

# Initial Environmental Examination

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Project Number: 51250-001  
September 2017

## Baikonyr Solar Power Project (Kazakhstan)

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**BAIKONUR SOLAR POWER PLANT  
ENVIRONMENTAL AND SOCIAL ASSESSMENT**



September 2017

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## ABBREVIATIONS AND CURRENCY CONVERSION

ADB	Asian Development Bank
CSR	Corporate Social Responsibility Program
EBRD	European Bank for Reconstruction and Development
ESAP	Environmental and Social Action Plan
HSE	Health Safety and Environment
ILO	International Labour Organization
OVOS	Environmental Impact Assessment based on Russian standards
PR	Performance Requirement of the EBRD Environmental and Social Policy
SPP	Solar photovoltaic power plant Aquila Solar
SPS	Safeguard Policy Statement
TL	Transmission Line
SEP	Stakeholder Engagement Plan

For financial figures an exchange rate KZT330/\$ is used in this report

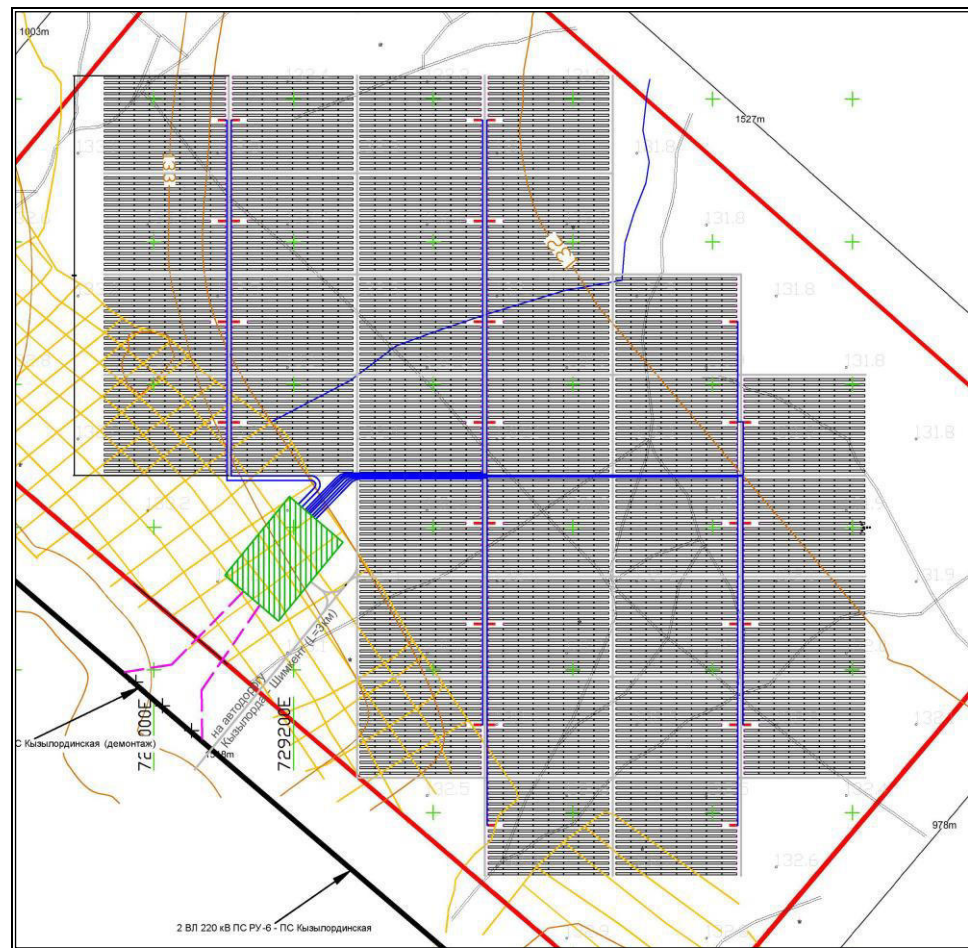
## EXECUTIVE SUMMARY

The European Bank for Reconstruction and Development (“EBRD”) and the Asian Development Bank (“ADB”) (or the “Banks”) are considering providing financing to Baikonur Solar LLP for the construction and operation of a 50 MWe Solar photovoltaic power plant Baikonur (SPP) in the Kyzylorda Region. The project will be implemented by Baikonur Solar LLP (the Company). The 150ha fenced site will have nearly 200 000 fixed photovoltaic panels, 33 pairs of PV Box RT invertors and a substation connected with the invertors with 10kV underground cables and with the grid via a wireline to the existing 220kV line that runs 100m away from the site.

Summary of the project impacts in relation to EBRD Performance Requirements and ADB’s Safeguards and Social Requirements are given below:

EBRD Performance Requirements	ADB Policies & Requirements	Impacts and Issues	ESAP Action
1 Environmental and Social Appraisal and Management	2009 SPS SR1 Environment	Overall compliance expected but risk that the EBRD requirements may not be transferred to the contractor and subcontractors	EHS system to include contractors
2 Labour and Working Conditions	2009 SPS SR1 Environment 2001 SPS on core labor standards	Overall compliance expected but rented worker accommodation may not meet the requirements	EHS management systems and contractor management
3 Pollution Prevention and Abatement	2009 SPS SR1 Environment	Overall compliance	Need to manage construction process
4 Health and Safety	2009 SPS SR1 Environment	Overall compliance. Site guards may not know how to deal with trespassers	EHS management systems and contractor management
5 Involuntary Resettlement and livelihood restoration	2009 SPS SR2 Involuntary Resettlement	No physical or economic displacement of land users and owners, no impact on road users if access road is not blocked or damaged during construction but no benefit to local population.	CSR program to address local social issues to ensure benefit from project
6 Biodiversity Conservation and Sustainable Natural Resource Management	2009 SPS SR1 Environment	Site not located in sensitive areas but contain included in Kazakhstan Red Book saksaul shrub endangered as it is used as firewood	None. Saksaul is abundant and will recover from roots and seed bank
7 Indigenous Peoples	2009 SPS SR3 Indigenous Peoples	The nearest settlement to the project are inhabited by Kazakhs. There are no communities which meet ADB and EBRD’s criteria to be considered as Indigenous Peoples.	N/A
8 Cultural Heritage	SR1 Environment	Small likelihood that ancient burial mounds are present on site	Chance find process
10 Information Disclosure and Stakeholder Engagement	2009 SPS 2011 PCP	Local residents may miss on employment opportunities created by the project. Perceived project impacts may deviate greatly from the actual impacts if not communicated	Need for ongoing social dialogue, SEP and NTS

The Project has been categorized by the EBRD as B and the Environmental and Social Assessment (ESA) has not identified any issues that would warrant a review of this categorization. The ESA confirmed that environmental and social impacts are site specific and short term in nature and that the Project is structured to comply with the EBRD's Performance Requirements and ADB's safeguards policy and social requirements, namely, the 2009 Safeguards Policy Statement, 2001 Social Protection Strategy, the 1998 Gender and Development Policy; and the 2011 Public Communications Policy.



**Figure 1 SPP layout showing the fixed panels (black), converters (red), substation (green), cables (blue), old irrigation channels (yellow and blue) and dykes (grey).**

No critical issues have been identified. The plant fence will have no impact on pasturing or agricultural activities. It will not affect the local roads and will have low impact on animals and plants despite presence of the Red Book listed black saksaul shrub in it. The vegetative cover is sparse throughout the plant area and congregations of this shrub although relatively frequent are sporadic and small.

Appropriate measures will need to be in place to remove the small risk of localized ground and groundwater contamination with diesel and oil during construction. Worker accommodation is not an issue as practically all the workers are expected to be local and travel to work daily.

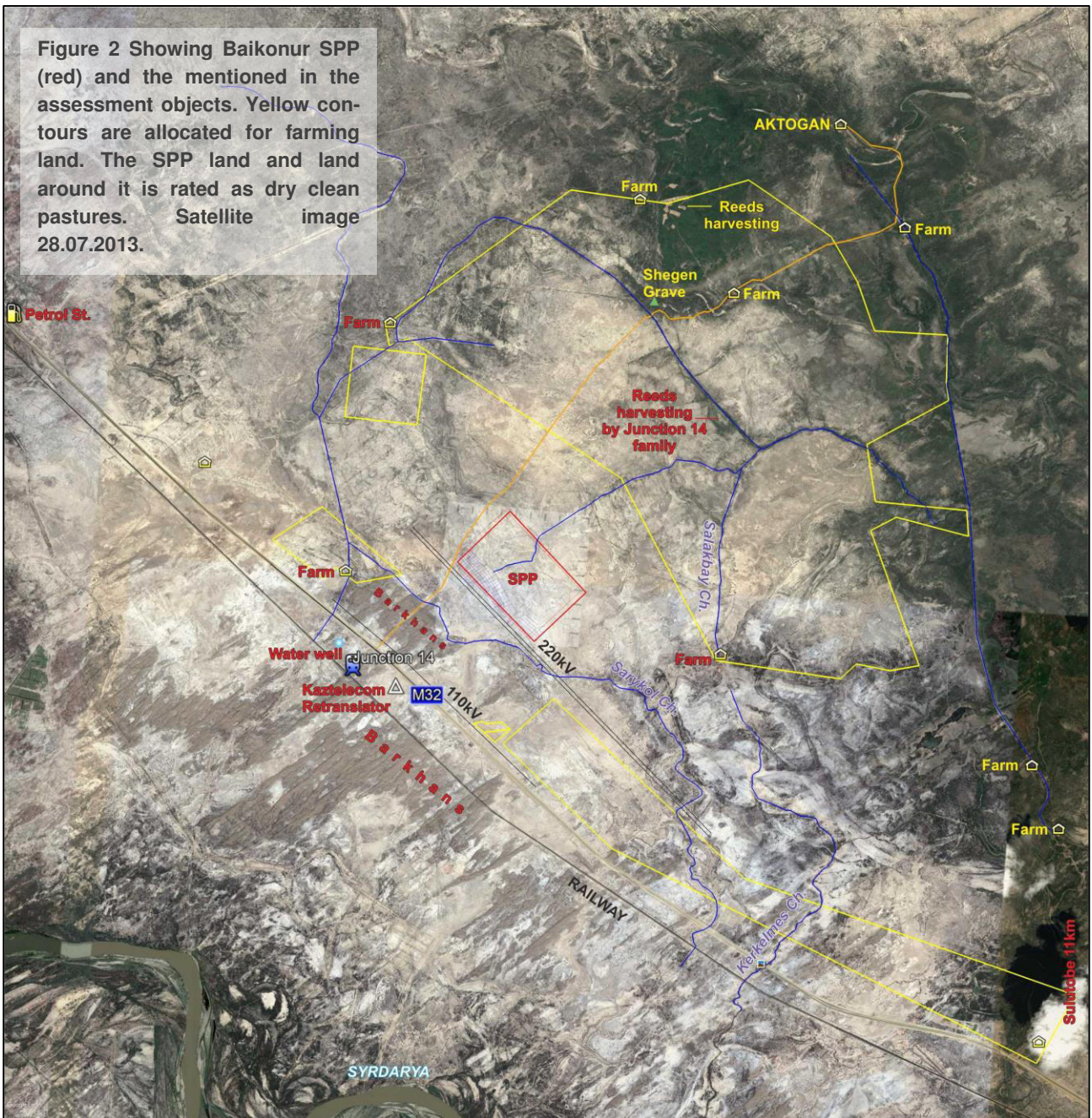
The suggested impact mitigation measures are expected to reduce risks to acceptable level and ensure that the project is developed and operated in line with the Bank's Performance Requirements.

The project benefit will be more apparent on the regional level when reduction in energy deficit will allow further economic development, especially for local industries and creation of new jobs. Few jobs will be created for the local unskilled labour but presence of the SPP may lead to knowledge transfer and encouragement of the targeted education among the local school graduates. Indirect benefits are expected to be minimal or none. Communication with the affected parties is expected to be maintained by using a stakeholder engagement plan.

Given the need to improve social dialogue and allow for some benefits from the project to be felt by the local community a Corporate Social Responsibility Program that would include both financial as well as other forms of support is to be agreed as part of ESAP, It is envisaged that an initial lump sum for local investment and then on-going annual support to community actions will be provided.

## 2 PROJECT DESCRIPTION

The Project aims to provide sustainable and environmental and socially friendly source of renewable electrical energy for the region. The plant is to be located 25km southeast of Kyzylorda, 1,6km north-east from Shymkent-Kyzylorda road and between Berkazan and Sulutobe villages on the old rice and melon fields irrigated by the system of shallow (0.3m) channels and small (0.5m) thaw water retention dykes. Since the agricultural activities stopped in 30 years ago, shrubs and semishrub vegetation has established on it dominated by saksaul that has been listed in the Kazakhstan Red Book for plants. The 150 ha of State Reserve land will be rented from the Shieli District Council for 49 years.



It does not contain buildings, cultural and archaeological objects and recreational areas. Detailed information on land acquisition is given in the Social Audit Report.

Construction includes 198198 photovoltaic panels fixed at 30° and orientated to the south 250W each, thirty six 680kVA DC/AC inverter pairs, substation with 10/220kV step up transformers connected to the

invertors with 8.17km of underground 10kV cable and the 220kV power line 100m away. Two TL towers may be installed on a 10x10m foundation.

The territory will be fenced with a 2m high polymer coated wire mesh fence with a gap underneath for small animals passage and security lighting installed along the perimeter. Passages 4.5m wide will be constructed with sand-gravel mixture between the panels. Technical water will be brought to the site from the Solutube village well with sufficient capacity to accommodate the project needs. Because the concrete will be brought from Kyzylorda, limited volume of water will be needed for dust suspension hygiene etc. The panels cleaning will not be needed. The first 1.6km of the M38-Aktogan dirt road will be hardened with chip rock in the way to allow the rare local vehicles to pass by the construction. Because the access road is the only way for several local farmers to reach their homes, heavy trucks will not enter the road until it is hardened.

After the preparation work and parts transportation to the site, the construction is planned to last for 12 months. Maximum 200 assembling workers, office and service staff will be needed for this period, of them 50 are engineers. After the commissioning, six specialists will maintain the power plant and two will guard it in 12 hour shifts.

### 3 LEGAL AND INSTITUTIONAL REQUIREMENTS

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#### 3.1 EBRD

According to the EBRD classification the project corresponds to category B. The relevant to the project Environmental and Social Policy Performance Requirements 1-4,6, 8 and 10. PR5 (Involuntary Resettlement) is not applicable because the plant is set in the area that is not used by anyone in any form and its perspective use for agriculture or pasturing is unlikely. PR7 (Indigenous Peoples) is not relevant because there are no indigenous people present. PR8 (Cultural Heritage) is not relevant because the power plant area does not contain objects of archaeological or cultural significance and fencing does not obstruct access to such objects. PR9 does not apply to the project because no financial intermediaries are involved.

