

PROJECT DOCUMENT
OF
THE ASIAN INFRASTRUCTURE INVESTMENT BANK

Republic of Turkey
Turkey Gas Storage Expansion Project

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CURRENCY EQUIVALENTS

(Effective as of February 1, 2018)
Currency Unit – Turkish Lira (TL)
TL 3.79 = USD 1.00

ABBREVIATIONS

AIIB	Asian Infrastructure Investment Bank
bcm	billion cubic meters
BOTAŞ	Boru Hatları ile Petrol Taşıma A.Ş.
DSCR	Debt Service Coverage Ratio
DSI	State Hydraulic Works
DS&I	Design Supply and Installation
EIRR	economic internal rate of return
EMRA	Energy Market Regulatory Authority
EPIAŞ	Energy Market Operations Company
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
EUAŞ	Electricity Generation Corporation of Turkey
FIRR	Financial Internal Rate of Return
FSRU	Floating Storage and Regasification Unit
FY	Financial Year
GAZBİR	Natural Gas Distribution Companies Association of Turkey
GDP	Gross Domestic Product
GHG	Green House Gases
Ha	Hectare
IBRD	International Bank for Reconstruction and Development
IDC	Interest During Construction
ICB	International Competitive Bidding
IFI	International Financial Institution
IsDB	Islamic Development Bank
LNG	Liquefied Natural Gas
MENR	Ministry of Energy and Natural Resources
mtCO ₂ -eq	Million tons of carbon-dioxide equivalent
NBP	National Balancing Point
NGML	Natural Gas Market Law
NPV	Net Present Value
PAP	Project Affected Persons
PMU	Project Management Unit
PPSD	Project Procurement Strategy for Development
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
ROW	Right-of-way
WB	World Bank

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1. PROJECT SUMMARY SHEET

Republic of Turkey Turkey Gas Storage Expansion Project

Project No.	000062
Borrower Guarantor Project Implementing Entity / Implementation Agency	Boru Hatları ile Petrol Taşıma A.Ş. (BOTAŞ) Republic of Turkey BOTAŞ
Sector Subsector	Energy Oil and Gas
Project Objectives/Brief Project Description	<p>The objective of the Project is to increase the reliability and security of gas supply by expanding underground gas storage capacity.</p> <p>The Project is expected to expand the capacity of the Tuz Golu Gas Storage Facility by 4.2 billion cubic meters (bcm), from 1.2 bcm to 5.4 bcm, through constructing 40 caverns in the Tuz Golu underground salt formation, related surface and subsurface facilities, fresh water and brine discharge pipelines, and electricity supply.</p>
Project Implementation Period (Start Date and End Date)	Start Date: June 19, 2017 End Date: October 31, 2023
Expected Loan Closing Date	October 31, 2024
Project cost and Financing Plan	<p>Project Cost: USD 2,735 million</p> <p><u>Financing Plan</u> (indicative)</p> <p>AIIB Loan: USD 600 million</p> <p>World Bank (IBRD) Loan: USD 600 million</p> <p>Islamic Development Bank: USD 350 million</p> <p>Commercial Loans: USD 450 million</p> <p>BOTAŞ: USD 735 million</p>
AIIB Loan (Size and Terms)	USD 600 million. Final maturity of 22.5 years, including a grace period of 7 years, with level repayments at the Bank's standard interest rate for sovereign-backed loans.
Co-financing	<p>Project to be jointly co-financed with the World Bank (IBRD).</p> <p>IBRD had earlier extended loans of USD 325 million in 2005 and USD 400 million in 2014 to BOTAŞ financing in part the 1.2 bcm Tuz Golu Gas Storage Facility under the Gas Sector Development Project.</p>
Environmental and Social Category	A
Project Risk (Low/Medium/High)	High
Additional Condition for Effectiveness and Disbursement	Effectiveness of the Co-financing Agreement

Key Covenants	<p>Borrower to</p> <ul style="list-style-type: none"> - maintain a Project Management Unit until the completion of the project; - carry out the project in accordance with the provisions of the ESIA and the RPF; - ensure contractors carrying out the project perform in accordance with the provisions of the ESIA and the RPF; - carry out resettlement works, if any, in accordance with the RAP(s); - ensure site specific environmental and social evaluation reports are updated after the design works; - ensure relevant sections of ESIA are updated in case of any change in pipeline route(s); - update hazard identification and hazard operability sections of the ESIA upon completion of detailed design; - ensure completion of environmental and social management system by including all sub-management plans as defined in the ESIA; - retain the services of construction supervision and ESIA and RAP monitoring consultants and to ensure that the consultants prepare quarterly ESIA and RAP monitoring reports to the Bank; - inform the Bank within five calendar days after the occurrence of a significant event related to Environment, Health and Safety; - ensure submission of Emergency Action Plan by the State Hydraulic Works for the Hirfanli reservoir dam no later than six months after the effective date; - take all reasonable measures to ensure the Emergency Action Plan and Operation and Maintenance Plan for the Hirfanli reservoir dam is properly maintained and implemented.
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the Bank is in compliance with the policies applicable to the Project.

President	Jin Liqun
Vice-President	D.J. Pandian
Director General, Operations	Yee Ean Pang
Manager, Operations	Gregory Liu
Project Team Leader	Hari Bhaskar, Senior Investment Operations Specialist
Project Team Members	Chongwu Sun, Sr. Environmental Specialist Giacomo Ottolini, Sr. Procurement Specialist Henri de Branche, Sr. Social Development Specialist Kari Nyman, Sr. Consultant/Advisor Kishor Uprety, Sr. Legal Counsel Yige Zhang, Project Assistant

2. STRATEGIC CONTEXT

A. Country Context

1. Turkey has achieved impressive economic and social development results since the early 2000s, raising it to the world's 17th largest economy. Macroeconomic stability, broad social and economic reforms, increased economic integration with the region, and a transformation of a significant part of the economy away from agriculture into manufacturing and services were core contributors to Turkey's growth. Turkey's economy grew strongly from 2001 to 2014, with GDP quadrupling in nominal U.S. dollar terms, underpinned by a comprehensive macroeconomic and structural reform program. As a result, Turkey's per capita income of US\$10,787 in 2016 puts it in the group of upper-middle-income countries. Following a strong performance in 2015, growth has slowed to 3.2 percent in 2016 partly reflecting weak investment due to failed coup attempt in July. In 2017, Turkey's growth rate increased to 7.4%¹ supported by an extensive fiscal stimulus, which together with credit expansion pushed inflation to double digits.² The current account deficit has widened and the Turkish Lira has depreciated significantly against the USD over the past 12 months. The country's sovereign debt rating has been downgraded recently by one notch to Ba2 from Ba1 by Moody's, citing concerns about the country's current account deficit and higher external debt.³ Looking ahead, Turkey's medium-term growth is projected to stabilize around 3.5- 4%, supported by domestic demand.⁴

2. The Government continues to implement its 10th Development Plan (2014-2018) for which ownership remains strong and long-standing. The Government is committed to continued structural reforms to ease constraints on productivity, tackle a low female labor force participation rate that hampers sustained growth, and build the skills of its population to reap the benefits of greater global integration. The continued difficult geopolitical environment in the region, stemming from the Syrian crisis amongst other issues, has had a negative impact. Weak growth in the EU – Turkey's largest export market and trading partner – has also impacted exports and investment. In response to these challenges, the Government has executed a successful fiscal stimulus since mid-2016 that underpinned the strong growth rate in 2017; continued growth of 5.5% percent each year is predicted for the medium-term (2018 to 2020) by the Government's medium term program.

B. Sectoral and Institutional Context

3. Turkey increased its access to natural gas after it made a strategic choice, in the late 1980s, to diversify its energy mix. Gas based power generation was preferred due to its lower investment cost, operational flexibility and environmental advantages compared to coal. Natural gas is now the most important fuel in Turkey's energy supply. Turkey's gas consumption, about 52 billion cubic meters (bcm) in 2017, accounted for about one third of Turkey's primary energy supply. Implementing the Government's strategic choice to diversify the country's energy mix, Turkey's national gas company BOTAŞ launched the development of a national gas transmission networks followed by natural gas imports in 1987. Less than two decades later, gas had displaced indigenous coal as the most important fuel in power generation. Residential and industrial consumption have increased steadily in line with the expansion of BOTAŞ' natural gas transmission network and the development of gas distribution systems by a large number of private companies across Turkey. Their shares in total consumption

¹ <http://www.turkstat.gov.tr/HbGetirHTML.do?id=27825>

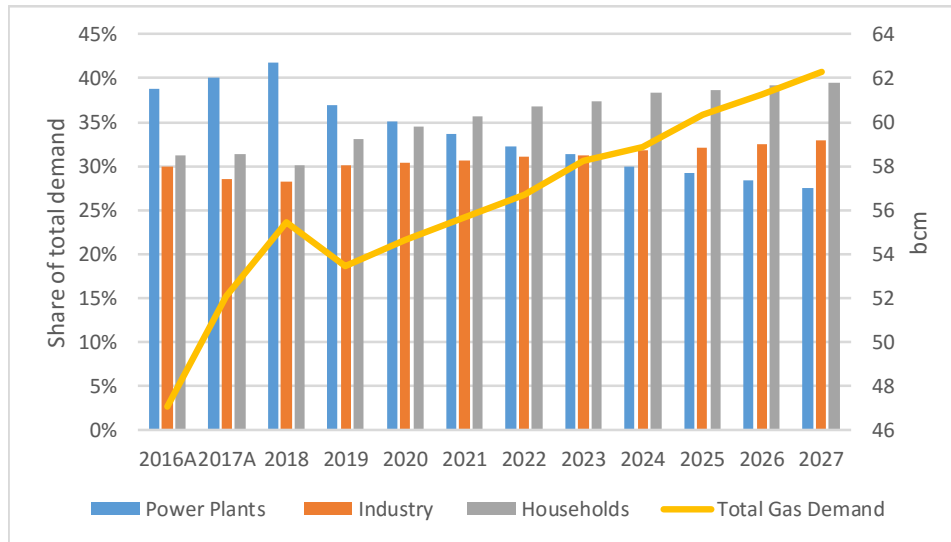
² IMF, 2018. Turkey: Staff Concluding Statement of the 2018 Article IV Mission, February 2018.

³ Source: Financial Times, March 21, 2018.

⁴ IMF, 2018. Turkey: Staff Concluding Statement of the 2018 Article IV Mission, February 2018

reached 31 percent and 29 percent of annual gas consumption in 2017, respectively; with power generation still accounting for the highest share at 40 percent.

Figure 1: Gas Demand Forecast by Consumer Type⁵



4. The 2001 Natural Gas Market Law (NGML) provided a strong legal foundation for gas sector reform and private sector participation in the gas sector. Particularly noteworthy is the country-wide entry of private companies into gas distribution urban areas. Energy Market Regulatory Authority (EMRA) played a key role in that effort through its program of competitive tendering of distribution licenses since 2003 and all 81 provinces of the country are now being supplied with natural gas by 72 gas distribution companies. However, the 2001 Law has proven less effective in attracting private sector participation into the import and wholesale supply segments of the gas sector. Turkey’s national gas company, BOTAŞ, continues to dominate the gas market with a market share of about 82 percent of annual consumption. Eight private companies account for the balance. This reflects: (a) the need to implement the envisioned unbundling of BOTAŞ; and (b) insufficient wholesale gas market development. The Government has been considering amending the 2001 Law to liberalize gas imports and restructure BOTAŞ into separate trading, transmission and storage companies in order to promote wholesale gas market development though a firm timeline for the enactment of the amendment has yet to be established.

5. Turkey's heavy dependence on energy imports (mostly oil and gas) constitutes a macroeconomic challenge and an energy security risk. By end-2017, energy imports accounted for nearly 60 percent of Turkey’s primary energy supply, 14 percent of imports and 80 percent of the current account deficit. Government strategy calls for containment in the growth of natural gas consumption, diversification of supply sources, and rapid increase of gas storage capacity:

- (i) Strategy to contain the growth of natural gas consumption is focused on the power sector. Substitution of gas is feasible in power generation, while residential and industrial gas consumers – with few exceptions – do not have feasible alternative energy sources. The devel-

⁵ Based on gas demand forecast, 2018 is assumed to be a dry year, therefore, gas consumption is expected to spike as hydropower generation declines. Demand then adjusts in 2019 due to a return to normal precipitation and temperature levels coupled with the fact that gas supply to power plants is being reduced significantly, while supply to households and industry modestly increases.

opment of renewable energy generation – hydro, wind, solar and geothermal – has been impressive and will continue. Government strategy also includes the introduction of nuclear power and continued utilization of indigenous coal for power generation;

- (ii) Almost 90 percent of gas imports are from three countries. Nearly 58 percent of Turkey’s gas imports are supplied by the Russian Federation, followed by Iran (17 percent) and Azerbaijan (14 percent). Diversification through the imports of liquefied natural gas (LNG) started with long-term contracts with Nigeria and Algeria and continues with term and spot purchases from other suppliers; and
- (iii) Storage capacity, with a 2.8 bcm Silivri Gas Storage Facility, accounts for less than six percent of annual consumption. A World Bank-supported project to develop a 1.2 bcm gas storage utilizing the Tuz Golu salt formation is underway⁶. A project to expand the capacity of the Silivri by 1.5 bcm to 4.3 bcm is at an early stage of implementation. When completed, the ongoing Tuz Golu and Silivri projects would raise Turkey’s storage capacity to 5.5 bcm - about 10 percent of annual gas consumption in the mid-2020s. Emphasizing the importance of gas storage, the Strategic Plan of Turkey’s Ministry of Energy and Natural Resources (MENR) has set a target to achieve 20 percent of gas storage. The 2001 NGML had set an obligation on gas importers (holders of gas import licenses issued by EMRA) to hold 10 percent of the imported gas in storage; this obligation was recently raised to maximum 20 percent. Due to the still insufficient available storage capacity this obligation remains inactive.

6. Overall, Turkey’s energy policies are directed at delivering secure, sustainable and affordable energy through the diversification of energy supply sources, promotion of indigenous energy production and energy efficiency. The country’s Vision 2023 sets specific energy targets including promoting indigenous energy resources, increasing the electricity share of renewable energy to 30% and reducing energy consumption by 20% (below 2010 levels)⁷. The tenth National Development Plan (2014-2018) sets several goals relevant to natural gas such as i) diversifying supply sources and routes, ii) realizing oil and natural gas pipeline projects, iii) improving competitiveness on electricity and natural gas markets and iv) expanding and constructing natural gas storage facilities. In line with the national development plan, the Ministry of Energy and Natural Resources Strategic Plan (2015-19)⁸ has set 16 medium-term policy goals such as i) ensuring strong and reliable energy infrastructure through adequate supply and demand planning and investment in reliable natural gas storage (at least 10% of domestic gas consumption or 5.3 bcm in 2019); ii) ensuring optimum resource diversity through the diversification of import countries and routes for natural gas, reducing the share of natural gas in electricity generation within total generation to 38% and in turn increasing the share of domestic coal, nuclear and renewable power generation; iii) effective demand side management mechanisms including for natural gas; iv) implementing energy efficiency measures; and v) building an integrated regional energy market for electricity and natural gas.

⁶ This 1.2 bcm Tuz Golu Gas Storage Project is being financed by the World Bank under the USD 325 million Gas Sector Development Project (P093765) approved in November 2005 and the USD 400 million Gas Sector Development Project Additional Financing (P133565) approved in July 2014 which aim to increase the reliability and stability of gas supply in Turkey through gas storage and network infrastructure. The first three of its 12 gas storage caverns were commissioned in time for operation before the 2017/18 winter in Turkey and overall completion is expected by October 2021. In this Project Document, the 1.2 bcm Tuz Golu Gas Storage Project is referred to as the ongoing project or ongoing Tuz Golu project while the 4.2 bcm expansion project covered in this Project Document and for which financing is sought from the Bank is referred to as the Project or the Expansion Project or the proposed Expansion Project.

⁷ IEA, 2016. Turkey Energy Policies for IEA Countries – Turkey – 2016 Review. <http://www.iea.org/publications/freepublications/publication/EnergyPoliciesofIEACountriesTurkey.pdf>

⁸ Ministry of Energy and Natural Resources Strategic Plan (2015-19) <http://www.enerji.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fStrategic%20Plan%2fStrategicPlan2015-2019.pdf>

3. THE PROJECT

A. Rationale

7. Storage capacity limitations endanger security of supply, constrain the flow of gas and also the trading of gas by prospective competitors.⁹ Residential gas consumption is increasing steadily. Gas is used mainly for heating and is heavily seasonal, peaking during winter months. Demand peaks in the residential sector have led to curtailment of gas service to the power sector during cold periods and generation of power from more expensive and in the case of fuel oil and coal, more polluting generation. While LNG remains a key part of Turkey’s energy security strategy and floating storage and regasification units (FSRUs) will help improve security of supply during peak demand periods, the Government has recognized LNG’s limitations: (i) higher cost of supply compared to pipeline gas; (ii) price seasonality with winter prices being higher precisely when demand in Turkey is at its peak; and (iii) transportation lead times and logistical challenges. Government strategy therefore calls for rapid development of additional gas storage capacity. The proposed Project would raise the capacity of the Tuz Golu Gas Storage Facility by 4.2 bcm (from 1.2 bcm to 5.4 bcm), and Turkey’s total capacity to 9.7 bcm (Table 1) – about 17 percent of projected annual gas consumption in the mid-2020s. Though a major improvement compared to the current less than 6 percent, 17 percent would still be rather modest compared to 30-40 percent in similar import-dependent European countries¹⁰. The Government also looks to the private sector to invest in gas storage; however apart from tentative initial interest no private sector projects are currently being planned.

