel to conduct works at height.
		  • Ensure fall protection systems are in place during works at height (e.g. guard rails, fall arrest equipment, safety belts, etc.).
		  • Consider additional safety equipment such as safety nets and airbags, where feasible
		  • Ensure the necessary equipment are checked and maintained regularly.
		  • Do not conduct related activities during heavy rain/storm and other poor/extreme weather conditions.
		  • Set and maintain appropriate exclusion zones below any working at height activities to the extent possible (measure for falling objects).
		  • Ensure all tools and equipment are attached by appropriate means to the personnel that is working at height (measure for falling objects).
		  • Use approved tool bags for raising and lowering equipment.
		  • Implement the worker's grievance mechanism.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Conduct regular labor audits to contractors workforce (by independent labor auditors assigned by the sub-borrower). • **Working in Remote Locations (difficulty in access to emergency services and communication)** • Ensure communications equipment are available for all personnel and maintained properly. • Keep a suitable patient transport vehicle on site. • **Working in confined spaces** • Ensure that only the staff trained on safe working in confined spaces work in such areas. • Ensure that isolation measures are in place for local utilities (gas, electricity and water) to allow the employees to work safely. • Ensure all the employees have suitable PPE to undertake a work in confined space. • A confined space should be adequately purged before the entry of workers to ensure that no sludge or other deposits will give off hazardous gas, vapour, dust or fume during the course of work. • Use portable oxygen or multi-gas meter with audible alarm features for the detection of any local pockets of gas or lack of oxygen. • Mechanical ventilation may be necessary to ensure an adequate supply of fresh air. • Ensure that the workers are familiar with the emergency procedures.
Human Health	• Toxic gas emissions during drilling • Unauthorized site access to drilling rig. • Hazardous chemicals may accumulate in ponds where reject thermal water to be re-injected to reservoir is collected • Pandemic outbreak	• Installation of hydrogen sulfide monitoring and warning systems • Siting of potential significant emissions sources with consideration of hydrogen sulfide gas exposure to nearby communities (considering key environmental factors such as proximity, morphology and prevailing wind directions) • Continuous operation of the hydrogen sulfide gas monitoring systems to facilitate early detection and warning • Site security and fencing around well sites, open ponds and mud pits • Emergency planning involving community input to allow for effective response to monitoring system warnings • **Hazardous chemicals** • Store in dedicated areas and on impermeable surfaces in accordance with the requirements of related legislation • Put “hazardous" labels • In addition to general measures defined in national and international standards, take additional protective measures; and safety precautions for handling, storing, and transporting the chemicals defined in MSDS forms such as locating suitable fire-fighting equipment, spill kits, second containment etc.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Training on handling hazardous chemicals; drills should be carried out for employees in case of any related scenario. • **Pandemic outbreak** • Guidance, directives and recommendations of Republic of Turkey Ministry of Health, Republic of Turkey Ministry of Family, Labor and Social Services, and World Health Organization shall be followed and all relevant necessary measures shall be taken, both for occupational health and safety of employees and for workplaces, in case of an outbreak of any other pandemic/communicable disease including COVID-19 • Preparation and implementation of site-specific contingency / emergency / crisis management / action plan regarding COVID-19 and any other pandemic/communicable disease risk. Contingency plans should consider arrangements for the storage and disposal arrangements for medical waste, which may increase in volume and which can remain infectious for several days (depending upon the material). To ensure that individuals roles and responsibilities are clear, contingency plans should be communicated widely, including both employees and affected local communities in the vicinity. • Provide regular trainings to workers on pandemic/communicable disease (including COVID-19) symptoms, how to be protected and what to do when symptoms appear • Conduct periodic medical checks for personnel and provide vaccination and/or other mitigating measures when required. • Provide health related awareness raising activities aimed at local communities. • Implement the Stakeholder Engagement Plan and the external grievance mechanism. • Keep a suitable patient transport vehicle on site. • Share information with community. • **Covid-19 (in addition to pandemic outbreak measures)** • Practice social distancing in common areas • Arrange common areas such as dining halls, dormitories according to social distance • Thermal cameras • Measure fever of each personnel at the entrance and exit. • Carry out routine health checks every morning • Use masks in common areas • Regular cleaning and disinfecting of all areas used by the personnel

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Limit outside visits and applying precautions to any guests • Disinfection of personnel transport services regularly • Provide hand sanitization supplies at places easily accessible by workers
Historical / Cultural Sites	• Disturbance/damage/degradation to registered and undiscovered sites	• Careful siting/alignment of works; special measures to avoid adverse impacts on cultural heritage • Immediately halt work in vicinity of discoveries, pending instructions from relevant museum directorates (implementation of Chance find procedure)

TABLE 3: ENVIRONMENTAL AND SOCIAL ISSUES AND RELATED MITIGATION MEASURES FOR POWER PLANT DEVELOPMENT AND OPERATION OF THE GEOTHERMAL PROJECT

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Effluents	• Discharge of spent geothermal fluids • Discharge of reject water from reinjection wells • Cleaning Water • Discharge of domestic wastewater from operational building	• Evaluation of potential environmental impacts of geothermal fluid discharges depending on the selected best available technique cooling system and identification of related mitigation (i.e. gas capture and treatment, changing the cooling system type etc.). In most of the projects, air cooling system is used which eliminates high water consumption and discharge problem in binary geothermal power plants. • Reinjection of geothermal fluids should be primarily considered in terms of good industrial practices and reservoir stability, and in such cases potential for contamination of groundwater should be minimized by installation of leak-proof casings in the injection wells to a depth to the geological formation hosting the geothermal reservoir. • Reinjection wells should be tested for mechanical integrity, demonstrating that re-injected fluid is not flowing into surface water zones and/or mix with groundwater resources. • If facilities could not re-inject all geothermal fluids underground, effluent discharge quality should not deteriorate the water quality of the receiving environment. For this purpose, wastewater characteristics of the geothermal fluids should be determined by chemical, biological and physical tests, and based on the results of the analysis, geothermal fluids (wastewater) should be disposed appropriately (by use of pre-treatment or treatment facility). Effluent discharge quality should be consistent with related regulations and international standards. • Reuse of opportunities of reject geothermal fluids should be maximized • Storage and disposal of domestic wastewater in line with related regulations. Domestic wastewater will be tested periodically in order to provide compliance with national legislations. • In case of any emergency, the operation of the plant should be stopped through installed system. Geothermal fluid discharge to any kind of environment should be prevented. The geothermal fluid collected in the emergency pond should be re-injected back to the system by reinjection pump. • In case of the failure of the reinjection line, the system will be shut down. In the event of unavoidable discharge of the geothermal fluid into the surface waters, the geothermal fluid will be retained in a thermal pond, where the temperature of the fluid will drop to the allowable limits set by the Water Pollution Control Regulation. • Effluent discharge management plan should be prepared considering industrial good practices as part of ESMP. • EPRP should contain effluent discharge risks and mitigation measures in case of accidents deriving from geothermal fluid spills.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• In capacity drillings of existing GPPs, there will be reinjection wells where excess drilling and testing fluid could be re-injected. • When reinjecting wells do not exist at capacity drilling phases of greenfield plants, drilling fluids have to be removed or discharged. Depending on chemical, biological and physical characteristics of drilling fluids, non-hazardous material could be discharged when a receiving body is available. Discharge should comply with pertinent regulations. Alternatively, the fluids after reuse must be transferred to appropriate storage facilities and according to their chemical, biological and physical characteristics must be disposed as hazardous or non-hazardous material by carrying off-site with licensed tankers to an appropriate wastewater treatment plant. Treatment plants of nearby organized industrial zones or municipalities can be receiving facilities for these materials. For hazardous material hazardous waste treatment plants at accessible distances can be used for disposal.
Groundwater	• Contamination of fresh groundwater resources during reinjection process • In case the use of groundwater for cooling and other operational purposes, over-exploitation can cause irreversible impacts on groundwater source. • Cumulative impacts can result to river basin pollution which affect also food chain and drinking water.	• Detailed analysis of aquifer structure and existing groundwater use at development area must be conducted to assess the availability of the groundwater resource and have the baseline condition that will enable to monitor potential impacts and develop further mitigation measures, if needed. • Determination of existing groundwater users in the vicinity of the operational wells (e.g. 1 km) should be identified. In addition, some of technical information about existing groundwater wells (e.g. depth, flow, etc.) should be collected. • Source vulnerability analysis for groundwater wells (in case the use of ground water for cooling purpose). If the results of the analysis concluded that the groundwater resource is vulnerable for such use, more appropriate cooling systems such as air cooling should be selected to avoid adverse impacts on groundwater source. Water cooling systems should be avoided to the extent possible and air-cooled systems should be considered based on good international industrial practices. • Installation of leak-proof well casings in the re-injection wells to a depth to the geological formation. • Drilling of monitoring wells and groundwater analysis • Periodical monitoring of groundwater in terms of possible contamination • Careful design and site selection of reinjection wells • Proper well casing and well casing material selection for groundwater aquifer section(s). • In case the use of groundwater for cooling purposes, cooling techniques will be evaluated based on the conditions of the plant and best available techniques will be assessed. The system will be chosen according to the related assessment.

Environmental and Social Issues	Possible Impacts	Mitigation Measures

Solid and hazardous Wastes	• Storage and disposal of solid and hazardous wastes
	• Storage and disposal of sulfur, silica, and carbonate precipitates collected from cooling towers, air scrubber systems, turbines, and steam separators
		• Hazardous wastes, waste oil, used accumulators and batteries, electrical and electronic wastes, recyclable wastes, domestic waste, medical wastes and etc. should be classified, separately stored and disposed in accordance to pertinent regulations
		• Provide adequate and appropriate storage areas.
		• The temporary waste storage area should have the properties defined in national and international standards. Such as;
		  • Roof and sides of the storage areas will be properly covered and drainage will be provided to prevent surface water and rainfall from contacting the wastes.
		  • Reinforced concrete or similar impermeable materials such as epoxy will be used on the floors of storage areas.
		  • Proper drainage will be provided to collect any leakage.
		  • Adequate ventilation will be provided, in case storage of volatile wastes is required.
		  • Storage areas' access will be controlled by gates.
		  • Cautionary signage and boards with name and contact number of authorized personnel will be in place.
		  • Separate storage areas/compartments will be designated for diverse types of wastes.
		  • Secondary containment in line with related legislation and standards will be in place for related wastes.
		  • Absorbents, spill kits, firefighting equipment, etc. will be kept ready at a close location for immediate response in case of an emergency such as spills, fires.
		  • Ensure container types, labelling, classifying, etc., in the storage areas are in in line with Sub-project standards.
		• Segregate hazardous and non-hazardous wastes at source.
		• Separate recyclable and non-recyclable solid waste and store separately until the related Municipality/ licensed firm collects it.
		• Ensure the firms that will conduct transport/ recovery/ disposal of non-hazardous waste are licensed.
		• Ensure that all excavation activities are implemented in line with the cut and fill program to minimize excavation waste.
		• Provide trainings and to personnel on waste reduction, general waste management and housekeeping.
		• Organize drills to personnel for emergency cases
		• Under no circumstances, dispose of or bury waste on site

