

Document of
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Report No: PAD2688

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$600 MILLION

TO THE

BORU HATLARI İLE PETROL TAŞIMA ANONİM ŞİRKETİ

FOR A

GAS STORAGE EXPANSION PROJECT

April 26, 2018

Energy and Extractives Global Practice
Europe and Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective February 28, 2018)

Currency Unit = Turkish Lira (TL)

TL 1.00 = US\$ 0.27

US\$ 1.00 = TL 3.79

FISCAL YEAR

January 1 - December 31

Regional Vice President: Cyril E Muller

Country Director: Johannes C.M. Zutt

Senior Global Practice Director: Riccardo Puliti

Practice Manager: Sameer Shukla

Task Team Leader(s): Yesim Akcollu, Abdulaziz Faghi

ABBREVIATIONS AND ACRONYMS

AIIB	Asian Infrastructure Investment Bank
bcm	billion cubic meters
BOTAŞ	Boru Hatları ile Petrol Taşıma A.Ş.
CPF	Country Partnership Framework
DSI	State Hydraulic Works of Turkey
DS&I	Design, Supply and Installation
DSCR	Debt Service Coverage Ratio
EAP	Emergency Action Plan
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
ESMS	Environmental and Social Management System
EU	European Union
EUAŞ	Electricity Generation Corporation of Turkey
FIRR	Financial Internal Rate of Return
FSRU	Floating Storage and Regasification Unit
GAZBİR	Natural Gas Distribution Companies Association of Turkey
GHG	Greenhouse Gases
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GSDP	Gas Sector Development Project
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDC	Interest During Construction
IFI	International Financial Institution
IFR	Interim Unaudited Financial Report
IFRS	International Financial Reporting Standards
ISA	International Standards on Auditing
IsDB	Islamic Development Bank
LNG	liquefied natural gas
mcm	Million cubic meters
MENR	Ministry of Energy and Natural Resources
mtCO ₂ -eq	Million tons of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
NBP	National Balancing Point
NGML	Natural Gas Market Law
NPV	Net Present Value
OHS	Occupational Health and Safety

PMU	Project Management Unit
PPSD	Project Procurement Strategy for Development
QHSE	Quality, Health, Safety and Environment
RAP	Resettlement Action Plan
RFB	Request for Bid
ROW	Right-of-Way
RPF	Resettlement Policy Framework
SCADA	Supervisory Control and Data Acquisition
SCD	Systematic Country Diagnostic
SCP	Shadow Carbon Price
SEP	Stakeholder Engagement Plan
SOE	State Owned Enterprise
SORT	Systematic Operations Risk-Rating Tool
TANAP	Trans-Anatolian Natural Gas Pipeline Project
TAS	Turkish Accounting Standards
TEİAŞ	Electricity Transmission Company of Turkey
TWF	Turkiye Wealth Fund
TWh	Terrawatt-hour
WB	World Bank



BASIC INFORMATION

Is this a regionally tagged project? No	Country(ies)	Financing Instrument Investment Project Financing
<input type="checkbox"/> Situations of Urgent Need of Assistance or Capacity Constraints <input type="checkbox"/> Financial Intermediaries <input type="checkbox"/> Series of Projects		
Approval Date 22-May-2018	Closing Date 31-Oct-2024	Environmental Assessment Category A - Full Assessment
Bank/IFC Collaboration No		

Proposed Development Objective(s)

The Project Development Objective is to increase the reliability and security of gas supply in Turkey by expanding underground gas storage capacity in the country.

Components

Component Name	Cost (US\$, millions)
Tuz Golu Gas Storage Expansion Plant	2,715.00
Construction Supervision Consultancy	17.00
ESIA and RAP Monitoring Consultancy	3.00

Organizations

Borrower : BORU HATLARI İLE PETROL TAŞIMA A.Ş. (BOTAŞ)
Implementing Agency : BORU HATLARI İLE PETROL TAŞIMA A.Ş. (BOTAŞ)



PROJECT FINANCING DATA (US\$, Millions)

<input checked="" type="checkbox"/> Counterpart Funding	<input checked="" type="checkbox"/> IBRD	<input type="checkbox"/> IDA Credit	<input type="checkbox"/> IDA Grant	<input type="checkbox"/> Trust Funds	<input checked="" type="checkbox"/> Parallel Financing
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Total Project Cost:
2,735.00

Total Financing:
2,735.00

Financing Gap:
0.00

Of Which Bank Financing (IBRD/IDA):
600.00

Financing (in US\$, millions)

Financing Source	Amount
Asian Infrastructure Investment Bank	600.00
Borrower	735.00
IBRD-88590	600.00
Islamic Development Bank	350.00
Foreign Private Commercial Sources (unidentified)	450.00
Total	2,735.00

Expected Disbursements (in US\$, millions)

Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	69.62	125.91	157.79	120.29	88.48	37.91
Cumulative	0.00	69.62	195.53	353.32	473.61	562.09	600.00



INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Moderate
2. Macroeconomic	● Substantial
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Substantial
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Substantial
7. Environment and Social	● High
8. Stakeholders	● Moderate
9. Other	



10. Overall

● Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any waivers of Bank policies?

Yes No

Safeguard Policies Triggered by the Project

Yes No

Environmental Assessment OP/BP 4.01

✓

Natural Habitats OP/BP 4.04

✓

Forests OP/BP 4.36

✓

Pest Management OP 4.09

✓

Physical Cultural Resources OP/BP 4.11

✓

Indigenous Peoples OP/BP 4.10

✓

Involuntary Resettlement OP/BP 4.12

✓

Safety of Dams OP/BP 4.37

✓

Projects on International Waterways OP/BP 7.50

✓

Projects in Disputed Areas OP/BP 7.60

✓

Legal Covenants

Sections and Description

The Borrower shall maintain, until Project completion, the Project Management Unit to be responsible for coordinating and supervising Project implementation, with staffing, budgetary resources, and authority necessary and appropriate including the provision of efficient and effective technical and administrative support to the PMU from other specialized units of BOTAS, for satisfactory Project implementation, and all of which shall be acceptable to the Bank

Sections and Description

The Borrower shall carry out the Project in accordance with the provisions and recommendations of the ESIA and the RPF, and shall maintain throughout Project implementation, dedicated teams to ensure the Project's



compliance with the ESIA, and to carry out any acquisition of land required under the Project in accordance with the RPF and the RAP(s).

Sections and Description

The Borrower shall ensure that any contractors carrying out the Project shall perform their work in accordance with the technical and environmental practices applicable to the Project, as set forth in the ESIA and the RPF, and under terms of reference and with qualifications and experience acceptable to the Bank, and ensure that any contracts for civil works under the Project include Codes of Conduct in form and substance acceptable to the Bank.

Sections and Description

The Borrower shall take all necessary actions to minimize any Involuntary Resettlement, prepare the RAP(s) for sites where pre-screening has identified Involuntary Resettlement impacts, in accordance with the principles and procedures set forth in the RPF, and commence such works in accordance with the RAP(s).

Sections and Description

The Borrower shall ensure, in relation to any Involuntary Resettlements under the Project, the payment of all expenditures and any other related payments referenced under the RAP(s).

Sections and Description

The Borrower shall ensure that site or unit specific environmental and social evaluation or assessment reports are defined and updated after the design works, in a manner acceptable to the Bank.

Sections and Description

The Borrower shall ensure that, in case of any change of routing of the pipelines, the relevant sections of the ESIA are updated in a manner acceptable to the Bank.

Sections and Description

The Borrower shall update the hazard identification and hazard operability sections of the ESIA as soon as the detailed design works are complete in a manner acceptable to the Bank

Sections and Description

The Borrower shall complete the environmental and social management system by including all sub-management plans to be prepared by the Borrower and by the contractor as defined in the ESIA in a manner acceptable to the Bank

Sections and Description

The Borrower shall cause the ESIA and RAP monitoring consultant to prepare quarterly ESIA and RAP monitoring reports, and to provide said reports simultaneously to each of the Borrower and the Bank in a timely manner.

Sections and Description



The Borrower shall as soon as reasonably practicable, but no later than five (5) calendar days after the occurrence of a Significant Event, inform the Bank the nature of the incident, accident, or circumstance and any effect or impact (whether on-site or off-site) resulting or likely to result there from; and, by no later than thirty (30) days after such Significant Event, provide the Bank with a summary report that includes a description of such Significant Event, and the measures, if any, that the Borrower is taking or plans to take to address such Significant Event and to prevent any future similar event; and keep the Bank informed of the on-going implementation of the said measures and plans.

Sections and Description

No later than six (6) months after the Effective Date and in any event prior to the commencement of component 1.A (i) of the Project, the Borrower shall be in receipt, and ensure the Bank's receipt, from the State Hydraulic Works ("DSI") an Emergency Action Plan for the Hirfanli Reservoir Dam, all in form and substance satisfactory to the Bank.

Sections and Description

The Borrower shall take all reasonable measures, including coordinating with all relevant parties, to ensure the Emergency Action Plan and the Operation and Maintenance Plan, including for dam safety monitoring as upgraded in 2017, for the Hirfanli Reservoir Dam is properly maintained and implemented, with due diligence and efficiency in a manner satisfactory to the Bank, and the Bank is appropriately informed of the implementation progress of said plans.

Sections and Description

For the purposes of construction supervision and ESIA and RAP monitoring, the Borrower shall retain the related consulting services until Project completion.