Table 1: Status of Gas Storage Projects in Turkey

Storage Facility	Operational/ Under construction	Planned Expansion	Total
Silivri Underground Gas Storage	2.8 bcm (operational)	1.5 bcm (2020)	4.3 bcm (2020)
Tuz Golu Underground Gas Storage	1.2 bcm (under construction, to be completed in 2021)	4.2 bcm (2023)	5.4 bcm (2023)
Total	4.0 bcm	5.7 bcm	9.7 bcm

8. The development of gas storage capacity is an integral component of the Government’s program to improve the security of gas supply. Other components include: (a) the installation of two floating storage and regasification units (FSRUs) to increase Turkey’s capacity to utilize liquefied natural gas (LNG) sourced from the international LNG market through spot purchasers and term contracts; (b) participation in the development of the Southern Gas Corridor, which includes the construction of the Trans-Anatolian Natural Gas Pipeline (TANAP)¹¹ across Turkey, to bring Azeri gas to Turkey and Europe; (c) participation in the proposed Turk Stream Pipeline for a second direct gas pipeline to Turkey from Russia (Turkey’s main supplier of natural gas); and (d) the establishment of a centralized gas

⁹ For more details regarding the issues discussed in this paragraph and other gas sector challenges, please see Turkey’s Energy Transition: Milestones and Challenges Report (the World Bank, 2015).

¹⁰ Such as France (33 percent), Italy (29 percent), and Germany (35 percent), as well as the Netherlands, a gas producing country (40 percent). Source: EMRA, BP World 2015 Report, Gas Infrastructure Europe, European Commission Country Reports and World Factbook.

¹¹ AIIB is financing TANAP project through a Sovereign guaranteed loan in an amount of USD 600 million to Southern Gas Corridor Joint Stock Company (SGC), Azerbaijan.. SGC has a 51% stake in TANAP while the remaining stakes are with BOTAS (30%), British Petroleum (12%) and SOCAR, Turkey (7%).

trading platform by the Energy Market Operations Company EPIAŞ for the Turkish gas market and towards realizing the Government’s vision of developing Turkey into a regional gas hub.

9. The rationale for public financing supported by AIIB and the World Bank (WB) includes the following: high national priority, the very large investment requirement and absence of private sector involvement beyond initial interest. Although a few private firms received license from EMRA since early 2014, these Turkish firms have neither realized investments in this field so far, nor seemed to have a timeline for the start of any investments. Given the nature of the Tuz Golu gas storage investment (requiring very large capital investment and including risks of the underground gas storage facilities such as geological risks) as well as the concerns by the Government on the national security of gas supply, it is reasonable for the government to finance the proposed project through BOTAŞ, a state-owned enterprise, to improve energy security and its ability to cover seasonal and daily demand peaks. International experience similarly shows that the first investments in gas storage facilities in the salt formations have been realized by the public financing, such as Jintan of China, Etzel of Germany and Kaliningradskoye of Russia. This will be WB’s third financing supporting the development of the Tuz Golu Gas Storage Facility (see footnote 2 for details of the two earlier financings).

10. **Strategic Alignment.** The Project aims to improve energy security of Turkey by building a sustainable gas storage infrastructure. With more gas available from this storage facility in winter (when there are usually gas supply curtailments), less coal and other fuel oil will be used for power generation thereby reducing the harmful GHG emissions. While sustainable infrastructure is a key thematic priority of the Bank, promoting energy security and reducing the carbon intensity of energy supply are integral parts of the Bank’s Energy Strategy.

11. **Value addition by the Bank.** The key value additions resulting from the Bank’s support are as follows:

- (i) Ensuring implementation of international environmental and social management practices in dealing with complex environmental and social impacts. This enhances the quality of project outcomes and helps in capacity building of the Implementation Agency; and
- (ii) Ensuring ‘fit for purpose’ procurement with the Bank’s involvement, together with WB, in the procurement process.

12. **Value addition to the Bank.** The key value additions to the Bank resulting from financing the Project are as follows:

- (i) This is the first project in Turkey to be financed by the Bank and helps the Bank in establishing long term cooperation with the government and other important entities in Turkey; and
- (ii) This is the first gas storage project to be financed by the Bank providing the Bank staff with an opportunity to learn more about this type of projects.

B. Project Objectives

13. The objective of the Project is to increase the reliability and stability of gas supply by expanding underground gas storage capacity.

14. **Project Beneficiaries.** The primary beneficiaries are gas consumers across Turkey:

- (i) Access to gas is improving rapidly. In line with the progress of BOTAŞ' transmission network development and EMRA's program to attract private companies into gas distribution, 81 provinces across Turkey are served by 72 private distribution companies. Unlike electricity, access to gas is still far from universal but the number of gas consumers increased from about 6 million in 2006 to 14 million in 2017 with roughly between 800,000 to 1 million subscribers added per year. The Natural Gas Distribution Companies Association of Turkey (GAZBIR) projects the number of gas consumers to increase from 13.5 bcm in 2017 to about 17.5 million by 2023; and
- (ii) Natural gas is the most important fuel in Turkey's primary energy and power generation fuel mix. Natural gas is well suited for power generation because it can provide both base load and peak load service, and is often the least-cost means of providing flexible supply for following demand fluctuations. Using natural gas rather than coal in power generation offers significant potential for mitigating greenhouse gas emissions. Because of its flexibility, natural gas is also ideally suited to complement solar and wind power, for both of which Turkey is aiming to utilize its potential as much as possible, to manage what can be large and rapid variations in intermittent renewable energy generation.

15. BOTAŞ and other gas importers will also benefit from the Project as they will be able to utilize the substantially increased gas storage capacity in Turkey.

16. **Results Indicators.** The proposed results indicators for the Project are:

- (i) Reduction of gas curtailments due to available storage at Tuz Golu Gas Storage Expansion Plant;
- (ii) Reduction of spot LNG purchases due to available storage at Tuz Golu Expansion Plant; and
- (iii) Increasing gas storage capacity through the Tuz Golu Gas Storage Expansion Plant

C. **Project Description and Components**

17. The Project consists of three components. Detailed description of the components is provided in Annex 2; a summary is provided below.

18. **Component 1: Tuz Golu Gas Storage Expansion Facilities** consisting of

- (i) **Water and Brine Pipelines** including construction of a 117-km fresh water supply line (56-60" diameter) from the Hirfanli Reservoir to the project site and a 31-km brine discharge line from the 40 wells back to Tuz Golu. This will also include several pumping stations and storage reservoirs
- (ii) **Surface Facilities** containing all necessary gas injection and withdrawal units, compressors and connections to the natural gas grid;
- (iii) **Subsurface Facilities** including drilling of wells and leaching of salt caverns for gas storage purposes;
- (iv) **Electricity Supply** including electricity transmission lines for water pumping stations and operations of surface and sub-surface facilities;

- (v) **Instrument, Control and Telecommunications Systems** including a Supervisory Control and Data Acquisition (SCADA) system for the water supply line, brine discharge line and surface facilities and tools for communicating between the proposed project and the general SCADA system in Ankara; and
- (vi) **Contractor Services** including provision of management services, including detailed design and engineering, procurement, installation, testing and inspection, commissioning and operational acceptance; and training of the BOTAŞ personnel.

19. **Component 2: Supervision Consultancy**

Provision of services of consultants responsible for supervising the construction and installation of the facilities as well as for the inspection and testing of materials, plant and equipment both during the construction and installation of the facilities.

20. **Component 3: ESIA and RAP Monitoring Consultancy**

- (i) Provision of services of Consultants responsible for regular monitoring of compliance of the construction activities with the Environmental and Social Impact Assessment (ESIA) and the Resettlement Action Plans (RAP);
- (ii) Provision of services of consultants to check and monitor each stage of the construction activities in accordance with the frequencies specified in an Environmental and Social Management Plan (ESMP) ensuring all environmental and social standards are being fully satisfied and all services are in full conformity with the ESMP developed by BOTAŞ based on the (WB-approved) ESIA; and
- (iii) Provision of services of consultants to be responsible for monitoring the implementation of the Resettlement Action Plan (RAP) that will be prepared by BOTAŞ in line with the (WB-approved) Resettlement Policy Framework (RPF).

D. Cost and Financing

21. The total project cost is estimated at about USD 2,735 million. The project base costs are derived from the completed basic design developed for the project almost all of which are attributed to the Design, Supply and Installation contract estimated at USD 2,000 million including contingencies of about 25 percent¹². The total project cost includes interest during construction (IDC) and the upfront financing costs, the capitalized cost of cushion gas¹³ and the two consultancy contracts under component 2 and 3. The total cost will be spread over the construction period (5 years, as envisaged by BOTAŞ)

22. The indicative cost and financing plan are as shown in Table 2. BOTAŞ would be the borrower of the sovereign backed loan. Similar financing has been requested from the World Bank. In addition, the Islamic Development Bank (IsDB) is considering financing of about USD 350 million (or possibly more in forthcoming years, if their financing is structured in multi-year disbursement tranches). BOTAŞ committed to make resources available to meet its equity share of the financing of the proposed project from its operating cash flows. BOTAŞ is also actively in discussions with commercial

¹² Considering recent experiences in gas storage project in Turkey and relatively high risks relating to the drilling and leaching process

¹³ Cushion gas is the volume of natural gas necessary for maintaining the integrity of the storage caverns to be constructed and will be retained within the caverns throughout the life of the storage facility

lenders to substitute a portion of its equity in the later years of implementation with commercial loans. This will also be the case with respect to the parallel financing by IsDB which will be needed in the later years of implementation. For BOTAS to achieve its desired 75:25 debt-to-equity ratio for financing the proposed project, it will need to borrow about USD 450 million in commercial loans (in addition to the indicative IFI financing) and use about USD 735 million of its own cash as equity. To mitigate against a less favorable external environment, BOTAS is regularly updating its cash flow projections for different USD/TL exchange rates and oil price scenarios. However, there is a limit to how much BOTAS can withstand shocks given the difference between its mostly dollar-denominated gas import bill and its mostly Turkish Lira-denominated gas sales contracts. In the past, the government provided support to BOTAS to recover from these events through various fiscal measures.

Table 2: Cost and Financing (USD million)

Item	Cost	Source of Financing				
		AIIB	WB	IsDB	Commercial Loans	BOTAS
A. Base Cost						
Tuz Golu Gas Storage Expansion Facilities ¹⁴	2,000	590	590	350	450	20
Supervision Consultancy	17	8	9	0	0	0
ESIA and RAP Monitoring Consultancy	3	2	1	0	0	0
Interest During Construction	300	0	0	0	0	300
Cushion Gas	400	0	0	0	0	400
Total Base Cost	2,720	600	600	350	450	720
Other Financing Costs (including front end fees)	15	0	0	0	0	15
Total	2,735	600	600	350	450	735

23. **Co-financing arrangements.** AIIB and WB are proposing to jointly co-finance the Project, with WB taking the lead. The co-financing arrangements for the Project between WB and AIIB will follow the co-financing framework agreement signed by the respective Presidents of the two institutions in April 2016 (and amended in 2018). In essence, WB’s policies and procedures on safeguards, procurement, financial management, project monitoring, and reporting will be used for the Project activities to be financed in whole or in part out of the loan proceeds (including activities to be financed by AIIB).

24. **Financing Terms.** Final maturity of 22.5 years, including a grace period of 7 years, with level repayments at the Bank’s standard interest rate for sovereign-backed loans.

E. Implementation Arrangements

25. **Implementation Period.** Project implementation started in June 2017 with the issuance of the prequalification invitation. Completion is projected by October 2023¹⁵, in time for Turkey’s 2023/24 winter. This ambitious completion target will be confirmed during the bidding process.

¹⁴ Including contingencies

¹⁵ This is based on the project schedule. The Loan Closing Date is 12 months later to include the defects liability period

26. **Project Implementation Management.** The project is implemented by Turkey's national gas company BOTAS. It was established in 1974 by the Turkish Petroleum Corporation for the purpose of transporting Iraqi crude oil. In 1987 BOTAS expanded its original purpose of transporting crude oil through pipelines to cover natural gas transportation and trade activities. BOTAS' monopoly rights on natural gas import, sales and pricing were abolished by the 2001 NGML. However, BOTAS, continues to dominate the gas market with a market share of about 82 percent of annual consumption.

27. Within BOTAS the day-to-day project implementation is carried out by a Project Management Unit (PMU) led by the Head of the Storage Department. Details are provided in Annex 2. As the implementing agency of the ongoing Tuz Golu project, BOTAS as a company and the PMU are experienced in the development of underground gas storage. The PMU is familiar with and experienced in applying IFI (specifically, WB's) guidelines and procedures for both fiduciary (procurement and financial management) and safeguards (environmental and social) policies as the ongoing project is financed by WB. As is the case in the ongoing project, the PMU will be supported by a construction supervision consultant and an ESIA and RAP monitoring consultant.

28. **Implementation Supervision.** WB will be the lead co-financier and will supervise the Project and administer the AIIB loan on behalf of the AIIB, in accordance with the WB's applicable policies and procedures, and a Project Co-Lenders' Agreement, to be signed between the Bank and the WB, in accordance with the Co-financing Agreement between the Bank and the WB. WB staff will visit the project sites as needed to monitor progress. Given the importance of the project, the Bank will also send its team to join force with WB in project supervision. Proper resources will be made available to match the frequency of WB's supervision visits. This joint WB/AIIB collaborative approach is being successfully implemented in the ongoing TANAP project.

29. AIIB has reviewed all the applicable World Bank's Operational Policies (OP) and WB Business Procedures (BP), including OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.11 Physical Cultural Resources, OP/BP 4.12 Involuntary Resettlement and OP/BP 4.37 Safety of Dams; WB's Procurement and Consultant Guidelines, and the WB's sanctions policies and procedures, including WB's Anti-Corruption Guidelines. AIIB has found them all satisfactory for application to the project activities to be financed in whole or in part out of the loan proceeds, in accordance with the requirements, respectively of the: (a) Bank's Environmental and Social Policy (ESP) and Environmental and Social Standards (ESSs) (ESS1 – Environmental and Social Assessment and Management, and ESS2 – Involuntary Resettlement Assessment; (b) the requirements of the Bank's Procurement Policy; and (c) the Bank's Policy practices on Prohibited Practices. AIIB will rely on WB's determination of compliance with the above WB policies and procedures applicable to the project. Project monitoring and reporting, as well as financial management, will also be carried out in accordance with WB's requirements. This approach ensures that one set of policies will apply to the Project activities to be financed in whole or in part out of the loan proceeds. It will also provide a single point of contact for borrowers and therefore facilitate a more efficient and seamless approach to Project Implementation.

30. **Procurement.** The project involves only three new procurement packages. A single contractor will be engaged for the detailed design/engineering, supply and installation (DS&I) of the Tuz Golu Gas Storage Expansion Facilities and two consulting firms will be engaged to provide the supervisory/owner's engineer and ESIA/RAP monitoring services. Procurement will be carried out in accordance with *World Bank Procurement Regulations for IPF Borrowers* dated July 2016 revised in November 2017 (IPF is WB's abbreviation for Investment Project Financing).

- (i) An International Competitive Bidding (ICB) process with a single stage, one envelope Request for Bid selection method with pre-qualification will be followed for the engineering and construction contract to attract competition among the international firms that are capable of carrying out the project in a successful manner, as determined in BOTAS' Project Procurement Strategy for Development (PPSD) for the project. Prequalification Invitation was issued on June 19, 2017. Six of the eleven prospective firms/consortia that submitted applications were prequalified. It is expected that the bidding documents will be issued to these six prequalified bidders in May 2018; and
- (ii) The two consultancy services will be procured through Quality and Cost Based Selection (QCBS), as determined in the PPSD. Prospective firms will be invited to submit expressions of interest in due course.

31. **Fund Flow Arrangements.** BOTAS will maintain the financial management system of the Project and will ensure that activities are carried out in accordance with the Project's legal agreements. Fund flow arrangements established between BOTAS and WB for the ongoing project and TANAP projects will continue in the Project. BOTAS will open one Designated Account for the project for AIIB and WB. Payments made by BOTAS to its contractor and the two consultants will form the basis of disbursements. BOTAS will be responsible for submitting the withdrawal applications. Applications documenting funds utilized from the Designated Accounts will be submitted on a quarterly basis and will include supporting documents (to be specified in WB's Disbursement Letter).

32. **Disbursements.** BOTAS will open one Designated Account for the Project, which will be used for both WB and AIIB financing of the project. Payments made by BOTAS to its contractor and consultants eligible for WB and AIIB financing will form the basis of disbursements from the Bank, at 50:50 ratio between WB and AIIB financing. BOTAS will be responsible for submitting the withdrawal applications to the World Bank. Applications documenting funds utilized from the Designated Account will be submitted to the Bank on a quarterly basis and will include supporting documents specified in WB's Disbursement Letter. The World Bank and the Bank will coordinate the disbursement process according to the project Co-Lenders' agreement.

Retroactive Financing. Retroactive Financing is not envisaged under the project.

4. PROJECT ASSESSMENT

A. Technical

33. The ongoing Tuz Golu project is the first of its kind in Turkey and one of a few such projects undertaken globally. Its implementation is currently progressing well, after BOTAS having successfully overcome significant delays and challenges in its design and procurement. Though the proposed Expansion Project is four times as large, it consists of the same set of activities as the ongoing project. However, BOTAS' ambitious implementation schedule will provide an additional challenge to the contractor. There is a risk that prospective contractors may come up with different construction time requirements than those envisaged by BOTAS or submit higher than anticipated bids owing to the potential logistical site challenges and additional equipment and manpower needed to meet BOTAS requirements. In line with the ongoing project, differences would have to be resolved during the bidding process, before final bids are invited. The new owner's engineer to be appointed under the proposed project will approve detailed engineering drawings and supervise implementation of the project including the construction and installation of the facilities.