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Prepare and implement the Waste Management Plan in accordance with national regulations.
Noise	• Noise disturbance from construction works, separator station, pump houses and power plant	• Time work to minimize disturbance • Use appropriate construction methods & equipment • Restrict through-traffic in residential areas • Careful siting and/or design of plant, provide noise barriers • Consider use of sound isolation and silencers on equipment where appropriate • Ensure use of silencers and earmuffs to workers when required. • Conduct periodical occupational noise measurements • Use of commercially available acoustic shields to prevent high noise levels for any operation close to settlements, as appropriate
Air Emissions	• Possible toxic gas emissions in case not re-injected to geological formation by using closed system. - open contact condenser / cooling tower systems - extraction well sites and plant-site - vent mufflers • Dust emission due to site activities, arrangement of drilling rig areas, construction of power generation unit, access roads, traffic etc.	• Depending on the characteristics of the source, implement on site toxic gas measurements, (i.e. hydrogen sulfide, mercury) and include related risks in Emergency Preparedness Response Plan. • Consideration of total or partial re-injection of gases with geothermal fluids • Using closed non-contact cooling alternatives • Depending on the characteristics of source, venting of toxic chemicals (i.e. hydrogen sulfide and non-condensable volatile mercury) in line with current regulations • Depending on the characteristics of source, removal of possible toxic chemicals from non- condensable gases • Appropriate design, training in O&M, safety • Safety planning and measures for uncontrolled gas releases • Installation of shutoff valves • Control of dust with water suppression • Timing of works, vehicle speeds • Minimization of major works inside communities • Preparation and implementation of air quality management plan. • Preparation and implementation of NCG Mitigation Plan • The geothermal developers will be requested to provide alternatives assessment for viable NCG/CO2 reduction options in the sub-project specific environmental and social assessment documents. Depending on the results of the alternatives assessment, the applicable option will be included in the sub-project specific ESMP.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Odor Emission	• Odor emission due to release of H_2S	• Hydrogen sulfide emissions, which are the main driver regarding odor impacts at GPPs, are at minimum levels in closed circuit binary systems however, its odor impact is generally intolerable by communities. Continuous emission measurements should be carried out in the operating period and continuing emissions over limit values should be avoided by developing and implementing reducing techniques. • Measuring facilities should be installed at gas emitting points in the power plant before commissioning and the measurement systems be set up. This will enable to monitor the emission levels from the beginning and provide information on how they change with production or become stabilized in time. Monitoring will provide information for designing further mitigating systems, if deemed necessary. • H_2S measurement in predetermined sensitive receptors for monitoring purposes • Check grievance mechanism records related with H_2S • Use best available techniques • Preparation and implementation of H_2S Management Plan, and use of abatement systems to remove hydrogen sulfide emissions from non-condensable gases (NCG), if necessary.
Natural Resources	• Disturbance of natural during construction of power plant unit, (e.g. dust, noise, unseasonal working, poor siting, disposal of untreated wastes, etc.)	• Careful siting, alignment, design of rig sites, pipelines and power plant area, and/or timing of works (seasonal) • Selection of appropriate disposal areas and methods • Protect sensitive areas within/close proximity to site based on the results of E&S assessment studies • Avoid adverse impacts on natural habitats and critical habitats and prepare Biodiversity Management Plan if deemed necessary as a result of initial E&S risk assessments. (The projects in critical habitats or having adverse impact on natural habitats are not eligible) • National and international protection areas within the sub-project area will be determined and if needed a detailed assessment study will be carried out to avoid and monitor adverse impacts of the sub-project on these areas. • Implementation of mitigation measures for air emissions, solid and hazardous wastes, and noise described in the above sections. • Appropriate reinstatement of site during decommissioning. • Must comply with the EU Habitat Directive on the protection of natural habitats and wild fauna and flora.
Land Use and Soils	• Loss of topsoil during preparation of power plant site, construction of access roads or disposal of excavated materials • Damage to soil structure due to	• Strip topsoil (up to 300 mm depth) where necessary, temporary store separately in designated storage areas and reinstate • Storage areas will be prevented from the accumulation of storm water, provided with drainage. • Design hazardous waste storage area to prevent soil contamination, prevent from the accumulation of storm water provided with drainage.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
	material storage, traffic, etc. • Erosion due to uncontrolled surface run-off where vegetation is cleared • Landslips on embankments or hillsides	• Hazardous materials and chemicals will be handled properly in accordance with national and international standards, related management plans of the sub-project and take necessary measures defined in Material Safety Data Sheets for different type of materials (fire extinguishers, spill kits etc.)Protect non-construction areas, avoid work in sensitive areas during highly adverse conditions, provide temporary haul roads as appropriate, restore damaged areas • Design of drainage and other disposal facilities to ensure soil stability and appropriate treatment • Design of slopes & retaining structures to minimize risk, provide appropriate drainage, soil stabilization/vegetation cover • Take/dispose of materials from/at approved sites • Include hazardous materials management as a subject in EHS and OHS trainings to be provided to personnel. • Waste management plan will be implemented accordingly in order to mitigate the spill out risks of wastes from storage areas to soil. • Manage accidental spills and leakages through implementation of Emergency Preparedness and Response Plan • Regular maintenance of wellheads and geothermal fluid pipelines, including corrosion control and inspection; pressure monitoring; and use of blowout prevention equipment such as shutoff valves.
Well Blowouts	• Well blowout during operation	• Design of emergency response for well blowout and pipeline raptures including measures for containment of geothermal fluid spills through EPRP • Regular maintenance of wellheads and geothermal fluid pipelines, - corrosion control and inspection - pressure monitoring - use of blowout prevention equipment (e.g. shutoff valves) • An emergency/discharge pond to collect geothermal fluids in cases of emergencies and during maintenance. • EPRP should contain necessary trainings of communities for the preparedness to potential accidents. • Implementation of good drilling practices such as appropriate project planning, good design, appropriate personnel training, and right selection of blow out equipment and standards to avoid well blow outs.
Water Resources	• Possible over flow from mud pit. • Discharge of test water • Discharge of spent geothermal fluids • Contamination/pollution of	• Resource planning and management, in conjunction with authorities & communities • Careful design - maintain natural drainage where possible, provide suitable wastewater drainage, safe disposal of hazardous wastes • Baseline water quality analysis and periodic monitoring activities will be carried out. • Periodical monitoring of discharge and ambient environment in accordance to chemical characteristic of

Environmental and Social Issues	Possible Impacts	Mitigation Measures
	resource, drilling chemicals, fuel & oil, hazardous wastes, wastewater, etc. • Cumulative effects of water pollution sourcing from the GPPs in the same area.	geothermal water. • Geothermal fluids and test waters will be handled in accordance with national regulations. They will be analyzed and necessary permits will be obtained from authorities before discharge, if possible. • Waste storage will be done in dedicated and appropriate areas • Wastewaters will be collected in leakproof septic tanks and disposed in accordance with national regulation requirements • Hazardous materials such as fuels, chemicals etc will be stored in dedicated and appropriate areas that prevents any contamination with soil and water sources • Possible over flow from mud pit can cause localized soil contamination, which should be removed, restored and disposed off as hazardous or non-hazardous waste depending on its characteristics in line with related legislation. Over flow and effluent discharge risks should be included in EPRP. • The capacity of the mud pit should be determined to avoid over flow and regular monitoring activities on site should be conducted. • Discharge pond having a storage capacity equivalent to one hour flow should be constructed at wells and be connected to emergency ponds (cool pit) at the power plant. Emergency pond capacity will be identified proper to sectoral average breakdown durations of GPPs and censors will be installed in the pond to monitor the water level variations. • Wastewater management plan will be prepared and implemented. • Cumulative impacts will be considered within the scope of environmental and social assessment documents that needs to be prepared within the scope of project financing. Cumulative impact assessment studies which are being carried out by public authorities/IFIs will be benefitted as much as possible in the environmental and social assessment process.
Social Components	• Land based impacts including loss of livelihoods • Concerns and complaints of affected communities • Local employment and local procurement • Labor influx • Labor management • SH/SEA	**<u>Land based impacts including loss of livelihoods</u>** • Where needed, prepare sub project specific land acquisition plans and ex-post studies in line with project RPF for possible land impacts of investments. Prepare ex post social audits in line with project RPF for investments that have completed any kind of land acquisition process. Assess potential land-based livelihood impacts to take additional measures for livelihood restoration, if necessary. **<u>Concerns and complaints of affected communities</u>** • Ensure training is given to project workers to avoid miscommunication among project workers and communities, prepare code of conduct that will be shared with project workers during employment. • Consultation on risks and adverse impacts of the sub-project and creation of opportunities to receive affected

Environmental and Social Issues	Possible Impacts	Mitigation Measures

	• Gender	communities' views on sub-project.
		• Establishment of grievance mechanism to collect and facilitate resolution of affected communities' concerns, including workers' and grievances regarding the sponsor's environmental and social performance.
		• Transparent public disclosure to inform each phase of the sub-project through web site, notice boards, telecommunication tools and public meetings.
		• Assign designated staff for the implementation of SEP and to conduct engagement activities with stakeholders.
		• Establishing well designed and structured public questionnaire to receive feedback from affected communities.
		• Avoid gender-based violence by taking appropriate measures such as informing/training workers, ensuring sub-borrowers have a code of conduct in place and having a robust GRM.
		Local employment and local procurement
		• Make public announcements to inform local community and businesses on employment opportunities and procurement needs of the sub-project.
		Labor Influx
		• Screen and assess the type and significance of potential social and environmental impacts that may be generated by labor influx;
		• Development of a management plan for social and environmental impacts in consultation with affected communities (if needed);
		• Implementation of appropriate mitigation and monitoring programs, which includes development and implementation of a stakeholder engagement program;
		• Establishment of a grievance redress mechanism (GRM) for workers and host community;
		Labor management
		• Recruit unskilled or semi-skilled workers from local communities to the extent possible. Where and when feasible, worker skills training, should be provided to enhance participation of local people.
		• Provide adequate lavatory facilities (toilets and washing areas) in the work site
		• Raise awareness of workers on overall relationship management with local population, establish the code of conduct in line with international practice and strictly enforce them, including the dismissal of workers and financial penalties of adequate scale
		• Introduce requirement in the procurement for the contractors to
		  • adopt CoC, which stipulates norms and regulations of conduct and which addresses SH/SEA
		  • have it signed and understood by all the contractors' staff with a physical presence at the project sites, and
		  • train its staff on the obligations under the CoC.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		<u>Sexual Harassment (SH) and Sexual Abuse and Exploitation (SEA) SH/SEA</u> • Share information on SH/SEA risks during public consultations • Ensure that SH/SEA grievances are received, recorded and addressed through the project GRM in a confidential manner • Refer SH/SEA survivors to existing, identified service providers (*) and ensure that they are provided services promptly. **<u>Gender</u>** • Women focused engagement meetings will be conducted by sponsors/developers as part of regular community engagement activities. Culturally appropriate means and venues will be selected to host such women-focused meetings, where possible. If Covid 19 pandemic measures do not allow for physical engagement, then other safe online means will be utilized to continue meaningful engagement with the affected local communities. • Sponsor will receive gender-bias awareness training, as part of the project's corporate requirements recommended by the World Bank • Gender disaggregated data will be collected where possible • Women in technical and managerial positions will be encouraged by the sponsors/developers * *These are usually referred to national referral systems. Basically, the person dealing with GRM, if s/he receive such sensitive complaint, s/he should keep the survivor's info confidential and direct her/him to the national referral system and should not get into any detail or analyses on its own. If the survivor prefers to directly go the national service provider (police, health clinic etc) and does not report anything to the project GRM then the project GRM is not expected to chase or track anything. The point here is that if such confidential/sensitive issues come to project this is dealt in full confidentiality and the GRM focal point, directs this to national authorities/service providers.*
Aesthetics and Landscape	• Local visual impact of completed works and some intrusions into general manmade and natural landscape, loss of trees, vegetation, etc. Noise, dust, wastes, etc., during construction and operation	• Careful siting and design of works, screening of intrusive items • Replantation and afforestation.: will be implemented based on management plan (if needed) and/or actions identified within the content of environmental and social management plan considering the vegetation of the region to mitigate visual impacts • Painting the pipelines green and brown (camouflaging them in line with the color of the ground) • Minimizing the areas requiring the removal of vegetation, and upon finalization of works, replace/restore removed vegetation. Special measures if needed to avoid damage to protected trees or species. • Careful de-commissioning of drilling rig areas and disposal of wastes. After removing the drilling rig, well pad area needs to be restored. Replantation may be needed in some areas to preserve the original plantation. Afforestation should also be done where applicable. • Waste – will be collected in dedicated areas preventing any visual disturbance in accordance with national and international standards.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Dust - Close or cover trucks for the transport of materials. Throwing water on the ground where dust is generated, disposing of excess material and cleaning the location upon the finalization of works. Protective covers or curtains for zone where the largest amounts of dust are generated Noise - Imposing time constraints for works (works in the course of daytime (e.g. 7AM to 5 PM). Establish schedules and/or other forms of specific limitations for work.
Occupational Health and Safety	• Toxic gas emissions during operation of power plant • Non-routine exposures include potential blowout accidents during operation • Accidents during the construction stage. • Noise and vibration • Working at heights Working in remote locations	• Development of a site specific OHS risk assessment and management plans and training of personnel regarding the risks during construction and operation • Define an adequate OHS organizational structure as defined by the national legislation during construction and operation • Installation of hydrogen sulfide monitoring and warning systems. • Development of a contingency plan for hydrogen sulfide release events, including all necessary aspects from evacuation to resumption of normal operations • Provision of an emergency response teams, and workers at drilling rig, with personal hydrogen sulfide monitors, self-contained breathing apparatus and emergency oxygen supplies, and training in their safe and effective use • Provision of adequate ventilation of occupied buildings to avoid accumulation of hydrogen sulfide gas • Providing workers with a fact sheet or other readily available information about the chemical composition of liquid and gaseous phases with an explanation of potential implications for human health and safety • Shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc. • Use of personal protective equipment (PPE) as appropriate, including insulated gloves and shoes, masks • As personal protective equipment, air-fed full-face masks (at concentrations above 100 ppm) or full-face masks (at concentrations below 100 ppm) should be used, both equipped with a suitable gas filter. • Implementing appropriate safety procedures during the exploratory drilling process • Continuous operation of the hydrogen sulfide gas monitoring systems to facilitate early detection and warning will be applied; • Reducing the time required for work in elevated temperature environments and ensuring access to drinking water • Strict health and safety standards will be implemented including traffic management plan to reduce road related accidents. • Frequent checks of eye hazard protection equipment prior to use to ensure mechanical integrity • Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures should be taken into account

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		Noise and Vibration (noise and vibration caused by drilling activities) • Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure. • Ensure use of hearing protective devices such as silencers and earmuffs to workers as required. • Periodic medical hearing checks for the workers exposed to high noise levels • Consider changing equipment or implementing time limits in case of a grievance regarding vibration. **Working at Height and Falling Objects (working at heights more than 2 m and objects falling on individuals working below)** • Provide specialized OHS trainings. • As possible to the extent and as considered feasible, assemble structures and carry out other suitable work at ground. • Allow only competent and trained personnel to conduct works at height. • Ensure fall protection systems are in place during works at height (e.g. guard rails, fall arrest equipment, safety belts, etc.). • Consider additional safety equipment such as safety nets and airbags, where feasible • Ensure the necessary equipment are checked and maintained regularly. • Do not conduct related activities during heavy rain/storm and other poor/extreme weather conditions. • Set and maintain appropriate exclusion zones below any working at height activities to the extent possible (measure for falling objects). • Ensure all tools and equipment are attached by appropriate means to the personnel that is working at height (measure for falling objects). • Use approved tool bags for raising and lowering equipment. • Implement the worker's grievance mechanism. • Conduct regular labor audits to contractors workforce (by independent labor auditors assigned by the sub-borrower). **Working in Remote Locations (difficulty in access to emergency services and communication)** • Ensure communications equipment are available for all personnel and maintained properly. • Keep a suitable patient transport vehicle on site. **Working in confined spaces** • Ensure that only the staff trained on safe working in confined spaces work in such areas. • Ensure that isolation measures are in place for local utilities (gas, electricity and water) to allow the employees to work safely.