Conditions

PROJECT TEAM

Bank Staff

Name	Role	Specialization	Unit
Fatma Yesim Akcollu Oguz	Team Leader(ADM Responsible)	Senior Energy Specialist	GEE03
Abdulaziz Faghi	Team Leader	Senior Energy Specialist	GEE03
Salih Kemal Kalyoncu	Procurement Specialist(ADM Responsible)	Procurement	GGOPC
Ayse Seda Aroymak	Financial Management	Financial Management	GGOEW



Specialist			
Arzu Uraz Yavas	Social Safeguards Specialist	Social Safeguards	GSU03
Esra Arikan	Environmental Safeguards Specialist	Senior Environmental Specialist	GEN03
Hiwote Tadesse	Team Member	Operations	GEE03
Jasna Mestnik	Team Member	Finance Officer	WFACS
Jelena Lukic	Social Safeguards Specialist	Social Safeguards - Labor	GSUGL
Lisa Lui	Counsel	Country Lawyer	LEGLE
Ruxandra Maria Floroiu	Team Member	Regional Safeguards Coordinator (Environment)	GEN03
Sanjay Agarwal	Social Safeguards Specialist	Social Safeguards	GSU03
Satoru Ueda	Team Member	Lead Dam Specialist	GWAGP
Satoshi Ishihara	Team Member	Regional Safeguards Coordinator (Social)	GSU03
Selcuk Ruscuklu	Team Member	Program Assistant	ECCTR
Shota Yamanaka	Team Member	Financial Analyst	GTIFP
Thuy Bich Nguyen	Team Member	Program Assistant	GEE03
Zhengjia Meng	Team Member	Economics and Finance	GTIFP
Extended Team			
Name	Title	Organization	Location
Ben Teuben	Senior Gas Storage Specialist		Netherlands
Burcu Ergin	Social Safeguards Specialist		Turkey
Emre Kaya	Consultant / Safeguards Specialist		Turkey
Frederick Brusberg	Social Safeguards Specialist		United States
Kenneth Beckman	Technical Consultant		United States



TURKEY
GAS STORAGE EXPANSION PROJECT

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MAP: IBRD 43572



I. STRATEGIC CONTEXT

A. Country Context

1. **Turkey has achieved commendable economic and social development results since the early 2000s, raising it to the world's 17th largest economy and establishing it as a global presence.** Macroeconomic stability, broad social and economic reforms, closer economic ties with the European Union (EU), 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 Gross National Income per capita rose from \$3,115 in 2001 to \$11,000 in 2015; poverty incidence more than halved and extreme poverty fell even more dramatically. Turkey's success on poverty reduction was driven mainly by increased labor incomes and stemmed from growing levels of consumption rather than changes in the distribution: these are all factors that make poverty reduction more sustainable. Turkey's growth for the 2010-2017 period continued to be impressive, averaging 6.8 percent annually, in sharp contrast to many other middle-income countries. Despite being hit by adverse shocks in 2016 linked to the failed coup attempt, the economy has shown remarkable resilience: growth in 2017 was realized at 7.4 percent, supported by a substantial fiscal stimulus.

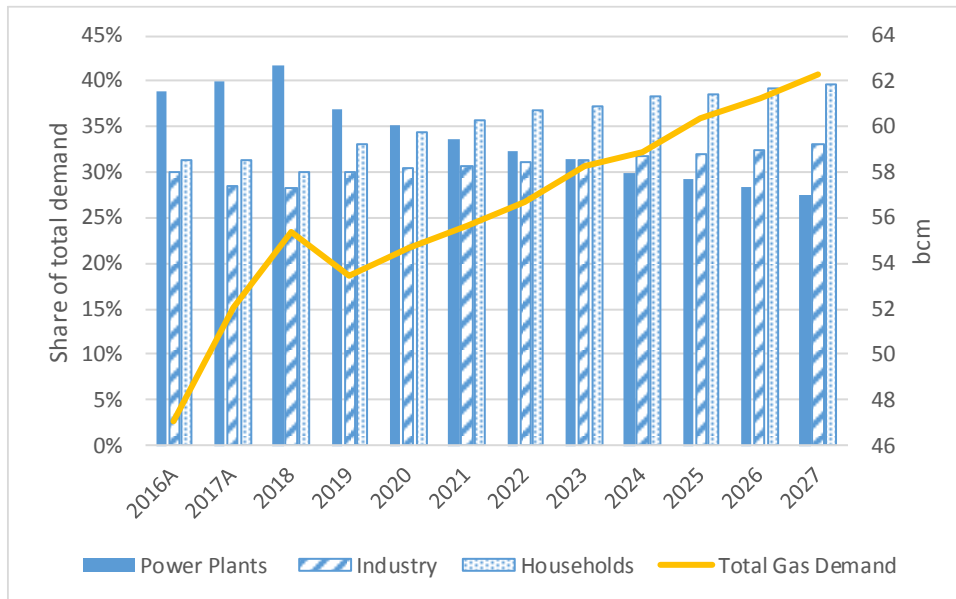
2. **The Government continues to implement its 10th Development Plan (2014-2018) for which ownership remains strong and long-standing.** The Government is committed to continued structural reforms to ease constraints on productivity, tackle a low female labor force participation rate that hampers sustained growth, and build the skills of its population to reap the benefits of greater global integration. Turkey's macroeconomic and fiscal frameworks remain robust despite political, security and economic challenges, many of which are external. 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. The Government's medium-term program projects an annual growth rate of 5.5 percent from 2018 to 2020. Turkey's development foundations remain sound and should bolster its ability to continue to face challenges and carry out needed reforms.

B. Sectoral and Institutional Context

3. **Natural gas is the most important fuel in Turkey's primary energy supply.** Turkey's gas consumption, about 52 billion cubic meters (bcm) in 2017, accounted for about one third of its primary energy supply. Implementing the Government of Turkey's strategic choice to diversify the country's energy mix, Turkey's national gas company BOTAŞ launched the development of a national gas transmission network 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. Use of natural gas for power generation was preferred due to its lower investment cost, operational flexibility and environmental advantages. 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 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 Type¹



Source: BOTAŞ

4. **Turkey's heavy dependence on energy imports (mostly oil and gas) constitutes a macroeconomic challenge and an energy security risk.** By the end of 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. With demand for gas continuing to grow, the government is looking for ways to efficiently utilize the country's natural gas consumption by moderating its use in power generation, diversifying supply sources, and rapidly increasing gas storage capacity, as outlined below:

- (a) The government is looking to prioritize gas supply from the power sector to residential and industrial gas consumers, as substitution of gas is feasible in power generation. On the other hand, residential and industrial gas consumers – with few exceptions – have no feasible alternative energy sources. In recent years, gas supply was curtailed to some consumers due to inadequate supply, which has a correlation to economic and financial losses on those consumers. In parallel, the development of renewable energy generation such as hydropower, wind, solar and geothermal - has been impressive and is expected to continue with new tenders announced, specifically for wind and solar power;
- (b) Almost 90 percent of gas imports are from three countries. About 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, both of which combine for 75 percent of Turkey's LNG imports as of 2016. The balance is sourced through short-term LNG contracts and spot purchases from other suppliers including

¹ Based on the gas demand forecast, 2018 is assumed to be a dry year, therefore, 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.



the United States, Qatar, Trinidad & Tobago, Norway and Equatorial Guinea²; and

- (c) Storage capacity currently stands at 3.1 bcm, mostly available in the Silivri Gas Storage Facility. This volume accounts for less than six percent of annual consumption. A Bank-supported project to develop a 1.2 bcm gas storage utilizing the Tuz Golu salt formation is underway³. 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. A project to expand the capacity of Silivri Gas Storage Facility from 2.8 bcm to 4.3 bcm is at an early stage of implementation. When completed, the ongoing Tuz Golu⁴ and Silivri expansion projects would raise Turkey's storage capacity to 5.5 bcm – which will be about 9 percent of annual gas consumption in the mid-2020s.

5. **Demand for natural gas is growing, particularly in residential and industrial sectors creating greater needs for increased gas storage.** Future gas demand is driven by increased residential gas consumption. In 2017, residential consumption was over 16 bcm and as natural gas connections expand to all 81 provinces, residential demand is projected to reach about 24 bcm by 2027, a 50 percent increase over current levels. Natural 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 occasionally more expensive – but certainly less environmentally friendly fuels, such as fuel oil and coal. 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 also recognizes LNG's limitations that include: (i) higher cost of supply compared to pipeline gas; (ii) price seasonality with winter prices being higher when demand in Turkey is at its peak; and (iii) transportation lead times and logistical challenges.

6. **In the absence of sufficient storage, Turkey has been increasingly relying on short-term and spot LNG to meet its natural gas demand exposing the country to the spot price premium and market price volatility risks.** In 2017, Turkey was among the top-10 LNG importing countries globally with volumes close to 7.3 million tons of LNG (a 25 percent increase over 2016 volumes), and was third in Europe behind Spain and France. While Turkey's LNG imports constituted about 16 percent of Europe's total LNG imports, Turkey's share of short-term and spot purchases amongst buyers in Europe was much higher at 29 percent. Between 2016 and 2017, Turkey's short-term and spot purchases grew by almost 50 percent, underlying the fact that gas demand growth is met almost entirely from spot LNG which is not a sustainable in the medium and long term. The Government's strategy therefore calls for rapid development of additional gas storage capacity to further diversify gas supply sources and improve energy security and flexibility. The proposed project would raise the capacity of gas storage at Tuz Golu from 1.2 bcm to about 5.4 bcm⁵, thereby increasing Turkey's total underground gas storage capacity to 9.7 bcm - or about 16 percent of projected annual gas consumption by 2024. Though a major improvement compared to the current capacity of less than 6 percent, it remains modest compared to average of 30 percent in similar import-dependent European countries. For example, France has natural gas storage equivalent to about 33 percent of its annual consumption, while Italy is at 29 percent and Germany is at 35 percent⁶.