#### 3.2 ADB REQUIREMENTS

The ADB Safeguard Requirements (SR) 1 applies to the project. The SR1 on Environmental Safeguards is relevant to the project as it requires use of a screening process for each project to determine the appropriate extent and type of environmental assessment. Apart from environmental requirements, such as conducting environmental assessment, preparing mitigation measures and applying pollution prevention and control techniques, the SR1 partially covers social requirements to carry out consultation with affected people, ensure timely information disclosure and provide workers with safe and healthy working conditions. The requirements on social performance are very limited in the SR1, but their full scope is covered by other ADB social policies relevant for the project and described below.

ADB SPS SR 2 does not apply as involuntary resettlement is not expected since the land is a vacant State Reserve land with no users. The nearest settlement is 15km southeast of the site. It is inhabited by Kazakh (99%) and the remaining population does not meet the ADB SPS criteria to be considered as indigenous people. SR4 requirements on existing facilities is being applied because allocation of land is in process and will be finalized in a few months. As such, a social due diligence or social audit has been conducted on past or ongoing land procurement. The audit report assessed and confirmed that there are no physical or economic displacements impacts, impacts on ethnic minorities or indigenous peoples.

Social requirements, including Social Protection Strategy 2001, Public Communications Policy 2011, Policy on Gender and Development 1998 are similar with the EBRD social requirements and are fully covered by the PRs.

The ADB's Social Protection Strategy (SPS) 2001 covers five major elements including labor market policies, social insurance programs, social assistance and welfare service programs for vulnerable groups, micro and area-based schemes to address vulnerability, and child protection. The SPS is relevant to the project as it focuses on improved employment, which is the major source of economic support for most workers and their families. It highlights the need to mitigate the employment risks by providing income support in the event of illness, disability, work injury, maternity, unemployment and old age. ADB's Social Protection Strategy requires that ADB Borrowers and their contractors and subcontractors comply with applicable labor laws in relation to the Project, and take measures to comply with the core labor standards.

The stakeholders' engagement is to be carried out in accordance with the ADB 2009 SPS which requires meaningful consultation with affected people. Meaningful consultation is a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues. The Project will engage with communities, groups, or people affected by projects about the impacts and the management measures. For instance, where a project will likely have an impact on access whether it will be restricted or affect their daily economic activities, the Project will need to inform and consult the communities on changes in access as a result of the project. Furthermore, the Project will comply with the Public Communications Policy which requires proactive disclosure on the ADB website. The Policy requires the client to provide relevant environmental, resettlement, and indigenous people information to affected people in a timely manner, in an accessible place and in a form and language(s) understandable by them.

The Policy on Gender and Development 1998 aims to ensure that gender issues are considered at all appropriate stages of the project cycle and to explore opportunities to address some of the new and emerging issues for women, as well as build the capacity of women through conducting various trainings and workshops.

### 3.3 KAZAKHSTAN AND INTERNATIONAL REQUIREMENTS

In Kazakhstan state-owned land can be leased to legal entities. Most leases are on a long-term basis for a maximum of 49 years. Provision of land plots for legal entities for temporary use is the responsibility of the council that is empowered to distribute the land. The main applicable law regulating land allocation process is the Land Code of the Republic of Kazakhstan. Article 48 states that for the energy projects land plots that are in The State Reserve (usually the land not suitable for traditional agriculture or pasturing) can be provided without tenders or auctions. The district council is responsible for reserving and providing land plots for the renewable energy sources (RES) projects in accordance with the Law "On supporting the Use of RES" #165-IV dated July 4, 2009.

Payment for leasing is regulated by the RK Government Resolution #890 on Establishment of Base Payment Rates for Land Plots in Providing them for Private Ownership, as well as in providing for lease by the State or State land users and also fees to be paid for selling the right to Lease land plots dated September 2, 2003 (with alterations 2011) and the Tax Code 2008 (with alterations 2017).



The Company and the contractors environmental performance is controlled by the regional Natural Resource Management Office. Being the hazard category 4, solar park is controlled by the regional Natural Resource Management Office. Health and safety issues are controlled by the regional emergency department and the Consumer Rights Protection Department. The regional department of the Ministry of Labor and Social Security controls adherence to the worker rights and working conditions. These bodies are entitled to review all current and historic HSE documentation that has to be retained for 5 years.

The permit to operate polluting equipment is given by the Natural Resource Management Office, which belongs to the Kyzylorda Regional Council, in the form of an Emission Permit, which states the maximum permitted annual emissions, discharges and waste volumes. These volumes are calculated by the independent environmental agency contractor on the base of the existing and planned to come to operation during the covered by the permission period (usually 5 years) equipment maximum output characteristics. As no pollution sources are represented at the solar park area during the power plant operation, Natural Resource Management Office will not ask for environmental protection plan or an environmental operational control program with the monitoring plan in it. According to the EIAs the air emissions are planned during the power plant construction period only.

Public consultation shall start from a public note in two local newspapers and placing EIA to a public domain. The consultation ends in 20 days after a public meeting with the meeting minutes that summarises the consultation results. The minutes are submitted with the EIA for the State Environmental Review. If an EIA developer identified no direct impact on environmental of human health, he may advise the Company not to conduct public consultation and confine the social assessment to individual or group interviews. However, it is the State Environmental Review that makes the final decision on the need for consultation basing on the Consumer Protection Office hazard category given to the Project. The Project is still to comply with the Banks' requirements to engage with the settlements near the SPP and inform them about project impacts and management measures as detailed in the Stakeholder Engagement Plan.

Apart from the main requirements of the RoK Environmental Code and the SanPiNs, the project is to comply with the requirements of the ratified international conventions and following EU directives that are obligatory under Kazakhstan Renewable Energy Financing Facility (KazREFF) requirements:

- The United Nations Framework Convention on Climate Change;
- Strategic Environmental Assessment Directive 2001/42/EC;
- Habitats Directive on the protection of sensitive and vulnerable natural habitats 92/42/EC
- EU Water Framework Directive 2000/60/EC;
- Air Quality Framework Directive 96/62/EC;
- Habitats Directive'92/43/EEC 2007;

KazREFF also requests in general terms to account for integrity of the transportation roads surface and structures, noise, dust and risk of working at height during construction.

The following legislation creates favorable conditions for the industry in order to increase the share of renewable energy for electric and thermal energy production:

- Kazakhstan Concept of Transition to "Green Economy 2013-2050",
- The Law On Support of Use of Renewable Energy Sources #165-IV from July 4, 2009 that

Production, transfer and use of electricity in Kazakhstan are regulated by the Electric Power Law #588-II from July 9, 2004.

Restrictions are applied to some hard surface roads along the transportation route as being maximum 10 tonnes for a wheel pair load. This limit lowered further to 8 tonnes for the day time and for the ambi-

ent temperature at or above +25°C. An oversize equipment transportation plan and traffic management plan are to be approved by the:

- Regional branches of the National Company (NC) KazAvtoZhol PLC of the Committee for the Automobile Roads of the Ministry of the Industry and Development;
- Transport Control Inspection;
- Traffic Police;
- Railway operator NC Kaztemirzholy PLC if railway is used;
- Municipal electric power district heating and gas distribution companies.

Transportation shall be conducted according to the Procedures for Transportation of Oversize and Heavy Freight on the Republic of Kazakhstan Territory #206, 2015 with amendments. The procedures restrict the speed to 60 km/h and to 10km/h above the dams and bridges, oblige to conduct transportation in the hours of the least road occupancy and during daylight outside the settlements and specify the conditions when a 'cover' car and an escort car with the blinking beacon lights are needed. The Procedures prohibit overtakes of all vehicles that move at speed above 30 km/h.

## 4 COMPLIANCE STATUS

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Table 1 summarizes the project compliance with the local, EBRD, ADB and EU requirements. The Baikonur Solar LLP is in compliance with the RoK requirements. The process being undertaken for the land allocation is compliant with the Land Code. It has valid permits and approvals that cover all aspects of the operation. The 76 pages preliminary EIA (predOVOS) describes the project and although lacks proper assessment of its environmental and social impact, has been approved by the required authorities. The local format EIA is to be approved before the construction starts. Since the Company does not conduct its own construction activities and no emissions are associated with the operation, it does not need the Emission Permits but will need to check that the contractor has it.

Baikonur Solar LLP is a new company created specifically for this project. As it is 100% owned by Samruk Kazyna-United Green LLP (SKUG) and is managed by the same personnel using the same management system, below the SKUG compliance status and internal capacity to fulfil the EBRD requirements is assessed basing on the documentation provided.

Being an enterprise of the 4 hazard class, SPPs are not required to develop any EHS documentation by the legislation. The SKUG appointed the Burnoye 1 SPP site manager to be the company EHS specialist who developed several EHS documents. Some were required by the Burnoye 1 project ESAP and some were developed on his own accord. Review of these documents show lack of structural approach and insufficient knowledge of the required by the ESAP EHS management system. Sending the EHS specialist to an appropriate training would help rectify this.

The developed for Burnoye 1 SPP EHS documents will be used to draft the same documents for Baikonur SPP. The Burnoye 1 documents include the Environmental and Social Management Plan (ESMP) and Environmental Monitoring Plan which implementation is reported to the company management at the end of the year. The ESMP requires development of an emergency preparedness and response plan for each working site and focuses on controlling the contractors to monitor the environment and mitigate any negative impact, to conduct regular trainings for construction workers on EHS matters, and to store and utilize wastes in an environmentally sound way i.e. separate different types of waste to enable utilization, store hazardous wastes separately and ensure proper utilization and safe disposal at the end of construction. A separate Plan on Improving Environmental Situation is 'self-designed' to document the Company plans for trees planting.

#### 4.1.1 Health and Safety Management

The Company is in compliance with RoK health and safety legislation. It has developed and communicated to all employees a Specialized Manual on Health and Safety (HS Manual). The HS Manual covers health and safety requirements for different types of work conducted at the SPP site and step by step first aid guidance for different injuries. There the HS responsibilities are assigned and explained.

The Company trains staff and tests understanding, and controls compliance with the procedures at work places by conducting regular inspections by the EHS Specialist. For contractors and visitors on site, safety induction briefings are conducted. The SPP staff is trained in first aid delivery.

The safe system of work with electrical equipment is arranged according to Kazakhstan requirements which with few exceptions have similarities with the corresponding international requirements. Prior to performing works with electrical equipment the team of minimum two workers has to get an approved work order – a some sort of safe system of work. However, the manual makes no provision for and individual working alone which in fact does occur.

#### 4.1.2 Contractors Performance

The Contractor's performance is controlled using the SKUG Regulations for Contractors in the Field of EHS. According to the Regulations, suppliers of goods and services EHS capacity is assessed at tendering stage with a questionnaire that scores answers on 3-point scale. The highest total score indicates high EHS performance of a candidate. SKUG also agrees with the suppliers on its right to conduct EHS audits of their project related activities.

Tenders are run in two stages: first, shortlisting suitable candidates and then selecting the winner from the shortlist. Previous satisfactory EHS performance of a shortlisted contractor gives him an advantage.

The SKUG EHS requirements are then included in the contractor contracts. Apart from the contractor own EHS control, the SKUG manager monitors the contractor compliance with the EHS requirements at least once a week and issues non-compliance note with the deadlines for rectification.

The Sanitary Requirements for Contractors were developed in accordance with the RoK Sanitary and Epidemiological Requirements for Working Conditions during Construction, Reconstruction, Repairs, Commissioning and Operation of Object dated February 28, 2015. The document establishes provisions related to technical and drinking water supply, temperature for workers, PPE, and basic accommodation requirements.

#### 4.1.3 Security

The access to SPP sites is granted via the pass permit and staff ID, which are to be presented at the security control point. Pass permits are issued by the HR Department. Passes are checked for authentication once a year. Non-employees/visitors can be granted access if accompanied by an authorized Company's personnel. In emergency, emergency rescue services are granted immediate access to the SPP site, but the security is to be notified by the employee that called these services.

A contracted private security company has its instructions for arms secure storage and application towards vulnerable groups of the community. Dogs are not used.

#### 4.1.4 Human Resource Policy

The HR Policy is based on a three-level HR management system that systemizes and increases the transparency. The first executive level employees are hired through an open competition, but technical specialists might be employed differently to ensure uninterrupted technological process. At this level the individual plans are developed to identify the employee potential for further professional growth within

the Company. The Company liaise with local higher education institutes in selectin of bright graduates for potential employment. The second management level employees, which are responsible for planning and management of major operations, are hired from the promoted 1<sup>st</sup> level specialists and no open competition is conducted. The list of positions at the third governing level is approved by the internal documents of the Company.

The Company's HR policy is regulated by the national Labor Code, which requires signing of individual contract with every employee, establishes minimum wages and benefits, as well as the right to participate in trade unions. No child labor, forced labor and discrimination prohibited by the legislation occur within the Company.