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Ensure all the employees have suitable PPE to undertake a work in confined space. • A confined space should be adequately purged before the entry of workers to ensure that no sludge or other deposits will give off hazardous gas, vapour, dust or fume during the course of work. • Use portable oxygen or multi-gas meter with audible alarm features for the detection of any local pockets of gas or lack of oxygen. • Mechanical ventilation may be necessary to ensure an adequate supply of fresh air. • Ensure that the workers are familiar with the emergency procedures.
Human Health	• Toxic gas emissions during operation • Unauthorized site access power plant site • Hazardous chemicals may accumulate in ponds where reject thermal water to be re-injected to reservoir is collected Pandemic Outbreak	• Installation of hydrogen sulfide monitoring and warning systems • Siting of potential significant emissions sources with consideration of hydrogen sulfide gas exposure to nearby communities (considering key environmental factors such as proximity, morphology and prevailing wind directions) • Continuous operation of the hydrogen sulfide gas monitoring systems to facilitate early detection and warning • Fencing around well sites, open ponds and mud pits • • Emergency planning involving community input to allow for effective response to monitoring system warnings • Completion of a hydrogeologic and water balance assessment during the project planning stage to identify hydraulic interconnections between the geothermal extraction and reinjection points and any sources of potable water or surface water features • Avoiding adverse impacts on surface water by introducing strict discharge criteria and appropriate means to bring water quality and temperature to acceptable standards • **Hazardous chemicals** • Store in dedicated areas and on impermeable surfaces in accordance with the requirements of related legislation • Put “hazardous" labels • In addition to general measures defined in national and international standards, take additional protective measures; and safety precautions for handling, storing, and transporting the chemicals defined in MSDS forms such as locating suitable fire-fighting equipment, spill kits, second containment etc. • Training on handling hazardous chemicals; drills should be carried out for employees in case of any related scenario. • **Pandemic outbreak**

Environmental and Social Issues	Possible Impacts	Mitigation Measures
		• Guidance, directives and recommendations of Republic of Turkey Ministry of Health, Republic of Turkey Ministry of Family, Labor and Social Services, and World Health Organization shall be followed and all relevant necessary measures shall be taken, both for occupational health and safety of employees and for workplaces, in case of an outbreak of any other pandemic/communicable disease including COVID-19 • Preparation and implementation of site-specific contingency / emergency / crisis management / action plan regarding COVID-19 and any other pandemic/communicable disease risk. Contingency plans should consider arrangements for the storage and disposal arrangements for medical waste, which may increase in volume and which can remain infectious for several days (depending upon the material). To ensure that individuals roles and responsibilities are clear, contingency plans should be communicated widely, including both employees and affected local communities in the vicinity. • Provide regular trainings to workers on pandemic/communicable disease (including COVID-19) symptoms, how to be protected and what to do when symptoms appear • Conduct periodic medical checks for personnel and provide vaccination and/or other mitigating measures when required. • Provide health related awareness raising activities aimed at local communities. • Implement the Stakeholder Engagement Plan and the external grievance mechanism by also taking into account the Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings, issued on March 20, 2020. • Keep a suitable patient transport vehicle on site. • Share information with community • **Covid-19 (in addition to pandemic outbreak measures)** • Practice social distancing in common areas • Arrange common areas such as dining halls, dormitories according to social distance • Thermal cameras • Measure fever of each personnel at the entrance and exit. • Carry out routine health checks every morning • Use masks in common areas • Regular cleaning and disinfecting of all areas used by the personnel • Limit outside visits and applying precautions to any guests • Disinfect of personnel transport services regularly Provide hand sanitization supplies at places easily accessible by workers

Environmental and Social Issues	Possible Impacts	Mitigation Measures
Historical / Cultural Sites	• Disturbance/damage/degradation to registered and undiscovered sites • Unique geological formations such as Pamukkale in Denizli, Turkey may be adversely affected in case thermal water feed is interrupted during operation of groundwater wells • Intangible cultural issues in the sub-project regions.	• Careful siting/alignment of works; special measures to avoid adverse impacts on cultural heritage. • Immediately halt work in vicinity of discoveries, pending instructions from relevant museum directorates (implementation of Chance find procedure) • Social and spiritual value of historic and present connections to existing communities should be defined in line with WB ESS8. • If needed depending on E&S assessment studies, cultural heritage management plan will be expected from investors.

4. TURKISH AND WB REQUIRMENTS AND KEY DIFFERENCES

The Turkish Regulation on EIA

The Regulation on Environmental Impact Assessment (henceforth "EIA Regulation") (Official Gazette No. 29186, November 25, 2014) governs environmental impact assessment of investment projects in Turkey and is largely in line with the EU Directive on EIA. Below, the key relevant steps of Turkish EIA procedure namely screening, public consultation, scoping, disclosure and supervision are reviewed briefly in the order in which they are prescribed to occur:

a) Screening:

The EIA Regulation classifies projects into three categories

- *Annex I projects*. These are projects that have significant potential impacts and *require* an EIA. Annex I of the EIA Regulation lists these projects types, so project proponents are expected to start the EIA procedure without any other screening process; and
- *Annex II projects*. These are projects that may or may not have significant effects on the environment. Annex II of the EIA Regulation lists these projects types. Proponents of Annex II projects are required to submit a Project Information File (PIF) to PDoEU. The PIF is prepared following the General Format for PIF provided in Annex IV of the EIA Regulation and contains information on (i) project characteristics; (ii) Project site and environmental characteristics of the project; and (iii) significant impacts of the project and measures to be taken. A non-technical summary of the above items is also to be added to the PIF. On the basis of the PIF and the Selection and Elimination Criteria specified in Annex IV of the EIA Regulation, PDoEU determines whether an EIA is necessary.
- *Non*-Annex projects: These are projects that are not in the scope of the Annex I and Annex II of Turkish EIA Regulation.

Table 4 lists the Project components that will be considered for funding under the GDP AF and their category according to the EIA Regulation.

TABLE 4: PROJECT TYPES AND THEIR CATEGORIZATION ACCORDING TO TURKISH EIA REGULATION

Investment Area	Annex I	Annex II
Drilling Activities (Drilling of production and re-injection wells within the scope of the sub-projects)		• Mine, petroleum and geothermal resource exploration projects (except seismic, electricity, magnetic, electromagnetic, geophysics, etc. methodologies)
Power Plant Development Activities	• Discovering or producing geothermal resources for electrical energy production (thermal capacity of 20 MW and above).	• Producing geothermal resources for electrical energy production (thermal capacity of 5 MW and above).

Source: Republic of Turkey, Regulation on EIA (Official Gazette No. 29186, November 25, 2014)

b) Public Consultation Meeting:

For projects that require the preparation of an EIA, the Governorate is required to inform the public that a project application has been submitted in a specified locality, that the EIA process has begun and that the public may submit its comments and suggestions to the Governorate or MoEU. The announcement is made using a variety of methods, including the internet, bulletin boards and loudspeaker announcements. MoEU informs the public of the same through the internet. The date, time, place and scope of the meeting is also announced in one national and one local newspaper at least ten calendar days before the date of the meeting.

A formal public consultation meeting occurs for projects that are subject to an EIA after the screening process and prior to scoping. The project proponent organizes a "public-participation meeting" chaired by a MoEU's provincial director in a location that affected local groups can access easily. The invitation to the meeting is published in a national and a local newspaper at least ten days prior to the meeting. There is no requirement that information on the project should be provided to the public, except for the subject matter of the meeting, in advance. However, the EIA Regulation specifies that during the meeting, which is chaired by the Director or a member of MoEU's provincial directorate, it should be ensured that the public is informed about the project, and its comments and suggestions regarding the project are obtained. The meeting chairperson may request comments in writing too. Minutes of the meeting are kept and submitted to MoEU and the Governorate. The Governorate is required to inform the public about the timeframe for submission of public comments and suggestions. Such comments and suggestions are submitted to the EIA commission.

For Annex II projects, which are subject to preliminary environmental impact assessment, there is no public participation process.

c) Scoping:

The project proponent presents a project dossier (PIF for Annex II projects or using the PIF outline for Annex I projects) to a commission, which comprises representatives of MoEU and relevant organizations as identified by MoEU. Based on the information submitted, the commission determines the scope of the EIA and the 'project specific format" which follows the outline of the "general format" used for the PIF, furthermore, the commission may exclude or include some items depending on the specific characteristics of the proposed project. The commission also determines the level of detail under each heading depending on the special project's environmental impacts. In this process, the commission takes into consideration of the opinions expressed during the public participation meeting.

d) Review and Approval of the EIA Report:

As mentioned previously, the commission reviews and studies the draft version of the EIA report. In its review, the commission assesses (i) the adequacy of the EIA report and its annexes; (ii) whether the analyses, evaluations or calculations were adequately substantiated by relevant data and documentation; (iii) whether the potential environmental impacts of the project were evaluated in adequate scope and depth;
(iv) whether measures necessary to prevent or mitigate negative environmental impacts have been identified; (v) whether the public participation meeting was carried out in accordance with prescribed procedures and the issues brought up during the meeting were adequately addressed in the report. While the EIA identifies a project's environmental impacts and mitigation measures, it does not specify costs and institutional responsibilities associated with these mitigation measures. Neither does the EIA include a monitoring plan. The final EIA report, which incorporates the commission's assessments, is then submitted to the MoEU for final review. MoEU determines whether the "EIA is positive" in which case the project proponent may implement the project or "EIA is negative" in which case the project may not go any forward.

e) Disclosure:

The start of the review process and that the Draft EIA Report is disclosed to public view is announced by the Ministry and its relevant Provincial Directorate(s) using appropriate communication tools (e.g. announcements, notice boards, internet, etc.). From the announcement date to the report finalization through the review and evaluation meeting(s), public can review the Draft EIA Report and submit their views and comments to the Ministry or its Provincial Directorate. These comments are taken into consideration by the Committee members and the competent EIA Consultant addresses them in the EIA Report. The Report is finalized based on the comments of the Committee members and the Final Draft EIA report is submitted to the Ministry for the final public disclosure. Accordingly, the Final Draft EIA Report is disclosed by the Ministry and its related Provincial Directorates for 10 calendar days through announcement boards and internet. Any comment received from public in this context is considered by the Ministry in the decision-making process. After MoEU's final evaluation of the EIA report, the Governorate announces to the public MoEU's decision together with its justifications. Disclosure of the final EIA document is made available via an online system named e-ÇED of the MoEU.

f) Monitoring and Inspection:

According to the EIA Regulation, MoEU monitors and inspects projects that were assessed either "not to need an EIA" or "to have a positive EIA" based on provisions specified in the PIF or the EIA, respectively. Furthermore, the project proponent is obliged to submit monitoring reports to MoEU, which transmits them to the Governorate for disclosure to the public. (The form or medium of this disclosure is not specified in the EIA Regulation). In case MoEU determines non-compliance, the Governorate issues a warning. If after the granted time compliance is still not achieved the Governorate may suspend the operation of the plant in question.