34. Geologic/geophysical investigations and seismic risks are also important and carry varying degrees of uncertainty. To address this, BOTAŞ retained the services of the Turkish Petroleum Corporation to reprocess the 3-dimensional seismic survey over the expansion area prior to the finalization of any construction contract. This would provide the subsurface contractor the necessary information to design the facility and minimize the risk of costly or failed drilling.

35. The above approach led to a successful implementation in the ongoing project except for the project schedule. The same risk of time delays is likely to be faced in the proposed Expansion Project. The currently envisioned schedule will be assessed by the prospective contractors and the schedule will be confirmed in the contract with the successful bidder. The level of BOTAŞ' financial commitment will be limited until an agreement on the schedule has been reached and contract has been awarded.

B. Economic and Financial Analysis

Economic Analysis. A Cost-Benefit Analysis¹⁶ was carried out by the lead co-financier, the World Bank, in close coordination with the Bank's team, to assess the economic viability of the project based on a cash flow analysis comparing with- and without project scenarios. All costs and benefits are estimated at 2018 constant prices. With a social discount rate of 6%, the Net Present Value (NPV) for the project is USD 384 million. The Economic Internal Rate of Return (EIRR) is estimated at 8.1%. The sensitivity analysis indicates that the EIRR remains above the social discount rate under two downside scenarios (40% increase in investment costs, narrowing of winter-summer gas price differential by 30%). The baseline scenario is based on a conservative estimate of the seasonal price differential in the gas market. With a higher, but realistic, price differential, the EIRR increases to 10.5% and the NPV to USD 874 million. When including climate benefits under a low and a high shadow price scenario for GHG emissions, the project EIRR increases to 8.5% and 9.0%, respectively.

36. **Gas supply and demand forecast:** Since 2011, gas demand has grown steadily at an average rate of 3.6% with year-to-year fluctuations driven by variability in hydrology and climate conditions. BOTAŞ expects future demand growth to be driven by industry and domestic consumers. Turkey's gas demand is mainly met by imported piped gas from Russia, Iran and Azerbaijan based on long-term supply contracts. Piped gas supply was not free of disruptions in the past. In 2009, the gas crisis between Russia and Ukraine led to decreased supply from the West Line. In winter, cuts in gas supply from Iran occur due to technical problems and serving domestic demand. Similarly, gas imports from Azerbaijan were historically below the contracted volume due to technical issues in the pipeline system. In 2017, a cold year, for the first time the demand surpassed the contracted volume. BOTAŞ and other importers relied on LNG from the spot market to meet the gap at a higher cost, in particular during the peak demand in winter. Consequently, spot LNG import volume has more than tripled from 2013 to 2017. Given the supply and demand trend in the past ten years, it is expected that gas supply shortages on cold winter days will become more acute in the future and spot LNG imports will substantially increase over the next 10-15 years.

37. **Project Benefits.** Quantified economic benefits are derived from three sources: (i) Cost savings from purchasing gas at lower cost during low demand periods for later release during high demand periods (seasonal storage) amount to a NPV of USD 903 million; (ii) The estimated benefit to meet gas demand peaks in winter (peak shaving), which otherwise would be curtailed, was estimated at USD 478 million, and (iii) the enhanced security of supply and reliability (energy security) was evaluated at USD 602 million. The project may also realize additional benefits through avoided investment costs (reduced need for compressor stations), enhancing Turkey's flexibility in contracting future gas volumes and prices, facilitation of gas trade in line with Turkey's ambition to become a gas hub and climate co-

¹⁶ The detailed analysis is presented in Annex 3.

benefits¹⁷. Apart from the climate co-benefits, the former benefits are difficult to quantify without strong assumptions and are excluded from this analysis.

38. **Project costs** include the cost of the physical investment over a construction period of five years (USD 1.65 billion), the first filling of cushion gas (USD 0.4 billion) and operation and maintenance (assumed at 1.5% of investment cost) over on an estimated 30 year economic lifetime of the caverns and pipeline. Economic costs were derived through a bottom-up calculation of the investment cost, cushion gas filling and operation and maintenance cost.

39. **Financial Analysis.** A financial analysis¹⁸ was carried out by the lead co-financier, the World Bank, in close coordination with the Bank's team to (i) assess the financial viability of the Project on a standalone basis and to (ii) assess BOTAS' financial performance. BOTAS is both an owner and user of this storage facility. As an owner and operator, BOTAS derives revenues from the Tuz Golu Facility through a storage tariff, which is regulated by the Energy Market Regulatory Authority EMRA¹⁹. The tariff regulation is based on cost-recovery of the investment, operation and maintenance cost and allows BOTAS to earn a reasonable real return on the capital investment. As a user, BOTAS derives benefits from lower cost of gas purchases, facilitated by its storage-enhanced ability to take advantage of seasonal and spot price opportunities and avoidance of penalties under take-or-pay provisions in its long-term gas purchase agreements. The financial benefits to BOTAS as a user are not considered in the financial analysis.

40. Under the baseline scenario, the project will yield a project financial NPV of USD 486 million with a Financial Internal Rate of Return (FIRR) of 8.7%. The generated cash flow from the project is sufficient to cover debt service with an average Debt Service Coverage Ratio (DSCR) of 1.8 and a minimum of 1.3. When including the contingencies in the project costs, the NPV of the project increases to USD 560 million due to the full cost recovery and guaranteed reasonable return principle of the tariff methodology. The FIRR and NPV are robust to changing assumptions in the sensitivity analysis. An increase in investment cost by 50%, without tariff increase, results in an FIRR of 6.6%. The Project FIRR is sensitive to a depreciation of the Turkish Lira against the US dollar due to a currency mismatch between the US dollar financing and Turkish Lira tariff revenues. A 25% depreciation in 2025 would bring the FIRR down to 6.1% and a 50% depreciation, an extreme scenario, would yield an FIRR of 2.5% and a negative NPV. Low and high tariff scenarios were considered in addition to the baseline scenario, which relies on the current proposed tariff, and yield an FIRR of 7.4% and 12.3% respectively.

41. **BOTAS' financial performance.** BOTAS' profitability and cash position are dependent on its ability to pass through its costs to the end consumers. BOTAS' year-to-year cost is primarily driven by the (i) import prices of gas in US dollar terms, and (ii) the TL/US dollar exchange rate. Since the Government approved a cost-based pricing mechanism for electricity and gas in March 2008 that provides for quarterly adjustments by the energy regulator (EMRA), BOTAS has not consistently been able to fully pass through changes in costs to end consumers, but was able to absorb negative import price and exchange rate shocks through deferred tax and import duty payments and, in the past, has always maintained a positive cash flow and repaid arrears with increased profits during subsequent years.

¹⁷ The GHG mitigation benefit was estimated by the World Bank taking into account avoided fuel substitution during winter peak demand curtailment and replacement of spot LNG with piped gas. The CO₂ prices for the low and high carbon price scenarios are 37 USD/t and 75 USD/t initially and increase thereafter gradually with time.

¹⁸ See Annex 3 for detailed analysis.

¹⁹ According to regulatory requirements, BOTAS' needs to maintain a storage capacity of at least 10% of wholesale gas imports. The Strategic Plan of Turkey's Ministry of Energy and Natural Resources (MENR) has set a target to achieve 20 percent of gas storage.

42. In recent years BOTAS' gas selling price has changed little in comparison to the changes in the prices of its gas imports (which broadly reflect price developments in the international market) and the TL/US dollar exchange rate. The depreciation of the Turkish Lira against the US dollar since the beginning of 2014 up to mid-2015 cost BOTAS more than it gained from the fall in its gas import prices in US dollar terms. A full and timely pass-through of BOTAS' gas import costs in TL was not applied, BOTAS profits in 2013 turned into losses for 2014 (TL 600 million) and into 2015 (TL 1 billion in the first half of 2015). This resulted in import duty arrears to the Government and related delayed payment penalties, which reached USD 2 billion by mid-2015. Due to the significant recovery in the last quarter of 2015, partially due to a fall in gas import prices, BOTAS realized a significant gross profit for 2015 (TL 2.5 billion) and an even higher gross profit for 2016 (TL 8 billion), notwithstanding a 10% sale price reduction from October 2016. The financial turnaround since mid-2015 enabled BOTAS to pay its arrears by end-2016. A 10% reduction in BOTAS' gas selling price in late 2016 and continued depreciation of the Lira reduced BOTAS profitability in 2017.

43. BOTAS' financial forecast (see Annex 3) shows an overall break-even level in the next five years under the assumption of flat oil price and a moderate exchange rate depreciation from 2018-2019 with a subsequent stabilization. In 2018, it is estimated that BOTAS will make a TL6.4 billion net loss mainly because of the increase in oil price during the second half of 2017, which is expected to be reflected in the 2018 increasing gas purchase price. Going forward, the gas price and exchange rate risk remains high, in particular the impact of the depreciation of the Lira on BOTAS' gas import costs. However, the risk of the gas price affecting BOTAS' ability to finance its share of the Tuz Golu Gas Storage Expansion Project is mitigated by past experience, which has shown that at the time of cash shortfalls BOTAS was able to meet its payment obligations except for the payment of customs duties and taxes to the Government until its selling price is adjusted to cover costs and recover arrears.

C. Fiduciary and Governance

44. **Anti-corruption.** The Bank is committed to preventing fraud and corruption in the projects that it finances. It places the highest priority on ensuring that Projects that it finances are implemented in strict compliance with the Bank's Policy on Prohibited Practices or PPP (2016). The Bank will monitor the work related to tender document preparation and tender/proposal evaluation and award under Bank financing. Implementation will also be monitored rigorously and regularly by Bank staff. The Bank reserves the right to investigate, directly or indirectly through its agents, any alleged Prohibited Practices relating to the Project and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate. To the extent that WB's Anti-Corruption Guidelines is similar to the Bank's PPP, the WB's Anti-Corruption Guidelines will apply to the Project activities financed in whole or in part by the proceeds of the proposed AIIB and WB Loans. Detailed requirements will be specified in the Loan Agreement, the Co-Lenders' Agreement and the Project tender documents.

45. **Financial Management.** The Project will use the existing financial management arrangements for the ongoing project. BOTAS' Financial Affairs Department is responsible for accounting and registering the payments. The work flow as well as the internal control processes are well defined, and the current arrangements are satisfactory to the Bank. The Financial Affairs Department is highly experienced in managing the financial management of WB funded projects and its staff have the required qualifications and experience. The joint co-financing with WB will be in a 50:50 ratio to be applied on an invoice by invoice basis. WB will provide disbursement services for the Bank in respect of the parts

of the Project to be jointly financed by the Bank and WB, including review and approval of Applications for Withdrawal. The financial management arrangements that are assessed as satisfactory to WB will also be relied upon for the Bank's loan.

46. **Wealth Fund.** BOTAS is a joint stock company established in Turkey. It is a state-owned enterprise and until February 2017 the Undersecretariat of Treasury (Treasury) owned 100 percent of its shares. In August 2016, the Turkiye Wealth Fund (WF) and Turkiye Wealth Fund Management Company were established with the Law no: 6471. Its main purposes were defined as (i) supporting acceleration of the economic growth and deepening of the capital markets, (ii) expanding the use of Islamic Finance, (iii) creating jobs, (iv) providing external financing to major infrastructure projects without increasing public debt, (v) supporting companies that operate in technology intense sectors such as defense, software, and aviation and (vi) investing in strategic sectors such as natural gas and petroleum in order to ensure supply security. In February 2017, shares of BOTAS, Halk Bank, Ziraat Bank, Istanbul Stock Exchange and some other companies have been transferred to the Turkiye Wealth Fund from the Treasury. In accordance with a number of amendments to the Public Finance and Regulation of Debt Management Law (no. 4749) introduced in 2017, the Treasury is allowed to extend its guarantee for the Loan to BOTAS.

47. **Procurement.** Procurement will be carried out in accordance with World Bank Procurement Regulations for IPF Borrowers. Contract packaging has been determined by BOTAS in its PPSD. It includes only three contracts – a single contractor and two consultants for supervisory/owner's engineer and ESIA/RAP monitoring services. This method was proven to be successful in the ongoing project. All these contracts will be subject to WB's prior review. The construction of the various components of the facility (i.e. fresh water and brine discharge pipelines, surface facilities, drilling / leaching/ de-brining of the wells and laying the gas pipes as well as the brine disposal lines) all can be better coordinated by a single contractor. Multiple contractors would pose a significant risk to the implementation including time delays and cost impacts if separate contractors are not able to effectively coordinate and perform their works. Having a single contractor will also bring management and implementation advantages for BOTAS. It will be very difficult for BOTAS to coordinate and manage multiple contractors and a very large construction program, while meeting the deadlines and remaining within the budget. The contract strategy has adequately responded to the lessons learnt from the ongoing project by consolidating in one single contract the DS&I and by reinforcing the consultancy support to BOTAS in supervising and managing the Contract. The Bank considers this strategy fit for purpose. However, a key risk of this approach is that the success (or otherwise) of the project rests on the performance of one contractor which will be mitigated by including suitable performance guarantee and penalty clauses while drafting the contract. Also, it is important that the consultancy contract for supervision engineer be concluded timely in order to ensure that BOTAS is adequately supported from the on-set of contract implementation. The procurement process will be monitored closely by the Bank in coordination with the WB team.

D. Environmental and Social

48. The proposed Project would use the WB's Environmental and Social Safeguard Policies (Safeguard Policies) since: (i) they are consistent with the AIIB's Articles of Agreement and materially consistent with the provisions of the Bank's Environmental and Social Policy (ESP) and relevant Environmental and Social Standards (ESSs); and (ii) the monitoring procedures that the WB has in place to ascertain compliance with its Safeguard Policies are appropriate for use under the AIIB Project. Under the WB's Safeguard Policies, the proposed Project has been assigned Category A, which is consistent with the provisions of the Bank's ESP. The Project team conducted due diligence, including

documentation review, site visit, discussions with WB Safeguard Specialists and the Client during Project preparation through close coordination with the WB task team.

49. **Preparation of environmental and social safeguards instruments.** The potential environmental and social impacts of the proposed Gas Storage Expansion Project are likely to be more diverse and large scale than the ongoing project (also categorized as A). According to Turkey's national Environmental Impact Assessment (EIA) process for the proposed Project, an EIA was finalized in March 2017 and approved by the Ministry of Environment and Urbanization. Since then, BOTAŞ has worked with the WB task team and has prepared a full environmental and social impact assessment (ESIA), including an environmental and social management plan (ESMP) and a resettlement policy framework (RPF), to meet the WB's safeguard policy requirements in OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.11 Physical Cultural Resources, OP/BP 4.12 Involuntary Resettlement and OP 4.37 Safety of Dams.

50. **Environment.** The main environmental concern is the potential adverse impacts on the Tuz Golu (Salt Lake). The Salt Lake has been designated a Special Environmental Protected Area by the Turkish Ministry of Environment and Urbanization. The ongoing Project's potential impacts on the protected area were assessed as part of the original environmental assessment and revisited with additional studies in 2013. Both assessments concluded that there were no significant adverse impacts on the Salt Lake. The brine solution has the same characteristics as the natural inflows to the lake and the total amount of brine solution discharged is not significantly affecting the amount of water in the lake. The ongoing environmental monitoring program for the on-going project, which is conducted by BOTAŞ with the support of its environmental monitoring consultant, covers the impacts on the Salt Lake. The ESIA presents the monitoring results (for a duration of six years) of the ongoing WB project and links the observed results with the estimated impacts under the proposed Project. In summary, according to the ESIA, based on the monitoring results for the ongoing WB project, no significant residual impacts are foreseen for the proposed Project on the Salt Lake, except the larger-scale but temporary impacts of the construction phase and permanent land take during the operation phase. The impact of the leaching phase to excavate the caverns during the construction phase, mainly the discharge of the brine solution into the protected Salt Lake, has been considered as the major potential risk in the ESIA. However, as noted in the monitoring results above, there are no significant impacts, regarding either quantity or quality of the water in the lake. Monitoring will continue under implementation of the proposed Project.

51. Since the proposed Project will be implemented through a design, supply and installation contract under which the contractor will finalize the detailed design, the ESIA indicates that final design and exact locations of the project facilities, e.g., well locations, route of fresh water and brine lines, camp sites, energy transmission lines, surface facilities, etc., were not known during the preparation of the safeguard instruments. Therefore, a detailed risk assessment was conducted within the scope of the draft ESIA and ecological, socio-economic and cultural heritage "No-Go Areas" were identified. To conserve species of critical concern and manage sensitive cultural heritage sites (the Project license area includes registered cultural heritage sites), the ESIA states that the contractor may not undertake any activities in these "No-Go Areas." In addition, the construction contract will include archaeological chance find provisions as an obligation of the contractor. Chance find procedures are also presented in the ESIA's cultural heritage management plan. Other construction, drilling and leaching related impacts, including abstraction of water from Hirfanli Dam, and generation of construction dust and drilling mud, are discussed in detail in the ESIA together with the mitigation and monitoring actions.

52. **Sub-management Plans.** The ESIA also provides frameworks for the sub-management plans (e.g. waste management, labor influx management, and biodiversity action plans) and requires the

contractor to finalize these plans and submit them for BOTAŞ' review and approval. The ESMS to be established by BOTAŞ will ensure that responsibilities for this post contract award stage are clear.