**Table 1 EBRD PR and ADB SPS compliance status. MN-material noncompliance, PC-partial compliance, FC-full compliance, NA-not applicable for the project.**

PR ref.	Banks' Requirement	Score	Comment/Gaps	Recommendation	ESAP #
<b>1</b>	<b>Assessment and Management of Environmental and Social Impacts and Issues (ADB SR 1. Environment)</b>				
Summary: The newly formed for the project company obtained all the required approval for the development. SKUG has EHS plans but lacks structure in it and does not employ a community liaison officer.					
1.1	Environmental and Social Assessment	FC	-	-	
1.2-1.4	Environmental and Social Management system, policy and plan	PC	ESMS, policy and plans are developed but lacks structure		1.1, 1.2, 1.3
1.5	Organisational capacity	PC	No Community Liaison Officer, EHS manager lacks knowledge	Employ CLO and send EHS manager to an appropriate training on stakeholder engagement and grievance redress	1.1
1.6; 2.9	Supply chain management	FC Expected	-	-	1.4
1.7	Project monitoring	FC	-	-	
<b>2</b>	<b>Labour and Working Conditions (ADB SR 1. Environment and ADB Social Protection Strategy)</b>				
Summary: The Company's labour and working conditions policy is regulated by local labour legislation and individual contracts. The Company has procedures for managing performance and labour conditions of contractors. Company to include provision on compliance with national and local laws and take measures to comply with the core labor standards in the contractor's and subcontractor's' contract.					
2.1	Human resource policies and working relationships	FC Expected	-	-	2.1
2.2-2.3	Child and forced labour, non-discrimination and equal opportunity	FC Expected	-	-	1.3
2.4	Workers Organizations	FC Expected	-	-	
2.5	Wages, benefits, and conditions of work and accommodation	FC Expected	-	-	
2.6	Retrenchment	NA	Collective redundancy of ~200 local unskilled workers expected after construction completion but this retrenchment requirement does not apply to the contractor workers		
2.7	Grievance Mechanism	Risk of PC	Grievance mechanism may not be implemented properly	Ensure that grievance mechanism maintained according to ESAP requirements	2.3
2.8	Non-Employee Workers	FC expected	Overall compliance expected but rented worker accommodation may not meet the requirements	EHS management systems and contractor management to be monitored and compliance reported. Company to include provision on compliance with national and local laws and take measures to comply with the core labor standards in the contractor's and subcontractor's' contract.	2.1, 2.2, 2.3
2.10	Security Personnel Requirements	FC Expected	-	-	
<b>3</b>	<b>Resource Efficiency and Pollution Prevention and Control (ADB SR 1. Environment)</b>				
Summary: Potential for small and localize contamination of ground with oil products if no measures are taken					
3.1	Resource efficiency	NA	Due to very low volumes, resource use reduction plan is not required		

PR ref.	Banks' Requirement	Score	Comment/Gaps	Recommendation	ESAP #
3.2	Air emissions	FC Expected	-	-	
3.3	Waste waters	NA	Water will not be used for panels cleaning		
3.4	Greenhouse gases	NA	GHG emission during construction is thought to be negligible in comparison with the GHG emission reduction as a result of the SPP operation		
3.5	Water	NA	Due to very low volumes, water use reduction plan is not required		
3.6	Wastes	Risk of PC	No hazardous waste but risk that waste management will not follow the re-use-reduce-recycle-recover-safe disposal hierarchy and that some waste may be misplaced	Develop waste management plan to include broken and decommissioned solar panels utilization. Request the contractor to provide waste memos to ensure appropriate disposal location and methods, and to include this requirement in the agreement with subcontractors.	3.1
3.7	Hazardous substances and materials	Risk of PC	No hazardous materials stored at site but construction equipment refueling will occur	Request fuel tank drivers use trays under refueling couplings. Emergency power diesel generator will have small fuel tank that not require designated actions	3.2
<b>4 Health and Safety (ADB SR 1. Environment)</b>					
Summary: Large number of unskilled local labour would require more frequent and systematic control over HS practices					
4.1	Occupational health and safety	Risk of PC	Contractor HS performance may be insufficiently controlled	In the contract request the Contractor to identify HS risks and develop OHS policy and site specific plan. Audit Contractor HS performance regularly	4.2, 4.3
4.2	Community health and safety	NA	Local community interests and activities are far from site. Project traffic will not affect road users safety due to presence of multiple lanes and safe turning at the recently reconstructed road.		
4.3	Infrastructure, building, and equipment design and safety	FC	-	-	
4.4	Hazardous materials safety	Risk of PC	No hazardous materials stored at site but construction equipment refueling will occur	Request fuel tank drivers use trays under refueling couplings. Emergency power diesel generator will have small fuel tank that not require designated actions	3.2
4.5	Product and services safety	NA	-	-	
4.6	Traffic and road safety	Risk of PC	Transportation may not be regulated	Develop and enforce traffic management plan	4.1
4.7	Natural hazards	NA	No risk of fire spreading through sparse desert vegetation or flooding as the Syrdarya River flow and attached irrigation channels flow is controlled		
4.8	Exposure to disease	NA	-	-	
4.9	Emergency preparedness and response	Risk of PC	No provision may be made for fire prevention and response. Risk of flooding may not be addressed.	Develop and implement site specific emergency response plan	4.2
<b>5 Land Acquisition, Involuntary Resettlement and Economic Displacement (ADB SR 2. Involuntary Resettlement)</b>					
Summary: The 150 hectare land for the SPP is an unused State land, without legal or informal land users. No encroachment to common resources is expected. Existing dirt road will be improved. Further SPP expansion is not planned.					
5.1-5.3	Avoid or minimise displacement and compensate for it	NA	Unused state land, no land owners or land users affected. Project land allocation/lease process to comply with the Land Code.	Conduct remaining land leasing procedure according to Land Code and local regulations. Obtain land lease agreement and land certificate before commencement of land clearance and construction If the access road is not designed to coincide with the existing road, impact on current road and land users shall be assessed including consultations with road and land users	5.1, 5.2
5.2-5.4	Consultation and grievance mechanism	NA	-	-	

PR ref.	Banks' Requirement	Score	Comment/Gaps	Recommendation	ESAP #
<b>6 Biodiversity and Living Natural Resources (ADB SR 1, Environment)</b>					
Summary: No management provided but impact is expected to be of low significance					
6.1 6.2	Assessment Conservation	NA	Area has low ecological value with no migratory routes but contain Red Book black saksaul	Preserve soil from wind erosion by retaining as much vegetation as practicable. Cut rather than uproot shrubs	6.1
6.3	Sustainable management	Risk of PC	Site vegetation will require management to prevent wind erosion	Seed bare patches in the second warm season and water them regularly until vegetation appears	6.1
<b>7 Indigenous Peoples (ADB SR 3, Indigenous Peoples)</b>					
Summary: No communities which meet ADB and EBRD's criteria to be considered as Indigenous Peoples.					
7.1	Indigenous Peoples	NA	-	-	-
<b>10 Information Disclosure and Stakeholder Engagement (ADB SR 1, SR 2, and SR3)</b>					
Summary: No designated CLO to implement SEP and Grievance mechanism effectively					
10.1	Stakeholder engagement plan	Risk of PC	Without designated CLO SEP and mechanism may not be implemented properly	Employ designated CLO and implement SEP	2.4, 10.1, 10.2
10.2	Operational grievance mechanism	FC	Grievance Mechanism developed	implement grievance mechanism as part of SEP	10.1, 10.3
<b>ADB SR 2. Involuntary Resettlement</b>					
Summary: No involuntary resettlement or land acquisition is foreseen by the Project. The 150-hectare land for the SPP is an unused State land, without legal or informal land users.					
2.1	Compensation, assistance and benefits for displaced persons	NA	-	-	-
2.2	Social impact assessment	FC	The land plot is free from any structures or economic activities or residents. No social impact is foreseen.	-	-
2.3	Resettlement planning	NA	-	-	-
2.4	Negotiated land acquisition	FC	Payment for leasing is regulated by the RK Government Resolution #890 on Establishment of Base Payment Rates for Land Plots in Providing them for Private Ownership, as well as in providing for lease by the State or State land users and also fees to be paid for selling the right to Lease land plots dated September 2, 2003 (with alterations 2011) and the Tax Code 2008 (with alterations 2017).	-	5.1
2.5	Information disclosure	NA	-	-	-
2.6	Consultation and participation	Risk of PC	Consultation might not be arranged and participation not ensured without designated CLO	Appoint a full-time CLO and implement SEP	10.1, 10.2
2.7	Grievance redress mechanism	FC	Grievance Mechanism developed	Disseminate to stakeholders and implement grievance mechanism as part of SEP	10.1, 10.3
2.8	Monitoring and reporting	NA	-	-	-
2.9	Unanticipated impacts	NA	-	-	-
2.10	Special considerations for indigenous peoples	NA	-	-	-
<b>Overall Compliance</b>					
Summary: The Company's performance is in full compliance with national legislation. The project is consistent with the State policy towards promotion of renewable energy sources, legal requirements and other plans for the area of influence. It fulfils the main strategic plan to eliminate regional deficit in energy to allow its further development. However, partial compliance with EU requirements is feared as control over the contractors non skilled workers EHS performance and stakeholder engagement may not be effective					
National ESHS, requirements		FC	-	-	-
EU ESHS requirements		Risk of PC	Control over contractors' EHS management system may be not effective	Establish policy and procedures for managing and monitoring the performance of contractors	1.3

#### 4.1.5 Stakeholder Engagement and Grievance Redress Mechanism

The Company does not have a full-time Community Liaison Officer (CLO). The SPP Project Manager handles the responsibilities of CLO. The Company has been notified before that this is not sufficient to

maintain the required by the Banks' stakeholders engagement. The project information boards at the operational sites entrances contain stakeholder engagement plans and a box for grievances.

The Company has conducted public hearings in November 2015 in Kyzylorda city. The list of participants includes representatives from the Company, Kyzylorda city council, Housing and Communal Services Department, Environmental Department of Kyzylorda region, Nur Otan democratic party, project organization, OVOS developers and local population. The information on public hearings was posted in the local newspaper Kyzylordinskiye Vesti twenty days prior as per the legislation requirements. The major concern of the population was whether the solar panels will have a negative impact on environment and health. As a result of discussions the participants approved the implementation of the project. The Company plans to use their website and information board at the SPP entrance as a primary source of information.

#### 4.1.6 Corporate Social Responsibility Policy

The SKUG Corporate Social Responsibility Policy (CSR) will be employed for the Baikonur SPP project. It commits to the principles of social responsibility in the following fields: full and timely contribution to the state budget, human rights, labor relations, environmental protection, fight against corruption and social engagement with local communities.

On 14 pages the CSR establishes standards for communicating with its stakeholders and commits to conducting regular EHS training of its employees. Here the Company commits to providing sponsorship support to the local community by implementing social projects. The Company Supervisory Board monitors compliance with this policy by assessing regular implementation reports made according to the Global Reporting Initiative (GRI) Standard.

The Company does not have the CSR Programme for its sites, which is to be developed with the local community's Public Governance Council and includes the action plan and allocated budget for a year. The financial assistance for local needs that the Company provided as part of the CSR does not comply with the criteria for CSR Programme funding, which are: 1. Fit the allocated for CSR budget; 2. No overlap with the State programs; 3. Investment is sustainable or lead to creation of jobs.

## 5 EXISTING ENVIRONMENTAL AND SOCIO-ECONOMIC CONDITIONS

### 5.1 CLIMATIC CONDITIONS

The climate is characterized as highly continental. The region is dominated by dry hot weather. Summer is usually hot, winter is moderately cold. The average temperature of the hottest month – July is +27°C but the absolute maximum reaches +46°C. January is the coldest month with average temperature of -9,1°C, average minimum of -23,8°C and absolute minimum -38°C.

This is the driest region in Kazakhstan. The long term average annual precipitation is 133mm. Every year precipitation  $\geq 0,1$ mm can persist for 50 days. Average relative humidity is 58% over a year and 37% in summer.

The average wind speed is 3.1m/s but strong winds are frequent with northeastern winds prevailing throughout the year. The storm speed of 22m/s is reached on average once a year, 30m/s - every 10 years and 32m/s every 20 years.

## 5.2 GEOMORPHOLOGY AND GEOLOGY

The SPP is located on the first terrace of the Syrdarya River sedimentary plain. Relief is flat with numerous irrigation channels some are elevated to 0.3-0.5m some are 0.3m deep. Their width does not exceed 0.5m. The altitude changes between 131.9m and 133.7m in 1.2km.

The SPP area geology is represented by 1,5-3m thick modern Quaternary alluvial sandy silts and clayey silts (aQ<sub>IV</sub>). Grey-brown and brown sandy silts are hard but ductile and fluid when saturated with water. It lays above and below ground water level. Sands occupy 34-44% of the aeration zone, the rest is mostly silts (40-45%) This ratio changes to 16/74% in the saturation zone. Brown semisolid and stiff clayey silts (24% clay 54%, silt) subside when saturated with water.

Takyr-like clay up to 2m thick forms in the depressions. It is underlain by fine silty sands, which interbed with clay down to 10m depth. Humus varies from 0,6 to 3% and spreads down to only 0,1-0,2m.

Further down to 40-50m alluvial Middle-Upper Quaternary fine sands are interbedded with silty clays and clays.

According to the seismic zoning earthquakes of up to Richter Scale 6 are possible. No scientifically valuable geological outcrops exist in the area.

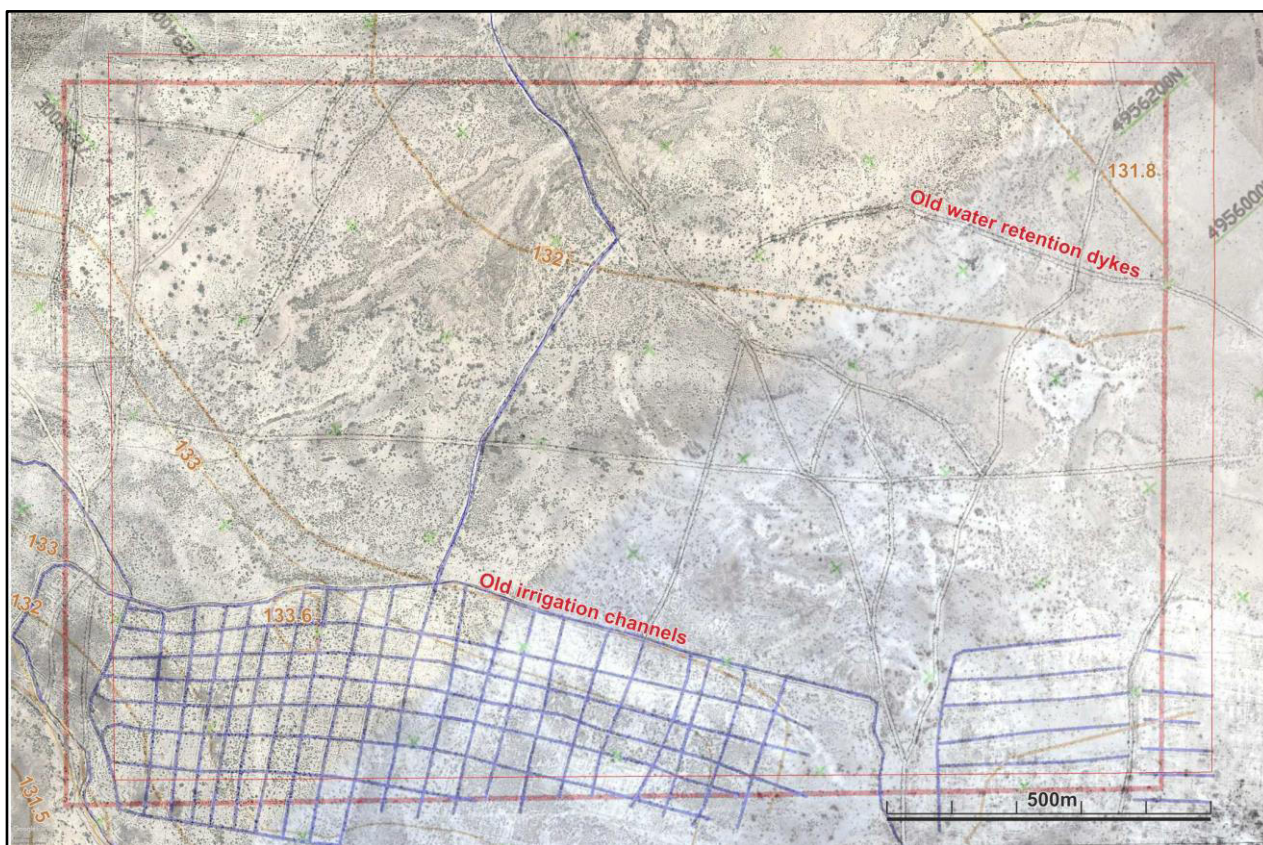


Figure 3 Juxtaposition of 1:10 000 topographical survey map on the satellite image 28.07.2013 showing distribution of channels, dykes and shrubs in the SPP area.