² *The LNG Industry*. GIIGNL Annual Report 2018.

³ The Tuz Golu Gas Storage Plant is being financed by the World Bank under the US\$325 million Gas Sector Development Project (GSDP) approved in November 2005 and the US\$400 million GSDP Additional Financing approved in July 2014 that aim to increase the reliability and stability of gas supply in Turkey through gas storage and network infrastructure. In this Project Appraisal Document, the 1.2 bcm Tuz Golu Gas Storage Project is referred to as the ongoing Project.

⁴ This excludes the proposed project which would increase the storage capacity at Tuz Golu by about 4 bcm.

⁵ The proposed project adds a minimum of 4 bcm, but could be up to 4.2 bcm depending on final detailed design parameters.

⁶ Source: EMRA, BP World 2015 Report, Gas Infrastructure Europe, European Commission Country Reports and World Factbook.



7. **Private participation in the energy sector in Turkey is significant. The 2001 Natural Gas Market Law (NGML) provided a strong legal foundation for gas sector reform and private sector participation in the gas sector.** The NGML abolished BOTAS' monopoly rights on natural gas imports, sales and pricing which had been granted by the Decree of Natural Gas Utilization No. 397 dated February 9, 1990. Particularly noteworthy is the country-wide entry of private companies into gas distribution in urban areas. The Energy Market Regulatory Authority (EMRA) played a key role in that effort through its program of competitive tendering of distribution licenses since 2003 resulting in 77 provinces of the country being supplied with natural gas by 72 gas distribution companies. Currently, investments are ongoing in the four remaining provinces and natural gas is expected to reach all 81 provinces by end-2018. In power generation, natural gas currently represents 32 percent of the total generation mix (or about 26,000 megawatts of capacity) and is almost entirely owned and operated by private companies⁷. The Government is also looking to the private sector to invest in gas storage and as of end-2016, EMRA had granted five companies licenses to develop underground natural gas storage. However, none of the private sector projects have been developed. On the other hand, a World Bank report⁸ on energy sector challenges in Turkey describes how the NGML 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, BOTAS, continues to dominate wholesale gas imports with a market share of about 82 percent of annual consumption while eight private companies account for the balance. This reflects: (i) a lack of commitment to implement the envisioned unbundling of BOTAS; and (ii) insufficient wholesale gas market development. The government has been considering an amendment to the 2001 Law to liberalize gas imports and restructure BOTAS into separate trading, transmission and storage companies to promote wholesale gas market development. Several drafts have been prepared in the past several years; however, a firm timeline for the enactment of the amendment has yet to be established.

8. **In the broader context of gas market development in Turkey that includes both private and public interventions, storage has an important role in fulfilling the country's energy security needs.** As the country moves to further liberalize the natural gas market (as it has with the electricity sector), the development of private storage facilities can be expected to follow. EMRA had granted licenses to private firms as early as 2014; however, as noted above, private firms have neither realized investments in this field so far, nor have a timeline for the start of any investments. In general, underground storage projects— and salt caverns in particular – take years to materialize given the inherent technical, geological and regulatory risks. The size of the investment required and the general financial constraints in the oil and gas industry in recent years further limited private companies' interest to invest in such projects and in the timeframe required by the government. Due to the high national priority placed on energy security, and the need to cover seasonal and daily gas demand peaks, these strategic storage projects at Silivri and Tuz Golu are being carried out through public investment. This approach is also consistent with international experience in that the initial investments in gas storage facilities in salt formations have been realized by public financing, such as Jintan of China, Etzel of Germany and Kaliningradskoye of Russia. When underground storage projects demonstrate technical and commercial viability with a tested regulatory framework, projects sponsored by private companies are more likely to materialize.

C. Higher Level Objectives to which the Project Contributes

9. **The Project contributes to the Turkey Country Partnership Framework (CPF) for the FY18-21 period by supporting the objective to improve the reliability of energy supply.** Financing of the proposed Gas Storage

⁷ A few of these power plants are partly financed by the International Finance Corporation.

⁸ Dilli, Budak; Nyman, Kari J. 2015. *Turkey's energy transition milestones and challenges (English)*. Washington, D.C.: World Bank Group.



Expansion Project is an integral component of the World Bank's program of policy, technical and financial assistance in Turkey to support energy reform in general and gas sector reform specifically. The overall engagement, including the proposed project, will support the framework for expanded private investment in gas and electricity. Gas storage, through improved reliability of supply, helps private industries to sustain and expand their operations. Other elements of Bank support for Turkey's gas market include:

- (a) financing to BOTAŞ for part of its share in the Trans-Anatolian Natural Gas Pipeline (TANAP) Project currently under construction with first gas delivery to Turkey expected by mid-2018; and
- (b) support for the establishment of an energy market operations company (EPIAŞ)⁹, under the Sustaining Shared Growth Development Policy Loan approved in FY14, and a technical assistance (administered by the Bank with financing from the EU's Instrument for Pre-Accession program for Turkey) for the restructuring of BOTAŞ, the institutional development of EPIAŞ, design of its gas trading platform and a review of the alignment of Turkey's legal and institutional framework for natural gas with the EU's energy acquis.

10. **The proposed project is in line with the World Bank Group's Energy Sector Directions Paper.** Natural gas is well suited for power generation because it can provide both base load and peak load 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 CO₂ emissions. Because of its flexibility, natural gas is also ideally suited to complement solar and wind power, both of which Turkey is aiming to scale-up to manage large and seasonal variability of electricity produced from renewable sources.

11. **The proposed project is aligned with Turkey's 10th National Development Plan, under the "Innovative Production, High and Stable Growth" pillar and contributes to the 2015-2019 Strategic Plan of the Ministry of Energy and Natural Resources (MENR).** The Government's 10th Development Plan¹⁰ calls for adequate emergency supply stocks for gas and completion of the on-going project, and MENR's 2015-2019 Strategic Plan aims to increase gas storage capacity to 10 percent of the annual consumption by 2019 and to 20 percent in the long run. The Government has assigned a high priority on increasing natural gas storage capacity so as to: (i) improve Turkey's energy security and its ability to cover natural gas demand peaks; (ii) help lower the cost of gas supply by taking advantage of gas price variations between summer and winter, reducing dependence on more expensive spot LNG purchases and improve commercial terms of new medium to long term gas import contracts; (iii) reduce CO₂ emissions from scaling up renewable energy power generation; and (iv) improve operational flexibility of the gas network.

⁹ In September 2015, EPIAŞ took over the operation of Turkey's first centralized electricity trading platform known then as Piyasa Mali Uzlaştırma Merkezi, from the electricity transmission system operator, TEİAŞ. To create a well-functioning gas market, and improve the capacity allocation and balancing systems similar the electricity market, a centralized trading platform for gas is being developed and planned to be operational in September 2018. The forthcoming gas trading platform is benefiting from the technical assistance work on the initial design of such a platform under the EU Instrument of Pre- Accession Program Phase I.

¹⁰ The preparation of Turkey's 11th Development Plan for 2019-2023/4 was recently initiated, and increased gas storage capacity in line with consumption projections and Turkey's aspiration to become a gas trading hub are among the major considerations.



II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

The Project Development Objective is to increase the reliability and security of gas supply in Turkey by expanding underground gas storage capacity in the country.

B. Project Beneficiaries

12. **The primary beneficiaries are gas consumers across Turkey, including residential and business consumers, industrial and electricity generators.** BOTAŞ and other gas importers are also able to utilize the increased gas storage capacity in Turkey to meet the demand of consumers in the country, specifically, residential consumers whose demand for natural gas is increasing rapidly. In line with the progress of BOTAŞ' transmission network development and EMRA's program to attract private companies into gas distribution, 77 provinces of the country are served by 72 private distribution companies with the remaining four provinces expected to be connected by the end of 2018. 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 million in 2017 to about 17.5 million by 2023.

13. There are significant human and economic consequences for households, business and services in Turkey in the absence of natural gas. The proposed project ensures that sufficient supply of natural gas is available to those consumers at all times, especially during cold winter months or when all supply options have been exhausted. In the absence of sufficient gas supply, or when supply is curtailed, the same consumers have to rely on solid fuels including coal to meet their energy needs, especially for heating purposes.

C. PDO-Level Results Indicators

14. **The proposed key performance indicators are:**

- (a) Reduction of gas supply curtailments due to available gas storage at the Tuz Golu Gas Storage Expansion Plant;
- (b) Reduction of spot LNG purchases due to available storage at the Tuz Golu Expansion Plant; and
- (c) Increased gas storage capacity through the Tuz Golu Gas Storage Expansion Plant.

15. The first indicator measures the reduction in the volume of curtailments until these are eliminated, which is an indicator for energy reliability. The second indicator is a measure of energy security as the country continues to rely on LNG purchased from the spot market which often requires lead times of up to 15 days. In addition, global demand for LNG in the winter is high, driving prices up at a time when demand in Turkey is also at its peak. The third indicator measures the volume of storage expected to be added through the proposed project.