53. **Safety of the Hirfanli Dam.** Since the fresh water for leaching the salt caverns will be supplied from an upstream dam (Hirfanli Dam and reservoir), WB's OP 4.37 Safety of Dams will be applicable to the proposed Project, as it was for the WB's ongoing project. For the proposed Expansion Project, WB's dam safety specialist conducted a due diligence of the Hirfanli Dam in February 2017 and the agreed actions with BOTAŞ and the dam operator, State Hydraulic Works (DSI) have been completed.

54. The amount of water to be utilized from the reservoir and its impacts on the dam are evaluated in the ESIA. DSI and the Electricity Generation Corporation of Turkey (EUAŞ) are responsible for the Hirfanli Dam structures and the hydropower plant, respectively. DSI is also the national regulator of dam safety and responsible for running dam safety programs, including periodic inspections and safety assessments of its dams. During the preparation of the additional finance for the WB's ongoing project, dam safety assurance measures were agreed with DSI, EUAŞ and BOTAŞ for implementation by the DSI field organization. These were: (i) seepage analysis based on the installed observation well and geophysical resistivity survey; (ii) seismic hazard assessment and pseudo-static stability analysis of the dam; (iii) global movement monitoring/geodetic survey; (iv) upgrading of the Operation & Maintenance Plan, and (v) drafting of the Emergency Action Plan. These measures have been updated and revised in line with the WB review for the proposed Project, including the Operations and Maintenance Plan. They did not involve significant and complex remedial works. The Emergency Action Plan also was reviewed by WB and will be finalized in line with WB's comments during the early stages of implementation of the proposed Project.

55. **Climate Impact.** Though the Project will generate greenhouse gas emissions, primarily in the gas turbines that drive the turbo-compressors that are used to compress gas into the underground storage caverns, the net climate impact is expected to be positive due to the following reasons:

- (i) Currently, at the time of gas supply curtailments, priority is given to meeting the needs of households and industrial consumers, and supply to gas-fired power generators is curtailed. In response, gas power generators have to switch to light fuel oil or reduce or even switch off generation. Light fuel oil is more expensive, and its greenhouse gas emissions are much higher than those of gas. Generation in coal-fired stations will also be increased to help deal with the curtailments. It is expected that enhanced storage will enable Turkey to avoid such curtailments and reduce the use of light fuel oil and coal.
- (ii) Storage also enables BOTAŞ and other gas importers to reduce reliance on spot LNG during peak demand periods by importing more gas through pipelines during off-peak periods. Spot LNG is more expensive, and its greenhouse gas emissions are higher than those of pipeline gas, primarily because LNG liquefaction plants consume about 6 percent of the raw gas feed to turn it into LNG.
- (iii) Large gas supply system and gas-fired power generation capacity provide Turkey with a flexible complement and back-up capability for integrating large scale variable renewable generation, especially wind and solar, into the power grid.

56. **Social.** The proposed Project will contribute in the long run to the sustained availability of natural gas across the growing national distribution network for domestic and potentially other users during high demand or times of scarcity. The proposed Project will also create local business and employment opportunities during the construction and operation phases. However, employment opportunities for Project affected people (PAPs) will likely be mostly limited to unskilled temporary positions.

A Local Employment and Training Plan has been prepared to enhance potential benefits such as local hiring and regional skills development, and ensure communication of employment and service provision opportunities, appropriate working conditions and development of skills and capacity.

57. **A socio-economic survey in the Project area of Influence** has covered 12 villages who are principally engaged in agriculture and livestock raising, which are the only sources of income in the affected settlements. Of the land to be affected, 76 percent is arable, and 14 percent is pasture. Other PAPs reside outside the area of influence but own and/or use land within it. While the final footprint of the facilities and the subsequent requirement for land acquisition are not yet determined since the final designs are not available, a land identification study conducted in 2017 identified 1,483 parcels potentially affected by the Project's associated facilities (fresh water, brine and gas pipeline) covering 108 ha of temporary easement during construction and 392 ha of permanent easement. The Project will also have to permanently acquire 110 ha and secure 150 ha of permanent easement for surface facilities and well pads. Approximately 4,085 land owners will be affected either through permanent land acquisition or easement arrangements²⁰, affecting livelihoods and potentially inducing physical displacement of structures on plateau settlements. In finalizing designs, BOTAŞ will endeavor to limit land take as far as possible, and ensure that the RAPs to be prepared determine the exact number of affected landowners, scale and scope of impacts, and mitigation, compensation and rehabilitation measures prior to the commencement of construction activities. The entitlement matrix and compensation standards applied to the proposed Project, as defined in the RPF and internal RAP Fund Management documents, are in line with WB's OP 4.12. Vulnerable groups defined as comprising women, the elderly, informal dwellers and land users, seasonal workers and those resettled from the ongoing gas storage project in the proposed Project's area of influence are likely to be affected, but their number and extent of impacts will be determined during preparation of the RAPs. BOTAŞ also will strive to acquire land through negotiations, and where these fail, the national law on expropriation will be followed. The RAPs development and implementation will be overseen by the RAP Monitoring consultant.

58. **Community health and safety** impacts will mostly occur during the construction phase, when noise from vehicles and equipment, vibration, construction dust, combustion emissions and increased traffic will occur. Measures to limit significant noise emissions to daylight working hours, minimize dust emissions through topsoil covering and sprinkling, and manage combustion emissions through use of sound equipment and quality fuel have been defined in a Community Health and Safety Management Plan. A Traffic Management Plan addressing security and safety measures applicable to the Project has been prepared, and site-specific work plans will be produced by the contractor to inform communities about transportation activities, minimize transportation disturbances and rehabilitate damaged roads. Unarmed security forces will be employed during construction for managing access to work sites, both to prevent third parties entering hazardous areas and to protect equipment. During operation, the facility will be protected by armed private security hired by BOTAŞ. An appropriate management plan for these security forces will be put in place to address potential risks their security arrangements might present for local communities prior to the start of construction. The Grievance Redress Mechanism (GRM) will allow community members to raise issues with the Project and Contractors throughout the construction and operation phases.

59. **Occupational Health and Safety (OHS)** is touched upon in the ESIA and takes into account applicable Turkish regulatory requirements. Measures to protect working conditions and manage specific tasks will be further defined in the OHS Plans to be developed by the contractor. In line with the ESIA and the final OHS Plans, BOTAŞ is required to maintain a dedicated organizational unit for the proper implementation and monitoring of the OHS Plans. BOTAŞ is required to inform the WB as soon

²⁰ These numbers are likely to change after detailed engineering studies are completed once the contract is awarded

as possible, but no later than within five (5) days, of any significant event occurring during Project implementation.

60. **Labor Influx.** The ESIA includes a situational analysis on labor influx, impacts and proposed mitigation measures. The construction phase, which is expected to last approximately 5 years, will require about 500 employees on site, out of which 400 will be construction workers. The operational phase, which will last 30 years, will require about 100 people on site. While the skilled workforce will be brought from outside of the Project areas, the Project will make efforts to hire semi-skilled and unskilled positions locally. The Project has prepared (i) Labor Influx Management Guidelines (including a Code of Conduct), (ii) a Local Employment and Training Plan, based on which the contractor and sub-contractors will prepare their own labor influx management plans, (iii) Community Health and Safety Plan; (iv) Community Relations Plan; (v) Traffic Management Plan; and (vi) Occupational Health and Safety Management Guideline. Mandatory cultural sensitization and Code of Conduct trainings will be provided by BOTAŞ and the contractor to the contractor's workforce. Regular community engagement will include communication on employment availability and labor influx. The majority of the construction workers will be accommodated in a new camp site set up by the contractor that will provide workers with basic amenities and facilities such as lodging, cafeteria, laundry, a health facility, a recreational facility, etc. The current project work camp has a capacity for 400 people and so far, no conflicts between the contractor workforce and local populations have taken place or been recorded in the GRM.

61. **Gender.** The Project will have both direct and indirect social impacts on women. The involvement and participation of women will be ensured through dedicated engagement activities carried out for Project affected women. Project information will be made available at public spaces easily accessible to women. BOTAŞ will ensure that Project benefits such as local employment opportunities, right to resettlement and compensation and safety trainings are also made available to women. BOTAŞ and/or its contractor will provide equal employment opportunities to women. During Project implementation, gender-disaggregated data will be collected at all levels, to allow for the sound design of compensation strategies, livelihood restoration programs/support that will take into consideration the needs, requests and concerns of Project affected women and vulnerable groups.

62. **Stakeholder Engagement and Grievance Redress Mechanism.** BOTAŞ has prepared a Stakeholder Engagement Plan (SEP) specifically for the proposed Project that includes the project-level GRM. The SEP will be administered by BOTAŞ' social team, which will be present both at headquarters and on site. Engagement activities will be initiated at the early stage of the proposed Project to ensure timely and transparent information disclosure. BOTAŞ will inform stakeholders on Project impacts, construction schedules, rights and entitlements pertaining to resettlement and compensation, RAP Fund, employment opportunities, labor influx and the GRM. BOTAŞ will ensure that a gender-sensitive approach is adopted during community engagement activities. Critical dates and issues in relation to land acquisition (i.e., cut-off date, entitlements, negotiations, start of construction etc.) will be announced and disclosed in places accessible to all stakeholders including vulnerable groups, in simple language. BOTAŞ will have two full-time community relations specialists (on site and in headquarters) dedicated to coordinating and implementing engagement activities. BOTAŞ will also establish consultation committees comprising representatives from Project affected people, chambers of commerce and industry, regional authorities, local schools and businesses.

63. BOTAŞ will establish a project-level GRM, to complement the state-managed national GRM open to the public for all national projects. Procedures for receiving Project-related grievances at all levels have been elaborated in the SEP and the RPF. BOTAŞ will ensure that the contractor(s) also establish a GRM in line with the provisions provided in the SEP. The GRM will aim to collect all

Project-related concerns, requests, and complaints, serving both internal (Project workers) and external stakeholders. BOTAŞ introduced the project-level GRM to affected stakeholders through the ESIA and RPF consultations initially and during Project implementation subsequently. On site community relations specialists of BOTAŞ and the contractor will be responsible for addressing site-level grievances on a regular basis as per the GRM process.

64. **Consultation and Information Disclosure.** The first round of public consultations was conducted in November 2016 in the scope of the regulatory EIA. Most of the concerns were related to potential adverse impacts that may affect people's income source as the result of the project (e.g., whether fencing would be used around the well areas or license borders, and whether the local people could continue agricultural and animal husbandry activities, etc.). An early draft ESIA was disclosed in-country by BOTAŞ and through the WB's website on June 6 and June 7, 2017, respectively. During the second round of public consultations held in early March 2018, BOTAŞ noted that no opposition was raised against the proposed project or the ongoing project. Local residents mostly enquired about land acquisition and voiced expectations about potential job opportunities. The ESIA was finalized following the conclusion of consultations and was disclosed both in country on BOTAŞ' website and on WB's website in late March 2018.

65. The environmental and social safeguard instruments can be consulted on the following links:

www.botas.gov.tr/docs/ihaleler/2018/ddb_GSEP_ESIA_Report.pdf
www.botas.gov.tr/docs/ihaleler/2018/ddb_Resettlement_Policy_Framework_RPF.pdf
<http://projects.worldbank.org/P162727/?lang=en&tab=documents&subTab=projectDocuments>

66. **Institutional Capacity.** Within the PMU, BOTAŞ has created a Quality, Health, Safety and Environment (QHSE) Unit and appointed a QHSE manager, one environmental expert, one social expert and one communications specialist. That team was the main focal point for the preparation of the environmental and social safeguard instruments—ESIA, Environmental and Social Management Plan (ESMP), Resettlement Policy Framework (RPF), stakeholder engagement plan (SEP), Resettlement Action Plan (RAP) Fund Management Directive and Procedure, and is required to be maintained during the entire Project period. In addition, a similar team will be set up at the Project site. BOTAŞ is also required to establish an Environmental and Social Management System (ESMS), which describes the roles and responsibilities of all parties (BOTAŞ team, contractor, construction supervision consultant, and ESIA and RAP Monitoring consultant) with regards to review, approval of any changes/revisions and monitoring of the safeguard instruments, including all sub-management plans (i.e., waste management plan, cultural heritage management plan, labor influx management plan, etc.)

67. The ESIA provides a generic description of the ESMS; however, it will be incumbent on BOTAŞ to further develop its ESMS and review the ESMS and detailed ESMPs and procedures to be prepared by its contractors as required in the bidding documents. The construction supervision and ESIA and RAP Monitoring Consultancy components of the proposed Project will need to be fully in line with the ESIA and ESMS requirements. BOTAŞ' organizational system will support the review, approval, monitoring, reporting mechanism of the ESMS. Any change to the ESMS (and/or the proposed activities) in the course of the Project will need to be reviewed and approved by the WB and the Bank.

68. **Monitoring and Supervision.** A Project Management Consultant and an ESIA and RAP Monitoring Consultant (as detailed in Components 2 and 3 in paragraphs 18 and 19, respectively, will be hired by BOTAŞ to oversee the implementation of the ESMP and development by the contractors of site- and activity-specific management plans, and to monitor environmental and social performances against BOTAŞ’ commitments and the WB requirements. BOTAŞ corporate and site QHSE teams will oversee the contractor’s work and review the monitoring reports to be received from the ESIA and RAP Monitoring Consultant. Moreover, it has also been agreed that BOTAŞ’ ESIA and RAP Monitoring Consultant will share the quarterly monitoring plans simultaneously with AIIB through the WB and BOTAŞ to create an independent line of reporting. While the WB will lead on Project monitoring and reporting as per the co-financing framework agreement signed by the respective Presidents of the two institutions in April 2016, the Bank will review the Consultant’s monitoring reports and conduct supervision on at least a yearly basis.

E. Risks and Mitigation Measures

69. Based on the pre-appraisal mission by the Bank, review of documents available from BOTAŞ and WB, and internal discussions and reviews, the Bank assigns a *High* risk rating to the Project.

70. The potential risks according to the Bank’s current assessment and the likely mitigation measures are listed in Table 3.

Table 3: Summary of Risks and Mitigating Measures

Risk Description	Bank’s Current Assessment	Mitigation
Country Risk Deteriorating macro-economic situation of Turkey	High	Re-payment of the loan is guaranteed by the Republic of Turkey through a Sovereign Guarantee
Procurement Complexities in tendering and tender evaluation.	High	The use of BOTAŞ’ owner’s engineer for the ongoing project in the preparation of tender documents. Pre-bid meetings and clarifications/addenda to tender documents ahead of final bids. WB (and the Bank) will be involved in prior review of the contracts.

Risk Description	Current Assessment	Mitigation
<p>Project Implementation Implementation delays compared to the currently envisioned schedule</p>	High	<p>Engagement of supervision consultant/owner's engineer through project completion.</p> <p>The proposed use of a single contractor to minimize coordination issues and facilitate project management by BOTAŞ and its supervision consultant/owner's engineer.</p> <p>Confirming/re-setting the completion schedule at the time of award of the contract with possibility of introducing bidders' proposed time schedule as an evaluation criterion.</p> <p>BOTAŞ and contractor to agree on a Project Management Plan and BOTAŞ to submit and implement a contract monitoring plan.</p>
<p>BOTAŞ Finances BOTAŞ' overall financial performance affecting its ability to finance its share of the project cost.</p>	High	<p>In the past, although BOTAŞ has been able to absorb negative import price and exchange rate shocks through deferred tax and import duty payments and has always repaid arrears with increased profits during subsequent years. (Currently BOTAS does not have any pending taxes and import duty payments.)</p> <p>Also, the Treasury is committed to bridge shortfalls, if any.</p>
<p>Commercial Loans Commercial loans envisaged by BOTAS may not materialize in time</p>	Medium	<p>Construction completion reasonably assured without commercial loans.</p> <p>Govt. of Turkey / Treasury is expected to bridge shortfalls, if any.</p>
<p>Environmental and Social Land acquisition needs cannot be specified upfront as exact locations of subsurface facilities and pipelines can be determined only during detailed design/engineering by the DS&I contractor.</p>	High	<p>Preparation of RAPs during project implementation as detailed design/engineering progresses and exact locations of subsurface facilities and pipelines and land acquisition requirements can be assessed and finalized.</p> <p>Engagement of an ESIA/RAP monitoring consultant through project completion.</p>
<p>Financial Management Flow of funds from financiers to the contractor and consultants.</p>	Low	<p>Existing arrangements agreed between BOTAŞ and WB under the ongoing Tuz Golu and TANAP projects to continue under the Expansion Project.</p>

Annex 1: Results Framework and Monitoring

PDO Statement

The Project's Development Objective is to increase the reliability and stability of gas supply by expanding gas storage capacity.