## 5.3 SURFACE AND GROUND WATER AND ITS QUALITY

The Syrdarya River flows 6.4km from the site to northwest. It is drained by multiple irrigation channels including the Koksou channel that feed water to Aktogan area used by the locals for cattle herding and hay harvesting. The river flow volume is regulated throughout its length. The nearest Kyzylsay Center-Compensator Reservoir 330km upstream of the SPP is used to prevent winter and early spring flooding of Kyzylorda. It accumulates water released in Kyrgyzstan to generate power in winter and lets it out at



the start of irrigation season. The earth irrigation channels that feed Aktogan area and have potential to flood the SPP site are regulated at their head gates by Kyzylorda Vodokanal who allows into the channels the volumes ordered by the farmers plus the estimated loss into the ground on the way. However, the Vodokanal may exceed the farmers instructions if the river level threatens the head gates integrity. In such circumstances large areas around the channels would be inundated with water that may also reach the SPP site.

In particular snow rich years the SPP site has standing water in between the dykes for some time in Spring. The ground becomes very muddy and unpassable for vehicles at this time.

Multiple lakes formed as the river old channels close up along its banks. They used by the locals for recreational fishing.

The alluvial complex of Quaternary sediments consists of two aquifers formed by precipitation and melt water. The unconfined aquifer lays at 2-4m depth in the modern Quaternary alluvial sediments with hydrophilic soils such as silty sands, sandy silts and silts. The second confined aquifer is in Middle-Upper Quaternary sediments. The unconfined groundwater has sulphate sodium-potassium Ion composition. No more information on the water chemistry is available but this water is tapped by the 7.5m deep Junction 14 well with 10m<sup>3</sup>/hour output of fresh (salinity <1g/L) water. The well is far enough and up-stream from the pothole toilets of the Junction houses. Being a public well, it is checked regularly by the Regional Sanitary Epidemiological Service.

## 5.4 ECOLOGY AND BIOTIC RESOURCES

The SPP site is the Natural Habitat as per the ADB SPS habitat classification as the biological communities are formed largely by native plant and animal species. The biological communities are formed largely by native plant and animal species, and human activity has not modified the area's primary ecological functions.

The SPP site animals and plants were surveyed along the site perimeter. Very high temperature reduced the number of animals that can be visually recorded so indirect evidences were used to identify the species present (Table 3). Identification of some plants was also constrained by absence of flowers, fruits or seeds. These plants were collected and identified in the Institute of Botany and Phytointroduction laboratory.

**Table 2 Occurrence of 19 species identified at the SPP territory at 49 random assessment plots**

Occurrences	Morphological Form	Common	Name Latin	Russian
18	Shrub	Black saksaul	<i>Haloxylon aphyllum</i>	саксаул черный
10	Shrub	Halostachys	<i>Halostachys belangeriana</i>	соляноколосник каспийский
9	Perennial grass	Saltmarsh sea-lavender	<i>Limonium otolepis</i>	кермек ушковатый
9	Perennial grass	Camelthorn	<i>Alhagi pseudalhagi</i>	верблюжья колючка
6	Shrub	Loose tamarisk	<i>Tamarix laxa</i>	тамарикс рыхлый
	Shrub	Saltcedar	<i>Tamarix ramosissima</i>	тамарикс многоветвистый
	Shrub	Russian salt tree	<i>Halimodendron halodendron</i>	чингил серебристый
4	Perennial grass	Karelinia	<i>Karelinia caspia</i>	карелиния каспийская
	Semi-shrub	Teresken grey	<i>Krascheninnikovia ceratoides</i>	терескен серый
3	Annual grass	Russian thistle	<i>Salsola australis</i>	солянка южная
	Perennial liana	Siberian cynanchum	<i>Cynanchum sibiricum</i>	цинанхум сибирский
	Annual grass	Woolly saltwort	<i>Climacoptera lanata</i>	климакоптера шерстистая
2	Perennial grass	Shoreweed	<i>Aeluropus littoralis</i>	прибрежница солончаковая
1	Annual grass	Opposite-leaved petrosimonia	<i>Petrosimonia brachiata</i>	петросимония супротивнолистная
	Perennial reed	Common reed	<i>Phragmites australis</i>	тростник
	Perennial grass	Syrian bean caper	<i>Alhagi pseudalhagi</i>	парнолистник амударьинский

Annual grass	Opposite-leaved saltwort	<i>Climacoptera brachiata</i>	климакоптера супротивнолистная
Annual grass	Saltwort	<i>Salsola nitraria</i>	солянка натронная
Semi-shrub	Eastern saltwort	<i>Salsola orientalis</i>	кейреук

The takyр soil of SPP area is occupied by 19 salt resistant plants out of which 5 frequently occurring shrubs reach 2m height (Table 2). The lower level is occupied by 2 semi-shrubs, 7 perennial and 5 annual plants. Despite flatness of the site and apparent homogeneity of soil, projective cover varies significantly from few percent to 80% in isolated clusters. While shrubs distribution does not correlate to any geomorphological features, semi-shrubs and grasses that are more dependent on surface water concentrate at the shallow bottoms of the old irrigation channels and microdepressions. From the shrubs tamarix dominate the view but results of the random assessment shows three times more frequent occurrence of saksaul. The SPP area is not designated for protection but saksaul has recently been added to the Kazakhstan Plants Red Book for its rapid disappearance from elsewhere. It is valued as firewood for meat cooking for its high heat output and specific smell. After designation very vibrant saksaul firewood sale was prohibited. The rest of the plants are not endemic, rare and endangered. No evidences of ground fire have been noted when observing plant remains. The bare stems of dead shrubs could be result of a drought or rodents attack on the shrub roots.

The animals of the site area is not very diverse. No endemic, rare and endangered species, including those listed in the Red Book, have been noted at or around the SPP site. Only rodents, lizards, birds and insects typical for the region were found. Migratory birds observation in the area during 2012-2016 conducted by the ornithologists of the Kazakhstan Zoology Institute (not published) indicate that the migratory routes or roosting areas of migratory birds are at some distance from the SPP site. The nearest area designated for protection of animals is Turangulsayskiy (25km west) and Kargalinskiy (87km southeast) nature preserves. They have been arranged to recover the populations of Bactrian deer (*Cervus elaphus bactrianus*) and Ring-necked Pheasant (*Phasianus colchicus mongolicus*) in Syrdarya floodplain forest but work for introduction of these species into the preserves has never commenced.

**Table 3 Animals recorded during the site survey 2.08.2017 (IUCN Category: LC-Least Concern, VU-Vulnerable, n/a-information not available)**

IUCN category	Latin	Name Common	Russian	Signs of presence and numbers
<b>Mammals (7)</b>				
LC	<i>Meriones tamariscinus</i>	Tamarisk gerbil	Гребенщикова песчанка	2 colonies 100 and 50 borrows
LC	<i>Rhombomys opimus</i>	Great gerbil	Большая песчанка	2 colonies 30 and 25 borrows
LC	<i>Lepus tolai</i>	Tolai hare	Заяц Толай	Faeces found frequently
LC	<i>Vulpes corsac</i>	Corsac fox	Корсак	Digging and faeces
LC	<i>Canis aureus</i>	Golden jackal	Шакал	Digging and faeces
LC	<i>Meles meles</i>	Eurasian badger	Обыкновенный барсук	Digging
LC	<i>Erinaceus auritus</i>	Long-eared hedgehog	Ушастый еж	Skin
<b>Birds (7)</b>				
LC	<i>Buteo rufinus</i>	Long-legged Buzzard	Обыкновенный курганник	1 nesting around SPP
LC	<i>Merops apiaster</i>	Bee-eater	Золотистая щурка	2 nesting around SPP
LC	<i>Galerida cristata</i>	Crested Lark	Хохлатый жаворонок	7 nesting around SPP
n/a	<i>Lanius pallidirostris</i>	Steppe Grey Shrike	Пустынный сорокопуд	3 nesting around SPP
LC	<i>Oenanthe isabellina</i>	Isabelline Wheatear	Каменка-плясунья	5 nesting around SPP
LC	<i>Cercotrichas galactotes</i>	Rufous Bush Robin	Тугайный соловей	1 nesting around SPP
LC	<i>Luscinia svecica</i>	Bluethroat	Варакушка	2 flying over
<b>Reptiles (3)</b>				

IUCN category	Latin	Name Common	Russian	Signs of presence and numbers
VU	<i>Agrionemys horsfieldi</i>	Steppe tortoise	Степная черепаха	Borrow
n/a	<i>Trapelus sanguinolentus</i>	Steppe agama	Степная агама	1
LC	<i>Phrynocephalus helioscopus</i>	Sunwatcher	Такырная круглоголовка	1

The nearest important birds area is not designated for protection Telikol Lakes (KZ068) 68km east of the sites. Saiga antelope has never been recorded near the SPP area. The nearest group of Bektakdala population that accounts 6570 antelopes <sup>1</sup> comes from northeast no closer than 260km (50km from Baikonur rocket launching pads) to the site in winter and retracts back north in Spring.

## 5.5 AIR QUALITY AND NOISE

Air quality at the site is good and noise level is ambient. The nearest source of the insignificant air pollution and noise is the M32 road 1.6km away. The EU LV and the WHO Guideline for ambient air quality gives the criteria for annual average as 40µg/m<sup>3</sup> for NO<sub>2</sub>; 20µg/m<sup>3</sup> for PM10 and 20µg/m<sup>3</sup> as the 24hour average for SO<sub>2</sub>. In the same climatic zone 640km east of the site at the points 1.3 and 2km from the main road these concentrations were measured as 1.3, 9 and <1.08 µg/m<sup>3</sup> respectively. The ambient noise was L<sub>Aeq</sub>=44-50dB(A) and L<sub>Amax</sub>=59-61dB(A) which is below the maximum permitted in Kazakhshtan residential areas for day time 55 and 70dB(A) respectively. The measurements were conducted by EcoSocio Analysts LLC for a year in 2016-2017 using a first grade nose meter, diffusion tubes and a PM10 meter.

## 5.6 GROUND CONDITIONS

No evidence of ground contamination, waste dumping or suspected waste burials were found at or around the site. Several dump truck loads of inert construction waste was noted along the access road. Soil structure and chemical composition have been altered in the past by channels and dykes construction but in between the soil has natural structure appearing at the surface as takyrs with characteristic polygonal cracks in the dried clayey silt. No signs of top soil wind or water erosion were noted at the site. Out of the livestock, the site is visited only by few horses as it does not support grass. The borrow pits along the M32 road that were dug 5 years ago also show no such signs and have albeit not yet fully complete but typical for the area vegetation cover.

## 5.7 SOCIO-ECONOMIC AND CULTURAL ISSUES

### 5.7.1 Regional level

In 2016 the population grew by 1.5% to reach over 760 000 (Table 4). In 2015 the influx of migrants has increased by 15% to 15 311, compared to 13083 in 2014 but emigration has also increased by 16% to 18590 most likely indicating increasing mobility of the population.

Table 4 Kyzylorda region key demographic indicators at the start of a year.

	2010	2011	2012	2013	2014	2015	2016
<b>Population</b>							
Total	689008	700578	712878	726781	740389	753148	765171
Men	343012	349327	355887	363070	369842	376316	382512
Women	345996	351251	356991	363711	370547	376832	382659
<b>Rates per thousand of population</b>							
Birthrate	28,83	28,47	27,99	27,61	27,54	26,06	n/a
Mortality	6,9	6,73	6,5	6,01	6,1	5,8	n/a
Marriages	9,71	9,7	9,63	9,97	8,81	7,69	n/a
Divorces	2,07	2,05	2,09	2,21	2,13	2,27	n/a

<sup>1</sup> KazOkhotZooProm annual inventory. 2017 (unpublished)

In 2015 infant mortality accounted to 11,07/1000. The main causes are from conditions originating in the perinatal period, accounting to 95 cases in of the total number of infants. The most common death causes are congenital anomalies – 25%, sepsis -8%, pulmonary diseases – 6%, and infectious and parasitic diseases-6%. Forty-two hospitals and medical institutions provide medical services in the region.

## 5.7.2 Local Level

### 5.7.2.1 Kyzylorda

Kyzylorda city is the focal point for the population around the SPP for its proximity. After the road modernization to the 1b category (one below the highest), the time to the city halved. It takes 30min an less than a euro to reach the city centre and EUR8 to take a taxi full of products back. Daily commuting for work has also become easier. This is one of the reason why the actual unemployment around the SPP is relatively low.

The 240km<sup>2</sup> Kyzylorda City Administrative Area of includes Tasboget, Belkol, Berkazan and Kyzylzharma settlements located close to each other. In 2016 the area population was 277 771 (135 668 men and 142 104 women) mainly Kazakhs (Table 5).

The city's history dates back to 1820 to the site of a Kokand fortress known as Ak-Mechet (white mosque). In 1853, the fort was taken by Russian troops and established a new fort called Fort-Perovsky, after the General Vaily Perovsky, who conquered the area. The town Perovsk developed around the fort. In 1925 it was renamed to Kzyl-Orda and served as a capital of the Kazakh Autonomous Republic for 4 years. In 1930-1940 the population of the region and the city has grew significantly due to mass deportation of migrants from other parts of the USSR including political exiles, deported Polish from Western Ukraine and Belarus, Germans, Koreans from the Far East, Crimea and North Caucauss tatars. During the War, the evacuated from the occupied regions also settled in the city.

**Table 5 Kyzylorda Area ethnic composition**

Ethnicity	Quantity	%
Kazakhs	257280	92,62
Russians	9889	3,56
Koreans	6100	2,20
Tatars	1260	0,45
Uzbeks	1062	0,38
Chechens	393	0,14
Ukrainians	211	0,08
Turkish	200	0,07
Kyrgyz	147	0,05
Bashkirs	127	0,05
Azeries	126	0,05
Uyghurs	110	0,04
Greeks	105	0,04
Germans	88	0,03
Moldovans	81	0,03
Belarusians	65	0,02
Others	527	0,19

Kyzylorda's industry plays an important role in its economy development. The development of manufacturing industry is represented by the food industry, engineering, chemical and processing, production of construction materials. A number of oil companies located in the area have recently decreased their activity substantially which resulted in sizeable redundancies but agricultural activity has risen. Compared to 2016 the area of rice crops production has increased by 520ha. The rice is processed at two rice mills.