III. PROJECT DESCRIPTION

A. Project Components

The Project consists of three components:

16. **Component 1: Tuz Golu Gas Storage Expansion Plant.** This includes:
 - (a) Water and Brine Pipelines including construction of a water intake structure at the Hirfanli Reservoir, 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 the Tuz Golu lake. This will also include several pumping stations and storage tanks;
 - (b) Surface Facilities containing all necessary injection and withdrawal units, compressors and connections to the natural gas grid;
 - (c) Subsurface Facilities including drilling of wells and leaching of salt caverns for gas storage purposes;
 - (d) Electricity Supply: construction of electricity transmission lines for water pumping stations and operations of surface and sub-surface facilities;
 - (e) Instrumentation, Control and Telecommunication Systems: 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
 - (f) Contractor Services: Provision of management services, including detailed design and engineering, procurement, installation, testing and inspection, commissioning and operational acceptance; and training of the BOTAŞ personnel.
17. **Component 2: Construction Supervision.** This includes:
 - (a) 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; and
 - (b) Develop and implement the overall Project quality assurance and quality control program.
18. **Component 3: ESIA and RAP Monitoring.** This includes:
 - (a) Consultants responsible for regular monitoring of compliance of the construction activities with the Environmental and Social Impact Assessment (ESIA) and the Resettlement Action Plans (RAPs);
 - (b) Each stage of the construction activities will be checked and monitored by consultants 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 Bank-approved ESIA; and



- (c) The consultants will be responsible for monitoring the implementation of the RAP that will be prepared by BOTAŞ in line with the Bank-approved Resettlement Policy Framework (RPF).

A detailed project description is provided in Annex 1.

B. Project Cost and Financing

19. **The total project cost is estimated to be US\$ 2,735 million.** The project base costs for the main infrastructure works are derived from the completed basic design developed for the construction of the underground gas storage plant and are estimated to be \$2,000 million including contingencies of about 25 percent.¹¹ The total project costs also include interest during construction (IDC) and upfront financing costs, the capitalized cost of cushion gas¹² and the two consultancy contracts under Components 2 and 3. The total costs will be spread over the construction period (envisaged by BOTAŞ to take approximately five years). The Bank's technical and fiduciary support enabled BOTAŞ to optimize the project design, including utilization of existing infrastructure from the ongoing project to implement the proposed project. In addition, the size of the infrastructure requirements for the proposed project was also optimized while still achieving the target objective of 4 bcm of additional gas storage capacity. Combined, these measures enabled BOTAŞ to reduce the project's estimated capital expenditures.

20. BOTAŞ' financing plan consists of loans from the World Bank and the Asian Infrastructure Investment Bank (AIIB) of US\$600 million each. In addition, the Islamic Development Bank (IsDB) is considering financing of about US\$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 lenders to substitute a portion of its equity, needed in the later years of implementation, with commercial loans. Parallel financing by IsDB is also expected to be needed in the later years of implementation. For BOTAŞ to achieve its desired 75:25 debt-to-equity ratio for financing the proposed project, it will need to borrow about US\$450 million in commercial loans (in addition to the indicative IFI financing) and use about US\$735 million of its own cash as equity.

21. The Bank's participation in the project is leveraging both AIIB and IsDB through its due diligence effort on the technical, procurement, and environment and social safeguards efforts with BOTAŞ. The Bank and AIIB intend to enter into a Co-Lenders Agreement for the purpose of joint co-financing of the project, under similar arrangements already established for other projects, including the TANAP project in Turkey and elsewhere. The Bank/AIIB financing will apply to Component 1 (Tuz Golu Gas Storage Expansion Plant), Component 2 (Construction Supervision Consultancy) and Component 3 (ESIA and RAP Monitoring Consultancy). The Bank/AIIB financing will exclude the cost of cushion gas and IDC, which will be financed by BOTAŞ and/or commercial loans. The IFIs support to this project are expected to serve as anchor loans and increase the likelihood of BOTAŞ attracting commercial loans on better terms. The Bank will be supporting BOTAŞ with its effort to access the capital markets. The breakdown of the estimated cost and indicative sources of financing is given in Table 1 below.

¹¹ Considering recent experiences from the ongoing project and relatively high risks relating to the drilling and leaching process.

¹² The term "cushion gas" means 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.



Table 1: Summary cost estimate and financing

Project Components	Project cost (US\$m)	IBRD Financing	AIIB Financing	IsDB Financing	Commercial Loans	BOTAŞ equity
Tuz Golu Gas Storage Expansion Plant ¹³	2,000	590	590	350	450	20
Supervision Consultancy	17	9	8	-	-	0
ESIA and RAP Monitoring Consultancy	3	1	2	-	-	0
Interest During Construction	300	-	-	-	-	300
Cushion Gas	400	-	-	-	-	400
Total Costs	2,720	-	-	-	-	-
Financing Costs (including Front End Fees)	15	-	-	-	-	15
Total Project Costs	2,735	-	-	-	-	-
Total Financing Required	-	600	600	350	450	735

C. Lessons Learned and Reflected in the Project Design

22. **The proposed Project builds extensively upon the experience gained during the preparation, procurement process and implementation of the ongoing project.** The basic design for the proposed project reflects the detailed design, as currently implemented with three caverns already commissioned, in the ongoing project. Procurement will be carried out under one large design, supply and installation contract, as was successfully done in the ongoing project after earlier attempts to proceed with a multi-contract approach had not succeeded. The pre-qualification process of contractors that has already been carried out and completed demonstrates strong competition among fully-qualified firms/joint ventures.

23. **Bank participation in the project design has helped BOTAŞ with addressing challenges faced under the ongoing project with the application of international best practice related to environmental and social issues.** During the baseline studies of the ESIA for the proposed project, the Bank was informed of four households that were evacuated from public pasture lands they had been occupying in order to clear land for construction activities on the ongoing project. At the request of the Bank and through its supervision, BOTAŞ carried out an evaluation of the assets lost and prepared a Social Audit verifying the physical and economic losses of the four households. BOTAŞ established a RAP Fund to compensate for losses determined through the Audit. Through this Fund, BOTAŞ paid the compensation and conducted other rehabilitation measures that are not recognized under national laws but which are required under the Bank’s OP 4.12. The RAP Fund will also be made available for the proposed project, as similar cases may be encountered for land take requirements.

¹³ including contingencies.



IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

24. **Implementation Period.** Advance procurement started in June 2017 with the issuance of the prequalification invitation for the and BOTAŞ plans to complete construction by October 2023.¹⁴ This ambitious completion target will be confirmed during the bidding process expected to be launched in April 2018.

25. **Project Implementation Agency.** The project is implemented by Turkey's national gas company (BOTAŞ). BOTAŞ was established on August 15, 1974 by the Turkish Petroleum Corporation under Decree No. 7/7871, for the purpose of transporting Iraqi crude oil. Because of Turkey's increasing need for diversified energy sources, in 1987, BOTAŞ expanded its original purpose of transporting crude oil through pipelines to cover natural gas transportation and trade activities. Although BOTAŞ' monopoly rights on natural gas import, sales and pricing were abolished by the 2001 NGML (see paragraph 7), BOTAŞ, continues to dominate the gas market with a market share of 82 percent of annual consumption. 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.

26. **Project Implementation Management.** The day-to-day project implementation is carried out by a Project Management Unit (PMU) within BOTAŞ led by the Head of the Storage Department. Other departments provide inputs in their areas of responsibility, including procurement, finance, environment and social safeguards. The organization chart of BOTAŞ is provided in Annex 2. As the implementing agency of the ongoing project, BOTAŞ – and the PMU – are experienced in the development of underground gas storage. The PMU is familiar with, and experienced in, applying Bank 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 throughout the project implementation period.

B. Results Monitoring and Evaluation

27. **BOTAŞ will provide reports on its activities regularly.** The progress of project implementation will be reported and evaluated at various levels. BOTAŞ' contractor and the environmental and social monitoring consultants will be responsible for providing BOTAŞ with inputs to the project reports. In addition, the Bank will provide project implementation support through a decentralized team in Ankara and from Washington, DC. Key staff covering financial management, procurement, environment and social safeguards for the implementation phase are located in the Bank's Ankara office, which facilitates close day-to-day interaction in-between formal implementation support missions.

28. **BOTAŞ' RPF for the Project provides comprehensive monitoring and evaluation arrangements including the establishment of a database management system, external monitoring, completion audit and end-of-project impact evaluation.** The Bank's OP 4.12 on projects with significant involuntary resettlement risks provides for the client to retain independent professionals to advise on compliance and verify the clients' monitoring information including consultations with affected people. BOTAŞ has engaged environmental monitoring consultants under the ongoing project and will engage monitoring consultants on environmental and

¹⁴ Based on BOTAŞ' project schedule. The Loan Closing Date is 12 months later to include the defects liability period.



social monitoring for the proposed project as noted above. BOTAŞ and the Bank have agreed that the ESIA and RAP monitoring consultants will submit their quarterly ESIA and RAP monitoring reports to the Bank simultaneously as they are submitted to BOTAŞ. BOTAŞ' RPF and Stakeholder Engagement Plan (SEP) are discussed in Section VI.E.

C. Sustainability

29. **Natural gas plays an important role in decarbonizing Turkey's electricity system because it helps integrate large scale renewable energy into the electricity grid and enables the displacement of coal which emits twice as much carbon dioxide.** Upon completion of the ongoing project plus the proposed project and the Silivri facility, Turkey will have doubled its gas storage capacity from current levels to about 9.7 bcm – or about 16 percent of the forecasted 2024 annual demand. The Government's program to improve the security of gas supply also includes: (i) participation in the development of the Southern Gas Corridor, which includes the construction of the TANAP project across Turkey, to bring natural gas from Azerbaijan to Turkey and Europe; (ii) participation in the proposed TurkStream Pipeline for a second direct gas pipeline to Turkey from Russia; (iii) the establishment of a centralized gas trading platform by EPIAŞ, for the Turkish gas market towards realizing the Government's vision of developing Turkey into a regional gas hub; and (iv) installation of FSRUs¹⁵ to enhance its supply diversification of LNG sourced from the international market through long term contracts, as well as spot purchases in the medium term while underground storage is being developed.