Project Development Objective Indicators

PDO Level Results Indicators	Unit of Measure	Baseline	Cumulative Target Values								Frequency	Data Source / Methodology	Responsibility for Data Collection
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	End Target			
Reduction of gas supply curtailments	million cubic meter	1500	1500	1500	800	800	0	0	0	0	Annual	BOTAS	BOTAS
Reduction of spot LNG purchases	percentage	0	0	0	0	0	4	31	67	67	Annual	BOTAS	BOTAS
Increase in gas storage capacity	million cubic meter	0	0	0	0	200	1600	4000	4000	4000	Annual	BOTAS	BOTAS

Intermediate Results Indicators

Intermediate Results Indicators	Unit of Measure	Baseline	Cumulative Target Values								Frequency	Data Source / Methodology	Responsibility for Data Collection
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	End Target			
Turkish gas consumers benefitting from gas supply	Million consumers	14	14	15	16	16.5	17	17.5	18	18	Annual	GAZBIR	BOTAS
Implementing Tuz Golu RAP to compensate Project Affected Persons	percentage	0	100	100	100	100	100	100	100	100	Annual	BOTAS	BOTAS
Registered grievances addressed within the stipulated timeframe	Percentage	0	50	60	70	80	90	90	90	90	Annual	BOTAS	BOTAS
Registered grievances submitted by women addressed within the stipulated timeframe	Percentage	0	50	60	70	80	90	90	90	90	Annual	BOTAS	BOTAS
Number of community consultations held for women in proportion to the total number of consultations held	Ratio	0	20	25	30	35	40	40	40	40	Annual	BOTAS	BOTAS

Annex 2: Detailed Project Description

A. The Project

1. The Tuz Golu Gas Storage Expansion Project consists of three components:

- (i) Component 1: Tuz Golu Gas Storage Expansion Facilities;
- (ii) Component 2: Consulting services for project supervision; and
- (iii) Component 3: Consulting services for environmental and social monitoring.

2. Component 1: Tuz Golu Gas Storage Expansion Facilities

(i) Water and Brine Pipelines:

- (a) Construction of a water intake structure at the Hirfanli Reservoir Dam;
- (b) Construction of a 117-km fresh water supply line (34 km of 1,500 mm diameter and 83 km of 1,300 mm diameter) from the Hirfanli Reservoir to the project site with valves (94 air relief valves, 108 drain valves and 18 line valves), four pumping stations, and four storage tanks; and
- (c) Construction of a 31-km brine discharge line (1,600 mm diameter) with valves (26 air relief valves and 5 drain valves and 5 line valves), and a diffuser, from the project site to the Tuz Golu lake.

(ii) Subsurface Facilities:

- (a) Drilling and leaching 40 caverns (plus up to eight “spare caverns” which will be drilled and leached only if necessary), in two phases, to store 4.0 bcm of gas:
 - 12 caverns, each with a net volume of 630,000 m³;
 - 28 caverns with net volumes ranging from 630,000 to 872,000 m³;
 - To drill the caverns in the required timeline, at least 6 drilling rigs are expected to be required;
- (b) Snubbing of 40 caverns;
- (c) Testing all cavern integrity and gas tightness;
- (d) First gas filling for each cavern (operational costs are covered under the contract, excluding the cost of gas itself);
- (e) Commissioning of each cavern; and
- (f) Operation of the facilities.

(iii) Surface Facilities:

- (a) The existing surface facility (SF1), developed for the ongoing Tuz Golu project, will be used for the leaching of 6²¹ of the 40 caverns. It will be connected to 18 of the 40 caverns for gas injection and gas withdrawal;
- (b) Construction of a new surface facility (SF2) for the leaching of 34²² of the 40 caverns. It will be connected to 22 of the 40 caverns for gas injection and gas withdrawal. The facility will include a station inlet/outlet line with pigging facilities, filters, gas flow metering units, five 30 MW gas turbine/turbo-compressor units (four for operations, one stand-by), heat exchangers, water separators, heating and pressure reducing units, and glycol/gas absorber and glycol regeneration units, and utilities;
- (c) Construction of a connection pipeline between the two surface facilities (SF1 and SF2) for first gas filling, operation and maintenance; and
- (d) Construction of a gas transmission line to connect the facility to BOTAS' Kayseri-Konya-Seydisehir gas pipeline/national gas grid at Bozcamahmut.

(iv) Electricity Supply

- (a) Construction of electricity transmission and lines and power supplies for water pumping stations, surface and sub-surface facilities; and
- (b) Uninterruptible power supply systems for critical processes.

(v) Instrumentation, Control, and Telecommunication Systems

(vi) Services to be provided by the Contractor

- (a) Management - planning, co-ordination, control, QA/QC, HS&E, administration, reporting and security requirements, including:
 - QA/QC - quality management system accredited in accordance with ISO 9000:2014;
 - HS&E - health and safety in accordance with OHSAS 18001, 2000 "Guide to Occupational Health and Safety Management Systems"; and
 - HS&E - environment, using an Environmental Management System accredited in accordance with ISO 14001 and implementing the Environmental Management Plan for the Project.
- (b) Detailed design and engineering;

²¹ Surface Facility 1 was designed (under the ongoing Tuz Golu project) to allow leaching of 6 caverns in parallel. Leaching under the Expansion Project will use water from the existing fresh water pipeline and will start as soon as leaching under the ongoing project has been completed.

²² Surface Facility 2 will be designed to allow leaching of 34 caverns in parallel. Leaching will start as soon as the new fresh water pipeline has been completed.

- (c) Procurement;
- (d) Installation services;
- (e) Testing and inspection services;
- (f) Commissioning and operational acceptance; and
- (g) Training of BOTAŞ personnel.

3. Component 2: Supervision Consultancy

- (i) Provision of services of supervision consultant/owner's engineer to be responsible for approving detailed engineering drawings and for supervising the construction and installation of the facilities as well as for the inspection and testing of materials, plant and equipment both during the construction and installation of the facilities; and
- (ii) Provision of services of consultant to develop and implement the overall project quality assurance and quality control program. The program will describe the quality procedures to be followed during data/document review, installation and operation stage.

4. Component 3: ESIA and RAP Monitoring Consultancy

- (i) Provision of services of consultant for regular monitoring of compliance of the construction activities with the ESIA and the RAP;
- (ii) Provision of services of consultant to check and monitor each stage of the construction activities in accordance with the frequencies specified in an ESMP ensuring all environmental and social standards are being fully satisfied and all services are in full conformity with the ESMP developed by BOTAŞ based on the (WB-approved) ESIA; and
- (iii) Provision of services of consultant to be responsible for monitoring the implementation of the RAP that will be prepared by BOTAŞ in line with the WB-approved RPF.

B. Project Implementation Management

5. Within BOTAŞ the day-to-day project implementation is carried out by a Project Management Unit (PMU) led by the Head of the Storage Department. Other departments provide inputs in their areas of responsibility, including procurement, finance, environment and social safeguards. As the implementing agency of the ongoing Tuz Golu project, BOTAŞ as a company and the PMU are experienced in the development of underground gas storage. The PMU is familiar with and experienced in applying WB guidelines and procedures for both fiduciary (procurement and financial management) and safeguards (environmental and social) policies as part of the ongoing project implementation. As is the case in the ongoing project, the PMU will be supported by a construction supervision consultant and an ESIA and RAP monitoring consultant.

6. The PMU has recently been strengthened with more procurement and safeguards specialists (both at BOTAŞ' headquarters and at the project site). These staff oversee project preparation activities, monitoring, reporting and resolving issues and in accordance with WB's policies. The PMU consists of 55 permanent staff working on technical aspects (the surface and subsurface activities), procurement/contracts, safeguards, legal, and financial management and payments. 25 out of 55 PMU staff who are working at the headquarters of BOTAŞ are mainly responsible for project contracting

and control, and ESHS, while 30 of the PMU staff are located at site for implementation and operations. The organization charts of BOTAŞ site personnel for project implementation and gas operations are provided below in Figure 2 and Figure 3, respectively. The PMU is supported by other departments of BOTAŞ such as Land Acquisition and Construction Department (land acquisition and resettlement), Financial Affairs Department (financial management and disbursements) and Office of the Legal Counsellor (Contractual conflicts and arbitration). During project preparation, preparation of the safeguards and technical documentation are externally supported by the Environmental Monitoring Consultant and the Owners Engineer, respectively, as a part of the ongoing project. Implementation activities of the proposed project will be supported by a supervision consultant as well as an ESIA and RAP monitoring consultant. The work and deliverables of both consultancy contracts will be managed by the PMU.

Figure 2: BOTAŞ organization structure for site personnel (project implementation)

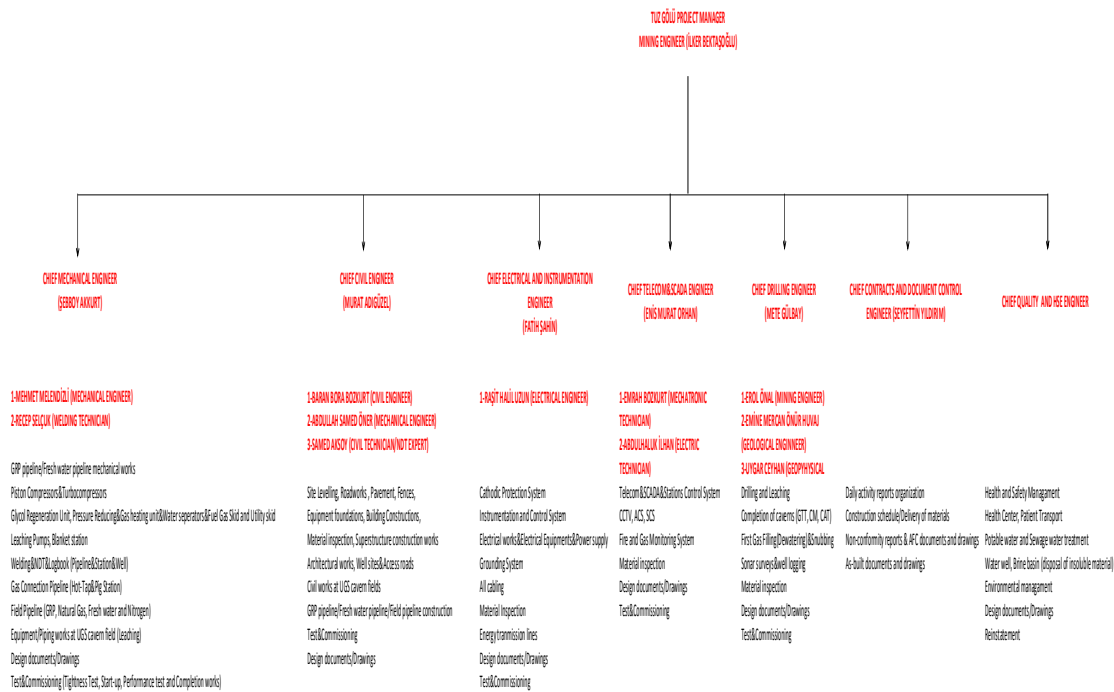
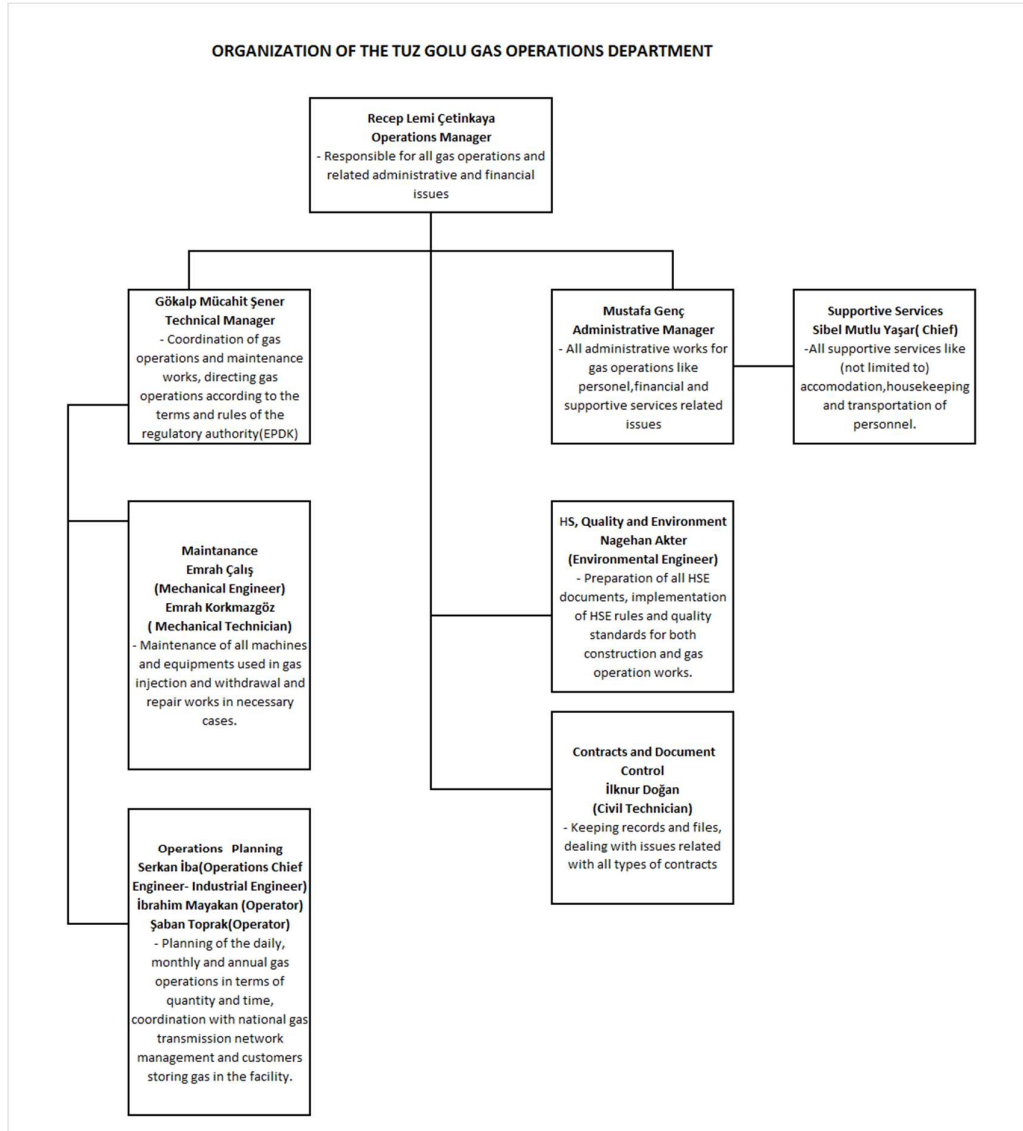


Figure 3: BOTAŞ organization structure for site personnel (gas operations)



Annex 3: Economic and Financial Analysis

Economic Analysis

1. **Gas Supply and Demand.** In the past two decades, the natural gas demand grew steadily. The initial growth was led by the power sector, and after the expansion of the natural gas transmission and distribution systems in the country, residential consumption growth picked up. Since 2011, the annual demand has been growing on average about 3.6 percent with year-to-year fluctuations driven by different hydrology and climate conditions. Gas consumption in 2017 was about 52 bcm, which exceeded the total contracted annual gas supply.

Table 4: Historical Natural Gas Supply and Demand (bcm)

Import		2011	2012	2013	2014	2015	2016	2017	2012-2016	Contract Supply Vol
Russia	bcm	25.4	26.5	26.2	27.0	26.8	24.5	n/a	26.2	30.0
Iran	bcm	8.2	8.2	8.7	8.9	7.8	7.7	n/a	8.3	9.6
Azerbaijan	bcm	3.8	3.4	4.2	6.1	6.2	6.5	n/a	5.3	6.6
Algeria	bcm	4.2	4.1	3.9	4.2	3.9	4.3	n/a	4.1	4.4
Nigeria	bcm	1.2	1.3	1.3	1.4	1.2	1.2	n/a	1.3	1.3
Others*	bcm	1.1	2.5	0.9	1.7	2.5	2.1	3.1	1.9	n/a
Total	bcm	43.9	45.9	45.3	49.3	48.3	46.4	52.0	47.0	51.9

*Others include supply sources from the spot LNG market

Source: EMRA, BOTAŞ, World Bank analysis

2. Turkey's domestic gas demand is met primarily through imported pipeline gas from Russia (30 bcm), Iran (9.6 bcm) and Azerbaijan (6.6 bcm) and by LNG from Nigeria (1.3 bcm) and Algeria (4.4 bcm). Long-term gas purchase contracts were put in place starting in the late 1980s to secure gas supplies. By the mid-1990s, Turkey began importing LNG to increase security and flexibility of supply, first from Algeria (starting in 1994) and then Nigeria (from 1999). Of the long-term contracted volumes, about 22 bcm²³ will expire by late 2021 and the rest will be gradually expiring by 2026²⁴.

3. Gas supply was not free of disruptions in the past. In 2009, the natural gas crisis between Russia and Ukraine resulted in decreasing amounts of natural gas being shipped through the Western route to Turkey. Iran often made cuts to natural gas supply in the winter because of technical problems and the fact that Iran could not meet its domestic demand. Gas imports from Azerbaijan were historically below the contracted volume due to pipeline system constraints.

4. Supply disruptions, coupled with increasing domestic gas demand, especially in winter months cause supply-demand imbalances. As a response, BOTAŞ and other importers were given the freedom to import LNG from the spot market. As a result, the total imported spot LNG volume increased from less than 1 bcm in 2013 to more than 3 bcm in 2017²⁵.