Free school education is conducted in Kazakh and Russian languages. There are 59 schools and 29 kindergartens. Currently 12 public halls and 21 libraries operate in Kyzylorda and suburban settlements of the area.

### 5.7.2.2 Sulutobe

Sulutobe village is the center of the 31780 ha rural area in which the SPP is positioned. Having established around the Solo-Tobe railway station for the ease of movement and potable water availability, it grew north and south to the Salakbay and Sarykol irrigation channels. In the Soviet time, it was the center of Kirov Collective Farm where most workers were Korean deported by Stalin from the Far East. The Farm grew rice, melons of a particular known quality, watermelons, wheat and sweet corn and sunflower both for the cattle and men. The residents kept vegetable patches. After the farm disbandment in 1997 most Koreans moved to Kyzylorda.

Now Sulutobe has 406 houses populated by 2 498 people. All population is Kazakh but one Russian family. The majority of the population (2096) is economically active, including self-employed – 338, state workers – 246, private companies – 50, rotation workers– 84 and others – 16.

The village infrastructure is poor but in good condition. The roads are tarmac paved, there is a new public hall, a kindergarten, café and shop that sells first necessities. Most residents shop at Kyzylorda markets. A day clinic and a hospital employ 16 and 19 staff respectively. The clinics provides first diagnostics and treatments. An ambulance caters for the rural area. A middle school for 500 pupils is managed by 113 staff. It stopped teaching in Russian in 1998 when the last Russian pupil left the school.

The State programs such as Sybaga, Altyn Asyk, Kulan and Yrys support the agricultural development through providing farmers with access to credits through the Agrarian Credit Corporation PLC to which small and medium-sized businesses can apply for a loan with low interest rate and non-aggressive return policies. Most credits have been taken to buy more cattle as the cattle number does not seem to be limited by other factors but cash availability. However, the local council strives to differentiate the population activities to e.g. retail, cafes and tailoring.

### 5.7.2.3 Junction 14 and Farms

Just across the road to Kyzylorda there is the railway junction 14 with 5 houses and a junction house occupied by 5 families. The closest to the road house has been empty for some years. Most residents are pensioners that live on their pension and help from children that work in Kyzylorda.

The house on the other side of the railway is occupied by a man that guards a cellular phone retransmission mast located 600m east of the junction. If not count a mechanic and signaling officer of the junction who are not residents, he is the only employed here. His two sons help him collect reed for two cows and two calves. To reduce cost they do it by hand from July well into October and gather 500 bundles to pass the winter. The man then pays over half of his monthly salary for a truck to take the reeds to his house. The family would increase the livestock to sell meat at Kyzylorda market but has no savings and cannot arrange a loan. The entire salary is spent on food, utilities and basic clothes.

Two farms located 1.5 west and 2 km east of the SPP at the same side of the road to Kyzylorda have taken loans to buy cattle. The closest farm has also built two large greenhouses next to the old road body material borrow pit. The owner is currently constructing a cattle barn as one of the conditions for getting a loan within the Sybaga crediting program. Upon completion he will receive KZT 15mln (USD45 450), which he plans to spend on 150 cows and 200 sheep. He plans to pasture the cattle in Shegen Grave area, closer to the Salakbay irrigation channel 5-6km north of the SPP. Administratively farms subordinate to the Shieli District Council, located almost 100km southeast in Shieli town, however all the veterinary data is reported to the veterinarian in Sulutobe.

According to the veterinarian the 5 farms located around the SPP area hold on average of 2000 cattle, 1000 sheep and goat and 500 horses. The livestock quantity in the area is growing but all these farms activity is confined to the territory near the Salakbay channel 4-5km northeast of the site.

## 6 PROJECT IMPACT ASSESSMENT

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### 6.1 CONSTRUCTION

#### 6.1.1 Environmental Impacts

The main impact is expected from cutting or uprooting shrubs and driving over semi-shrubs. The food base and hiding places of the noted above rodents and lizards will be reduced forcing rodents to travel further from their borrows. Some pray birds tolerant to human presence will be attracted to the opening

for scanning territory and presence of elevated installations like the fence and security lighting poles. Other animals are likely to leave the fenced area for the construction period.

Vegetation is expected to recover from roots and seed bank collected in the clay cracks providing sufficient supply of melt water is available. For this reason cutting would create less impact on shrubs than uprooting. The latter will however be inevitable for the 5m wide fire protection belt around the fence.

Air pollutants generated during construction is likely to disperse to concentrations well below the maximum permitted before reaching the residential area even in the worst climatic condition. With the given ground, dust will be an issue for workers only. Both vegetation and animals noted are adapted to high dust content in the air and are unlikely to be affected in any notable way.

Noise will be generated by the construction equipment and machinery but it will not reach the houses, which are further than 1km away from the site. Noise generated by excavators, bulldozers and cranes is expected to be under the limit permitted for work without hearing protection of 85dB(A) (SanPiN 1.02.007-94 Noise Limit at Workplaces) thus no significant impact on the construction workers from noise is envisaged. Rodents and lizards are the only receptors that will remain at the site during construction. They normally are indifferent to the noise and vibration generated by heavy equipment and are attracted to the site by created loose ground during earthwork.

No fuel and oil will be used or stored at site but a fuel tank truck will fill up the heavy machinery at the place. Without secondary containment minor leakages may occur.

Inert construction waste (mainly packaging material and wooden pallets) will be disposed to the Kyzylorda city licensed landfill 19km northeast of the site. Some of this material will be utilized by the landfill.

Sensitivity	4	Red Book protected saksaul in the low diversity plant and animal matrix
Magnitude	2	Expected minor soil compaction and up to 10ha total destruction but natural revegetation is possible
<b>Significance</b>	<b>8</b>	<b>Medium</b>

To mitigate risk further, control shall be imposed over the contracted fuel tank trucks that have to use trays under heavy machinery refueling couplings.

## 6.1.2 Social Impacts

### 6.1.2.1 Land Use

Assessment of the historic, current and perspective use of land around the SPP suggested **no impact to the other land users** now and in the future. Historically the site supported marginal agriculture with high labour expenditure for bringing water in. With the increase in the labour value, it is highly unlikely that rice pads or melon patches will be re-established. Significant increase in irrigation water availability is not expected as the water flow of the Syrdarya River is regulated throughout its length and revamping agriculture upstream is likely to take any extra water available. As hay is the limiting factor for livestock expansion, tapping into relatively shallow groundwater would only allow establishment of a farm at previously unattractive place but would not help increase hay availability. Thus cattle herding and hay harvesting will concentrate along the irrigation channels and at Aktogan area where the channels enter lowland and flood large area in spring.

### 6.1.2.2 Equipment and Parts Transportation

All the equipment will be delivered to the railway spur at the Kyzylorda grain elevator located in 300m from the M-32 two lane Samara-Shymkent road. The 32km of this recently renovated road will be used for further transportation to the site. There will be no obstacles or risks to the local drivers or damage to the road surface. The turn left to the SPP access road across the fast moving incoming traffic is properly engineered with an additional speed reduction lane and unobstructed visibility. The traffic in-

tensity is low. However, turning left at low visibility condition (night, mist, rain, sand storm) should be avoided and the next U-turn used if the vehicle length allows for it. It is expected, that the remaining 1.6km of the access road to the site will be surfaced with chip rock before transportation starts.

The step up transformers are the only items whose in-the-box height and width (HWL~ 3.5x2.5x5m) exceed a standard rail container dimensions (HWL 2.4x2.4x6m). Their transportation will not disturb overhead powerlines and pipes. The wheel pair load of the trailer will be <5t which is within the maximum allowed 10t limit for the hard surface roads. The limit is not lowered with the ambient temperature increase.

Additional impact on 7 cottages and 7 blocks of flats located in Kyzylorda 22-30m away from the M32 busy but flat and paved road will be not significant as transportation will be conducted for a short period during the day at constant speed.

Thus transportation impact is considered to be **negligible**.

### 6.1.2.3 Workers Influx

Out of maximum 200 construction staff 150 panels assembling workers are expected to be employed from Kyzylorda and the near settlements. Under the supervision, they can perform the main volume of work of assembling of the panels and cables laying. Few others are expected to be hosted in various accommodation in Kyzylorda that will comply with the EBRD Minimum Accommodation Requirements. The workers will mainly be men, but their presence in an isolated site will have no gender related impact. Use of Illegal, forced or child labour will be controlled by the local labour protection inspector and immigration police and thus the associated impact is unlikely. However, the Company shall emphasise this prohibition in the construction contract and include relevant checks in the internal audits. Considering that the Company will extend its existing practices over contractors control to this project, this form of impact is thought to be **low**.

## 6.2 OPERATION

### 6.2.1 Environmental Impacts

Shrubs trimming will be required to avoid damage to panels and the fire protection belt around the fence will have to be kept clear of vegetation but the rest of the vegetation will be allowed to grow naturally. No changes in plants composition or distribution is expected. Despite notable difference between microclimate of the front and hind side of the panels, vegetation there is unlikely to differ. The panels will also not create a niche for exotic invasive species which seeds could be brought with the SPP equipment imported from china. Water availability to roots at these sides will also not change significantly as the plants feed of melt and ground water.

The plant fence will not affect animals daily movements or seasonal migratory routes. Population of rodents that that could have suffered from the ground clearance will recover with the vegetation recovery and will likely be limited by food availability. The powerline poles will help pray birds in scanning the area that is cleared from large shrubs but the panels will give sufficient protection to rodents and small birds to compensate for this potential increase in predation. Collision risk presented specifically by solar panels to birds is low. The noted ground animals will easily cross under the plant fence and are unlikely to be scared off by the plant staff activities.

Security lighting will attract insects but with the absence of insect eating bats, the impact on insects is thought to be low.

Considering the above, it is possible to conclude that the environmental impact is likely to be **low**.

### 6.2.2 Social Impact

**No impact** from reduction of pasture area is expected. There is a small possibility that in the future irrigation water supply to the channels increases and the farmers will decide to re-establish the old network of earth channels to grow animal fodder. There are two main obstacles to such possibility. First, the global warming effect is likely to reduce availability of irrigation water. Second, the efforts required to re-establish the channels are likely to exceed the benefits from the increased yield. The impact from possible further expansion of the SPP to the adjacent land will be evaluated at the expansion design stage.

Few operation workers will not put any pressure on the local infrastructure and will not alter the local markets and prices. There will be no increase in the local traffic as the only regular supply will be water and a tank truck is expected to do only 3 hulls a month.

In terms of landscape and visual Impact, the SPP components will be seen only to rare passersby to Aktogay Farm. As their wellbeing depends on the area 4km away from the SPP and the access road to this area, they likely to view the plant positively providing no major disruption was made during the improvement of the first 1.6km of this road.

### 6.3 CLOSURE AND DECOMMISSIONING

**The area can be brought practically to the original condition** within several month of non-intensive disassembling. Practically all parts of the plan can be reused or recycled. The other parts will constitute non-hazardous waste that can be disposed locally using waste memos to avoid dumping along the way. Disturbed ground above the excavated cable trenches is likely to be covered with annual vegetation in the first vegetative season because of import of seeds from the adjacent plants and higher moisture retention potential of the disturbed land. It is expected that a full or at least half of a vegetative period will be available for the vegetation to establish before the fence is taken down and grazing reestablishes on the land. A 5x5m reinforced concrete plate are likely to remain after the step up transformer is removed. The other strip foundations will be excavated.

Air pollution will be considerably less than during construction because decommissioning would involve less equipment and the work will not have tight timescale.

### 6.4 RISK OF EMERGENCIES

Two fairly unlikely types of emergencies are reviewed: ground fire emanated from outside or inside the SPP and spring flooding as a result of leman irrigation system breakage. Natural fires do not occur in the desert environment of the SPP site due to incomplete vegetation cover, and succulent with high salt content leaves composition that is not tuned to regeneration through fire. Externally ignited ground fire will also not spread further than ignition place. The risk of such fire can be completely excluded with maintaining a 4m wide <sup>2</sup> fire protection belt around the fence. The internal shortcut induced fire will trigger several automatic protection devices and the internal firefighting procedures but they may be insufficient for prevention of fire spreading over the vegetation which cannot be cleared off from the SPP territory for fear of soil wind erosion. To fight such ground fire, provisions in the emergency response plan should be made to engage the Kyzylorda fire brigade #12 and ensure access to a high output or sufficient volume water source. The nearest water well at Junction 14 has insufficient capacity of 10m<sup>3</sup>/hour, but with several firefighting engines continuous water supply can be arranged from a lake at Sulutobe village 10km away along fast road.

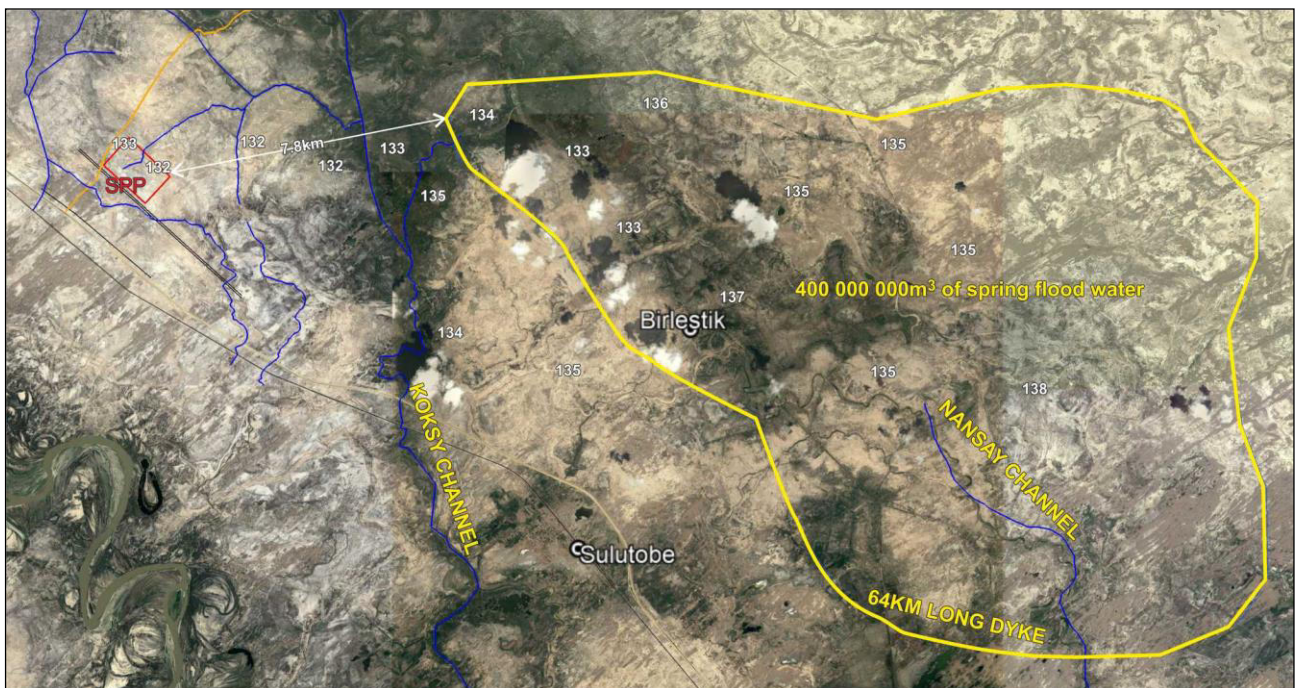
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<sup>2</sup> Fire protection rules. Government of RoK Order#1077 from 9.10.2014



With the ambient temperatures range -38°C failure of the heating equipment can be considered an emergency to which the Company may need to be prepared. However, because the likelihood of the decentralized electrical heating equipment failure and the total power cut is negligibly small, this risk is not thought to require further evaluation. While during the construction the power will be backed up by an emergency diesel generator, during the operation the supply reliability will be ensured by the grid connection and the plant own capacities. Working in the maximum recorded heat +46°C is allowed with the provision of water and PPE. Thus extreme heat is also not considered to be an emergency situation.