Environmental Permit and Hydrogen Sulfide Monitoring Requirements for GPPs

According to the Regulation on Environmental Permit and License (amended in November 2020), geothermal power plants with more than 5 MWe installed capacity are obliged to obtain Environmental Permit.

The Regulation on Control of Industrial Air Pollution includes limit values for H_2S parameter, which will be applicable after 30/06/2021, and continuous H_2S monitoring requirements for the GPPs with more than 5 MWe installed capacity with Continuous Emissions Monitoring Systems (CEMS). H_2S limits defined for different installed capacities are given in the table below. The geothermal power plants with H_2S emissions higher than the indicated limits below are required to install H_2S abatement systems.

TABLE 5: LIMIT VALUES FOR H2S EMISSIONS

GPP Capacity (MW)	H_2S Limits (kg/hour)
20	6
20 - 50	10
50	15

The details of CEMS to be installed for the monitoring of H_2S are included in the Communique on Continuous Emissions Monitoring Systems.

The WB Environmental and Social Assessment Policy

a) Project Categories and Screening[8]

Under the WB's Operational Policy for Environmental Assessment (O.P. 4.01) projects are classified under Categories A, B and C according to the level of their likely impact on the environment:

- *Category A.* A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts (based on type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts). These impacts are generally large-scale, irreversible, sensitive, diverse, cumulative or precedent setting and may affect an area broader than the sites or facilities financed by the project. For example, Category A projects have one or more of the following attributes: large-scale conversion or degradation of natural habitats (the projects on critical habitats and projects having adverse impacts on natural habitats are not eligible for financing); extraction, consumption, or conversion of substantial amounts of forest, mineral and other natural resources; direct discharge of pollutants resulting in degradation of air, water or soil; production, storage, use or disposal of hazardous materials and wastes; measurable changes in hydrologic cycle; risks associated with the proposed use of pesticides.
- *Category B.* A proposed project is classified as Category B if the potential impacts on the environment are typically site-specific, reversible in nature; less adverse than those of Category A projects and for which mitigation measures can be designed more readily. Projects in Category B sometimes differ only in scale from Category A projects of the same type. For example, large irrigation and drainage projects are usually categorized as A; however, small-scale projects of the same type may be categorized as B. The same can be true for small-scale, relatively clean (gas or light diesel oil fired) thermal power plants, micro hydro power plants, and small sanitary landfills. Similarly, projects that finance rehabilitating or maintaining an existing infrastructure may have adverse impacts, but are likely to be less significant compared to a Category A project, and would be categorized as B. Furthermore, Category B projects can be divided to two within its structure as B and B+ projects (this is a practical usage, this is not defined in OP 4.01 of WB Policy). Category B+ projects have relatively more impacts and mitigation measures comparing to Category B projects, yet the impacts and mitigation measures are not significant enough to be recognized as Category A projects.
- *Category C.* A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. For example, technical assistance projects in institutional development, computerization and training fall in Category C.

When a WB-funded project involves a series of subprojects, which are selected and funded by a financial intermediary (FI) using WB loan proceeds, the project is classified as Category FI. In such projects, the FI screens and classifies the proposed subprojects as Category A, B, or C following the above definitions and ensures that the sponsor carries out the corresponding environmental assessment. Since the present project is an FI project, the following discussion will refer to subprojects only.

There are no clear-cut border values distinguishing the categories or, unlike the Turkish EIA Regulation, any ready lists of project types for categorizing projects as A, B and C; rather projects are screened on a case by case basis. The GDP AF has been assigned as Category FI (Financial Intermediary) in accordance with World Bank safeguard policy OP/ BP/ GP 4.0 since TSKB has been assigned as FI for using WB loan proceeds. The sub-projects will be screened by TSKB according to

WB environmental safeguards and a consensus about final category will be reached with the Bank.

b) Scope of Environmental and Social Assessment.

The scope and type of the environmental and social assessment (ESA)[3] varies between Category A and B projects.

For Category A subprojects the borrower is required to prepare an ESIA which examines the project's potential negative and positive environmental and social impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental and social performance (see Table 2 and Table 3). ESIA also includes an environmental and social management plan (ESMP) which details the measures to be taken during the implementation and operation of a project to eliminate, reduce or offset adverse environmental and social impacts, the actions needed to implement these measures as well as monitoring indicators and actions and responsibilities (see Annex 1 for an ESMP format, and Annex 4 for ESIA format).

The scope of environmental assessment document for a Category B subproject may vary from subproject to subproject, but is narrower than the ESIA required for Category A. Like Category A ESIA, it examines the subproject's potential negative and positive environmental and social impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental and social performance. If the project is recognized as Category B, this information may be contained in an environmental and social management plan (ESMP) only unless there are site-specific issues which necessitating a site-specific assessment in addition to the ESMP. An example is modest scale building construction on a site in an urban area which would normally require only an ESMP if it is known that there are no environmental issues relating to the site. If it is construction on a greenfield site, an ESIA[4] would be needed to clarify whether there are any special environmental or social issues. The project could turn into Category A, if ESIA work shows likelihood of significant damage to natural habitat. On the other hand, if the project is recognized as B+, then ESIA is required to satisfy the expected requirements (Attachments provided in Annex 1 provide sample ESMP formats for each of components to be financed under GDP AF).

c) Public Consultation and Stakeholder Engagement

For all Category A and B projects proposed for WB financing, during the ESA process, the borrower consults project-affected groups and NGOs about the project's environmental aspects and takes their views into account.

For category A projects, at least two consultations (one is at scoping stage and one is on draft ESIA stage) are held.

For category B projects, at least one consultation is held with affected groups and local NGOs: once the draft ESA report (including ESMP) is prepared. The borrower provides a summary of the ESA's conclusions. (Please also refer to "g) Disclosure").

In addition, the borrower consults with such groups throughout project implementation as necessary to address ESA-related issues that affect them.

For meaningful consultations between the borrower and project-affected groups and local NGOs on all Category A and B projects proposed for WB financing, the borrower provides relevant material (in local language) in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted.

Stakeholder engagement is the continuing and iterative process by which the Borrower identifies, communicates, and facilitates a two-way dialogue with the people affected by its decisions and

activities, as well as others with an interest in the implementation and outcomes of its decisions and the project. It takes into account the different access and communication needs of various groups and individuals, especially those more disadvantaged or vulnerable, including consideration of both communication and physical accessibility challenges. Engagement begins as early as possible in project preparation because early identification of and consultation with affected and interested parties allows stakeholders views and concerns to be considered in the project design, implementation, and operation.

Meaningful stakeholder engagement throughout the project cycle is an essential aspect of good project management and provides opportunities for Borrowers to learn from the experience, knowledge, and concerns of the affected and interested stakeholders, and to manage their expectations by clarifying the extent of the Borrowers responsibilities and resources.

Sponsors will engage with stakeholders throughout the project life cycle, commencing such engagement as early as possible in the project development process and in a time frame that enables meaningful consultations with stakeholders on project design. The nature, scope, and frequency of stakeholder engagement will be proportionate to the nature and scale of the project and its potential risks and impacts.

d) Expert Selection

For Category A subprojects, WB reviews and clears the 'TABLE OF CONTENTS' of the ESIA. If needed, WB can advise on the TOR for the ESIA consultant. Furthermore, such experts must be independent from the project proponent and not affiliated with the project. For Category B, the sponsors may either select consultants designing the Project or staff of the Project proponent to carry out the ESMP. The FI of the Project will be responsible for monitoring and guiding the process.

e) Review and Approval of the ESMP

In FI projects, the responsibility to ensure that OP 4.01 (and benefiting from the new WB ESF when needed) requirements are shared between sub-borrower (applicant), FI, and the WB. FI is the responsible agency to review and assess the sub-borrower to meet the conditions as set out in this FW document and WB provides overall supervision and also no- objection as defined in Chapter 5. The ESA process should normally be completed prior to the FI's approval of a project for financing with a WB loan.

f) Conditionality

In FI projects, the sub-loan agreement between FI and the sub-borrower must include the conditionality for the sub-borrower to implement the relevant ESA document (ESIA, ESMP, etc.) for Category A and Category B subprojects. The borrower must monitor and ensure that the contractor is in compliance with the provisions of the ESA document. In order to fulfill its environmental obligation, the borrower may incorporate provisions of the ESA document into the procurement documents and contracts for works. Non-compliance may lead to the suspension of WB funding for the subproject.

g) Disclosure

In addition to the disclosure requirements specified under "c) Public consultation" above, for Category A subprojects the FI must make the draft EIA report in local language available at a public place accessible to subproject-affected groups and local NGOs.

When the ESIA and/or ESMP documents of a Category A and Category B subproject is finalized, they are disclosed in local language. The FI transmits to WB an English language copy of the final report including an English language executive summary. The Bank distributes the executive summary to its

executive directors and makes the report available through the WB external website.

In case of Category B subprojects, the ESIA and/or ESMP document is disclosed in country in local language and after finalization FI transmits to WB the final English language of the report. Then, as in Category A subprojects, WB makes it available through its external website by indicating the in-country disclosure date.

h) Implementation

During project implementation, the FI reports to WB on (a) compliance with measures agreed with the Bank on the basis of the findings and results of the ESA, including implementation of the ESMP; and (b) the findings of monitoring programs. The Bank bases supervision of the project's environmental and social aspects on the findings and recommendations of the ESA, including measures set out in the legal agreements, any ESMP, and other project related documents.

Key Differences between the Turkish EIA Regulation and WB Environmental and Social Policy

The Turkish EIA procedures are, with some exceptions, in line with the World Bank's ESA policies. The primary exceptions are in project categorization, content of ESA and public consultation:

a) Project Categorization.

The sub-borrower can apply for a loan for establishing the power plant for energy generation or using the geothermal energy for heating facilities, SPAs, etc. Unless significant environmental and social issues are identified, SPA like facilities are expected to fall into Category B. However, some of the energy production facilities (power plants) under Additional Financing may be categorized as 'A' according to environmental and social risks. Turkish regulation classifies geothermal energy generation facilities as Annex I if the installed capacity is larger than 20 MW. World Bank will categorize projects on case by case basis, therefore the FI will consult and agree with WB on the categorization of sub-projects and will follow relevant procedures for environmental and social assessment based on the agreed category.

b) ESIA Expert Selection.

There are no clauses in the Turkish EIA Regulation limiting expert eligibility to prevent conflict of interest.

c) ESA Content.

Category A subprojects. A broad comparison of the outline required by WB for a Category A subproject ESIA with the general format of a Turkish PIF indicates a number of differences. These include notably the absence of an executive summary and information on the policy, legal and administrative framework, as well as possible discrepancies with regard to the level at which the subproject's environmental and social impacts, its alternatives, and mitigation measures for the impacts are discussed. A key gap is the absence of an ESMP with clear specification of actions and delineation of responsibilities. Nevertheless, the project specific format for EIA may require more details under some of these headings than indicated in the general format for PIF. Consequently, a case by case review of the Turkish EIAs is necessary to identify gaps with WB requirements.

Category B subprojects. The content of the ESA required by WB depends on the special circumstances of the project. In all cases, an ESMP is required which is only partially covered in a Turkish EIA. The WB also requires ESIA for Category B+ projects (i.e. Category B projects that are complex and significant enough to require an ESIA nearly equivalent to Category A), on the other hand, there is no corresponding category in Turkish EIA Regulation for Category B+ classification.

5. APPLICATION OF THE TURKISH EIA REGULATION AND WB ESA POLICY

In the light of the similarities, the procedures to be carried out for meeting with the WB OP 4.01 requirements will be designed to avoid repeating the same steps of Turkish EIA process. These procedures will be a supplementary to the Turkish EIA process that have already been carried out. The following section lays out the procedures in a step-by-step manner.

Step-By-Step Process of Meeting WB Requirements

Step 1: Screening

The Environmental and Social Management Framework (ESMF prepared by the client) will be disclosed in country and then WB will share it via its external website before project appraisal. The locations and the scope of the objectives will be identified during the project implementation and relevant environmental and social assessment documents will be prepared according to WB OP 4.01 (also benefiting from the new WB E&S Framework as needed) requirements.

By using its ERET (Environmental and Social Risk Evaluation Tool) tool and in consultation with WB, TSKB will carry out the screening of all subprojects in terms of Category A, Category B or Category C. It is assumed that on exceptional basis, the sub-projects that will be screened by TSKB may fall into Category A if assessed to carry "high risk". Still most of the sub-projects (capacity drills and heating, SPA, energy generation facilities) is expected to be classified as Category B.