30. **World Bank participation in the proposed project contributes to sustainability** by bringing BOTAŞ its advice and experience in the application of international best practice on technical design, procurement, environmental and social safeguards issues (including citizen/stakeholder engagement) as well as financial management and corporate governance. This has helped BOTAŞ enhance the quality of project preparation and continuing through project implementation. During the project preparation phase, the Bank has provided significant advice and support on the development of the project design and approach to implementation and future operations. This has enabled BOTAŞ to optimize its approach and key design parameters that has resulted in reduced capital expenditures.

D. Role of Partners

31. **AIIB and the World Bank are proposing to jointly co-finance the Project.** The two institutions worked closely together on project preparation and appraisal. The co-financing arrangements for the project between the Bank and AIIB will follow the co-financing framework agreement signed by the respective Presidents of the two institutions in April 2016. World Bank 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 of the Bank and AIIB under a joint co-financing arrangement. This joint World Bank/AIIB collaborative approach is being successfully implemented in the ongoing TANAP project as well. Additionally, IsDB is keen on supporting the project through parallel co-financing and will be relying on the Bank's due diligence extensively.

¹⁵ In Turkey's context, FSRUs also act as an insurance policy backstopping conventional storage and/or pipeline supply.



V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

32. Although BOTAŞ, the proposed borrower and implementing entity of the project, is experienced with gas storage project implementation and Bank policies, and the sector strategies and policies are in place, a Substantial Overall Risk Rating is proposed for the project. The risk ratings for the proposed Project are determined in accordance with the Systematic Operations Risk-Rating Tool (SORT) of the World Bank and are based on the Bank staff's assessment of available data at the time of Appraisal. The ratings will be periodically reviewed during the implementation of the project, and when necessary, would be revised accordingly.

33. The rating is influenced by the following factors:

(a) *Macroeconomic risk is Substantial.* Despite Turkey's remarkable resilience to recent shocks, the macroeconomic and fiscal outlook is subject to global and domestic challenges. There are growing macroeconomic imbalances with double digit inflation, a sizable current account deficit, and a depreciation of the Turkish Lira. Whilst fiscal policy has remained relatively prudent, the impact of recent stimulus and contingent liabilities on the medium-term fiscal framework warrant close monitoring. The prospects of a rapid tightening global liquidity could lead to further pressures on the currency, adding strains on corporate balance sheets, which could lower private investment and GDP growth. In BOTAŞ' case, this scenario, together with rising international commodity prices, would mean more rapidly rising cost of gas imports and a more difficult domestic business environment for passing on such cost increases to customers.

(b) *Technical Design of Project or Program is Substantial.* Although the proposed project is a significant expansion of the plant, it is largely the same set of activities as in the ongoing project. On the other hand, BOTAŞ' 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 BOTAŞ or place higher than anticipated bids owing to the potential logistical site challenges and additional equipment and manpower needed to meet BOTAŞ requirements. The construction supervision consultant to be appointed under the proposed project will support BOTAŞ with the review of detailed engineering drawings and supervise implementation of the project, including the construction and installation of the plant. Geological/geophysical investigations and seismic risks are also important and carry varying degrees of uncertainty. To mitigate this, BOTAŞ carried out analysis on salt cores from the ongoing project and also retained the services of the Turkish Petroleum Corporation to reprocess the three-dimensional seismic survey over the expansion area prior to the finalization of any construction contract. This would provide the contractor with the necessary information on subsurface conditions to design the plant and minimize the risk of costly or failed drilling.

(c) *Institutional Capacity for Implementation and Sustainability risk is Substantial.* BOTAŞ' capacity has increased significantly during the implementation phase of the ongoing project, but the schedule is ambitious (discussed in section VI.D). Implementation of such a large-scale investment requires a large and highly skilled team from BOTAŞ composed of technical, procurement and safeguards specialists. BOTAŞ has retained additional staff for the PMU, both in its headquarters and at the project site, and will be supported by a construction supervision consultancy firm to supervise project activities.



(d) *Fiduciary risk is Substantial.* (i) Procurement of the plant started with a successful contractor pre-qualification process. Nevertheless, there is a risk that contractors may come up with different requirements than those envisaged by BOTAŞ in its basic design for the project and bid prices may also vary substantially; (ii) past audits have been qualified and these qualifications are mainly due to differences between the Turkish Accounting Standards (TAS) applied by BOTAŞ and International Financial Reporting Standards (IFRS) according to which the audited financial statements were prepared.

(e) *Environment and Social risk is High.* The potential environmental and social impacts of the proposed expansion project are expected to be larger in scale than the impacts under the ongoing project. The project involves brine discharge to the Salt Lake which is a 'special environmental protected area' under national regulations and considered a 'Critical Natural Habitat' under the Bank's OP 4.04. There is also a registered archaeological site within the project license area. The proposed project involves possible impacts linked to operational health and safety aspects including hazard risks (ruptures, material failures, seismic events, etc.) and corresponding emergency actions during construction and operations. The proposed project is likely to involve substantial displacement (mostly economic and some physical) due to temporary and/or permanent involuntary land acquisition. Preliminary estimates indicate over 4,085 land owners may be impacted. In terms of labor influx, about 500 employees will engage in project-related activities on site including construction workers and managers. Following the completion of construction activities, about 100 staff and managers will be on site during the operational phase. The impacts and their mitigation through the implementation of environmental and social management plans and monitoring by separate consultants are discussed in sections VI. E and VI. F.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

34. **Economic Analysis.** The following three economic benefits are valued in the economic analysis: (i) using seasonal storage to facilitate purchase of gas at lower cost at off-peak demand periods; (ii) using storage to meet gas demand peaks; and (iii) improving security of supply and reliability. The proposed project also has climate benefits in the reduction of curtailments and minimizing the use of spot LNG described in section VI. G. There are also other benefits of gas storage that are difficult to quantify and thus not included in the analysis of the proposed project. These include: (i) avoided cost of incremental infrastructure investments (e.g. compressor stations and pipelines) as it is difficult to allocate the exact cost savings attributed only to storage; (ii) enhancing Turkey's flexibility in contracting future gas supply volumes and prices; (iii) enhanced cross-border trading as part of Turkey's ambition to become a gas trading hub; (iv) consumers switching to more polluting solid fuels in the absence of gas; (v) flexibility in managing power generation; (vi) support the integration of large-scale renewable energy into the electricity grid; and (vii) climate resilience in dealing with hydro vulnerability.

35. Project costs include infrastructure investment and operation and maintenance costs as well as the cost of the cushion gas. A preliminary economic analysis of the proposed project was conducted by BOTAŞ and an advanced economic assessment benefitting from earlier analyses and based on the benefits and costs of the gas storage expansion has been carried out by the Bank. The resulting Net Present Value (NPV)¹⁶ for the project is US\$384 million (at a 6 percent discount rate) with an economic internal rate of return (EIRR) of 8.1 percent. When including greenhouse gas (GHG) emissions savings, the EIRR increases to 8.5 percent and 9.0 percent under the

¹⁶ For details on calculations on benefits valuation please see Table 11 in Annex 4.



low case and high cases of the shadow carbon price (SCP), respectively. The GHG benefits are mainly attributed the use of other more polluting fuels to reduce curtailment and through replacement of spot LNG with piped gas.

36. The economics of the Project is most sensitive to factors of import LNG price differential between peak and off-peak seasons as well as the total project cost. The Project remains economically viable even with a 20 percent cost overrun or a 30 percent narrowing price differential between peak and off-peak LNG price. If the summer-winter price gap increases to 20 percent from 14 percent in the base case¹⁷, the project NPV and IRR would be US\$874 million and 10.5 percent, respectively.

37. **Financial Analysis.** Revenues from the use of the Tuz Golu Gas Storage Expansion Plant are derived from user tariffs set by EMRA regulation. The regulation is designed to enable storage facilities to recover their investment and operation and maintenance costs and earn a reasonable return on the capital investment. As the owner of the facility, BOTAŞ will finance and operate it. It will generate revenues from the storage tariff and will fulfill the regulatory obligation of a minimum storage amount equivalent to 10 percent of the imported wholesale volume.¹⁸ The analysis assessed the financial viability of the Tuz Golu Gas Storage Expansion at the project level under the current project cost estimates, financing plan and tariff regime. Additionally, BOTAŞ will derive benefits from lower cost of gas purchases, facilitated by its storage-enhanced ability to take advantage of seasonal price differences and to meet peak winter demand, which are captured in the economic analysis.

38. Based on the Bank team estimates that are derived from the tariff methodology, the project financials yield a positive NPV at US\$486 million¹⁹ with a financial internal rate of return (FIRR) of 8.7 percent. Under the base case scenario, the cash generated from the project is also sufficient to cover debt service with an average Debt Service Coverage Ratio (DSCR) of 1.8 and a minimum DSCR of 1.3.

39. The project financials are sensitive to foreign exchange risks mainly due to the currency mismatch between the financing (in US Dollars) and the tariff (in Turkish Liras). When tested against a currency depreciation scenario of 25 percent one-off Lira depreciation in 2025, the project experiences a 25 percent revenue reduction in dollar terms because exchange rate losses are not provisioned under the current tariff methodology. Under this scenario, the project financials show a marginally positive return. Any further depreciation of the Lira will result in a negative project NPV. The Project financials are less sensitive to the cost overrun and project delays as the tariff methodology allows for the recovery of additional costs conditional upon the regulator's approval²⁰. Under a 25 percent cost overrun scenario, if additional costs are not allowed by the regulator as part of the recovery base, the project NPV and FIRR will drop to US\$218 and 6.7 percent, respectively. Oil price volatility plays a relatively small role in the project financials. If the oil price goes up, the cost of cushion gas (which is partially indexed to the oil price) will likely be higher than the base case; however, the impact on the overall results is limited. In a scenario where the oil price increase from the current level of US\$60/bbl to US\$80/bbl by 2023, the project NPV and EIRR will drop to US\$483 million and 8.1 percent respectively.