Flooding risk could not be properly evaluated in this assessment time and scope but although the likelihood is thought to be low, severity of consequences is judged to be medium as the station would have to be shut until the water is drained. The planned Koksuy-Nansay leman irrigation system is to hold 400mln m<sup>3</sup> of spring water brought to the area 7.8km east of the site by the two channels Koksuy and Nansay (Figure 4). The risk comes from two sources: 1) flow of water into the adjacent channels during



**Figure 4** Illustrating flooding risk from the plans to reestablish leman irrigation 7.8km east of the SPP. Altitudes (white figures) show that with an enclosure dyke disintegration, water can flow towards the site.

the area infill in spring and 2) breakage of the flooded area dyke. In both cases a temporary flooding of the SPP site to a maximum depth of 1m is considered to be the worst scenario. Accessing the channels and the dyke to repair them may be very difficult over the flooded or soggy area. The irrigation operator Kyzylorda Vodkhoz has no resources and organisational provisions to handle such breakages until the area is dry. The SPP operators would have to engage excavators to dig the channels that can drain the site. The underground cables may make this effort difficult.

Probability	2	Flooding is unlikely to but may occur during the period of the SPP operation
Consequence	4	SPP would have to be shut down until the water is drained off the site.
<b>Significance</b>	<b>8</b>	<b>Medium</b>

To reduce probability, the risk shall be discussed with Kyzylorda Vodkhoz and the irrigation system detailed design reviewed by a specialist. A topographical survey along the possible flow of water may be required. These studies may conclude that no such a risk exists. The consequence can be reduced by erecting earth dykes in the possible water flow route and arranging drainage.

## 6.5 ALTERNATIVES IMPACT COMPARISON

With the local currency devaluation, the main criteria for selection between the reviewed alternatives was the time needed to recover the cost. An alternative location was considered near Berkazan 7km closer to Kyzylorda. This plot was closer to the main road and the Syrdarya River. It had more advanced irrigation system and revamping agricultural activities around it. With the proximity of the water source, removal of this land would affect the potential to repair the irrigation channels and restart agricultural practices on it.

The selection of current site was also determined by the proximity to the existing grid of the Kazakhstan Electrical Grid Operation Company (KEGOC). Other alternatives as scale, layout, materials used and operation conditions were viewed in comparison with the already tested options at the operating SPP Burnoye. With the given financial constraints and similarities between the projects, it was decided to rule out other alternatives to minimise financial and logistical risks. The selected in SPP Burnoye options are also thought to be most desirable in environmental and social terms. An option for minor improvement will be considered during detailed design: connection to the grid without installation of intermediate posts between the KEGOC power line and the substation.

The do-nothing option would leave South Kazakhstan energy deficit unsolved, hinder the regional development with appearance of new jobs and retain low power supply reliability to the locals.

## 6.6 PROJECT BENEFITS

No direct benefits to the local environment and ecology is expected. However, a notable benefit is expected in reduction of greenhouse gases and pollutants associated with the production of equal amount of energy using hydrocarbon fuel. Kazakhstan will also be closer to fulfilling its target to increase the share of renewables in the country energy balance (3% by 2020) and to implement undertakings adopted at Paris COP21. In longer perspective, cumulative efforts in greenhouse gases emission reduction may halt undesirable climatic changes and events that can damage the country economy and livelihood of the entire population and specifically the farmers around the SPP that depend on the Syrdarya River water availability and flow dynamics.

Another long term benefit is expected to be from making an example of renewable energy source profitability that may encourage other developers to invest in similar projects elsewhere.

Short term benefit to the local community will be from creation of up to 150 work places for a year. During the operation employment is expected to be available for two local guards and a cleaner. All can be taken from the poor family of a warden at Junction 14 by this generating beneficial impact at the nearest to the SPP community. The experience however showed that the guards need to be employed from elsewhere to avoid deviance based on familial connections. So, the long term employment may be redirected to Kyzylorda residents.

In the long term the social benefits appear from two directions. More local jobs will be created because higher energy availability will allow further economic development in the region. Very minor long term benefit may be from encouragement of the school graduates to obtain appropriate education to qualify for an electrician position at the plant.

### 6.6.1 Reduction of Kazakhstan Contribution to Climate Change and Air Pollution

The plant will generate 70 900 MWh/year of net energy output during the designed 18 years of the operation.

For EBRD renewable energy projects, electricity added to the grid from the solar plants is assumed to displace grid generation, rather than represent new generation. The national GHG emission factor for

grid electricity generation should be employed to determine GHG offsets resulting from project implementation<sup>3</sup>. Kazakhstan energy emission factor ( $EF_{grid}$ ) for the projects supplying additional electricity to the grid is  $1.355 t_{CO_2}/MWh$ . The total reduction for the expected operation period of the plant will be:

$$1.355 t_{CO_2}/MWh * 70\,900 MWh/y * 18 years = 1\,729\,251 \text{ tons } CO_2$$

During the operation the annual reduction in pollutants emission for each MW produced is expected to be  $SO_2=60t$  and  $NO_x=40t$ . Therefore, the total reduction of  $SO_2$  and  $NO_x$  emission for the expected operation period of 18 years will be 1080t and 720t respectively as per below calculation:

$$SO_{2\,total} = 60t/y * 18 years = 1080 \text{ tons}, \quad NO_{x\,total} = 40t/y * 18 years = 720 \text{ tons}$$

## 6.7 KEY UNCERTAINTIES AND DATA GAPS

The risk of the SPP site flooding as a result of the Koksnu-Nansay Leman Irrigation System dyke or feeding channels breakage should be further evaluated through interviewing Kyzylorda Vodkhoz specialists, assessment of the system design and conducting topographical survey along the possible flow of water. The system feeding channels head gates management and integrity should also be assessed.

## 6.8 RESIDUAL IMPACT

No residual impact is expected providing the measures prescribed in the ESAP are implemented.

## 7 EHS AND STAKEHOLDER MANAGEMENT AND MONITORING FRAMEWORK

The EHS and social performance of the project contractors and subcontractors will clearly be fundamental in the successful management of this project. The monitoring and control program shall be developed as an integral part of the EHS and Stakeholder Management System (EHSSMS). A framework for this program is proposed in Table 6. The program should aim to validate the predicted EHSS impacts and to be subject to review. At the construction stage the Company site manager shall regularly record and report deviations from the prescribed by the contractor agreement EHSS requirements and required corrective actions and control timely implementation of these actions. The monitoring of the adherence of the plant operation to the legislative and the EBRD performance requirements shall be carried out throughout the life of the project.

**Table 6 Environmental control and monitoring framework with the key performance indicators (KPIs).**

Media / Issue	What to Monitor/Control?	Reporting Frequency / Responsible	Key Performance Indicators
<b>Construction</b>			
Soil, ground, vegetation	Driving on site and off site is conducted along designated passages Visual hydrocarbon contamination at the machinery parking area Overspills and leaks at oil and waste oil storage	Cover in weekly work activity reports	No oil stains larger than few drops, vegetation stripped on <300m <sup>2</sup>
Access road use	Adherence to the traffic management plan		Traffic management plan violation notes: <10 in the first month, <2 in following months.
Stakeholders and workers	Adherence to the SEP for stakeholders and grievance mechanism for the project personnel	Monthly CLO	Information boards are intact and displayed information is up-to-date and as per SEP requirements. Grievance database is maintained and replies are within the set maximum response period

<sup>3</sup> EBRD Methodology for Assessment of Greenhouse Gas Emissions Guidance for consultants working on EBRD-financed projects

Media / Issue	What to Monitor/Control?	Reporting Frequency / Responsible	Key Performance Indicators
<b>Operation</b>			
Soil and Vegetation	Vegetation rehabilitation inside the plant fence	Monthly Site Manager	Vegetation shows signs of natural recovery. Most perennial vegetation recovered in the second season, no signs of wind erosion
ESAP	Adherence to the ESAP	End of year / Company	Full compliance with ESAP scope and schedule

## 8 CORPORATE SOCIAL RESPONSIBILITY PROGRAM

Considering that the local community will not directly gain from the project in a long term, a Corporate Responsibility Program (CSR) should be developed and agreed with the representatives of these stakeholders. It is suggested to set a budget for the Program implementation during construction and an annual contribution during the operation. A long term sustainable improvements should be favoured over serving acute needs that may be provided by other financing sources.

The program is to enable the local residents to 'buy into the project' i.e. to ensure that some benefit from it can be obtained irrespective whether there is an impact on them or not. The Company shall discuss the CSR and the needs with the Sulutobe Rural Area Public Governance Council and provide them with information on the budget. The Company should use and disclose to the others involved the following criteria for a need qualifying for the CSR funding:

1. Fit the allocated for CSR budget
2. No overlap with the State programs
3. Investment is sustainable or lead to creation of jobs

For instance, construction of a playground or mini stadium at Sulutobe school to address the lack of sport facilities or provision of grants for Sulutobe children that graduate from local school to finance obtainment of an appropriate for the need of the plant education can be reviewed as options.

## APPENDIX 1 DETAILS OF PERSONS CONSULTED

The following stakeholders were interviewed:

- |  |                       |
|--|-----------------------|
| • Sulutobe rural area councillor               | Kazhdenbek Mamatov    |
| • Kyzylorda district land relations department | Kulyaihan             |
| • Baikonur Solar LLP director                  | Nurlan Kapenov        |
| • Baikonur SPP site manager                    | Pavel Komarevtsev     |
| • Sulutobe veterinarian                        | Zholdasbai Yemberinov |
| • Kyzylorda transport inspection               |                       |
| • Shieli department of land cadastre           |                       |

Local residents from Junction 14 and closest farms were asked individually, as it was not possible to form the focus groups.

As a minimum the following questions were covered with the interviewees:

- history of their presence in the area and knowledge of the area history
- current activities, sources of income, unemployed members, plans for further economic development, opportunities and obstacles;
- What ongoing problems they had, improvements/deterioration in the past 5 years, weather there have been any interruptions to electricity
- whether they knew of the project and if so, what did they know, what impact and benefits for themselves did they see from the project
- Whether the presented stakeholder engagement mechanism would be able to take their opinion into account, the most appropriate place to post information about the project
- How do they feel about the project and whether they approve of it in general.

Out of the interviewed, only one family at the Junction 14 was truly local. The house owner Muratbay and his two sons were born there. Muratbay guards a cellular phone network retranslation mast while his sons help him collect reed for two cows and two calves. To reduce cost they do it by hand from July well into October and gather 500 bundles to pass the winter. The man then pays over half of his \$103 monthly salary for a truck to take the reeds to his house. The family would increase the livestock to sell meat at Kyzylorda market but has no savings and cannot arrange a loan. The entire salary is spent on food, utilities and basic clothes. The sons have no education to obtain employment at the railway or in Kyzylorda and can only work as guards. There has been no improvements at the Junction apart from appearance of the earning from installation of the mast. Muratbay new nothing about the project but welcomed it as hoped that his sons and the son wife may be able to find employment there as guards and a cleaner. In respect to the engagement in the project, they were indifferent of the means and only cared about finding out about the vacancies. They do not go to the rural are council and asked to be contacted directly.

Other 9 residents of the Junction 14 are pensioners that came there at different times mainly for the presence of fresh water source for the livestock and proximity of the Syrdarya River flood plain pastures and the city. E.g. Sapat Tazhibekov bought a house there in 2005 when he retired. He and his wife keep small number of livestock. They visit their children in Kyzylorda frequently using busses that come every hour and cost \$0.9 one way. It takes 40min to reach the city but the timing is not stable and a bus pavilion at the road in the city direction to shelter them while waiting for a bus would be very desirable. He had not heard about the project, was happy for its appearance and did not want to receive information on it. The same opinion was expressed by three other households of the Junction that had been interviewed.

The owner of the nearest to the SPP farm Zhomart has just just obtained the land and built two large greenhouses next to the old road body material borrow pit. Zhomart took a loan from the Sybaga Crediting Program to buy 150 cows and 200 sheep. To obtain this low interest loan Zhomart had to agree to build a cattle barn. He lives in Kyzylorda and employs local herders to manage the livestock. He was also indifferent about the project as his pasture land was further northeast towards the seasonally flooded Aktogan area. He did not care about the information on the project but said that an internet source would be the best place to obtain it.

The other three interviewed farms were considered to be too far from the unattractive SPP site to care. They established in the area at different times to heard livestock. One has already obtained a loan from the Sybaga Crediting Program, others were thinking to use it too to expand the livestock numbers. One of three farms used the dirt road which first kilometer will be used by the SPP. He uses the road rarely and was not worried about the roadworks when was explained that the passage would be ensured throughout the construction. All did not know about the project but were indifferent about it. One said that an internet source would be sufficient to receive the information and give feedback. The others was happy with the information board at the regional council. All thought that the existing mechanism of complaining to the regional and the rural area councils is sufficient to account for their interest.

## APPENDIX 2 REVIEWED DOCUMENTS

1. Project resume #1414-09-t.1;
2. Marketing research;
3. Technical solutions and connection schemes;
4. Local PreEIA;
5. Project economics and finances;
6. Report on engineering surveys;
7. Cost estimate documentation;
8. Price list, comparative analysis of equipment suppliers.

## APPENDIX 3 IMPACT ASSESSMENT METHODOLOGY

### 1. DEFINING ENVIRONMENTAL ASPECTS

The International Standard Organization’s standard for Environmental Management Systems (EMS), ISO 14001 defines an environmental aspect as: **“An element of an organization’s activities, products or services that can interact with the environment.”** An environmental or socio-economic impact may result from any of the identified project aspects; that is, activity-receptor interaction.