As it is described above, Category B covers any project which is not sufficiently complex and risky to require a full, comprehensive ESIA (addressing a wide range of potential issues and including up-to-date environmental and social baseline data and a detailed analysis of alternatives), but does require some analysis of potential environmental and social impacts in order to be able to identify appropriate mitigation measures and monitoring indicators. According to the significance of the limited impacts of Category B projects different types of Environmental and Social Assessment (ESA) documentation could be required. The FI will assess whether the impacts are more significant than a low risk (B-) project and then an ESIA will be asked instead of an ESMP.

The natural habitats policy is triggered for the project to inform the ESA process about detailed assessment of natural ecology if the project site (both for capacity drilling or energy generation facilities) is on or in the vicinity of a natural habitat. However, any project located in a critical natural habitat will be ineligible for financing. It should be noted that nationally protected areas are defined as critical habitats as well. See Box 1 for further information.

With regard to OP 7.50, FI is responsible for ensuring that the projects financed are located/depending on national waterways only. The waterways identified as NOT an international waterway (do not trigger OP 7.50) in Turkey are namely: Susurluk, North Aegean, Gediz, Kuçuk Menderes, Buyuk Menderes, Western Mediterranean, Antalya, Sakarya, Western Black Sea, Yesilirmak, Kizilirmak, Konya Kapali, Eastern Mediterranean, Seyhan, Ceyhan, Eastern Black Sea, Burdur, Afyon, Orta Anadolu, and Van. In addition to the river basins, there are three transboundary aquifers in Turkey. The first, known as "Svilegrad/Orestiada" is in the northern border area between Bulgaria-Greece-Turkey. The second, known as "Evros/Meric" is along the Greece-Turkey border while the third, known as the "Topolovgrad karst waterbearing massif" is on the Bulgaria-Turkey border. The three lie along the northern borders of Turkey along the areas highlighted in yellow in the extracted map below. Drilling activities should also avoid these aquifers and the main responsible party for ensuring this is the relevant FI of the project application.

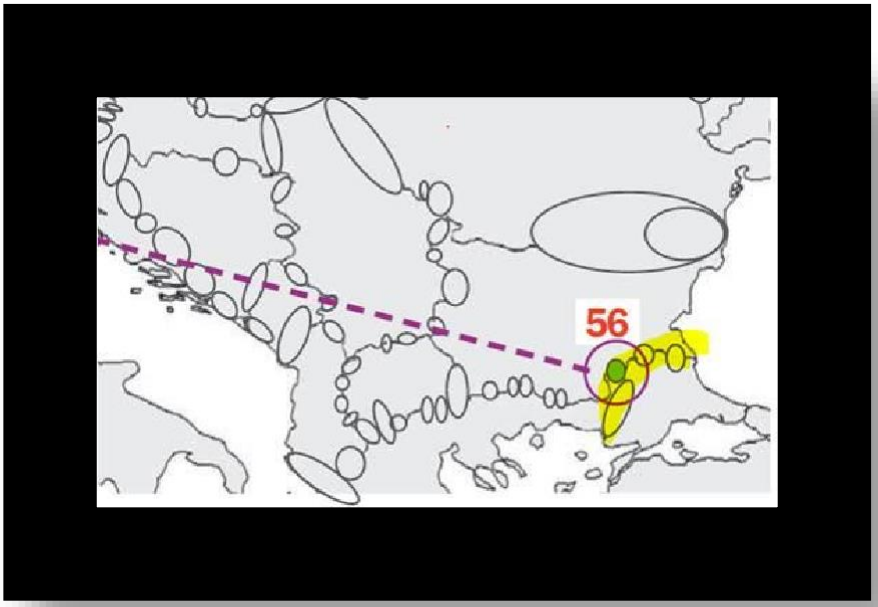

FIGURE 7: TRANSBOUNDARY AQUIFERS IN TURKEY

BOX 1 COMPLIANCE WITH OTHER WB OPERATIONAL POLICIES

Natural Habitats (OP 4.04). *The capacity drilling activities may take place in rural areas that are potential natural habitats. According to OP 4.04 the projects which do not create any significant adverse impacts on natural habitats and that are not placed in critical natural habitats will be eligible for financing. Issues related to natural habitats will be detailed in the ESA documents which will be prepared for each sub-project. It should be noted that nationally protected areas are defined as critical habitats.*

Physical Cultural Resources (OP 4.11). *In any circumstances, whether or not the Project is located in historic areas, the ESIAs/ESMPs will include procedures and responsibilities for managing accidently discovered or chance find cultural artifacts.*

Turkish laws, notably Law No. 2863 dated 21.07.1983 on the Protection of Cultural and Natural Assets (revised through the amendment issued on 27.07.2004 dated Official Gazette) and practices meet the World Bank requirements. The Regulation on Researches, Drillings and Excavations in Relation to the Cultural and Natural Assets, which was published in the Official Gazette No. 18485 dated 10.08.1994 define the procedures and obligations concerning the cultural and natural assets found out during construction. FI is responsible to avoid or mitigate impacts on physical or cultural resources of the financed projects. Therefore, FI will not proceed with project funding until all requirements of the Turkish legislation are met. Since the national regulations on the conservation of cultural properties are strict, it is not anticipated that any additional requirements would arise WB safeguards policies.

Involuntary Resettlement (OP 4.12). *- According to Turkish regulation, all involuntary land acquisition is generally completed prior to World Bank financing of above components. The counterparts were informed however that even if the land acquisition is completed prior to World Bank financing, OP 4.12 applies if land was acquired in anticipation of or in preparation for a project shortly before initial discussions with the Bank and the land is directly linked to the World Bank project. In such cases, the FI of the Project will need to conduct social audits to ensure that the land acquisition was completed in accordance with the objectives of OP 4.12, and in cases when necessary, the FI will develop a corrective action plan to bridge significant gaps.*

In cases where additional involuntary land acquisition will be necessary, the borrower under the supervision of FI will be responsible in preparing Resettlement Action Plans prior to such land acquisition. Temporary social impacts during drilling activities, such as disturbances to the local population, may also occur during the project. The need to avoid or mitigate such impacts was also discussed with FI of the Project. For sub-projects that will use retroactive financing, an Ex Post Social Audit will be carried out to assess previous land acquisition activities and their compliance to project RPF.

As specific sub-projects are not identified at this point, all of the potential social impacts and the procedures to manage these social impacts will be covered in a Resettlement Policy Framework (RPF). The RPF will be prepared by the client and disclosed in country and in World Bank's external website before appraisal.

Other World Bank Safeguards. *No other safeguard policies are expected to be triggered but FI will alert the WB if questions arise.*

Step 2: Environmental and Social Assessment

Category A Subprojects

For Category A projects, if a Turkish EIA was not prepared (either because the subproject was listed in Annex II and not deemed to need an EIA or it was not listed in either Annex I or Annex II) a full ESIA following WB guidelines will have to be prepared. If a Turkish EIA was prepared then FI will carry out a gap analysis of the information and analysis provided to determine the content of the supplementary documents. If the nature of the missing information is minor, i.e. the information gap concerns only policy, legal and administrative framework; baseline information; or minor discrepancies in project description, but all other requirements listed in Annex 2, including ESMP, are met, then supplementary documents will contain only this information. If the information gap concerns the depth and scope of discussion on environmental and social impacts, mitigation and monitoring measures and arrangements; project alternatives, it is considered major, and will require in depth documentation of these issues, including an ESMP. In both cases, the "WB ESIA" will consist of supplementary documents and the Turkish EIA. It should be noted that evaluating cumulative impacts is a part of Category A ESIA process (as described below).

Category B Subprojects

If the project is recognized as Category B+, then ESIA (including an ESMP) is required to satisfy the expected requirements. For Category B-, an ESMP will suffice. For subprojects that are listed in Annex II of Turkish EIA Regulation there is a PIF and the PIF likely has information on the mitigatory measures but no details on their costs and the institutions designated to carry them out or a detailed monitoring plan. The PIF can be used as a background document while preparing ESIA or ESMP. It should be noted that evaluating cumulative impacts is a part of Category B ESIA/ESMP process as well (as described below).

Completing a satisfactory ESMP/ESIA is responsibility of the sponsor. FI will perform an overall quality assurance function that the documents prepared meet WB requirements. In reviewing an ESMP/ESIA, FI will also confirm that it is clear, feasible and appropriate. The ESA documents will then be submitted for WB's review and approval.

Cumulative Impact Assessment

In the cumulative impact assessment (CIA), priority will be given to the available CIA reports prepared for the geothermal resources in Turkey, particularly for the region of planned project, by the governmental authorities and/or IFIs. Recently, a CIA study, namely "Turkey: Development of CIA of Geothermal Resources" has been conducted within the technical cooperation among the MoEU and the EBRD with the financial support of the EBRD. The study covers the CIA of geothermal resources in the Menderes and Gediz Grabens together with a "Best Practice Guide Report" and expected to be finalized soon. These studies could be used as a guidance and/or reference document, particularly within the scope of ESA documents that needs to be prepared.

In the preparation of ESA documents, the CIA Report prepared for the geothermal resources could be directly referred if the proposed project has already been considered in the study, and mitigation measures and monitoring requirements could be determined in the ESA documents by also considering the results of that CIA study. Even if the proposed project has not been directly listed and/or considered in the CIA study, again considering the similar nature of the impacts, the CIA study could mainly be utilized/benefited in the assessment, particularly for the ones in the same region (Aydin, Manisa and Denizli provinces).

Besides, particularly for the proposed projects in other regions where there are not any available CIA

reports acceptable by the WB and prepared by the governmental authorities and/or IFIs, the methodology for the CIA will follow the Rapid Cumulative Impact Assessment (RCIA) process suggested by IFC Good Practice Handbook. RCIA consists of six-steps including; (i) Scoping phase I – VECs, spatial and temporal Boundaries, (ii) Scoping phase II – Other activities and environmental drivers, (iii) Establish information on baseline status of VECs, (iv) Assess cumulative impacts on VECs, (v) Assess significance of predicted cumulative impacts, and (vi) Management of cumulative impacts – design and implementation. (see also Section 3.1.d. Cumulative Impact Assessment and Management).

Step 3: Public Consultation and Stakeholder Engagement

Category A Subprojects

The number and content of public consultations in Category A projects will depend on whether a Turkish EIA was carried out and the compatibility of the Turkish EIA report with WB requirements. If a Turkish EIA was not carried out, at least two public consultation meetings will be carried out, namely one to discuss the TOR and a second one to discuss the draft ESIA report.

In cases where the Turkish EIA has major information gaps relative to WB requirements (see discussion under "Step 2: Environmental and Social Assessment"), also at least two public consultation meetings will be held. The first meeting will be on the ESIA TORs for the proposed supplementary documents. The second meeting will be held when the supplementary environmental assessment documents are in draft form; at this meeting both the draft supplementary documents and the Turkish EIA will be discussed. In contrast, in cases, where the information gap between the Turkish EIA and the WB requirements is minor (also see discussion under "Step 2: Environmental and Social Assessment), a public consultation meeting will be carried out when the draft supplementary documents are available and discuss the entire WB ESIA package.

Category B Subprojects

A public consultation meeting will be held for Category B subprojects at the draft ESA stage whether or not PIF is available. This is because the Turkish EIA Regulation does not require public consultation for projects that are not included in Annex I of Turkish EIA regulation whereas WB policy (OP4.01) requires at least one consultation meeting for Category B projects.

Public consultations will be widely announced at least two weeks using local newspapers and other local means of information dissemination that are known to be effective. For both Category A and Category B projects, the sponsor will ensure that draft ESIAs and ESMPs and other assessment or supplementary documents are available in public places and meeting announcement will point out the location. The minutes of public meetings will be recorded and included in the ESIA /ESMPs of sub-projects. Annex 3 provides a table of contents for the public consultation documentation.

It is also important to inform local people about the methodology of land acquisition (expropriation, urgent expropriation, willing buyer willing seller procedures, etc.) during public consultations. However, local people should be informed that the public participation meeting is not the venue for individual discussions on compensation amounts, etc. Therefore, the overall methodology of the land acquisition methods, the timeframe assumed for this phase and the contact point from sub-borrower site should be presented.

Stakeholder Engagement Plan (SEP) proportionate to the nature and scale of the subproject will be prepared as an integral part of ESA. The timing and methods of engagement with stakeholders throughout the life cycle of the project will be described in SEP. Public consultation activities (including public consultation meetings) will be carried out as per SEP to be prepared. Preparing and implementing a satisfactory SEP is the responsibility of the Sponsors. In reviewing a SEP, FI will also

confirm that it is clear, feasible and appropriate.

Step 4: ESIA Expert Selection and TOR

For Category A subprojects, WB reviews and clears the 'TABLE OF CONTENTS' of the ESIA. If needed, WB can advise on the TOR for the ESIA consultant. Furthermore, such experts must be independent from the project proponent and not affiliated with the project. For Category B Projects, the sponsors may either select consultants designing the sub-project or staff of the sub-project proponent to carry out the ESMP. The FI of the Project will be responsible for monitoring and guiding the process.