²³ Russia West – 14bcm, Azerbaijan Shah Deniz 1 – 6.6bcm, Nigeria LNG – 1.3bcm, Algeria – 4.4bcm

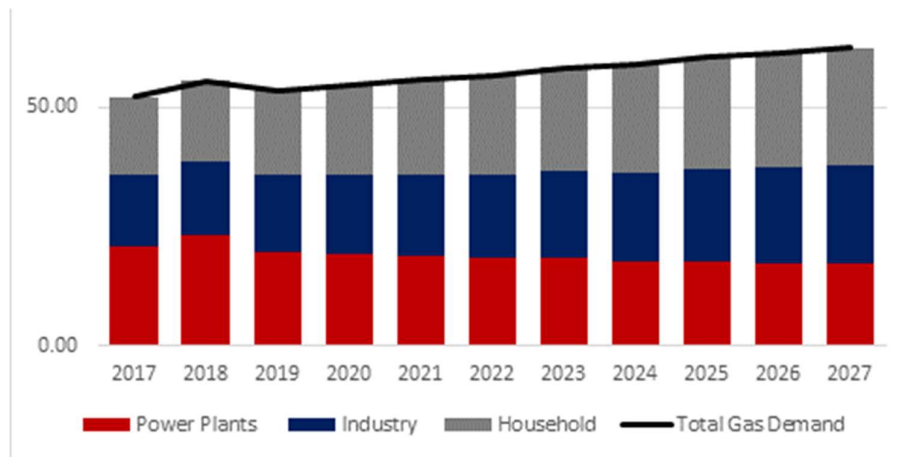
²⁴ A contract between BOTAŞ and Gazprom to import 16 bcm/year through the Blue Stream pipeline that expires in 2025 and a Long-Term Contract between BOTAŞ and Iran to import 9.6 bcm/year that expires in 2026.

²⁵ There are currently three LNG terminals in operation for storage, re-gasification and withdrawal of LNG: (i) Marmara Ereğlisi LNG Terminal which came into operation in 1994 by BOTAŞ; (ii) Ege Gaz A.Ş. LNG Terminal which was constructed in 2001 in Aliağa and came into operation in 2006; and (iii) an FSRU, owned by Etki Liman İşletmeleri Doğal Gaz İthalat ve Ticaret A.Ş., which is the first FSRU terminal in Turkey that came into operation at the end of 2016.

5. Historically the contract volume is always larger than the actual imported volume due to seasonal demand variations, infrastructure constraints and supply disruptions, especially during the winter. The supply demand gap is filled by spot LNG cargos. In 2017, a cold year, demand surpassed the contracted volume (i.e. even if all suppliers can deliver their contracted volume in a very optimistic scenario, Turkey would still face gas shortages). Indeed, the spot LNG import peaked in 2017 to about 3.1 bcm, a 50 percent increase from 2016. Given the supply and demand trends over the past ten years, it is expected that gas supply shortages will become more acute in the forthcoming years when the available supply cannot meet demand, especially during cold winter days.

6. **Future Gas Demand.** natural gas demand is projected to grow in Turkey, mainly driven by the residential and industrial sectors as shown in Table 5.

Table 5: Forecasted Gas Demand by consumer category (bcm)



Source: BOTAŞ

7. A main contributor to past gas demand growth is the extension of the gas transmission and distribution network where work remains to connect all regions of Turkey. As of the end of 2016, the national transmission and distribution networks provided natural gas to households in 77 provinces (out of 81) and 403 districts (out of 958 districts in Turkey). According to BOTAŞ, in the next decade, more households will be connected as part of the ongoing investment in the distribution network. This yields an average annual growth rate of about 4 percent for residential consumers. For industrial consumers, the use of natural gas will gradually increase at an average rate of about 3 percent, in line with long term GDP growth of about 3.5 percent.

8. The government aims to decrease the share of natural gas for electricity generations due to cost and security considerations associated with gas import. In the last five years there has been a slight decrease of gas fired power plant share, mainly due to increasing renewable generation and a reduction in the electricity demand growth rate. It is expected that this trend will continue. As a result, the forecast gas demand from the power generation sector will decrease year by year at roughly 2 percent after 2019.

9. Based on indicative climate data, 2018 will be a drought year with an average temperature. This is the main reason behind the jump of gas demand in 2018.²⁶ The drought condition requires

²⁶ Based on gas demand forecast, 2018 is assumed to be a dry year, therefore, gas consumption is expected to spike as hydro-power generation declines. Demand then adjusts in 2019 due to a return to normal precipitation and temperature levels coupled with the fact that gas supply to power plants is being reduced significantly, while supply to households and industry modestly increases.

more power generation from gas-fired power plants, which in turn require more natural gas. After 2018 the base case forecast assumes that both precipitation and temperature will be on average condition. By 2027 the total demand is expected to be about 62 bcm, 10 bcm more than the 2017 level.

10. **Future Gas Supply.** As noted above, Turkey's existing gas contracts are gradually expiring over the next 4-8 years. About 22 bcm gas contracts (Nigeria LNG, Russia West pipeline and Azerbaijan Phase-1) are due for renewal well by end of 2021 and negotiations are expected to start well ahead. The base case assumption is that these contracts will be renewed on time, although it remains uncertain if Azerbaijan Phase-1 has sufficient upstream reserve to support another long-term supply agreement. The base case forecast further assumes that the remaining existing contracted volume will be renewed around 2024, which is critical for Turkey to maintain its supply security and system reliability.

11. It is also important to note that should existing contracts be renewed on-time, the current volumes will not be sufficient to meet the projected increasing demand. As demand already surpassed the total existing long-term contract volume, new supply contracts or the same contracts with larger volumes will be needed in the coming years. The only signed new supply addition is 6 bcm of natural gas from Azerbaijan's Shah Deniz 2 field via TANAP²⁷. The initial supply via TANAP will be limited to 0.8 bcm in 2018 and gradually increase to 6 bcm in 2023 after a ramp-up period. TANAP is also designed to be expandable to potentially carry up to 31 bcm although it remains to be seen how much of this future expansion would be contracted by Turkey as TANAP is intended to also transport gas to European buyers.

12. Aside from TANAP gas from Azerbaijan, additional gas supplies from Russia are possible. A new 63 bcm pipeline system dubbed TurkStream is underway. Led by Gazprom, the project is designed to transport gas directly from Russia to Turkey across the Black Sea. The first of the two envisioned 15.75 bcm parallel pipelines are slated for completion by the end of 2019. One of the two pipelines under construction will supply Turkey which is expected to supply the 14 bcm currently supplied through the Russia West gas pipeline (or could alternatively supply as much as 15 bcm incremental volume once operational in the early 2020s). The second of the two pipelines could supply additional volumes to Turkey and/or countries in South-East Europe, for a total of 15 bcm/annum.

13. The base case supply forecast does not take into considerations the additional supply volume outside signed contracts before 2030 because negotiations of these multi-billion long term gas contracts are a sensitive issue and could take very long time to materialize. However, it should be noted that up to 15 bcm could, in-principle, be supplied in the 2020s by the second of the two TurkStream pipelines. Beyond 2030, the base case does assume over 15 bcm new gas volume from Russia, Iraq and/or other countries combined. The base case further assumes that Iran gas will be limited to 8.4 bcm given the enduring technical problems and the fact that Iran could not meet its own domestic consumptions in the winter. The base case assumes full contracted volume from Azerbaijan Phase-1 and TANAP as the technical constraints on imports in the past was largely removed after BOTAS added new compression stations in 2016.

14. Based on the projected gas supply and demand, spot LNG imports will continue to play a critical role in balancing Turkey's winter natural gas needs. It is estimated that spot LNG import will increase from 1.0 bcm to over 9.9 bcm by 2030, as a flexible way to meet the growing demand. It also worth mentioning that if any contract renewal does not realize, the supply vacuum will most likely be filled with spot LNG on an ad-hoc or permanent basis.

²⁷ the remaining TANAP capacity of 10 bcm are contracted by others

Table 6: Forecasted Gas Supply (bcm)

Contract (volume)	Expr Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Algeria LNG (4.4bcm)	2024	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Nigeria LNG (1.3bcm)	2021	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Azerbaijan Phase-I (6.6bcm)	2021	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Azerbaijan (TANAP) (6bcm)	2033	0.8	2.3	4.3	5.2	5.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Russia (Black Sea) (16 bcm)	2025	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Russia (West and possible TurkStream ²⁸ combined) (14bcm)	2021	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Iran (9.6bcm)	2026	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Total w/o spot LNG		51.0	52.4	54.5	55.3	55.4	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2
Total demand		55.4	53.5	54.6	55.6	56.7	58.2	58.9	60.3	61.3	62.3	63.5	64.8	66.1
Spot LNG		4.4	1.0	0.2	0.3	1.3	2.1	2.7	4.2	5.1	6.1	7.4	8.6	9.9
Total Supply		55.4	53.5	54.6	55.6	56.7	58.2	58.9	60.3	61.3	62.3	63.5	64.8	66.1

Source: BOTAŞ (contracts, volumes and expiration years); Bank team estimates (forecasts)

15. BOTAŞ and other LNG importers in the past years purchased LNG during winter months when the contracted supply did meet the demand, although this came at a premium given that spot LNG is more expensive during winter. Storage facilities can help Turkey's LNG importers shift the purchase pattern from winter to summer, taking advantage of the lower price and more abundant supply. The overall annual import might remain constant, but the LNG purchase costs can be significantly reduced when storage facilities are fully utilized.

16. **Tuz Golu Expansion Benefit Summary.** The economics of the proposed project is driven by the cost of construction, cushion gas purchase and benefits associated with the facility. The benefits are mostly derived from (i) seasonal storage; ii) meeting winter peak demand; and iii) security of supply. There are additional benefits that were not quantified as shown in Table7 such as: (i) avoided cost of incremental gas infrastructure investments; (ii) enhanced future gas supply contracting options; (iii) gas trading with Europe; and (iv) using stored gas as back-up pressure support to stabilize or regulate the operating pressure of the grid, if needed.

17. Benefit (i) is realized by saving cost by purchasing gas at a lower price and does not compete with the benefits (ii) and (iii). While the benefits (ii) and (iii) could theoretically overlap in terms of using gas storage capacity, the parameters and assumptions in the analysis are chosen such that the benefits do not overlap, i.e. benefit (ii) and (iii) can be realized at the same time.

18. The first benefit of seasonal storage derives from the fact that storage enables BOTAŞ and other gas importers in Turkey to buy and inject gas into storage outside winter months, when the gas is more available and affordable. The stored gas can then be withdrawn during the winter when gas

²⁸ Once completed, TurkStream can provide more than 14 bcm, potentially serving as reserve margin for Turkey.

is in short supply and/or more expensive. This way, Turkey as a major gas importer, can take advantage of seasonal gas price differences in the market and reduce its energy import bill.

19. Second, storage can be used to fulfill the above-average gas demand in the coldest days in winter when the gas demand, mainly from the residential sector is at its highest. Currently BOTAS is facing shortages during the coldest days of the winter when it prioritizes the gas supply to households for heating over power generation, causing curtailment at some gas fired power plants. The power shortage is then offset, if at all, by increased use of fuel oil/diesel in dual-fuel power plants or from coal-fired power plants.

20. Third, storage provides an alternative supply source in the case of unexpected gas supply disruptions or exceptional climate conditions that cannot be mitigated by the gas supply system.

21. In addition, there are also other significant, but less quantifiable benefits associated with the Tuz Golu gas storage expansion that were not included in the economic analysis. For example, the availability of additional supply in winter months provides Turkey with options in contracting future gas supplies including possible price and/or delivery flexibilities. Tuz Golu also supports Turkey's ambition to become a gas trading hub between the Middle East and Europe. The trading hub will benefit from the storage capacity in facilitating domestic and cross-border trade and smoothing short-term supply disruptions. Additionally, the Tuz Golu expansion could also reduce the need for additional compressor stations and pipelines in the transmission system. The stored gas at Tuz Golu can also serve as back-up pressure support to be injected into the grid to stabilize or regulate the operating pressure, if needed.

22. **Benefit Qualification Assumptions and Methodology.** The incremental costs and benefits are consolidated to establish the EIRR of the project deriving from the quantifiable benefits of the project. The economic evaluation spans a period of 30 years from 2018 to 2047. This is based on the estimated economic life of caverns and pipeline systems. Construction is assumed to start by end of 2018.

23. The total estimated infrastructure costs are US\$1.65 billion (excluding contingencies). Additionally, the capitalized cost of cushion gas (US\$400 million) are included in the analysis as well as the operations and maintenance costs at 1.5 percent per year of the investment costs. For the economic evaluation, the project costs exclude price contingencies and interest during construction. The investment costs are assumed to be incurred over five years based on BOTAS' implementation schedule.

24. Both costs and benefits are estimated in economic terms at constant 2018 price levels and set up as cash flows over the lifetime of the infrastructure including the construction and operations periods. The NPV of benefits and costs is calculated using a discount rate of 6 percent²⁹.

25. **Benefit – Seasonal Storage.** Storage allows more gas to be bought in the summer when it is readily available and generally lower cost. The stored gas can then be used during winter during supply shortages or demand spikes. Without storage, Turkey must procure LNG on the spot market to fill the gap. As shown in Table 10, spot LNG supply is expected to grow in the 2020s. By the end of 2030, the spot LNG import can reach about 10 bcm annually.

²⁹ Turkey's real term annual GDP growth rate is 3.5% (http://www.imf.org/external/datamapper/NGDP_RPCH@WEO/UKR/TUR); Turkey's population growth rate is 0.5 - 0.7 percent (<http://www.un.org/esa/population/publications/worldageing19502050/pdf/200turke.pdf>); and the adjusted real term GDP per capita growth rate is about 3.27 percent. The discount rate chosen is roughly twice the real GDP growth per capita of Turkey at 6.54 percent.

26. Turkey is experiencing spot LNG price differences between summer and winter and continues to pay a price premium for its LNG import during the winter. When gas storage is in place, Turkey can shift its LNG purchases to the summer months. The analysis uses National Balancing Point (NBP)³⁰ data on gas prices to approximate the spot LNG price movement between summer and winter. Based on historical (2013-2017) NBP data shown in Table 8, over this period the winter price was in some years 13 percent higher than the annual average prices (e.g. in 2014). While in other years the average winter price was higher by 4 percent than the annual average price. Therefore, taking the average of the past four years' premia, the average premium applied to winter gas prices is 8 percent. The same methodology was applied to summer gas prices, resulting in an average discount in summer gas prices over the last four years of 6 percent compared to the annual average prices. Shifting gas imports from winter to summer therefore would yield a 14 percent swing in price benefits.

Table 7: Benefit Quantification Method

	Types of Benefit	Description of Benefit	Method of Benefit Measurement
Measurable benefits	1. Using seasonal storage to facilitate purchase of gas at lower cost during off-peak demand periods	Due to the seasonal price gap in the spot LNG market between summer and winter, by procuring cheaper gas for the storage in the summer for winter usage, Turkey benefits from this price arbitrage	Seasonal Price Gap x Amount of Tuz Golu Expansion working gas capacity
	2. Meeting peak demand	Due to Infrastructure and contractual constraints, Turkey has difficulty meeting short-term demand peak in winter caused by lower than average temperatures. Additional gas storage volumes could fill the short-term gap.	(Alternative Fuel Cost x Peak Supply Demand Gap) – (Gas Price x Peak Supply Demand Gap)
	3. Enhancing security of supply	In case any supply interruption occurs due to technical, political or commercial reasons, additional gas storage could be an alternative emergency supply source for a short period.	(Alternative Fuel Cost x Supply Interruption) – (Gas Price x Supply Interruption)
Unmeasurable benefits	4. Avoided Cost of Incremental Infrastructure Investments	Due to the nature of underground storage, the stored gas can serve as back-up pressure support to be injected into the grid to stabilize or regulate the operating pressure, reducing the need for additional compressor stations or transmission pipelines.	Not measurable as it is difficult to allocate the exact cost savings attributed only to storage.
	5. Enhancing Turkey's flexibility in contracting future gas supply	The flexibilities provided by the storage facility provides Turkey with options in contracting future gas supply volumes and prices.	Not measurable and not included in the analysis
	6. Facilitating gas trade with Europe	The storage facility helps Turkey to realize its ambition to become a major trading hub.	Not measurable and not included in the analysis
	7. Grid pressure management	Stored gas can be used as back-up pressure support to stabilize or regulate the operating pressure of the grid, if needed	Not measurable and not included in the analysis

Table 8: NBP Gas Seasonal Price (GBP per million British thermal units)

	Winter Months							Summer Months								
	Nov	Dec	Jan	Feb	Mar	Avg	Premium	April	May	Jun	Jul	Aug	Sep	Oct	Avg	Discount
2013	69.0	66.0	66.3	69.2	93.0	72.7	7%	64.3	67.0	63.1	67.4	63.7	63.2	65.5	64.9	5%
2014	58.4	48.8	61.3	56.7	50.5	55.1	13%	46.6	42.7	39.0	39.7	45.1	50.7	47.0	44.4	9%
2015	38.7	32.1	49.2	51.9	48.2	44.0	4%	46.0	43.8	42.1	42.9	37.9	39.0	37.3	41.3	3%
2016	50.0	52.9	30.8	31.1	28.4	38.6	8%	32.1	33.7	33.7	34.1	22.8	35.0	46.8	34.0	5%
2017	56.2	53.2	55.9	44.5	38.5	49.7	10%	41.3	37.1	36.5	39.5	45.0	43.9	48.1	41.6	7%

Source: Bloomberg

27. After 2030, the assumption is that Turkey should be able to secure new gas supplies, most

³⁰ As spot price purchases are confidential, NBP data is used as a price proxy for spot LNG imports.

likely piped gas from neighboring countries. By that time, the storage facility primarily serves to reduce the spot LNG import requirement by replacing it with less expensive pipeline gas during the summer. It is assumed that new gas contracts will have a similar price regime to the contracts to Europe which would be the alternative market for the gas supplying countries. As a conservative approach, the economic analysis does not assume price parity between piped gas and LNG in view of an emergence of regional gas market pricing. Should there be an explicit long-term price premium for LNG over pipeline gas, the project economics would be more favorable.