40. **BOTAŞ' Financial performance.** BOTAŞ' 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, BOTAŞ made a loss in 2011-12 and again in 2014-2015. Despite BOTAŞ' losses in 2014 and 2015, it managed to continue

¹⁷ Based on 5-year average of National Balancing Point price differences between summer and winter (see Annex 4 for details)

¹⁸ The same regulation applies to the remaining private importers for all wholesale importers.

¹⁹ Total investment used excludes contingencies.

²⁰ The tariff can be adjusted after the construction period for the regulator to consider the final project costs for tariff determination. However, it is not well established that if any deviations from the original investment plan can be fully absorbed in the new tariff.



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.

41. In 2016, BOTAŞ 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 BOTAŞ' import gas price in 2016, which explained the significant fall of BOTAŞ' Cost of Sales by almost TL13 billion. This, coupled with the unchanged gas sales price, enabled BOTAŞ' to recover its previous loss positions. In 2016, BOTAŞ managed to clear all its arrears in delayed tax payment to the government. After settling all arrears and meeting investment and operational needs, BOTAŞ' cash balance still increased by TL1.7 billion.

42. BOTAŞ' profitability forecast shows an overall break-even level in the next five years under the assumption of a generally stable oil price²¹ and exchange rates after 2018. In 2018, it is estimated that BOTAŞ 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 2 below shows BOTAŞ' Income Statement forecast. As noted above, to ensure a sustainable profitability and cash position and for BOTAŞ' to undertake such large investments, it will need to be able to pass-through foreign exchange and gas import prices fluctuations to its consumers.

43. BOTAŞ 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 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. BOTAŞ 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 BOTAŞ' 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 deprecating 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 BOTAŞ' and for the project. Table 3 shows BOTAŞ' Cash Flow Statement Forecast.

44. BOTAŞ Balance Sheet forecast (Table 4), 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. BOTAŞ' current ratio is forecast to fall below one in some years, reflecting a challenging working capital position.

²¹ Oil price is key to BOTAŞ' profitability, as most of its gas import contracts contain oil indexed price formula.



Table 2: 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 3: 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 BEGINING 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 4: BOTAS Balance Sheet Forecast

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B. Technical

45. **The ongoing project is the first of its kind in Turkey and one of a few such projects undertaken globally.** Construction of gas storage in underground salt formations is less common compared to the more prevalent form of underground storage typically done in depleted oil and/or gas reservoirs. Nonetheless, its implementation is currently progressing well after BOTAŞ successfully overcame significant delays and challenges in its design and procurement. For the proposed project, BOTAŞ, with the assistance of its owner's engineer for the ongoing project, has completed the basic design of the project including drawings and specifications for the Tuz Golu Gas Storage Expansion Plant. The basic design of the project underwent several iterations with significant Bank support to optimize the engineering design and project costs that meet the storage requirements of BOTAŞ. The current design parameters are sound and based on substantial analytical rigor.

46. **The basic design forms the basis of the bid documents.** BOTAŞ has submitted the bid package to the Bank for its no objection and the review process is ongoing. The final bid package will be issued to the six prequalified contractors / joint ventures who will each present their proposed detailed design as part of their bids. Prequalified contractors are expected to bid in accordance with BOTAŞ' requirement but given the size and scale of the project including site logistical challenges and equipment and manpower needed to meet BOTAŞ' requirements during construction, differences would have to be resolved during the bidding process through clarifications, in writing. The construction supervision consultant to be appointed under the proposed project will support BOTAŞ with review of detailed engineering drawings produced by the successful contractor and will also supervise implementation of the project, including the construction and installation of the plant.

47. **Geologic/geophysical investigations and seismic risks are also important and carry varying degrees of uncertainty.** As part of the ongoing project, BOTAŞ had retained all salt cores removed during the drilling of the first 12 wells and the analysis showed that the characteristics of the salt formation is largely uniform. Furthermore, BOTAŞ retained the services of the Turkish Petroleum Corporation to reprocess the three-dimensional seismic survey over the expansion area prior to the finalization of any construction contract. This provides the subsurface contractor with the necessary information to design the plant and minimize the risk of costly or failed drilling under the proposed project.

48. The above approach facilitated successful implementation in the ongoing project to date, except for the project schedule. The same risk of time delays will be faced on the proposed project. The level of realism of the currently envisioned schedule will be assessed by the prospective contractors and the schedule will be confirmed in the contract with the successful bidder.

C. Financial Management

49. The Project will use the existing financial management arrangements for the ongoing project. BOTAŞ' 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 the Bank funded projects and its staff have the required qualifications and experience.



D. Procurement

50. The World Bank Procurement Regulations for IPF Borrowers – July 2016 revised in November 2017 (“Procurement Regulations”) will apply to the proposed Project (“Procurement Regulations”). The World Bank’s *“Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants”, dated October 15, 2006 and revised in January 2011 and as of July 1, 2016 (Anti-Corruption Guidelines)”* will also apply to the proposed Project.

51. Procurement Regulations Paragraphs 5.1 and 5.2 (Advance Contracting and Retroactive Financing) permit the Borrower to proceed with the procurement process before signing the Legal Agreements. In such cases, if the eventual contracts are to be eligible for Bank financing, the procurement procedures, including advertising, shall be consistent with Sections I, II and III of the Procurement Regulations which basically include the Bank’s Core Procurement Principles of economy, efficiency, transparency, fairness, fit-for-purpose, value-for-money and integrity.

52. BOTAŞ developed a Project Procurement Strategy for Development (PPSD) in which it proposed to apply Procurement Regulations including “Approved Selection Methods” for the procurement of all contracts under the proposed Project. The PPSD also proposed to initiate procurement as early as possible for the timely implementation of the contracts to meet its ambitious project timeline.

53. Contract packaging has been determined by BOTAŞ in its PPSD. It includes three contracts – a single contractor for the plant and two consultants for construction supervision, and ESIA and RAP monitoring services. This approach has proven successful in the ongoing project. The construction of the various components of the plant (i.e. fresh water and brine discharge pipelines, surface facilities, drilling, leaching, de-brining of the wells and laying the gas pipelines 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 BOTAŞ. It will be very difficult for BOTAŞ to coordinate and manage multiple contractors and a very large construction program, while meeting the deadlines and remaining within the budget.

54. Prequalification of prospective contractors has been carried out. BOTAŞ’ evaluation report of the pre-qualification stage has been reviewed and the Bank issued its no-objection to BOTAŞ to prequalify six applicants in January 2018. The bidding documents are expected to be issued to the prequalified bidders in April 2018.

E. Social (including Safeguards)

55. **The long term social impacts are positive, though some negative impacts are unavoidable.** Overall the project will have a nationwide positive social impact in terms of providing gas during high demand or in times of scarcity in colder months. The project will also have benefits through increasing local employment at the project site during construction and operation phases and creating opportunities for local businesses. However, the Project will be implemented in semi-arid rural areas which are sparsely populated and used mostly for animal grazing and crop production. The exact scale and scope of social impact will not be known before the detailed designs are ready, but the acquisition of private lands and the loss of livelihoods is expected to occur. As final design allows, BOTAŞ will make maximum effort to avoid expropriation, except for certain facilities, such as well locations. In line with OP 4.12, an RPF was developed and disclosed in both Turkish and English on BOTAŞ’ official website and the World Bank external website prior to the public consultations held on March 5, 2018. The final



RPF was disclosed both in-country on BOTAŞ' website and on the Bank's external website on March 27, 2018. The RPF is also made available locally in places of easy access such as Sultanhane municipality and BOTAŞ site office. Construction of pipelines (fresh water, brine and gas) will cause temporary access loss during construction and permanent restriction of land use during operation under easement arrangements. Other above-ground facilities including access roads and towers for transmission lines and wells will require permanent land acquisition and physical relocation of some households. In line with the RPF, RAPs will be prepared during implementation indicating the exact number of affected landowners, scale and scope of impacts, and compensation and rehabilitation measures to mitigate negative impacts. BOTAŞ will make efforts to acquire land through negotiations. Where negotiations fail, the RPF will be followed.

56. A preliminary assessment shows that about 110 Ha of private land is likely to be permanently acquired (including well locations and other areas such as pump stations, water storage tanks, transmission line pole locations, valve chambers), with an additional 542 Ha under permanent easements and 108 Ha under temporary easements. Approximately 4,085 land owners will be affected either through permanent land acquisition or easement arrangements (excluding permanent ownership rights for well locations, pump stations, water storage tanks, transmission line pole locations, valve chambers).²² The project is likely to result in physical displacement, affecting structures in plateau settlements. Social baseline studies and a census will be conducted for the RAPs when the detailed designs are ready. These will also assess informal use of pasture land and identify vulnerable people (such as women, especially female-headed households, elderly, seasonal workers, etc.) within affected areas and develop an inventory of losses. BOTAŞ will pay compensation and conduct other rehabilitation measures in accordance with the RPF. These include measures that are not permissible under national laws but which are required under OP 4.12 through a RAP Fund.

57. **Legacy Issues from ongoing project have been resolved.** During ESIA preparation, it was determined – and the Bank's due diligence subsequently confirmed – that four informal households had been relocated under the existing project. Although no physical displacement had been anticipated under the ongoing project, in line with the project RAP and OP 4.12, mitigation measures for the compensation of both physical and livelihood losses of the households were enforced. BOTAŞ compensated the four affected households for their losses, as documented in the resettlement audit report which was acceptable to the Bank. This experience led to the establishment of a RAP Fund by BOTAŞ to avoid similar cases in the proposed project as there are no provisions in national law to allow for compensation or livelihood assistance for people occupying pasture lands.