Step 5: World Bank Clearance

The World Bank will review and provide no objection to all projects assigned as Category A and B Projects in accordance with WB procedures before a final decision to fund the subproject can be taken by FI (TSKB).

It should be noted that for all sub-projects, TSKB will confirm with WB the environmental and social risk category of the sub-project after the ERET has been implemented, according to OP 4.01.

Step 6: Incorporation in Works Contracts

Sub-loan agreement must include requirement to implement the ESMP. The ESMP and other supplementary documents will also be attached to the procurement documents and be part of the contract with the contractor selected to carry out the project works. These sections include potential impacts that may occur during the set of works in question and measures that the contractor needs to take to mitigate them.

Step 7: Information Disclosure

For both Category A and B projects, the sub-borrower will ensure that hard copies of the final Turkish language WB ESIAs and ESMPs are available in public places. FI will post the final documents on its website. Disclosure in Turkey must be completed before WB can provide the 'no objection' to its financing.

Prior to subproject approval, FI will also submit English versions of the final WB ESIA and ESMP documents to the World Bank for posting on its external website. In case of Category A subprojects, 30 days prior to subproject approval, FI will submit an English language executive summary of the WB ESIA report to WB for submission to the WB Board of Executive Directors.

Step 8: Monitoring

The FI of the project will carry out regular supervision of projects during construction and operation to ensure that the ESMP is being duly carried out. When FI notices any problems in ESMP implementation it will inform the relevant sponsor and agree with them on steps to rectify these problems.

FI will report its findings to the WB in its biannual project progress report or more frequently, as needed to bring issues to the attention of the World Bank. The WB project team will on occasion, and as required, also visit project sites as part of project supervision. Moreover, for any significant environmental or social incidents (e.g. fatalities, lost time incidents, environmental spills etc.), the Sponsors will inform FI in 3 business days, and FI will inform the World Bank about the incident as soon as it is informed. The incident report including root cause analysis, precautions and compensation measures taken, will be submitted to FI in 30 business days and FI will forward the incident report to the World Bank.

Retroactive Financing

All activities involved in production drilling and power plant and direct use facilities construction, including civil works and equipment, will be eligible for retroactive financing. Hybrid-systems (e.g. PV plants) that are added on to already existing geothermal power plants will not be eligible for retroactive financing.

For retroactive financing, the sub-project will be assessed as a whole and for all its phases no matter in which phase TSKB has been included. In projects where retroactive financing is needed, the projects are mostly at later stages of construction where screening and categorization are done at these later stages. The gaps between the sub-project's environmental and social implementations and WB requirements will be determined with a due diligence study with a dedicated site visit as well as a screening process that will be carried out by using the ERET tool and categorization will be agreed with the World Bank in terms of Category A, Category B or Category C.

Regarding the E&S requirements for the retroactive financing, an Environmental and Social Due Diligence (ESDD) for the already completed and ongoing projects (including the associated facilities) will be required from the developers, as an eligibility requirement for the project financing to determine the projects'/operations' compliance with the Project's safeguards requirements (OPs). An E&S action plan will be required from developers as part of the financing agreement and the developers will be requested to close out any gaps or non-conformities identified in the ESDD as per the condition of disbursement(s) as needed. Adoption of appropriate mitigation measures of the relevant geothermal developers will be required by TSKB. An indicative outline for an ESDD is provided in Annex 5.

The requirements for filling the gaps will be elaborated through E&S action and management plans (ESIA / ESDD / ESMP / SEP / GRM and relevant management plans). The sub-loan agreement between FI and the sub-borrower must include the conditionality for the sub-borrower to implement the relevant E&S action and management plans for all subprojects.

Regarding the stakeholder engagement, although a Public Consultation has been carried out within the scope of the current regulation, additional public consultation may be required according to the project category.

Due to the nature of the project, majority of the sponsors who apply to the loan might have acquired land before, either through private transactions or expropriation. For sub-projects that will use retroactive financing, an Ex Post Social Audit in line with OP 4.12 will be carried out to assess previous land acquisition activities and their compliance to project RPF. The ex-post review would make sure all of the Project Affected People (PAPs) were compensated at their replacement cost, PAPs were aware of their rights and entitlements under the RPF, and had knowledge of and access to the grievance redress mechanism for any possible claims, and no vulnerable or severely impacted people were worsen off.

Similarly to Category A sub-projects, the World Bank will review and provide no objection to all retroactive financing sub-projects in accordance with WB procedures before a final decision to fund the subproject can be taken by FI (TSKB).

6. INSTITUTIONAL ARRANGEMENTS

Key actors in the implementation of this framework are the PIU of GDP AF and the project sponsors.

TSKB will be the financial intermediary for the implementation of the loan. The PIU in the project will be responsible for implementation of this ESMF for the capacity drilling and power plant establishment and operation activities. In the following the overall roles and capacities of these actors are discussed.

PIU (TSKB)

The PIU includes Environmental Specialists, Social Specialists as well as an Occupational Health Safety Specialist to coordinate the implementation of the ESMF.

The responsibilities of Environmental/Social/H&S Specialists will be as follows:

- Provide sponsor ESA consultants guidance on preparation of ESA documents in accordance with WB requirements.
- Provide sponsor ESA consultants with guidance on World Bank ESA procedures, notably consultation and disclosure requirements.
- Provide sponsor ESA consultants with guidance on WB safeguard requirements (documentation and procedures) for cultural properties and natural habitats.
- Provide sponsor ESA consultants with guidance on WB safeguard requirements for managing community outreach and consultation, grievances, land acquisition process etc.
- Review ESA documentation, provide written comments to sponsor ESA consultants, ultimately provide formal approval of ESA documentation and procedures in accordance with WB safeguard requirements.
- Ensure that sub-loan documentation includes agreements to implement the ESMP and any other environment or social safeguard requirements.
- Perform supervision of ESMP implementation by the sponsor and document performance, recommendations and any further actions required as part of overall project supervision reporting to the WB.
- Be open to comments from affected groups (including vulnerable) and local environmental authorities and civil society organizations regarding environmental and social aspects of project implementation. Meet with these groups during site visits, as necessary.
- Coordinate and liaise with WB supervision missions regarding environmental and social safeguard aspects of project implementation.

It is to be noted that the PIU will coordinate the communications with the WB's Project Team as well as manage all the internal coordination processes regarding the AF. The PIU will also be guiding the project sponsors benefiting from the AF on E&S requirements.

SUSTAINABILITY ORGANISATION OF TSKB

All sustainability work across the organizational structure is managed by the Sustainability Committee, which is comprised of three Board Members, General Manager and two Executive Vice Presidents. The members of the Sustainability Committee are appointed through Board decisions. The Committee's mission is the coordination of the work and business plans to be composed in regard to TSKB's sustainability strategy, vision and targets. Executive Vice Presidents of the Bank are responsible for the main credit activities, such as Project Finance, Corporate Banking, Engineering and Technical Advisory, Financial Institutions and Development Finance Institutions were selected as Committee members.

ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM OF TSKB[9]

TSKB developed a well-structured Management System in 2005 in order to manage its risks and opportunities on environmental issues including climate change. It has been certified with ISO 14001 since 2007. TSKB applies its experience in sustainability to its internal operations and documents according to Sustainability Policy. TSKB ensures that all level risks & opportunities are identified and managed via Sustainability Management System (SMS)'s internal procedures.

Within the procedure, TSKB developed an environmental and social risk evaluation tool on voluntary basis called ERET in 2005, in order to identify and manage external risks related with the lending activities of TSKB.

The model is based on studying the environmental impacts of investment projects subject to credit evaluation and other activities of the project owner with both current and future perspective. It defines the dimensions of the environmental and social risks, clarifies acceptable limits for the risks involved and ensures that the project complies with the general lending policies of TSKB.

ERET is applied to each and every project finance and corporate loans regardless of scope, size, sector and loan amount of investment projects only and only if the project is not listed in "List of Activities that are not to be financed" under "Environmental & Social Impact Policy"[10]. This list is developed considering the high risk and sensitivity sectors. TSKB declares not to finance these sectors due to high environmental and social risks.

Likewise to the list TSKB commits not to finance any geothermal project which involves;

- Any activity that is prohibited by Turkish laws and regulations or by international agreements concerned with the protection of biodiversity resources or of the cultural heritage.
- Any activity/development in a critical habitat (National protected areas are defined as critical habitats.)
- Any activity/development having significant adverse impact on a natural habitat,
- Use of oil-based drilling muds,
- Any geothermal project involving forced labor; any project related to production that involves the exploitation of child labor or employs children in potentially injurious or dangerous activities either in construction and operation process;
- Any project that restricts individuals' personal rights or violates human rights;

All investment projects are analyzed in terms of their E&S impacts by Engineering and Technical Advisory Department during credit evaluation processes. According to results, TSKB seeks for solutions with investors to manage investments' risks. The financing is only possible if TSKB is sure that investor has implemented necessary E/S control and management measures. TSKB also has the right to drop the credit, withdraw the previous disbursed amount due to projects' and adverse impacts. ERET classifies clients' and their projects' risks as A, B-, B+ and C, where A is the highest. The risk category clarifies acceptable limits for risks involved and ensures that the project complies with general lending policies of TSKB. It determines a risk score and offers a proper action plan to minimize and manage environmental and social risks of projects. This tool was developed with the cooperation of KfW and then enhanced in line with the updated requirements of IFIs and internationally accepted standards. Although not yet certain, risk classification relevance of ERET and WB may be applied as

follows.

TABLE 6. ERET AND WB CLASSIFICATION RELAVANCE

ERET Score A	WB Category A
ERET Score B+	WB Category B (projects that are complex and significant enough to require an ESIA nearly equivalent to Category A)
ERET Score B-	WB Category B
ERET Score C	WB Category C

In the Engineering and Technical Advisory Department, there are 15 engineers (in average) from different disciplines, such as environmental, mechanical, industrial, electronic, civil and chemical engineering. There are three engineers experienced in H&S, land acquisition and grievance management and monitoring issues within the PIU. For the AF, PIU is enhanced by the inclusion of the Vice President of Social Impact Assessment Working Group of TSKB and a team member from Project Finance Department.

Sponsors

The ESA work to be prepared by the sponsors will be mainly conducted by consulting companies of which there is an adequate number in Turkey. Sponsors have been carrying out infrastructure investments and are familiar with Turkish environmental legislation and construction procedures.

Sponsors generally have the capacity to properly implement ESA documents during the construction and operational phases. Where such capacity is lacking, TSKB will require the Sponsors to establish sufficient internal E&S organizational capacity for the implementation and monitoring of ESMF and RPF requirements. The sponsors might retain environmental and social specialist consultants to assist them in supervising the works carried out by the contractor and ensuring that the ESA document (ESIA or ESMP) is followed adequately until such internal E&S organizational capacity is developed.

In addition to the above mentioned roles, it is expected that the PIU (TSKB) will report to WB about the compliance status of the project activities with regards to respective ESA documents. In its biannual project status reports, the PIUs will include a section titled “Environmental and Social Safeguards” which will summarize the status of ESA document’s implementation based on its monitoring activities. The report will highlight any issues arising from non-compliance and how it has been/is being addressed during the implementation of the project. Some of the key roles of sponsors, PIU and WB are summarized in Table 7 given below.

TABLE 7. ROLES AND RESPONSIBILITIES

Roles	**Sponsor**	**PIU**	**World Bank**
Financial Roles	Requestor	Financial intermediary	Main finance source
Application Process	Submit Applications	Review / Analyze the applications in order to provide information to World Bank	Concur the final selection of projects.

Preparation Process	Welcome and apply the relevant laws and regulations that are introduced by World Bank through PIU	Coordinate the selected sponsor to ensure all the relevant standards and regulations will be adopted throughout the project. Organize internal working structure for the investment options	Assist PIU in Developing Performance and Monitoring Database system during the preparation phase Provide technical guide for PIU
Project Roles	Preparation of ESIA, ESMP and Grievance Mechanism Tendering all the project works and consulting services	The main responsible for monitoring the implementation of ESIA & ESMP and Grievance management processes Supervise and monitor the whole process to ensure the proper application of the World Bank's environmental and social safeguard policies are applied.	Overall review of the project development stages Review of incoming reports to see the Bank standards are in Progress

CONSULTATION STRATEGY OF TSKB

TSKB website will be used effectively for the "World Bank - Geothermal Development Project – Additional Finance" in terms of disclosing project related documents (Environmental and Social documents) or sharing any other significant progress/development regarding the subprojects and receiving any possible feedback.