28. The Tuz Golu expansion (4 bcm³¹), coupled with the 1.2 bcm capacity from the ongoing project and Silivri facility (4.4 bcm), can shift a total of about 10 bcm of natural gas intake from the winter to summer, taking advantage of lower gas prices. The benefits are allocated between various facilities on a pro-rata basis based on working gas capacity. As a result, the present (economic) value associated with seasonal storage for Tuz Golu expansion is US\$0.93 billion.

29. **Benefit – Meeting Winter Peak Demand.** Turkey’s gas demand is highly seasonal. The average demand during the five coldest months (January to March and November to December) is about 25 percent higher than in the remaining seven months as illustrated in historical data given in Table 9.

Table 9: National Monthly Consumptions (mcm)

	2012	2013	2014	2015	2016	2012-2016
	Net	Net	Net	Net	Import	Average
January	4,743	4,490	4,723	4,967	5,392	4,863
February	4,188	4,050	4,157	4,588	3,964	4,189
March	4,591	3,856	4,477	4,210	3,812	4,189
April	3,188	3,388	4,077	3,521	3,553	3,545
May	3,138	3,475	3,856	3,280	3,215	3,393
June	3,151	3,076	3,249	3,180	3,173	3,166
July	3,638	3,343	3,620	3,253	3,220	3,415
August	3,318	3,209	3,754	3,669	3,627	3,515
September	3,694	3,459	3,823	3,623	3,007	3,521
October	3,149	3,472	3,419	3,701	3,456	3,440
November	3,987	3,865	4,525	4,538	4,354	4,254
December	4,527	4,904	4,949	5,274	5,574	5,046

Source: EMRA, Bank team analysis

30. Regularly during the winter, the maximum daily supply does not meet the demand on the coldest days as shown in Table 10. BOTAŞ has recently experienced gas curtailments as much as 1-2 bcm per year. Going forward, it remains a challenge to keep up with the increasing daily demand, and this is when storage can help supply the additional gas volumes that are needed to meet the demand. The volume requirement is estimated from the probability of a given number of cold days in an averagely cold winter³². As a result, over the five winter months, about 12 effective days are estimated as the coldest days where the total supply is falling short of demand. The difference between the demand and the available supply is supplied by storage (both existing and planned storage facilities).

31. In the absence of storage, the energy supply demand gap during the coldest days can be offset

³¹ The storage capacity of Tuz Golu after completion is estimated to be 4.2 bcm, the exact storage capacity is uncertain. To be on the conservative side, the economic and financial analysis work with the rounded value of 4 bcm.

³² For the daily gas demand, a normal distribution is assumed for different climate conditions during the winter. The coldest days where supply fails to meet demand are defined as three standard deviations above the average cold day.

by marginal power generators. Light fuel oil and/or diesel are typically used as replacement fuels for natural gas. The avoided costs of using light fuel oil and diesel during winter are the main benefit to using storage for meeting the winter peak demand and avoiding curtailment.

32. The benefits of meeting peak demand for the proposed project is in proportion to its storage capacity relative to the total available storage capacity in Turkey. As a result, the present value associated with meeting peak demand is about US\$0.48 billion.

Table 10: Maximum Gas Supply Volume (mcm)

Maximum planned and existing supply facility (million cm)								
Existing Entries	2017	2018	2019	2020	2021	2022	2023	2024
RUSSIA WEST*	41	41	41	41	41	41	41	41
BLUE STREAM WINTER	47	47	47	47	47	47	47	47
IRAN WINTER	20	20	20	20	20	20	20	20
AZERBAIJAN PHASE -I WINTER	19	19	19	19	19	19	19	19
AZERBAIJAN PHASE-2		3	12	12	17	17	17	17
SILIVRI STORAGE	25	25	25	25	60	65	70	75
MARMARA EREGLI LNG	20	20	27	27	27	27	27	27
SPOT LNG	24	30	30	30	30	30	30	30
TUZ GOLU		20	20	30	40	40	40	40
TOTAL DAILY SUPPLY	196	225	241	251	301	306	311	316
DAILY DEMAND WINTER	209	222	231	234	247	254	260	264
DAILY PEAK DEMAND WINTER	249	273	285	293	306	313	322	330
DAILY PEAK SUPPLY DEMAND GAP	-53	-48	-44	-42	-5	-7	-11	-14

* Russia West might be partially replaced by TurkStream

33. **Benefit - Supply Security.** The use of storage for security of supply is to avoid gas shortfalls due to exceptional or unexpected events such as unexpected supply interruptions. Under these circumstances, it is assumed that 15 days equivalent gas of the largest supply route will be interrupted. It is also assumed that if the interruption lasts longer than 15 days, it should be possible to secure spot LNG from the market which is the expected lead time for cargo arrival. It is further assumed such event will take once in 10 years³³.

34. The benefit of storage for security of supply was evaluated by considering a one in 10 years probability weighted value of the avoided costs of using light fuel oil or diesel to make up for gas supply interruptions or for exceptionally high demand. The benefits of the proposed project are in proportion to its storage capacity relative to total working gas capacity. As a result, the present value attributed to supply security is about US\$0.60 billion.

35. **Results of Economic Analysis.** The total NPV of the project is US\$384 million with an EIRR of 8.1 percent. The NPV and EIRR including GHG benefits is US\$437 million and 8.5 percent for the low case SCP, and US\$526 and 9.0 percent for the high case SCP. The NPV for each measurable benefit is also presented in Table.

36. In the future, natural gas might evolve into a global commodity when LNG cargos enables global trade. In that scenario, price parity between piped gas and LNG is possible. The analysis tested the sensitivity of a narrowing gas price differentials between summer and winter by 30 percent. The

³³ The last occurrence of such event was in 2009 when disputes between Russia and Ukraine over natural gas supply resulted in interruptions to Turkey.

NPV and EIRR of the project reduced to US\$48 million and 6.1 percent, respectively. Also, the analysis tested a very conservative cost overrun scenario by increasing the total construction costs by 40 percent (from US\$ 1.65 billion to US\$ 2.31 billion). The NPV and EIRR of the project reduced to US\$97 million and 6.3 percent, respectively. The project upsides are also tested in the scenarios where the summer and winter price gap increases to 20 percent from 14 percent in the base case. In that scenario, the project NPV and EIRR would be US\$874 million and 10.5 percent, respectively.

Table 11: Summary of Economic Analysis

	PV (US\$ million)	EIRR (%)
Benefit 1: Seasonal Storage	903	-
Benefit 2: Meeting Winter Peak Demand	478	-
Benefit 3: Supply Security	602	-
Project Costs	-1,600	-
NPV (excluding GHG benefits)	384	8.1%
NPV (including GHG benefits with low case SCP)	437	8.5%
NPV (including GHG benefits with high case SCP)	526	9.0%

37. **Sensitivity Analysis:** The Project economics are most sensitive to the seasonal gas price difference and the project cost assumptions. Each factor has a significant impact on the NPV and EIRR of the project.

Table 12: Project Economic Sensitivities

Sensitivity Scenarios	NPV (US\$ million)	EIRR (%)
Base case	384	8.1
a. 40 percent infrastructure cost increase	97	6.3%
b. Narrowing winter-summer price gap	48	6.1%
c. Increase in winter-summer price gap	874	10.5%

Financial Analysis

38. **Tariff calculation methodology.** The storage tariff is set in accordance with the guideline on *Tariff Calculation Principles and Procedures for Underground Natural Gas Storage Companies* developed and managed by EMRA who is also in charge of approving BOTAS' tariff application. According to the regulation, the tariff is subject to change on an annual basis during the implementation period.

39. The storage tariff will be determined on a cost recovery basis with a minimum of 10 percent return on a real term basis. Cushion gas purchase costs can be capitalized and used for cost recovery as well. The cost recovery period can be chosen between 12 and 22 years. The storage tariff will be set in Turkish Lira and adjusted to inflation.

40. The basic steps to calculate the tariff are as follows:

- (a) Evaluate the regulated asset base that consists of capital expenditure;
- (b) Evaluate the regulated operating costs and operating capital costs;

- (c) Evaluate the cushion gas;
- (d) Calculate the real rate of return on the regulated asset base and the cushion gas; and
- (e) Adjust the regulated asset base, cushion gas to reflect the changes in expenditure, the natural gas price, and inflation.

Based on the above five components, the annual revenue requirement, which is the amount of annual tariff an underground natural gas storage facility can charge, is calculated as follows:

$$GG_t = (ODVT \times RGO_{net}) + \dot{i}_t + \dot{i}G_t + \dot{i}SG_t + YGB_t \quad (1)$$

Where:

- t:** is each tariff year in the tariff implementation period,
- GG_t:** is the annual revenue requirement for the tariff year *t*,
- ODVT_t:** is the average regulated asset base value in tariff year *t*,
- RGO_{net}:** is the adjusted rate of return (%),
- \dot{i}_t :** is the amount allocated for amortization of investments in tariff year *t*,
- $\dot{i}G_t$:** is the regulated operating costs set for the tariff year *t*,
- $\dot{i}SG_t$:** is the regulated operating capital costs set for the tariff year *t*,
- YGB_t:** is the cushion gas component for the tariff year *t*.

41. The Regulated Asset Base includes only on-facility assets used by the underground storage company in its operations, such as building, vehicle, software, etc., which are required for the execution of the underground storage activity. Any exchange rate difference, late payment charge, interests and similar financing expenses incurred after the commissioning of underground storage facility are not taken in to account. The Tariff Calculation Principles and Procedures does not explicitly mention whether financing costs occurred before the commissioning of the facility are allowed as part of asset basis, such as interest during construction and other upfront financing fees. To be conservative, the analysis excludes any financing costs from the cost recovery base.

42. **Tariff estimate parameters.** Following the tariff setting guideline, the tariff estimate assumes US\$2 billion in total capital investments including contingencies. The capital investment is assumed to be amortized in 22 years with a straight-line schedule to maximize the recovery period. The regulated operating capital costs are determined by multiplying 1/12 of the regulated operating costs taken for the related tariff year in the tariff calculations, by the real rate of return.

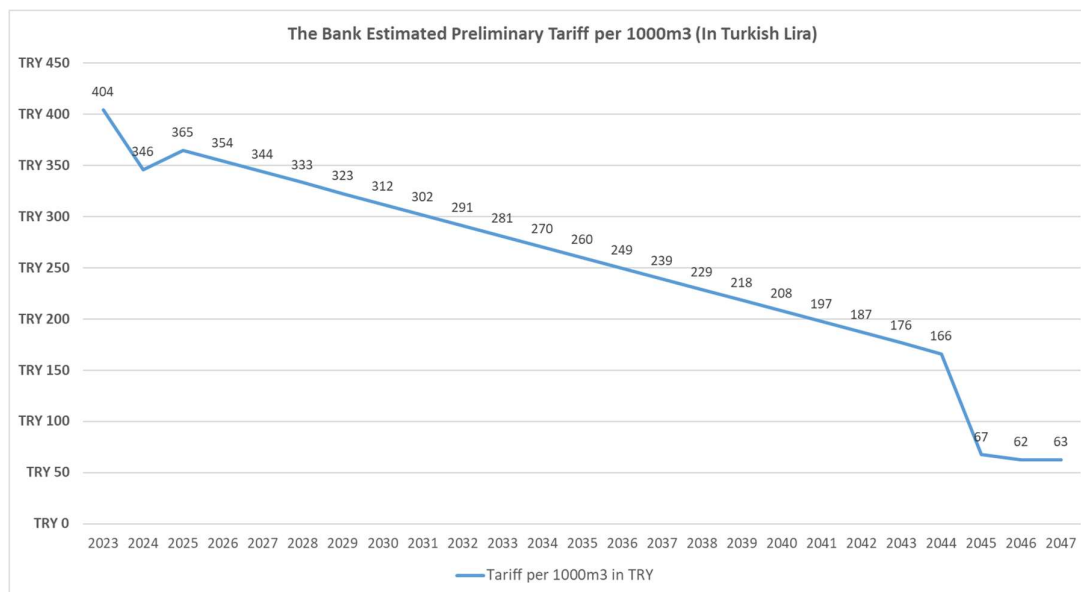
43. The cushion gas purchase cost is capitalized and recovered starting from the year that the cushion gas is injected into the storage. As per the tariff setting guideline, capitalized cushion gas purchase costs are not depreciated. As a result, BOTAS can apply the same rate of return on the value of the cushion gas for the entire project period, which is one of the large drivers of free cash flow of the Project.

44. The Bank estimate uses a 12.07 percent rate of return in nominal terms following the advice from BOTAS based on its Weighted Average Cost of Capital. Considering the minimum guaranteed return on real term at 10 percent and double-digit inflation rate in Turkey, a 12.07 percent rate of return on nominal terms are a conservative assumption. Different rates of return at 10 and 18 percent are tested in the sensitivity analysis.

45. The adjustment factors of regulated asset, regulated operating cost, and cushion gas were not considered in the financial analysis, since those adjustments are done on an annual basis during the implementation period.

46. Based on the tariff method described above, the Bank team estimated the annual tariff requirement for the project as shown in Figure 4 below. The estimate follows the *Tariff Calculation Principles and Procedures for Underground Natural Gas Storage Companies* described above.

Figure 4: Calculated Tariff (TL/1000m3)



47. *Sources and uses of funds.* The proposed project will be financed from four different sources, namely: IBRD, AIIB, IsDB, and commercial lenders (on a corporate finance basis). As part of the strategy to minimize interest during construction, BOTAŞ is planning to finance the investment costs (also referred to as capital expenditures or CAPEX) with the IFIs financing first. This provides BOTAŞ with flexibility to secure additional financing from commercial banks or utilize its equity later. According to BOTAŞ’ financing plan, the cost of cushion gas and IDC will be financed by equity or commercial borrowing. The preliminary financing plan is summarized in Table 13 below.

Table 13: Sources and Uses of Funds³⁴

Financing Plan - USD mln	2018	2019	2020	2021	2022	2023	Total	%
Use of Funds								
CAPEX	228	196	243	471	431	431	2,000	73%
Cushion Gas	0	0	0	0	124	275	400	15%
IDC	11	21	33	57	80	99	300	11%
Others	16	12	2	2	2	0	35	1%
Total Costs	242	219	278	528	627	806	2,735	100%
Source of Funds								
IBRD	123	109	139	229	0	0	600	22%
AIIB	123	109	139	229	0	0	600	22%
IsDB	0	0	0	71	279	0	350	13%
Commercial Lenders	0	0	0	0	139	311	450	16%
BOTAS Equity	0	0	0	0	251	484	735	27%
Total Funding	246	219	278	528	627	802	2,735	100%

48. *Revenue calculation.* It is assumed that the only source of revenue is generated from tariffs in

³⁴ CAPEX includes contingencies in the amount of US\$350 million shown for funding purposes only.

the financial analysis. The principle of tariff calculation is discussed above.

49. *Capital Expenditure.* The base case assumes a capital expenditure cost excluding contingencies. The capital expenditure schedule includes the infrastructure costs (US\$1.65 billion) and the construction supervision consultancy and the ESIA and RAP monitoring consultancy contracts (US\$20 million combined) for a total of US\$1.67 billion. It is also assumed that the cushion gas will be capitalized, but it will not be depreciated. The project follows a 22-year straight-line depreciation schedule. The project cost phasing is based on the estimated project implementation schedule as summarized in Table 14.

Table 14: Project Cost Phasing

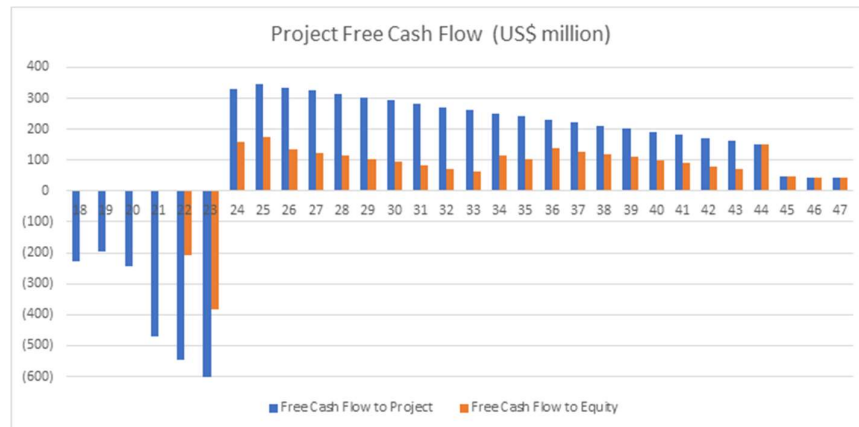
Year	Project Cost (US\$m)	Cost Distribution
2018	190	11%
2019	164	10%
2020	203	12%
2021	393	24%
2022	360	22%
2023	360	22%
Total	1,670	100%

50. *Cushion gas.* This gas is required to keep the storage at a certain pressure to maintain cavern integrity. The analysis assumes that 1.71 bcm of cushion gas is required, which is roughly equal to 30 percent of the total storage capacity in the cavern including both working gas and cushion gas. The cost associated with cushion gas of about US\$400 million is capitalized and financed accordingly.

51. *Operation Expenditure.* The operation expenditure of US\$9 million is assumed based on data provided by BOTAS. The operational expenditures are adjusted for inflation.