### 2. DETERMINING IMPACT SIGNIFICANCE

Once all project environmental aspects were identified, the level of impact that may result from each of the activity-receptor interactions is assessed. In assessing the level of impact that an activity may cause, two key elements are considered:

- **Sensitivity or value** of an impacted receptor;
- **Magnitude** (positive or negative) of an activity’s interaction with the legal, natural and/or socio-economic environments.

The significance of the impact is expressed as the product of the sensitivity and magnitude.

Environmental aspect significance rankings

Critical	5	10	15	20	25	5
High	4	8	12	16	20	4
Medium	3	6	9	12	15	3
Low	2	4	6	8	10	2
Negligible	1	2	3	4	5	1
		1	2	3	4	5

Sensitivity / Value →

Magnitude →

Those impacts that fall into the critical and high significance require further examination and analysis in terms of identifying alternatives and activities for which additional to described in Section **Error! Reference source not found**. impact mitigation measures will be required

**Receptor Sensitivity/Value**

Category	Ranking
Very high	5
High	4
Medium	3
Low	2
Very Low	1

An environmental receptor might be impacted by more than one project activity. Where this has been found to be the case, the higher impact significance ranking is taken as the significance ranking for the subject receptor.

**3. DETERMINING ENVIRONMENTAL IMPACT MAGNITUDE**

Scientific evidence as well as predictions based on observation of previous similar activities has been used in the impact assessment process. Where it has not been possible to fully quantify the effect that an activity may have on the environment or a component of the environment, or where there is a lack of scientific knowledge, qualitative judgment has been used. Such judgments have been based on the project conceptual idea, the impact assessment team experience and knowledge of the environment of the area in which the project will be implemented.

Residual impacts that remain after mitigation measures, including those incorporated into the project conceptual idea have been applied are stated at the end of the assessment.

To assign a level of magnitude to each environmental and socio-economic impact, criteria were defined in the following tables. If for a particular aspect the impact corresponds to the descriptions from more than one ranking, then the highest negative or lowest positive ranking is taken. To limit disadvantages of the accepted method of the magnitude assessment, it was viewed as a helping tool for a professional to make the final decision. Where evaluation criteria external to the below presented was used for decision making, an explanation is given below the impact significance evaluation table.

Air quality \* MPC= maximum permitted concentration in air

Ranking	Peak concentration (20-30min)	Daily average concentration
1 Negligible	Below detection limit	< 1 MPC*
2 Low	<0.75 MPC	1-1.5 MPC
3 Medium	0.75-1 MPC	1.5-2 MPC
4 High	1-1.5 MPC	2-4 MPC
5 Very high	> 1.5 MPC	>4 MPC

Dust

1 Negligible	2 Low	3 Medium	4 High	5 Very high
No measurable or notable increase	Measurable and notable increase in dust levels	Nuisance to people but no adverse health effects or on crops/property	Significant nuisance to people or with sensitive individuals affected, or minor property or crop damage	Very significant nuisance to people with measurable health effects, or significant damage to property or crops

Note 1: Nuisance takes account of duration by the inherent assumption that in order to cause a nuisance the impact must last for a reasonable duration (e.g. greater than one week or repeated impacts).

Note 2: The above criteria are qualitative in nature, but require professional judgment in order to assign the appropriate ranking

Traffic

Traffic impact relates to receptors reaction to changes in traffic flow and the site access roads condition as well as duration of these changes. The following rankings assigned to the percentage increase in traffic flow:

- Not measurable – very low
- <5% increase – low
- 6-10% increase – medium
- 11-20% increase – high
- >20% increase – very high

Should any of the above noted increased traffic flows be predicted to occur for more than two weeks, the next magnitude/severity level up is used.

Noise

	1 Negligible	2 Low	3 Medium	4 High	5 Very high
Construction	At sensitive receptors ambient noise level raised by <3dBA (not perceptible by most people) but be <L <sub>Aeq5min</sub> 70/75dB(A) at day and <L <sub>Leq(1-hour)</sub> 45dB(A) at night *	At sensitive receptors ambient noise level is expected to raise by 3-5dB(A) but be <L <sub>Aeq5min</sub> 70/75dB(A) at day and <L <sub>Leq(1-hour)</sub> 45dB(A) at night	At sensitive receptors ambient noise level is expected to raise by 6-10dB(A) but be <L <sub>Aeq5min</sub> 70/75dB(A) at day and <L <sub>Leq(1-hour)</sub> 45dB(A) at night	At sensitive receptors ambient noise level is expected to raise by >10dB(A) but be <L <sub>Aeq5min</sub> 70/75dB(A) at day and <L <sub>Leq(1-hour)</sub> 45dB(A) at night	As for Level 4 and either tonal or impulsive noise present.
Operation	L <sub>Leq(1-hour)</sub> <45 dB(A) at night and L <sub>Leq(1-hour)</sub> <55 dB(A)** during the day	L <sub>Leq(1-hour)</sub> <45 dB(A) at night and L <sub>Leq(1-hour)</sub> <55 dB(A) during the day but ambient noise level raised by <3dBA	L <sub>Leq(1-hour)</sub> <45 dB(A) at night and L <sub>Leq(1-hour)</sub> <55 dB(A) during the day but ambient noise levels at sensitive receptors raised by 3- 6dB (A)	> L <sub>Leq(1-hour)</sub> 45dB(A) at night or L <sub>Leq(1-hour)</sub> 55dB(A) during the day As guidance any operational noise of duration greater than 1 hour and exceeding the above standards and that is more frequent than once per week	> L <sub>Leq(1-hour)</sub> 45 dB(A) at night or L <sub>Leq(1-hour)</sub> <55 dB(A) during the day and tonal or impulsive noise present As guidance any operational noise of duration greater than 1 hour and exceeding the above standards and that is more frequent than once per week

\* WHO "Guidelines for Community Noise" (1999); \*\* World Bank Group "Pollution Prevention Abatement Handbook - General Environmental Guidelines". For a residential area, the World Bank recommend that daytime limits do not exceed L<sub>Aeq</sub> 55dB daytime, and L<sub>Aeq</sub> 45dB night-time, or a maximum 3dBA increase than the existing noise level should the existing ambient noise level already exceed 45dBA

Soil/ground properties and contamination

The severity/magnitude of impacts on soils has been evaluated by taking account of the following:

- The magnitude of the impact, as determined by its intensity;
- Extent in space and time;
- The vulnerability of the soils to the change caused by the impact; and
- The ability of the soils to recover from the impact.

Ranking	Erosion	Reduced productivity	Waterlogging	Sediment transport to water courses
1 Negligible	Soil erosion generally not discernable	generally not discernable	generally not discernable	generally not discernable
2 Low	Soil erosion predicted to occur at approximately the same rate as soil formation	Discernible, last <3 months	Water predicted to remain in surface depressions < 3 months after construction	Visible sediment predicted in watercourses for < 3 weeks after construction and no obscuration of the bed
3 Medium	Soil erosion predicted to be visibly active but no rill and gully formation evident	Limited, lasting 3-12 months	Water predicted to remain in surface depressions 3-12 months after construction	Visible sediment predicted in watercourses for > 3 weeks after construction but no obscuration of bed
4 High	Rill and gully formation predicted to be evident	Moderate, last 1-5 years	Water predicted to remain in surface depressions for 1-5 years after construction	Visible sediment predicted in watercourses for > 3 weeks after construction and obscuration of the bed



5 Very high	Rill and gully formation predicted to be extensive	Extensive, last >5 years	Water predicted to remain in surface depressions permanently	Permanent features in water-courses
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\* MPC= maximum permitted concentration in soil. When absent, Dutch Intervention Standards are used.

Water

Ranking	Surface water	Groundwater	Effect on Users
1 Negligible	No discernible change in surface water baseline conditions and no discernible change in downstream river discharge.	No discernible change in groundwater baseline conditions and no discernible change in groundwater resource quantity.	No effect
2 Low	Change of <25% in any parameter from the MPC; or visible sediment observed for less than 3 weeks; or <15% decrease of downstream river discharge for no more than 1 day.	Change of <25% in any parameter from MPC or depletion of resource that does not recover within 6 months post construction (within 10% of original elevation).	Temporary effect
3 Medium	Change of 25-50% in any parameter from the MPC; or visible sediment observed for more than 3 weeks; or 15-40% decrease of downstream river discharge for 1-2 days.	Change of 25-50% in any Parameter from the MPC or depletion of resource that does not recover within 6-12 months post construction within 10% of original elevation).	Short term but reversible effect
4 High	Change of 50-100% in any parameter from the MPC; or visible sediment observed for more than 3 weeks; or >40% decrease of downstream river discharge for 2-3 days.	Change of 50- 100% in any parameter from the MPC or depletion of resource that does not recover within 1-2 years post construction (within 10% of original elevation).	Long term but reversible effect
5 Very high	Change of > 100% in any parameter from the MPC; or visible sediment observed for more than 3 weeks; or >40% decrease of downstream river discharge for >3 days.	Change of > 100% in any parameter from the MPC or depletion of resource that does not recover after 2 years post construction (within 10% of original elevation).	Permanent and irreversible effect

MPC= maximum permitted concentration in fish containing water bodies. If no fish present, MPC for potable water can be used. When both MPCs do not exist for a pollutant, Dutch Intervention Standards are used.

Natural and Amenity Vegetation and Animals

Ranking	Vegetation	Animals
1 negligible	No discernible change	
2 low	Vegetative cover thinning allows natural revegetation	Short term disruption of habitats and migratory routes
3 medium	Long term reduction in vegetative cover, revegetation by planting and seeding is possible	Long term disruption of habitats and migratory routes
4 high	Loss of vegetation leads to changes in habitat that prevent natural vegetation regeneration (erosion, acidification, salinity increase etc.)	Permanent loss of habitat and key migratory routes that leads to species disappearance from the disturbed area
5 Very high	Permanent loss of endemic or protected species refugia	Permanent destruction of habitats and segmentation of migratory corridors for endemic and protected species

Socio-economic Impact

The evaluation of socio-economic impacts involves the assessment of both quantitative and qualitative data and the use of professional judgment. Quantitative data collected through national sources or local level interviews is assessed and analyzed by traditional economic or sociological techniques. However, qualitative data collected using the same methodology is more open to interpretation. In addition, what is a major impact to one person, one household or one community may be a minor impact to another according to specific personal circumstances. Hence, the results do not lend themselves easily to being ranked or assessed in exactly the same way as environmental data. As a result, the application of assessment language in the evaluation of results tends to be more qualitative in relation to the socio-economic impacts than in the equivalent environmental sections. In assessing the impact magnitude, the following factors are taken into consideration:

- Impact probability;
- Changes to the assets that households depend upon for their livelihoods;

- The duration of this change: short-term disturbance (e.g. during construction only), long term (e.g. during operation period) or permanent;
- The manageability of the change and potential for it to lead to further changes beyond the control of the project;
- The ability of the affected people to adapt to changes and thus maintain livelihoods over the long-term

To determine the required level of socio-economic impact assessment the variations between households’ reaction to the same impact was studied first. Because the impacts did not vary significantly between households, community level impact assessment was considered as sufficient.

Ranking	Definition
5 Catastrophic	<ul style="list-style-type: none"> <li>• Emergency situation with harmful consequences to human health (e.g. fatalities)</li> <li>• Disastrous consequences on the livelihoods of individuals (e.g. curtailment of access to primary income source).</li> <li>• Calamitous consequences on those seeking to access community facilities and utilities (e.g. resettlement of large numbers (1,000s) of households).</li> <li>• Disastrous consequences on the economy (e.g. all employment and supplier sourcing out of Kazakhstan).</li> <li>• Breach of company social policy and/or legislation.</li> </ul>
4 Major	<ul style="list-style-type: none"> <li>• Negative impact on human health and safety which cannot be contained or results in serious injury or increased mortality</li> <li>• Potential or perceived impact on ability of household to maintain livelihood/store of assets to an extent not acceptable to affected people (i.e. access to income source restricted over lengthy periods of time).</li> <li>• Permanent or perceived permanent reduction in quality of life</li> <li>• Permanent cultural change to which the communities are unable to adapt</li> <li>• Widespread perception of missed opportunity to improve quality of life, resulting in frustration and disappointment</li> <li>• Result in tensions with communities which lead to sabotage to construction or operation by local communities, or outbreaks of violence between workers and communities</li> <li>• Serious impact on access to community facilities and utilities (e.g. resettlement of large numbers (10s – 100s) of households).</li> <li>• Notable consequence on the economy, at a local, regional and/or national level (e.g. virtually no local sourcing of supplies or personnel)</li> <li>- Breach of company social policy and/or legislation</li> </ul>
3 Moderate	<ul style="list-style-type: none"> <li>• Potential or perceived impact on ability of household to maintain livelihood/store of assets in short term</li> <li>• Potential reduction in quality of life in short term</li> <li>• Potential disruption to lifestyle in short term</li> <li>• Perception of missed opportunity to improve quality of life</li> <li>• Possible or perceived short term (less than a week) decrease in access to infrastructure and utilities to which community is unable to adapt</li> <li>• Containable modest impact on human health and well-being with no increased mortality but which may result in high levels of complaint in the short term (e.g. noise, light, odor, dust, injuries to individuals).</li> <li>• Moderate impact on individual livelihoods (e.g. restricted access to income source).</li> <li>• Moderate impact on the wider economy, at a local, regional and/or national scale (e.g. only moderate levels of employment and supplies sourced within Kazakhstan).</li> <li>• Potential breach of company social policy and/or legislation.</li> </ul>
2 Minor	<ul style="list-style-type: none"> <li>• Possible short term decrease in quality of life (e.g. isolated incidents related to ethnic tensions, short (days) restriction on access to infrastructure and utilities or income source like pastures or fishing areas, short (hours) water or electricity supply disruption)</li> <li>• Limited and occasional impact on human health and well-being (e.g. occasional dust, odors, traffic noise).</li> <li>• Long lasting impacts to which the community is able to adapt (e.g. increased access to information/possible slow cultural change or changes in economic structure)</li> <li>• No discernable long term effect of the local economy</li> <li>• Sparse impact on the wider economy, at a local, regional and national level (e.g. limited procurement).</li> </ul>
1 Negligi-	<ul style="list-style-type: none"> <li>• Very limited impact on the wider economy at a local, regional and/or national scale (e.g. no dis-</li> </ul>

Ranking	Definition
ble	cernable indirect and induced development).
0 None	<ul style="list-style-type: none"> <li>No impact on human health.</li> <li>No impact on livelihoods.</li> <li>No impact on community facilities/utilities.</li> <li>No impact on the wider economy.</li> </ul>
+ Marginal Positive	<ul style="list-style-type: none"> <li>Marginal enhancement in health and safety of local population</li> <li>Limited improvement of individual livelihood or assets (e.g. additional employment opportunities leading to higher income)</li> <li>Limited improvements to community infrastructure or utilities</li> <li>Marginal enhancement in social capital (e.g. local skills)</li> <li>Marginal impact on the wider economy (e.g. limited local procurement)</li> <li>Isolated evidence of plausible view of some stakeholders on the Base operator</li> </ul>
++ Moderate Positive	<ul style="list-style-type: none"> <li>Moderate enhancement in health and safety of local population</li> <li>Moderate improvement of individual livelihood or assets</li> <li>Moderate improvements to community infrastructure or utilities</li> <li>Moderate enhancement in social capital (e.g. local skills)</li> <li>Moderate impact on the wider economy (e.g. intermittent local procurement)</li> <li>Enhancement of relationship between the Base operator and communities</li> </ul>
+++ Significant Positive	<ul style="list-style-type: none"> <li>Notable by local population enhancement in its health and safety</li> <li>Significant improvement of individual livelihood or assets (e.g. more than one person in a household employed by the Base Operator or its subcontractor)</li> <li>Significant and long term improvements to community infrastructure or utilities</li> <li>Sustainable enhancement in social capital</li> <li>Moderate impact on the wider economy (e.g. intermittent local procurement)</li> <li>Sustainable good relationship between the Base operator and communities</li> <li>Notable impact on the wider economy (e.g. extensive use of local supplies)</li> </ul>

#### 4. DETERMINING RISKS OF ACCIDENTAL EVENTS

Risk = Probability x Consequence

- probability:** the probability that an activity will occur.
- consequence:** the resultant effect (positive or negative) of an activity's interaction with the legal, natural and/or socio-economic environments; and

Five probability criteria were defined:

Category	Ranking	Definition
Certain	5	The impact will occur under normal operating conditions.
Very Likely	4	The impact is very likely to occur under normal operational conditions.
Likely	3	The impact is likely to occur at some time under normal operating conditions.
Unlikely	2	The activity is unlikely to but may occur at some time under normal operating conditions.
Very Unlikely	1	The activity is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances.