Environmental and Social Documents will include;

- Environmental and Social Management Framework
- Resettlement Policy Framework
- Stakeholder Engagement Framework

Within this scope, there will be a new particular page for "Geothermal Development Project - Additional Finance", located in TSKB's official website. This web page will then further be utilized to disclose also other Project related documents and any other significant progress, milestone, development regarding the sub projects financed under the AF. A clear guidance text will be included on this page, describing the purpose of the disclosure and the importance of the feedbacks from stakeholders. The options for sending feedbacks or lodging grievances will also be described here in detail.

The page will be prepared and displayed both in Turkish and English languages.

The page will be located under "Corporate Banking" category. There will be a new tab called "Responsible Finance", when the website user hovers over their mouse on "Responsible Finance" tab, "Geothermal Development Project – Additional Finance" will appear on right hand side.

There will be two options for receiving feedbacks on the disclosed documents or other project related information shared on the website;

- Via an e-mail address provided (jeotermalgelistirme@tskb.com.tr) and

- Via the TSKB's contact form (http://www.tskb.com.tr/tr/hakkimizda/tskb-iletisim-formu). Link of the form will be provided on the page.

TSKB's Geothermal Development Project Implementation Unit can receive any feedbacks and comments from a dedicated e-mail address (jeotermalgelistirme@tskb.com.tr), which is given on this specific web page.

The link of the page will be sent to the main project stakeholders via e-mail in order to inform them proactively and to receive any possible feedbacks from them.

Additionally, a webinar will be organized to consult stakeholders on the project's Environmental and Social documents.

- Invitees will be the main stakeholders (Sponsor Companies, Ministries, NGOs, Municipalities, etc.) of the Project.
- Introductory presentations may be held by TSKB both about the Project and the expected environmental and social risks and impacts, and how they will be managed through the Project's Environmental and Social documents (ESMF, RPF and SEF) which are prepared in line with the World Bank's Environmental and Social Safeguards policies (former operational policies).
- Webinar can also be coupled with a panel discussion with selected speakers.

After the webinar a second reminder to main stakeholders will be sent via e-mail to receive their feedbacks for the disclosed documents.

Main stakeholders of the project are defined below.

Possible Stakeholders
World Bank
TSKB's Current and Potential Customers
Ministries and Directorates
Republic of Turkey Ministry of Environment and Urbanization
Republic of Turkey Ministry of Culture and Tourism
Republic of Turkey Ministry of Agriculture and Forestry
Republic of Turkey Ministry of Health
General Directorate of Mineral Research and Exploration
Directorate General of Environmental Impact Assessment, Permit and Inspection
General Directorate of Land Registry and Cadaster
General Directorate of State Hydraulic Works
The Union of Chambers and Commodity Exchanges of Turkey
NGOs, Environmental Organizations
The Turkish Foundation for Combating Erosion Reforestation and the Protection of Natural Habitats
Geothermal Electricity Power Plant Investors Association and Geothermal Energy Association
Republic of Turkey Energy Cities Association
National Organizations
İzmir Institute of Technology
Geothermal Energy Research and Application Center
Dokuz Eylul University
Geothermal Energy Research and Application Center
Ege University Centre for Environmental Studies
Middle East Technical University
Republic of Turkey Ministry of Agriculture and Forestry Fig Research Institute
Republic of Turkey Ministry of Agriculture and Forestry Olive Research Institute
National Press
Dünya News
Yeşil Ekonomi (tr. Green Economy)
Ekonomi Gazetecileri Derneği (The Economy Journalists Association)

In addition to disclosing its own project documents, in due course TSKB will also disclose the subproject specific Environmental and Social plans prepared by its sponsors and any other significant information on these subprojects through its website.

7. ENVIRONMENTAL AND SOCIAL MONITORING AND GRIEVANCE MECHANISM

Environmental and Social Monitoring

The environmental and social issues included within the section on mitigation measures (Section 3.2) are monitored and supervised by the appointed specialists through the FI (TSKB) of the project. Although the environmental and social impacts are expected to be quite low, the potential adverse environmental and social impacts are planned to be prevented or mitigated during the construction and operation stages.

Environmental and social monitoring process starts from the drilling phase of the sub-project thorough the construction and operation phases in order to prevent adverse impacts of the sub-project and observe the effectiveness of mitigation measures. This system enables the WB and the borrower to evaluate the success of mitigation as part of sub-project supervision, and allows to take an action when needed.

The monitoring system provides,

- Technical assistance and supervision when needed,
- Early detection of conditions related to particular mitigation measures,
- Follow up on mitigation results,
- Provide information of the sub-project progress.

The sub-borrower will prepare semi-annual Monitoring Reports (both for Category A and B sub-projects) which will be including but not limited to the items listed below:

- General Environment
- Air Emissions (CO_2, NO_x, H_2S, all other relevant emissions)
- Soil
- Surface water and groundwater monitoring
- Biodiversity
- Noise and dust emissions
- Worker Health and Safety
- Community Health and Safety
- Climate Change
- Social Monitoring

The Monitoring report should include the data monitored, comparison of the data measured against ESA and its subsequent documents and national laws and regulations, any incompliances observed, the suggested corrective actions and a due date for these actions. These frequent Monitoring reports will be sent by the sub-borrower to the FI, and FI is responsible for sharing them with the World Bank. World Bank will disclose these monitoring documents.

Gender disaggregated data will be collected during monitoring activities.

Grievance Mechanism

The Grievance Mechanism is a process that enables any stakeholder to make a complaint or a suggestion about the way a project is being planned, constructed or implemented. The sponsor will establish a transparent and comprehensive Grievance Mechanism before the implementation of the project in order to receive and resolve the affected communities' concerns, queries, complaints and grievances about the environmental and social aspects of the project. Public announcements for the establishment of Grievance Mechanism includes,

- Distribution of leaflets to the public places

- Notice Boards
- Website
- Telecommunication Tools
- Public Meetings
- Social Media

The Grievance Mechanism (sometimes also called Grievance Procedure) will be prepared according to WB policies, procedures, laws and regulations. The Grievance Mechanism of the sub-projects will be:

- Readily accessible all segments of the affected communities at no cost to them and with no retribution
- Proportionate to nature and scale of risks and impacts
- Designed to address concerns promptly
- Designed as transparent process that provides timely feedback
- In a language that is understandable

As noted in the SEF, the GRM may include the following in line with the WBG requirements:

Channels: Different ways in which users can submit their grievances, which may include submissions in person, by phone, text message, mail, e-mail or via a web site;

Register: A log where grievances are registered in writing and maintained as a database;

Dissemination: Publicly advertised procedures, setting out the length of time users can expect to wait for acknowledgement, response and resolution of their grievances;

Transparency and Anonymity: Transparency about the grievance procedure, governing structure and decision makers; as well as anonymity for applicants if they want to remain so and

An appeals process (including the national judiciary) to which unsatisfied grievances may be referred when resolution of grievance has not been achieved.

Detailed procedures for the GRM is provided in the Stakeholder Engagement Framework and Resettlement Policy Framework documents prepared for the project, which will also be disclosed publicly.

Stakeholder and Citizen Engagement

As described in WB OP 4.01, stakeholder engagement is the continuing and iterative process by which the sub-borrower identifies, communicates, and facilitates a two-way dialogue with the people affected by its decisions and activities, as well as others with an interest in the implementation and outcomes of its decisions and the sub-project. It takes into account the different access and communication needs of various groups and individuals, especially those more disadvantaged or vulnerable, including consideration of both communication and physical accessibility challenges. Engagement begins as early as possible in sub-project preparation because early identification of and consultation with affected and interested parties allows stakeholders views and concerns to be considered in the sub-project design, implementation, and operation.

The Stakeholder Engagement Plan (SEP) should be clear and concise and focus on describing the sub-project and identifying its stakeholders. It is key to identify what information will be in the public domain, in what languages, and where it will be located. It should explain the opportunities for public consultation, provide a deadline for comments, and explain how people will be notified of new information or opportunities for comment. It should explain how comments will be assessed and taken into account. The SEP also needs to take into account special provisions for any disadvantaged and vulnerable groups. It

should also describe the sub-project's grievance mechanism and how to access this mechanism. The SEP should also commit to releasing routine information on the sub-project's environmental and social performance, including opportunities for consultation and how grievances will be managed.

The project will take reference of "ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects" during its implementation where the pandemic conditions apply.

The stakeholder engagement process aims to achieve the following issues:

- To establish a systematic approach to stakeholder engagement that will help sub-borrower identify stakeholders and build and maintain a constructive relationship with them, in particular project affected parties.
- To assess the level of stakeholder interest and support for the sub-project and to enable stakeholders' views to be taken into account in sub-project design and environmental and social performance.
- To promote and provide means for effective and inclusive engagement with sub-project-affected parties throughout the sub-project life cycle on issues that could potentially affect them.
- To ensure that appropriate sub-project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible, and appropriate manner and format.
- To provide sub-project-affected parties with accessible and inclusive means to raise issues and grievances and allow sub-borrowers to respond to and manage such grievances in a timely manner.

Once the draft ESMP (or the ESIA) has been prepared for the sub-project, it must be made available at mukhtar's offices, together with the brochures introducing the sub-project. Information regarding this introduction documents should also be announced in the sub-borrower's/sub-project's website.

The sub-borrower will continue to engage with, and provide information to, project-affected parties and other interested parties throughout the life cycle of the sub-project, in a manner appropriate to the nature of their interests and the potential environmental and social risks and impacts of the sub-project.

SEP is a living document. As implementation of a sub-project progresses, new impacts may arise, while other impacts may be eliminated. Sub-borrowers provide regular updates to stakeholders on sub-project performance and changes in scope or schedule, following the procedures agreed upon in the SEP.

As part of the Project's Citizen Engagement requirements, which will be detailed in the project operational manual of TSKB, i) citizen feedback surveys to measure the effectiveness of grievance mechanisms and engagement processes of the developers and annual round tables with beneficiary developers will be conducted regularly and monitored.

Annex 1. SUGGESTED FORMATS FOR ESMPs

Annex 1A. Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) consists of the set of mitigation, monitoring, and institutional measures to be taken during the implementation and operation of the Project to prevent adverse environmental and social impacts or reduce them to acceptable levels. The ESMP submitted to the Bank are prepared in English. The ESMP may be developed as a stand-alone plan (i.e. for low Category Bs) or, depending on the nature and the scale of the risks and impacts of the project, be included as part of the ESIAs.

(a) Responsible Party: The authors who prepared the ESMP along with the date of preparation.

(b) Project Description: Present a brief description of the project and its associated activities (i.e. material sources like quarries, high voltage transmission lines, campsites etc.). Include the nature of the investment, the location, and any characteristics of the area that are of particular interest (e.g. near a protected area, area of cultural or historical interest). Also, include a brief description of the socio-economic conditions in the area. One or more simple maps showing project location and relevant neighboring features should be included unless there is compelling reason not to.

(c) Area of Influence: Present a brief description of the project area include associated facilities or activities that required for planning construction and operation of the project. Area of influence also covers impact zones of project and associated activities.

(d) Potential Impacts: Identify potential impacts of project and associated activities during planning, construction and operation phase. One approach to accomplishing the potential impacts is to first identify environmental components (e.g., air, water) that may be affected by project and associated activities (e.g., land clearing, waste disposal, wastewater discharge etc.). After identification of environmental component, impact route and impact levels (including cumulative impacts) should be assessed in reference to national laws, regulations and standards as well as best practices.

(e) Mitigation Plan: This should include a description of the steps to be taken to mitigate the major potential impacts on land, water, air and other media during the planning, design, construction and operation phases and specify cost estimates and institutional responsibilities. Particular attention should be paid to the specification of emission limits (e.g. for wastewater discharge) and design standards (e.g. for solid waste disposal sites) and how these compare to Turkish laws (which at a minimum must be met) and any other relevant guidelines such as those in directives of the European Union or limits suggested by the World Bank Pollution Prevention and Abatement Handbook (1998) or other relevant international norms. Attachment 1 and Attachment 2 to this Annex provides the format for a mitigation plan for each component.

(f) Monitoring Plan: This should include a description of the key parameters to be monitored (including monitoring locations, schedules and responsible entities) to ensure that the construction and operation of the project is in conformance with Turkish law and other relevant norms and standards. If such details are covered by permits or construction or monitoring contracts these can be referenced as attachments. Attachment 3 and Attachment 4 to this Annex provides the format for a monitoring plan for each component.

(g) Institutional Arrangements: There should be a narrative discussion briefly presenting how the monitoring data is going to be used for sound environmental performance - who collects the data, who analyses it, who prepares reports, who are the reports sent to and how often, what is done by the responsible authorities after they receive the information; and how is non-compliance with the ESMP treated.

(e) Consultations with Affected Groups and Non-governmental Organizations:

The following should be included:

- Date(s) of consultation(s);
- Location of consultation(s);
- Details on attendees (as appropriate)
- Meeting Program/Schedule: What is to be presented and by whom;
- Summary Meeting Minutes (Comments, Questions and Response by Presenters)
- Agreed actions.