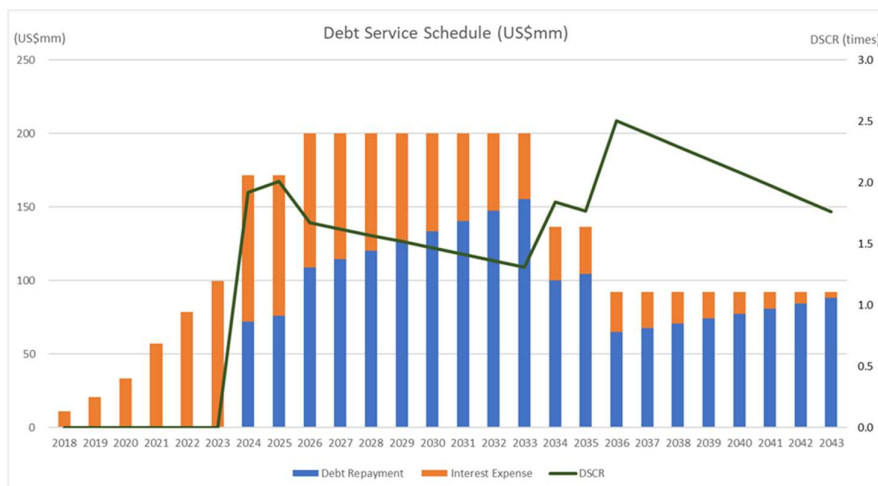
52. **Project Financial Analysis Results.** The Project is expected to generate sufficient cash to cover its operating expenditure, service its debt and pay taxes. The accumulated net cash flow is estimated to reach US\$2.6 billion over the 30-year life of the project. The Free Cash Flow to Project and the Free Cash Flow to Equity are estimated and shown in Figure 5 below.

Figure 5: Project Free Cash Flow



53. *Debt Service Schedule.* The results indicate the project’s ability to generate sufficient cash to meet its debt service with an average DSCR of 1.83 and a minimum DSCR of 1.31 as shown in Figure 6.

Figure 6: Debt Repayment Profile



54. *Summary of Financial Analysis.* Using the Bank’s tariff assumptions in the previous section, the base case project financial NPV is US\$486 million and the project FIRR is 8.7 percent.

55. *Sensitivity Analysis.* Six sensitivities were tested against various assumptions of project costs, Turkish Lira depreciation and rates of return. The results are shown in Table 15 below.

Table 15: Project Financial Sensitivities

Sensitivity scenarios	Project FIRR	Project NPV (US\$ m)
Base Case without Project Cost Contingency	8.7%	486
a. Base Case with Project Cost Contingency	8.7%	560
b. Cost Increase by 50% (no tariff increase)	6.6%	202
c. Turkish Lira Depreciation by 25% in 2025	6.1%	57
d. Turkish Lira Depreciation by 50% in 2025	2.5%	(399)
c. Rate of Return Decrease to 10%	7.4%	261
d. Rate of Return Increase to 18%	12.3%	1,131

56. The result of the Base case (excluding contingencies) is a NPV and FIRR of US\$486 million and 8.7 percent, respectively. When including contingencies, the NPV of the project is higher due to the higher asset base which allows BOTAS to generate more returns but there is no impact on the FIRR.

57. If project costs increase by 50 percent with no corresponding tariff increase (scenario b in Table), this implies a cost increase (or over-run) of about US\$835 million or a total cost of US\$2.5 billion. Under such a scenario with no tariff adjustment, the project would still be commercially viable albeit with a reduced NPV of US\$202 million and an FIRR of 6.6 percent.

58. Local currency depreciation has a great impact on the project financials. Any depreciation of the Lira effectively reduces the tariff in US dollar terms, weakening BOTAS' ability to maintain its profitability and generate sufficient cash to service its debt. In the case where the Turkish Lira depreciates by 25 percent in 2025 and remains flat after that (scenario c), the project will return a marginally positive result with an NPV of US\$57 million and a FIRR of 6.1 percent. If the Lira depreciates by 50 percent in 2025, the project NPV will be negative.

59. The existing storage tariff regulation allows for a minimum 10 percent rate of return (in real terms) for storage facilities. Assuming BOTAS only receives a tariff with an implied rate of return of 10 percent, the project's financial NPV and FIRR will reduce to US\$261 million and 7.4 percent, respectively. On the other hand, if the rate of return is set at 18 percent, the project financial results will be significantly higher with a financial NPV and IRR of US\$1,131 million and 12.3 percent, respectively.

60. On a stand-alone basis the project is less sensitive to cost increases. This is mainly driven by the cost recovery mechanism of the tariff methodology. A higher cost base can be converted to a higher asset base value thus allowing for higher recoveries and returns. However, it is unclear whether the regulator will apply any price cap to limit the recovery of additional costs. The project financials remain robust with a positive NPV and FIRR above the hurdle rate, even if BOTAS only receives the minimum rate of return of 10 percent guaranteed as part of the tariff formula under the existing regulation. The project is exposed to foreign exchange volatilities but this exposure to local currency depreciation is the same risk exposure faced by BOTAS' at the corporate level.

61. **BOTAS' Financial performance.** BOTAS' profitability and cash position are dependent on its ability to pass through its gas purchase costs to end consumers which it has not been able to do consistently. As a result, BOTAS made a loss in 2011-12 and again in 2014-2015. Despite BOTAS' losses in 2014 and 2015, it managed to continue its investment and maintain a positive cash position at year-end. This was achieved through an allowance to defer its value added taxes and other tax obligations to the Government.

62. In 2016, BOTAS made a strong financial recovery, making more than TL10 billion operating profit before tax in one year. The dramatic fall of oil prices starting from 2015 resulted in a delayed adjustment to BOTAS' import gas price in 2016, which explained the significant fall of BOTAS' Cost of Sales by almost TL13 billion. This, coupled with the unchanged gas sales price, enabled BOTAS' to recover its previous loss positions. In 2016, BOTAS managed to clear all its arrears in delayed tax payment to the government. After settling all arrears and meeting investment and operational needs, BOTAS' cash balance still increased by TL1.7 billion.

63. BOTAS' profitability forecast shows an overall break-even level in the next five years under the assumption of a generally stable oil price³⁵ and exchange rates after 2018. In 2018, it is estimated that BOTAS will make a TL6 billion loss mainly because of an increase in the oil price during the second half of 2017, which is expected to be reflected in the increasing gas purchase costs in 2018. Table 16 below shows BOTAS' Income Statement forecast. As noted above, to ensure a sustainable profitability and cash position and for BOTAS' to undertake such large investments, it will need to be able to pass-through foreign exchange and gas import prices fluctuations to its consumers.

64. BOTAS is entering a period of intensive capital investment in the next five years. Several large projects including gas storage expansions, TANAP, a new FSRU as well as gas transmission network

³⁵ Oil price is key to BOTAS' profitability, as most of its gas import contracts contain oil indexed price formula.

investment require significant internal cash generation as well as a strong balance sheet to raise financing as needed. A portion of these investment are expected to be financed with IFI loans and commercial loans. BOTAS is expecting a positive cash balance at year-end with a tight financing schedule. It is expecting to raise more than TL16 billion between 2018 and 2023 to finance an investment program of TL18 billion with the remaining being financed through equity contributions (cash generated from operations). Based on BOTAS' forecasts, such a financing program is manageable; however, there is little margin to maneuver if certain external factors become less favorable (e.g. rising oil price and depreciating Lira). The oil price and foreign exchange risks should be addressed through wholesale tariff adjustments to allow the pass-through of these costs up or down. This will be a key factor in reducing the risk for BOTAS' and for the project. Table 17 shows BOTAS' Cash Flow Statement Forecast.

65. BOTAS Balance Sheet forecast (Table 18), shows that it intends to increase its long term borrowing significantly. Its gearing ratio (i.e. debt to total capital ratio) is expected to increase from 33 percent in 2017 to 61 percent in 2023, reflecting the increasing reliance on external debt. BOTAS' current ratio is forecast to fall below 1 in some years, reflecting a challenging working capital position.

Table 16: BOTAS Income Statement Forecast

	Actual		Estimate	Forecast					
	2015	2016	2017	2018	2019	2020	2021	2022	2023
Revenue	37,101,536	29,680,347	33,470,700	42,486,925	46,840,177	53,722,394	61,482,910	68,403,979	78,128,497
Cost of Sales	-34,559,558	-21,600,262	(35,314,335)	(49,566,639)	(52,918,656)	(56,396,982)	(62,279,637)	(63,421,074)	(66,685,367)
Gross Profit	2,541,978	8,080,085	-1,843,635	-7,079,714	-6,078,478	-2,674,588	-796,727	4,982,905	11,443,130
General Administrative Expenses	-105,357	-104,825	(121,261)	(149,987)	(161,401)	(173,683)	(186,900)	(201,124)	(216,429)
Operating Other Income	550,680	2,960,530	7,222,105	964,380	6,121,121	203,991	217,536	231,829	246,735
Operating Other Expenses	-3,762,890	-492,371	(2,408,579)	(321,413)	(201,937)	(217,297)	(233,824)	(251,606)	(270,740)
Operating Profit/Loss	-775,589	10,443,419	2,848,630	(6,586,733)	(320,695)	(2,861,577)	(999,914)	4,762,003	11,202,696
Financing Income	1,325,149	1,467,614	1,748,842	1,379,868	1,795,928	1,213,663	1,223,652	1,249,683	1,273,668
Financing Expenses	-1,076,748	-1,069,689	(1,248,238)	(1,156,354)	(1,408,191)	(1,300,778)	(1,311,740)	(1,335,550)	(1,350,924)
Net Profit before Tax	-527,188	10,841,344	3,349,233	-6,363,219	67,042	-2,948,692	-1,088,003	4,676,137	11,125,440

Table 17: BOTAS Cash Flow Statement Forecast

	Actual		Estimate	Forecast					
	2015	2016	2017	2018	2019	2020	2021	2022	2023
A. CASH FLOWS FROM OPERATING ACTIVITIES	510,979	6,601,964	(698,486)	(98,042)	825,341	(575,673)	267,539	(3,103)	817,874
Profit / (loss) before tax	(527,187)	10,841,343	3,349,233	(6,363,219)	67,042	(2,948,692)	(1,088,003)	4,676,137	11,125,440
Changes in Operating Capital	1,964,244	(4,927,216)	(3,014,088)	5,901,393	758,298	2,373,019	1,355,542	(4,679,240)	(10,307,566)
Cash (used) from operating activities	634,367	6,254,498	335,145	(461,826)	825,341	(575,673)	267,539	(3,103)	817,874
Tax payments / remittances	(4,282)	14,447	(1,033,631)	363,785					
B. CASH USED IN INVESTMENT ACTIVITIES	(2,276,094)	(5,601,178)	(1,762,822)	(3,473,880)	(3,862,033)	(3,092,885)	(2,623,550)	(2,324,980)	(2,949,773)
Cash outflows from tangible and intangible assets			(663,286)	(3,107,500)	(3,359,320)	(3,079,108)	(2,623,548)	(2,324,977)	(2,949,770)
Changes in financial investments			(1,099,536)	(366,380)	(502,712)	(13,777)	(2)	(2)	
C. CASH FLOW FROM IN FINANCING ACTIVITIES	1,519,421	641,178	1,102,273	2,611,652	3,074,746	3,705,203	2,394,175	2,368,351	2,173,899
Cash inflows and outflows resulting from debt,(net)			1,102,273	2,611,652	3,074,746	3,705,203	2,394,175	2,368,351	2,173,899
NET INCREASE / DECREASE IN CASH AND CASH EQUIVALENTS BEFORE FOREIGN CURRENCY CONVERSION ADJUSTMENTS			(1,359,035)	(960,270)	38,054	36,645	38,164	40,269	42,000
D. EFFECTS OF FOREIGN CURRENCY CONVERSION ADJUSTMENTS ON CASH AND CASH EQUIVALENTS			-	-	38,054	36,645	38,164	40,269	42,000
NET INCREASE / DECREASE IN CASH AND CASH EQUIVALENTS	(245,693)	1,641,888	(1,359,035)	(960,270)	38,054	36,645	38,164	40,269	42,000
E. CASH AND CASH EQUIVALENTS AT THE BEGINNING OF THE PERIOD	1,423,168	1,177,475	2,819,363	1,460,328	500,058	538,112	574,757	612,921	653,190
CASH AND CASH EQUIVALENTS AT THE ENDING OF THE PERIOD	1,177,475	2,819,363	1,460,328	500,058	538,112	574,757	612,921	653,190	695,190

Table 18: BOTAŞ Balance Sheet Forecast

TRY in thousand	Actual		Estimate		Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023
ASSETS									
Current Assets									
TOTAL CURRENT ASSETS	11,055,828	11,763,262	12,014,691	11,804,000	13,016,603	16,686,390	20,087,120	20,521,496	24,303,314
Non Current Assets									
TOTAL NON CURRENT	9,581,406	15,674,537	18,933,918	23,303,783	28,518,196	31,212,980	32,319,019	33,457,474	35,067,172
TOTAL ASSETS	20,637,234	27,437,799	30,948,609	35,107,783	41,534,800	47,899,369	52,406,139	53,978,970	59,370,486
LIABILITIES & EQUITY									
Current Liabilities									
TOTAL CURRENT LIABILITIES	10,574,992	6,701,776	7,528,103	16,108,804	19,175,511	24,785,632	28,034,569	22,828,556	17,555,417
Non Current Liabilities									
TOTAL NON CURRENT LIABILITIES	1,401,472	3,224,364	2,696,154	5,307,692	8,600,960	12,304,101	14,649,936	16,752,643	18,658,244
Equity									
TOTAL EQUITY	8,660,770	17,511,659	20,724,352	13,691,286	13,758,328	10,809,636	9,721,633	14,397,770	23,156,826
			67%	39%	33%	23%	19%	27%	39%
TOTAL LIABILITIES & EQUITY	20,637,234	27,437,799	30,948,609	35,107,783	41,534,800	47,899,369	52,406,139	53,978,970	59,370,486

Annex 4: Sovereign Credit Fact Sheet

A. Recent Economic Development

Turkey's economy grew strongly from 2001 to 2014, with GDP quadrupling in nominal U.S. dollar terms, underpinned by a comprehensive macroeconomic and structural reform program. As a result, Turkey's per capita income of US\$10,787 in 2016 puts it in the group of upper-middle-income countries.

Following a strong performance in 2015, growth has slowed to 3.2 percent in 2016 partly reflecting weak investment due to failed coup attempt in July. The current account deficit remains sizeable, as the decline in tourism offsets savings from low energy prices. Growth was strong in 2017 and is estimated at about 7 percent due to sharp increase of export related to a softer lira and a sizeable credit impulse driven by state loan guarantees³⁶. The fiscal stimulus and credit expansion pushed inflation to double digits in 2017, and the 12-month current account deficit widened to US\$34.3 billion from US\$29.3 billion a year earlier due to rebound in oil prices.

Currency movement has been volatile. Earlier in 2017, prompted by a rise in inflation, the Central Bank began to increase interest rates in 2017. Amid portfolio inflows, together with Central Bank's tightening steps, the Lira had appreciated by around 10% from January 2017 to August 2017.³⁷ However, with the higher than expected inflation, the currency appreciation was sharply reversed. The Lira has since depreciated significantly against the USD.

B. Economic Indicators

Selected Macroeconomic Economic indicators (2015-2019)

Economic Indicators	2015	2016*	2017*	2018*	2019*
National income and prices (change %)					
Real GDP	6.1	3.2	7	4	3.6
Private domestic demand	3.2	2.5	1.5	2.8	3.0
CPI inflation (period average)	7.7	7.9	10.9	9.3	7.4
Central government operations (% of GDP)					
Overall balance	-1.5	-2.6	-3.4	-2.5	-1.3
External debt (% of GDP, end period)	55.4	59.6	67.1	67.8	66.6
Gross external financing need (% of GDP)	27.9	27.2	30.7	31.5	30.9
Nominal gross public debt	32.9	34.6	35.8	36.6	35.9
Public gross financing needs	5.3	6.5	7.4	8.9	8.5
Money and credit					
Broad money (M2, % end period)	17.1	11.1	-	-	-
Foreign direct investment (net, % of GDP)	1.7	1.1	1.2	1.3	1.4
Gross foreign reserves (billions \$)	110.5	117.8	117.8	117.8	117.8
Current account balance (% of GDP)	-3.7	-3.8	-4.6	-4.6	-5.0
Exchange rate (local currency/\$, end period) [Bloomberg]	2.9	3.5	3.9		

Note: * denotes projected figures. Source: IMF Country Report No, 17/32, WEO Oct. 2017 and Statement 2018 (see footnote).

³⁶ IMF, 2018. Turkey: Staff Concluding Statement of the 2018 Article IV Mission, February 2018.

³⁷ World Bank (WB), 2017. Country Snapshot—The World Bank in Turkey, October 2017.

C. Economic Outlook and Risks.

Looking ahead, Turkey's medium-term growth is projected to stabilize at around 4 per cent per annum, supported by domestic demand. There are several risk factors to Turkey. The weaker currency could result in feedback effects to inflation, and also impact external debt sustainability. The external risks mainly arise from a deteriorating geopolitical environment, uncertain future of the EU-Turkey relations, tensions in the South-East regions, and military involvement in neighboring countries, which could affect tourism and domestic demand.

For debt outlook, Turkey's external debt continued to increase and is estimated to have reached 59 percent of GDP in 2016. IMF projected that Turkey's external debt, while sustainable, is high and vulnerable to valuation shocks including real depreciation shock and a steeper recovery of fuel prices. Turkey's public debt ratio is well below its historical ten-year average, at about 35 percent of GDP in 2016. Gross public-sector financing needs have declined significantly and will remain low over the medium term. IMF suggests that Turkey's government debt is sustainable under different shock scenarios including lower growth.³⁸

³⁸ International Monetary Fund (IMF), 2017. Country Report No. 17/32– 2017 Article IV consultation—Press release; Staff report; and Statement by the Executive Board for Turkey. February, 2017.