58. **A labor influx analysis has informed project design.** The ESIA includes a situational analysis on labor influx, impacts and proposed mitigation measures and includes the following social management plans: (i) Labor Influx Management Guideline; (ii) Employment and Training Plan; (iii) Community Health and Safety Plan; (iv) Community Relations Plan; (v) Traffic Management Plan; and (vi) Occupational Health and Safety Management Guideline. Broader labor and community related social risks and impacts are covered by the Bank's OP 4.01. The construction phase, which is expected to last approximately five years (according to BOTAŞ' schedule), will require about 500 employees on site, out of which 400 will be construction workers and 100 technical and managerial staff. Operations of the plant are expected to last 30 years and will require about 100 people on site (60 workers and 40 technical/managerial staff). 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 Labor Influx Management Guidelines (including a Code of Conduct) and a Local Employment and Training Plan will form the basis for the Contactor and sub-contractors' own labor influx management plans. The ESIA monitoring consultant will be responsible in ensuring that the management plans are implemented accordingly. Mandatory cultural

²² These numbers are likely to change after detailed engineering studies are completed once the contract is awarded



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 grievance redress mechanism that was set up for the ongoing project will continue to be in force for the proposed project. It will be available to workers to raise workplace concerns and to the communities to raise any issue related to the project workforce. 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 accommodation, cafeteria, laundry, a health facility, a recreational facility, etc. The ongoing project work camp has a capacity for 400 people, and so far, no conflicts between the contractor's workforce and local populations has arisen or recorded in the grievance redress mechanism (GRM).

59. **Citizen engagement is integral to the project activities.** Due to the complexity of the project and the wide-ranging impacts on multiple stakeholders, BOTAŞ prepared a SEP specifically for the proposed project, with a detailed GRM as part of the ESIA. The SEP will be administered by BOTAŞ' social team, which will be present both in headquarters and on site. Engagement activities will be initiated at the early stage of the 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 and the project grievance mechanism. BOTAŞ will ensure that a gender sensitive approach is adopted during community engagement activities. Critical dates and issues (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. Community engagement activities shall be carried out at locations and times convenient for women, and shall utilize channels of communication which are accessible to women. Materials such as a Guideline to Land Acquisition and Compensation will be prepared and distributed widely. BOTAŞ will have two full-time community relations specialists (one on site and the other at their headquarters) dedicated to coordinate and implement engagement activities. BOTAŞ will also establish consultation committees comprising of representatives from Project Affected Persons, chambers of commerce and industry, regional authorities, local schools and businesses.

60. **The project's multi-level project GRM will be strengthened further.** BOTAŞ will strengthen its existing project-level GRM, to complement the national GRM. Procedures for receiving project related grievances at all levels have been elaborated in the SEP and the RPF. BOTAŞ will ensure that contractors also establish a GRM in line with the provisions provided in the SEP. The GRM will aim to collect all project related concerns, requests, complaints, serving both internal (project employees) and external stakeholders. BOTAŞ has introduced the project 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.

61. **Gender dimensions have been integrated into project activities.** In Turkey gender inequalities persist in access to economic opportunities and ownership of land. Despite neutral national laws on expropriation payments and in land ownership, usually fewer women own land compared to men. The Project will aim to contribute closing of above-mentioned gender gaps. The involvement and participation of women will be ensured through dedicated engagement activities carried out for project-affected women. BOTAŞ will ensure that project benefits such as local employment opportunities, right for resettlement and compensation and safety trainings will be made equally available to women. BOTAŞ and/or its contractors will provide equal employment opportunities for 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. The project will monitor the number of consultations held separately for women.



F. Environment (including Safeguards)

62. **Environment.** The ongoing Bank-financed Gas Sector Development Project (GSDP), is similar in nature to the proposed project, except with a larger footprint and gas storage capacity. Therefore, as with the ongoing project, the proposed project is also designated as Category A. The potential environmental and social impacts of the proposed project are likely to be more diverse and larger in scale since, for example, some of the new 40 wells will be drilled close to (but not inside) culturally sensitive areas. The first round of public consultations was conducted in November 2016, and most of the concerns were related to potential adverse impacts that may affect people's income source as a result of the project (e.g. whether fencing would be used to surround the well areas or license borders and whether they could continue agricultural and animal husbandry activities, etc.) The national EIA process for the proposed project was completed in March 2017 and received the approval of the Ministry of Environment and Urbanization. Since then, BOTAŞ worked with the Bank to prepare a full ESIA to fulfill the Bank's safeguards policy requirements. The draft ESIA has been disclosed in-country by BOTAŞ and on the Bank's website on June 6 and June 7, 2017, respectively. After several iterations and revisions, BOTAŞ submitted an 'advanced draft ESIA' to the Bank for review on February 12, 2018. The document was disclosed in both Turkish and English on BOTAŞ' official website on February 15, 2018 for public consultations purposes. Additionally, hard copies of the ESIA were made available at the project site, village headman's office and BOTAŞ General Directorate before the second round of consultations took place on March 5-6, 2018. BOTAŞ noted that there was no opposition raised against the ongoing project nor the proposed project. Local residents mostly inquired about land acquisition and voiced expectations about potential job opportunities. The ESIA was finalized following the conclusion of consultations and final comments provided by the Bank and was disclosed both in-country on BOTAŞ' website and on the Bank's external website on March 27, 2018.

63. The ESIA presents the monitoring results (for a duration of 6 years) of the ongoing project, and links the results observed with the estimated impacts under the proposed project. In summary, according to the ESIA, based on the monitoring results for the ongoing project, no significant residual impacts are foreseen for the proposed project except the larger scale temporary impacts of the construction phase and operation phase. Leaching phase impacts, mainly discharging the brine solution into the protected Salt Lake, has been considered as the major potential risk in the ESIA. However, the monitoring results for the ongoing project recorded in the ESIA show that due to the similar characteristics of the brine and the lake, no significant impacts have been witnessed, both with regards to quantity or quality of the recipient Salt Lake.

64. Since the proposed project will be implemented through a design, supply and install contract where 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) are not known during the preparation of the safeguard documents. Therefore, a detailed preliminary risk assessment was conducted within the scope of the ESIA. The result of this study is that the locations within the project area of influence that can be seriously affected from potential ecological, cultural and socio-economical negative impacts of the project units (e.g. wells, pipelines, energy transmission lines, access roads, camp sites etc.) were identified as 'No-Go Areas'. To conserve critical habitats and culturally sensitive sites, the ESIA commits that the contractor will avoid these areas. For impacts that are not completely avoidable, the proposed project detailed design will be carried out with an aim to minimize the environmental and social impacts and ensure that all mitigation measures are in place. In addition, the construction contract will have chance find provisions as a requirement of the contractor. Chance find procedures are also presented in the ESIA's Cultural Heritage Management Plan. Other construction activities as well as drilling and leaching related impacts (e.g. withdrawal of water from the Hirfanli dam, construction debris, drilling mud) are described in detail



in the ESIA report along with the relevant mitigation and monitoring actions. For the energy transmission lines, camp sites, and other activities to be finalized after contract award, the contractor will conduct a component specific environmental assessment which demonstrates that the commitments provided in the ESIA report have been considered. These evaluation reports will be shared with BOTAŞ and the Bank (when necessary) prior to commencement of construction for those activities.

65. The ESIA also provides framework sub-management plans (e.g. waste management plan, labor influx management plan, biodiversity action plan) and requires the construction contractor to finalize these plans and submit for BOTAŞ' review and approval. To present clear responsibilities for this post contract award stage, BOTAŞ' will establish a sound Environmental and Social Management System (ESMS). The ESIA provides a generic description of this ESMS; however, BOTAŞ will improve the ESMS and make it in line with the bidding documents and consultancy request for proposals. The construction supervision and ESIA and RAP Monitoring Consultancy components of the proposed project will also be fully in line with the ESIA and ESMS requirements and BOTAŞ' organizational system will support the review, approval, monitoring, reporting mechanism of the ESMS. Details on the required ESMS arrangements are presented in Annex 2.

G. Climate Impact

66. The Project will enhance supply security in the winter for gas-fired power generation, thus reducing the requirement for coal, preventing gas supply curtailment and resulting in GHG emissions savings. There are other climate benefits from the project that have not been quantified such as consumers switching to more polluting solid fuels in the absence of gas, flexibility in managing power generation and integration of large-scale renewable energy into the electricity grid, and climate resilience in dealing with hydro vulnerability. The following two effects have been identified and quantified:

(a) 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, some gas fired power generators have to reduce power generation and some other dual-fuel power generators switch to light fuel oil. The reduction of output from gas-fired power plants is then picked up mainly by hydropower and coal-fired power plants.²³ In 2016 and 2017, the share of coal based power generation in winter increased to about 36 percent and 35 percent from about 31 percent and 33 percent in summer months, respectively (see Figure 2 and Figure 3). Notwithstanding other factors (e.g. hydro and renewables availability), gas curtailment played an important role in the increased share of coal in the winter generation mix. The curtailed gas amounted to more than 900 million cubic meters (mcm) in the last two months of 2016, which corresponded to a larger output from coal-based plants. Should the gas be available either through LNG import or storage facility, about 2,000 megawatt (MW) of coal capacity could be deferred, assuming coal-based power generation remains at 32 percent of the energy mix. The analysis evaluated the GHG savings of avoidance of 2,000 MW coal capacity for about 12 days once the storage is available and enables gas-fired power plants to take over the coal capacity. Since gas-fired power plants have a higher efficiency factor, GHG emissions savings can be estimated and attributed to the proposed project at about 3 million tons of carbon-dioxide equivalent (mtCO₂-eq) per annum or US\$177 million for the low case SCP and US\$353 million for the high case SCP over the 30-year economic life of the project.²⁴ These values represent 50 percent of the total benefit since it is assumed that the