Annex 1B. Mitigation and Monitoring Plan

Attachment 1 to Annex 1B

A. MITIGATION PLAN FOR DEVELOPMENT

			Cost to:		Institutional Responsibility to:		Comments (e.g. secondary or cumulative impacts)
Phase	Impact	Mitigating Measure	Install	Operate	Install	Operate	
Development and Operational Phase							
Decommissioning phase							

Attachment 2 to Annex 1B

B. MONITORING PLAN FOR DEVELOPMENT

						Cost to:		**Responsibility to:**	
Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored -frequency or continuous?*	**Why** *is the parameter to be monitored (optional)*?	**Install**	**Operate**	**Install**	**Operate**
Development and Operational Phase									
Decommissioning phase									

Annex 2. SAMPLE OF GRIEVANCE FORM

GRIEVANCE FORM **If you wish to submit an anonymous complaint, you are kindly requested to fill out the (*) denotes required fields.**						
Date*						
Reference Number						
Way of Receiving Grievance		Phone □	Meetings □	Application to Office □	Mail/email □	Field visit □
Compliant Full Name (optional and can be left blank)						
Compliant ID Number: (optional and can be left blank)						
Compliant Contact Information (optional and can be left blank)	Address - Village: *					
	Postal Code:					
	Phone:					
	Email:					
Content of Grievance or Complaint *						
• *On abandonment (public housing)*						
• *On assets/properties impacted by the project*						
• *On infrastructure*						
• *On decrease or complete loss of sources of income*						
• *On environmental issues (ex. pollution)*						
• *On employment*						
• *On traffic, transportation and other risks*						
• *Other (Please specify):*						
Description of the Grievance * What did happen? When did it happen? Where did it happen? What is the result of the problem?						
What would you like to see happen to resolve the problem? *						
Consent to disclose the grievance information to 3rd parties						
Signature of complainant						
Received by	Full Name					
	Signature					

Annex 2A. SAMPLE OF GRIEVANCE CLOSEOUT FORM

GRIEVANCE CLOSE OUT FORM	
Grievance closeout number:	
Define immediate action required:	
Define long term action required (if necessary):	
Compensation Required?	Yes
	No

CONTROL OF THE REMEDIATE ACTION AND THE DECISION	
Stages of the Remediate Action	**Deadline and Responsible Institutions**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

COMPENSATION AND FINAL STAGES

This part will be filled and signed by the complainant after s/he receives the compensation fees and his/her complaint has been remediated.

Complainant	*Notes*
	Name & Surname
	Signature
	Date
Representative of the Responsible Institution / Company	*Title:*
	Name & Surname
	Signature
	Date

Annex 3. TABLE OF CONTENTS FOR THE PUBLIC CONSULTATION DOCUMENTATION

- Manner in which notification of the consultation was announced: media(s) used, date(s), description or copy of the announcement
- Date(s) consultation(s) was (were) held
- Location(s) consultation(s) was (were) held
- Who was invited
- Name, Organization or Occupation, Telephone/Fax/e-mail number/address (home and/or office)
- Who attended
- Name, Organization or Occupation, Telephone/Fax/e-mail number/address (home and/or office)
- Meeting Program/Schedule
- What is to be presented and by whom
- Summary Meeting Minutes (Comments, Questions and Response by Presenters)
- List of decisions reached, and any actions agreed upon with schedules, deadlines and responsibilities.

Annex 4. TABLE OF CONTENTS FOR ESIA

Table of Contents of a Category A ESIA Document (can be used for B+ project ESIAs)

An Environmental and Social Impact Assessment (ESIA) report for a Category A project focuses on the significant environmental issues of a project. The report's scope and level of detail should be commensurate with the project's potential impacts. The report and the executive summary submitted to the Bank are prepared in English.

The report should include the following items (not necessarily in the order shown):

(a) *Executive summary*. Concisely discusses significant findings and recommended actions.

(b) *Policy, legal, and administrative framework*. Discusses the policy, legal, and administrative framework within which the ESA is carried out. Explains the environmental requirements of any co-financiers. Identifies relevant international environmental agreements to which the country is a party.

(c) *Project description*. Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any supporting infrastructure that may be required (e.g., dedicated pipelines, access roads, power plants, water supply, housing, and raw material and product storage facilities). Indicates the need for any resettlement plan or indigenous peoples development plan (see also subpara. (h)(v) below). Normally includes a map showing the project site and the project's area of influence.

(d) *Baseline data*. Assesses the dimensions of the study area and describes relevant physical, biological, and, socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigation measures. The section indicates the accuracy, reliability, and sources of the data.

(e) *Environmental impacts*. Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.

(f) *Analysis of alternatives*. Systematically compares feasible alternatives to the proposed project site, technology, design, and operation--including the "without project" situation--in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

(g) Cumulative Impact Assessment: Cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time. The environmental and social assessment will consider cumulative impacts that are recognized as important on the basis of scientific concerns and/or reflect the concerns of project-affected parties. The potential cumulative impacts will be determined as early as possible, ideally as part of project scoping. Surface water and ground water analysis will be the main focus area within the context of cumulative impacts. Air quality management is another issue which should be examined during the CIA (Cumulative Impact Assessment) studies.

(h) *Environmental and Social Management Plan (ESMP)*. Covers mitigation measures, monitoring, and institutional strengthening; see outline in OP 4.01, Annex C.

(i) Public Consultation Records (copy of meeting announcements, presentation, list of participants, summary of questions and responses, etc.)

(j) Appendices

(i) List of ESIA report preparers--individuals and organizations.

(ii) References--written materials both published and unpublished, used in study preparation.

(iii) Stakeholder Engagement Plan and Record of interagency and consultation meetings, including consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs.

(iv) Tables presenting the relevant data referred to or summarized in the main text.

Annex 5. TABLE OF CONTENTS FOR ESDD

(a) Executive Summary
- Concisely discusses significant findings and sets out recommended measures and actions and timeframes.

(b) Legal and Institutional Framework
- Analyzes the legal and institutional framework for the existing project or activities, including the issues set out in WB OP 4.01 and (where relevant) any applicable environmental and social requirements of existing financiers.

(c) Project Description
- Concisely describes the existing project or activities, and the geographic, environmental, social, and temporal context and any Associated Facilities.
- Identifies the existence of any plans already developed to address specific environmental and social risks and impacts (e.g., land acquisition or resettlement plan, labor and working conditions, community health and safety risks, cultural heritage plan, biodiversity plan).
- Includes a map of sufficient detail, showing the site of the existing project or activities and the proposed site for the proposed project.

(d) Environmental and Social Issues Associated with the Existing Project or Activities
- The review will consider the key risks and impacts relating to the existing project or activities. This will cover the risks and impacts identified in WB OP 4.01, OP 4.04, OP 4.11 and OP 4.12, as relevant to the existing project or activities. The audit will also review issues not covered by the WB OPs, to the extent that they represent key risks and impacts in the circumstances of the project.

(e) Environmental and Social Analysis
- The audit will also assess
    - the potential impacts of the proposed project (taking into account the findings of the audit with regard to the existing project or activities); and
    - the ability of the proposed project to meet the requirements of the WB OPs.

(f) Proposed Environmental and Social Measures
- Based on the findings of the audit, this section will set out the suggested measures to address such findings. These measures will be included in the Environmental and Social Action Plan (ESAP) or in the legal agreements between the FI and the sub-borrower for the proposed Project. Measures typically covered under this section include the following:
    - specific actions required to meet the requirements of the WB OPs
    - corrective measures and actions to mitigate potentially significant environmental and/or social risks and impacts associated with the existing project or activities
    - measures to avoid or mitigate any potential adverse environmental and social risks or impacts associated with the proposed project
    - All these measures would need to be presented clearly with time-bound actions, as need be, and with responsible parties defined

Annex 6. STAKEHOLDER ENGAGEMENT FRAMEWORK

Please visit https://www.tskb.com.tr/en/corporate-banking/corporate-lending/geothermal-development-project-additional-finance to access the SEF prepared for the Project.

Annex 7. DISCLOSURE OF ESMF, SEF AND RPF

Both Turkish and English versions of the Project's Draft E&S Framework Documents were disclosed on the following web-pages on 6th October 2021 to receive feedbacks of the GDP-AF (the Project) stakeholders.

- English:
  https://www.tskb.com.tr/en/corporate-banking/corporate-lending/geothermal-development-project-additional-finance

- Turkish:
  https://www.tskb.com.tr/tr/kurumsal-bankacilik/kurumsal-krediler/jeotermal-gelistirme-projesi-ek-finansmani

Different communication channels were made available by TSKB to enable the stakeholders convey their questions and suggestions on the Project's Draft E&S Framework Documents during the period of 6th – 22nd October 2021.

The FIs (TSKB and TKYB) organized a mutual consultation webinar on 21st October 2021 to inform the Project's stakeholders on the Project's Draft E&S Framework Documents including ESMF, SEF (Annex 6 of the ESMF) and RPF with the participation of 85 attendees including the panelists from TSKB, TKYB and academia. A list of invitees is provided in the table below.

World Bank
Ministries and Directorates
Ministry of Treasury and Finance - Foreign Economic Relations
Republic of Turkey Ministry of Energy and Natural Resources
General Directorate of Mineral Research and Exploration
Republic of Turkey Ministry of Environment and Urbanization
General Directorate of Land Registry and Cadaster
Directorate General of Environmental Impact Assessment, Permit and Inspection
Directorate General of Environmental Management
Aydın Provincial Directorate of Environment and Urbanization
Manisa Provincial Directorate of Environment and Urbanization
Denizli Provincial Directorate of Environment and Urbanization
Republic of Turkey Ministry of Culture and Tourism
Republic of Turkey Ministry of Agriculture and Forestry
General Directorate of Plant Production
Republic of Turkey Ministry of Agriculture and Forestry Fig Research Institute
Republic of Turkey Ministry of Agriculture and Forestry Olive Research Institute
TAGEM (Tarım Araştırmaları, Döngüsel Ekonomi))
General Directorate of State Hydraulic Works
Republic of Turkey Ministry of Health
Energy Market Regulatory Authority
The Union of Chambers and Commodity Exchanges of Turkey
NGOs, Environmental Organizations
The Turkish Foundation for Combating Erosion Reforestation and the Protection of Natural Habitats
Geothermal Electricity Power Plant Investors Association (JESDER)
Geothermal Energy Association (JED)
Republic of Turkey Energy Cities Association (Enerji Kentleri Birliği)
National Organizations

	İzmir Institute of Technology
	Geothermal Energy Research and Application Center
	Dokuz Eylul University
	Ege University Centre for Environmental Studies
	Middle East Technical University
National Press	
Customers	

During the consultation webinar, the stakeholders have been informed on the current status of the geothermal investments in Turkey and performance of the GDP (parent project). The FIs (TSKB and TKYB) also provided information on the components and context of the GDP-AF.

During the webinar, TKYB presented the environmental impacts of the geothermal investments as well as the national legislative requirements and ESMF requirements to prevent and minimize potential environmental impacts during drilling, development and operation phases.

Following the TKYB's presentation, TSKB presented the social risks and impacts of the geothermal investments together with the measures included in ESMF, SEF and RPF to prevent and minimize the impacts during construction and operation phases. Good practices that can be implemented in geothermal energy investments to obtain social license as well as gender- related Project requirements have been explained during the webinar.

During the QA session, an anonymous attendee had a question on the impacts of Covid-19 on the implementation of public consultation and stakeholder engagement processes. Besides, the same attendee requested information regarding the Project's public consultation requirements of the Project.

TSKB recommended the investors in the webinar to organize online meetings or outdoor meetings with sufficient measures such as using masks and keeping a social distance considering the Covid-19 pandemic conditions when planning and organizing the public consultation and stakeholder engagement meetings/activities.

Regarding the question on public consultation requirements, TSKB informed the attendee that Section 5 of the ESMF includes necessary information for both Category A and Category B sub-projects. TSKB also added that for Category A sub-projects, at least two public consultation meetings (one is during the formal EIA process and other is after the draft ESIA is finalized) while Category B sub-projects at least one consultation meeting (once draft E&S assessment documents are prepared) is expected to be conducted from the investors (even the sub-project falls under Annex-2 of the national EIA Regulation).

One attendee requested information on the independent consultant requirements of the Project for environmental monitoring of the sub-projects. TKYB informed that for all Category A and Category B+ sub-projects appointment of an independent E&S consultant is required for preparation of the related E&S documentation and E&S monitoring. E&S performances of the sub-projects against determined actions/measures in ESMP are monitored through the bi-annual monitoring studies conducted by the FIs' PIUs.

It should be noted that the attendees also had some financial and technical issues related questions during the QA, which have been responded by a panelist from the academia (for the technical question about scaling) as well as other panelists from the FIs (for the financial questions).