Consequence is defined using the criteria for an impact magnitude described above.

**BAIKONUR SOLAR POWER PLANT  
Environment and Social Management Plan**

**23 April 2018**

## **I. Environmental Management**

The anticipated environmental and social impacts of the Project will be avoided, minimized or mitigated by implementing generally recognized good practices as well as preventive and control measures as detailed in the environmental and social management plan (ESMP) below. The ESMP includes mitigation and monitoring measures applicable during the construction, operation and decommissioning phases of the project.

In parallel, it is noted that an Environmental and Social Action Plan (ESAP) has been developed to highlight the most urgent steps for implementation of the mitigation measures given in the ESMP, according to the relevant Lender Requirements as well as other international guidelines and standards.

## **II. Institutional and Organizational Arrangements**

Baikonur Solar LLP is a new company created specifically for this project. It is 100% owned by Samruk Kazyna-United Green LLP (SKUG) with EHS performance managed primarily through SKUG's EHS management system.

The site manager will be responsible for the day-to-day implementation of the project and the appointed site EHS manager will be responsible for the development and implementation of site specific environmental, social, and health and safety management plans. Baikonur Solar LLP is responsible for undertaking the project in accordance with the initial environmental examination (IEE), the ESAP, and implementing the ESMP in line with local and national regulations, ADB's Safeguards Policy Statement (2009), ADB's Social Protection Strategy (2001), and EBRD's Environmental and Social Policy Performance Requirements.

Contractor performance will be managed through SKUG's Regulations for Contractors in the Field of EHS. This regulation includes a contractor screening process, the requirement to include EHS principles in contractor contracts, and the regular monitoring of EHS requirement compliance during project implementation. Day-to-day performance of contractors will be managed by the site manager.

## **III. Capacity Development and Training Measures**

As part of the site induction and training program, site workers will be made aware of and trained in the implementation of the site environmental, social, health and safety management plans, and labor standards and rights. Training will be target all staff levels, ranging from the management and supervisory personnel to skilled and unskilled personnel (including contractors). The scope of the training will include general environmental awareness, and the requirements of the IEE, ESAP, ESMP, SEP, and health and safety plan. The training will be conducted by the appointed site EHS manager, and other relevant specialist staff as required. In addition, power plant staff will be trained in first aid delivery.

To ensure that the project is implemented in accordance with the EHS and social requirements, the following will be undertaken:

- The EHS manager will be trained in ISO 14001 and OHSAS 18001 standards to enable the development and implementation of an adequate Environmental, Health and Safety and Stakeholder Management System and the required associated plans for the project.

- A community liaison officer will be employed to implement the Stakeholder Engagement Plan (SEP) and grievance redress mechanism effectively.

#### **IV. Review and Amendments**

The project ESMP is a social and environment management tool which shall be reviewed periodically (at least once in 2 years or earlier) to address changes in the project design, life cycle processes and activities, organization and regulatory requirements.

#### **V. Environment and Social Management Plan**

The Environment and Social Management Plan is presented in the sections below. The identified mitigation measures will be adopted by Baikonur Solar LLP and imposed as conditions of contract of the subcontractors employed for respective phases of the project. The mitigation measures suggested during operation will be made part of the regular maintenance and monitoring schedule.

The ESMP includes the following:

- Mitigations suggested for adverse environmental and social impacts and associated risks;
- Management tools and techniques for the implementation of environmental impacts and risk mitigation measure;
- Monitoring and reporting of requirements and mechanisms for the effective implementation of the suggested mitigation measures; and
- Reporting requirements.

**Table 1: Baikonur Solar Plant Environment and Social Management Plan**

Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
<b>Construction Phase</b>				
Waste generation and disposal	Develop a Waste Management Plan (WMP) to include broken and decommissioned solar panels utilization. The WMP should be consistent with the reuse-reduce-recycle-recover-safe disposal management hierarchy.	Development of an adequate WMP prior to commencement of construction.	EHS manager	Included in construction costs
	Request the contractor to provide waste memos to ensure appropriate disposal location and methods, and to include this requirement in the agreement with subcon-tractors.	Inspection and collation of waste disposal documentation throughout the project cycle.	EHS manager	Included in construction costs
Ground contamination	Request fuel tank drivers to use trays under refueling couplings.	Routine monitoring during construction.	Construction supervisor	Included in construction costs
	In case of any spillage: Localization of the spilled material and immediate cleaning of the contaminated area.	Routine monitoring during construction.	Site manager and construction supervisor	Included in construction costs
	Do not store hazardous materials (e.g. fuel, engine oil, paint, chemicals, lubricants, etc.) on site. If this cannot be avoided store these materials within sealed, bunded and roofed areas. Installation of secondary containment for storing liquid materials is recommended.	Routine monitoring during construction.	Site manager and construction supervisor	Included in construction costs
Biodiversity impacts	Prohibit staff and contractors from hunting, poaching and harassing wildlife.	Inclusion in the site induction training or site code of behavior.	Site manager	Included in construction costs

Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
Soil quality and erosion impacts	<p>Preserve frail soil by driving along designated surfaced with chip rock passages and making vehicle parking area as small as practically possible.</p> <p>Cut rather than uproot shrubs and leave as much of the stem as practicable.</p>	<p>Daily monitoring during construction.</p> <p>After construction, monitor vegetation reinstatement at damaged areas and soil for signs of wind erosion. If noted, apply effective erosion abatement measures.</p> <p>Compliance to be included as part of the annual E&amp;S monitoring review and report.</p>	Site manager	Included in construction costs
Worker and community health and safety impacts	<p>Prepare site specific health and safety and emergency response plans for construction and operation and disclose it to relevant stakeholders.</p> <p>Manage risk of site flooding from possible excessive water release into the Koksu channel.</p>	<p>Ensure that the developed plan includes all possible events and stakeholders are informed prior to the commencement of construction.</p>	Site manager and EHS manager	Included in construction and operational costs
	<p>Develop and enforce a traffic management plan for personnel and related project transport. Include the prohibition to use the access road before it is improved and the left turn from M32 to the access road in low visibility, instructing to use the next u-turn if vehicle length allows.</p>	<p>The plan is developed and implemented prior to the commencement of project material transportation.</p>	EHS manager	Included in construction costs
	<p>Dust generating activities should be avoided in high wind conditions. If unavoidable, implement dust suppression measures (e.g. spraying) as necessary.</p>	<p>Daily monitoring during construction.</p>	Site manager and construction supervisor	Included in construction costs
Worker health and safety impacts	<p>Develop and implement a site-specific Health, Safety and Environment Management Plan (HSEMP) for the construction phase.</p>	<p>Adequate plan developed.</p> <p>Daily monitoring during construction.</p> <p>Compliance to be included as part of the annual E&amp;S monitoring review and report.</p>	EHS manager and construction supervisor	Included in construction costs



Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
	As per national legislation for workers noise levels shall be kept below 85 dB (A). Provide hearing protection devices to all workers, when necessary.	Daily monitoring during construction. Compliance to be included as part of the annual E&S monitoring review and report.	EHS manager and construction supervisor	Included in construction costs
	Provide workers with appropriate protective equipment (PPE) according to SKUG's EHS requirements	Daily monitoring during construction. Compliance to be included as part of the annual E&S monitoring review and report.	EHS manager and construction supervisor	Included in construction costs
Working conditions	<p>Include EBRD and ADB EHS and social protection requirements into tender documentation and contracts.</p> <p>Select contractors that demonstrate adequate EHS and labor management capability.</p> <p>Ask contractors to obtain all required EHS permits and develop an EHS plan agreeable to the Company before starting any activities.</p> <p>Include in Contractor's contract a provision on compliance with national and local labor laws and measures to comply with the core labor standards.</p>	<p>Adequate plan developed. Tender documents include EHS requirements. Criteria for assessing contractors EHS and labor management capabilities established.</p> <p>Contractor EHS plan approved by the Company.</p> <p>Annual E&amp;S monitoring review and report to include number of workers employed disaggregated by sex and position, number of workers from surrounding local communities, compliance to national and local labor laws and to core labor standards, and grievances raised by workers.</p>	Company Contractor (preparation of EHS plan)	Included in construction costs
	Include environmental mitigation measures and EHS principles in the Contractors' work in accordance with international standards and EBRD / ADB requirements.	Proof provided of EPC Contractor capability.	Design Consultant, External and internal resources, con-tractors.	Included in construction costs

Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
	Emphasize prohibition of illegal, forced and child labor use by the contractor and subcontractors. Audit the contractor's adherence to the EHS aspects of the contract, ensure timely correction of deviations.	Audit reports to demonstrate compliance prior to and during construction.		
	Ensure that contractor has a worker representative and a human resource policy which is disclosed to workers. Develop a grievance mechanism with ability to complain anonymously, records of satisfaction in the given answer and explanation to unsatisfied worker where to take their grievance further. Produce annual report on implementation of grievance mechanism, types of grievances and resolutions.	Workers aware of this mechanism. Anonymous complaints have been registered and addressed. Annual report on grievance mechanism available.	Contractor as required by EHS manager	Included in construction costs
Land acquisition, involuntary resettlement, economic displacement	Conduct remaining land leasing/allocation procedure according to Land Code and local regulations. Obtain land lease agreement and land certificate before commencement of land clearance and construction.	No complaints or non-compliances. Included in the annual reports to the funding banks.	Company	Included in construction costs
	If the access road is not designed to coincide with the existing road, impact on current road and land users shall be assessed prior to and during construction, including consultations with road and land users.	No complaints or non-compliances.	Company, External consultant	Included in construction costs
<b>Operational Phase</b>				
Waste generation and disposal	Implement the WMP including the reuse and recycling of plant components. Comply with the reuse-reduce-recycle-recover-safe disposal management hierarchy.	Routine monitoring. Compliance to be included as part of the E&S monitoring review and report.	EHS manager	Included in operational costs
	Request and retain waste memos to ensure appropriate disposal location and methods, and to include this requirement in the agreement with sub-contractors.	Inspection and collation of waste disposal documentation throughout the project cycle.	EHS manager	Included in operational costs

Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
Ground contamination	Do not store hazardous materials (e.g. fuel, engine oil, paint, chemicals, lubricants, etc.) on site. If this cannot be avoided store these materials within sealed, bunded and roofed areas. Installation of secondary containment for storing liquid materials is recommended.	Routine monitoring during operations. Compliance to be included as part of the E&S monitoring review and report.	EHS manager	Included in operational costs
Soil quality and erosion impacts	Preserve frail soil by driving along designated surfaced with chip rock passages and making vehicle parking area as small as practically possible. Cut rather than uproot shrubs and leave as much of the stem as practicable.	Routine monitoring of vegetation reinstatement at damaged areas and soil for signs of wind erosion. If noted, apply effective erosion abatement measures. Compliance to be included as part of the annual E&S monitoring review and report.	Site manager	Included in operational costs
Biodiversity impacts	Allow vegetation on site to flourish naturally except in areas required to be kept clear to minimize damage to the panels and for fire protection (around the fence).	Routine monitoring. Compliance to be included as part of the E&S monitoring review and report.	Site manager	Included in operational costs
	Minimize light pollution during warm period nights	Inclusion in detailed design and routine monitoring during operations	Design contractor, site manager	Included in operational costs
	Prohibit staff and contractors from hunting, poaching and harassing wildlife.	Inclusion in the site induction training or site code of behavior.	Site manager	Included in operational costs
Worker health and safety impacts	Develop safety provisions for an individual electrician working alone (IWA), if working alone is unavoidable	IWA provisions are documented and implemented prior to commencement of operations.	EHS manager	Included in operational costs

Issue for Mitigation	Mitigation Measures	Monitoring / Reporting	Responsible Party	Estimated Cost and Source
Worker and community health and safety impacts	Prepare site specific health and safety and emergency response plans for construction and operation and disclose it to relevant stakeholders. Manage risk of site flooding from possible excessive water release into the Koksü channel.	Ensure that the developed plan includes all possible events and stakeholders are informed prior to the commencement of construction.	Site manager and EHS manager	Included in construction and operational costs
Working conditions	Company's Human Resource policy and procedures aligned with with national and local labor laws and measures to comply with the core labor standards.	Annual E&S monitoring review and report to include number of workers employed disaggregated by sex and position, number of workers from surrounding local communities, compliance to national and local labor laws and to core labor standards, and grievances raised by workers.	Company, Site manager, and EHS manager	
<b>Decommissioning Phase</b>				
Waste generation and disposal	Implement the WMP including the reuse and recycling of plant components. Comply with the reuse-reduce-recycle-recover-safe disposal management hierarchy.	Daily monitoring during decommissioning. Compliance to be included as part of the E&S monitoring review and report.	EHS manager and decommissioning contractor	Included in decommissioning costs
	Request the contractor to provide waste memos to ensure appropriate disposal location and methods, and to include this requirement in the agreement with subcon-tractors.	Inspection and collation of waste disposal documentation throughout decommissioning.	EHS manager	Included in decommissioning costs