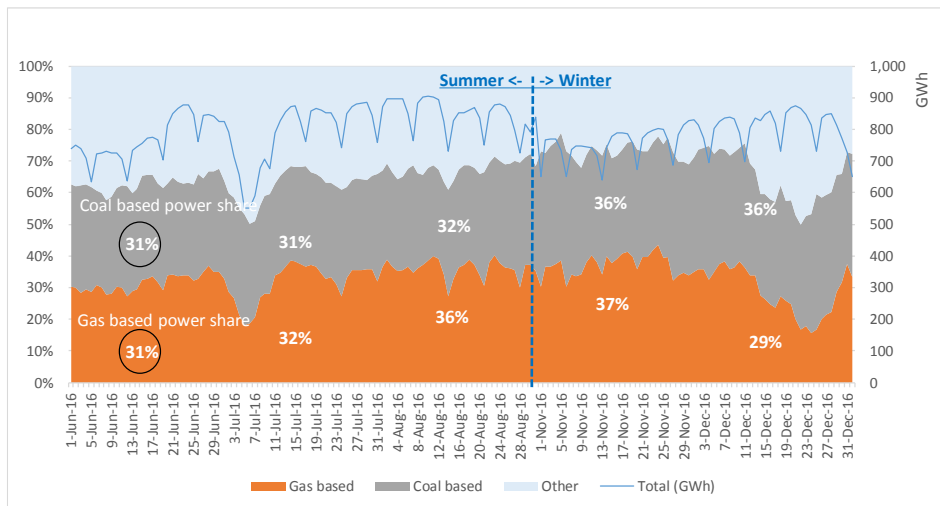
²³ To a lesser extent, output from renewables (wind, solar, geothermal and biomass combined) also increases in the winter.

²⁴ The September 2017 draft guidance note on shadow price of carbon directs World Bank task teams to use two scenarios for



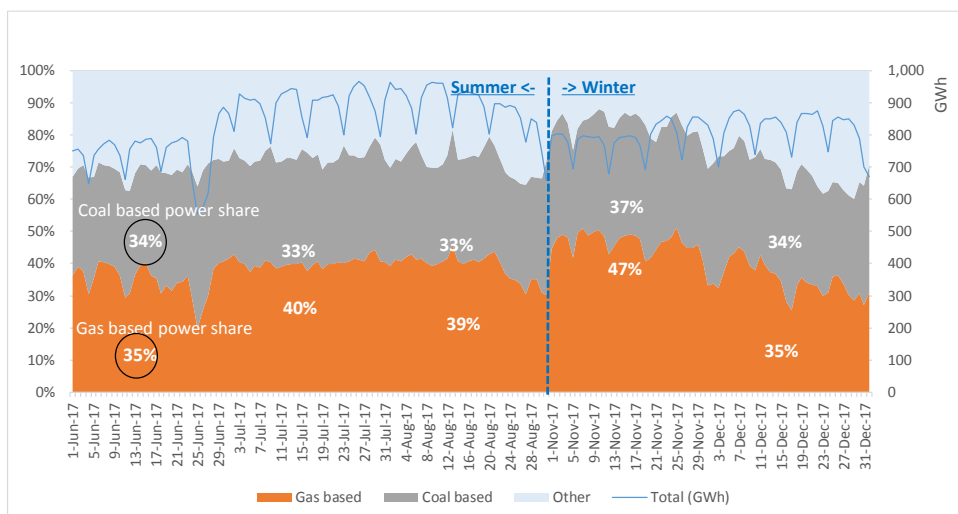
Silivri facility would also provide half of the required gas to the system. While demand for natural gas supply for power stations is decreasing as a result of a decreasing share of gas-based power in the generation mix, in the absence of LNG or stored gas in the winter, gas curtailment is expected to continue. This in turn places constraints on gas-based power plants when competing demand from industry and the residential sectors is forecasted to grow at about 3 and 4 percent, respectively in the next decade. As a result, the CO₂ emission savings are expected to be sustained. The switch from gas to light fuel oil for the dual-fuel power plants also results in higher CO₂ emissions; however, due to lack of sufficient data, the analysis did not take that benefit into account.

Figure 2: Electricity Generation by Source (% , 2016)



Source: TEIAS; Bank team analysis

Figure 3: Electricity Generation by Source (% , 2017)



Source: TEIAS; Bank team analysis

shadow carbon prices: (a) Low SCP scenario starting at US\$37/ton in 2017 and rising to US\$50/ton by 2030, US\$63/ton by 2040 and US\$78 by 2050; and (b) High SCP scenario starting at US\$75/ton in 2017 and rising to US\$100/ton by 2030, US\$125/ton by 2040 and US\$156 by 2050.



(b) 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 GHG emissions are higher than those of gas transported through modern pipeline systems, primarily because LNG liquefaction plants consume about 6 percent and 1 percent of the raw gas for liquification/regasification and shipping, respectively. The proposed project will enable Turkey to import additional piped gas volume from new contracts, likely through TANAP or TurkStream²⁵. The analysis assumes that the incremental piped gas volume will come through TANAP until 2030, after which 50 percent of the incremental piped gas will come from TANAP and the balance from TurkStream and/or other sources. This amount of incremental gas can replace the equivalent LNG volume and results in CO₂ emissions reductions. By substituting 4 bcm of LNG with piped gas, this results in about 6 mtCO₂-eq GHG emissions savings attributed to the proposed project or US\$348 million for the low case SCP and US\$696 million for the high case SCP over the 30-year economic life of the project.

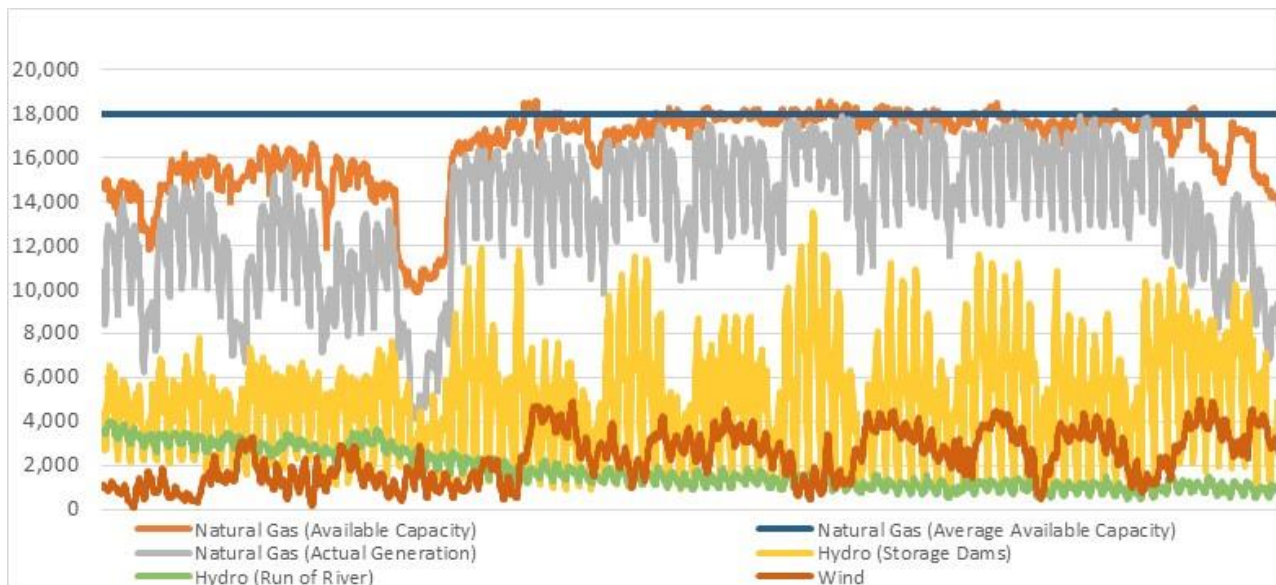
67. The Project will also generate GHG emissions, primarily in the gas turbines that drive the turbo-compressors used to compress gas into the underground storage caverns. The estimated volume of resulting CO₂ emissions is about 0.1 mtCO₂-eq per annum during operational life of the plant. Therefore, the estimated net GHG emissions savings from the proposed project amounts to 3 mtCO₂-eq or US\$182 million for the low case SCP and US\$364 million for the high case SCP over a 30-year period.

68. While difficult to quantify, in practice there are even more significant climate benefits for households which have no choice but to switch to more polluting solid fuels and coal when gas is not available. This is especially acute in the winter when heating requirements are high and gas availability is not able to keep up with the demand. In addition, Turkey's large gas supply system and gas-fired power generation capacity is flexible in its ability to complement and provide back-up for integrating large scale variable renewable generation, especially wind and solar, into the power grid. Renewable energy in electricity generation has grown from about 31 terrawatt-hour (TWh) – about 25 percent of total electricity supply in 2000 – to about 85 TWh in 2017 (or 29 percent of total electricity supply). Increased gas storage will enable Turkey to continue its ambitious renewable energy development program. Figure 4 and Figure 5 demonstrate the key role of flexible gas-fired power generation in Turkey's electricity supply in summer 2017 (June-August) and winter 2017/18 (November-January), respectively. Figure 5 also shows how the supply of gas to the power sector had to be curtailed in the absence of adequate storage during November 2017-January 2018, forcing the use of alternative generation sources including hydropower. This led to a reduction in available hydro generation during peak electricity demand periods in the summer months when hydro generation is normally at its highest (for example, in 2017, as shown in Figure 4).

²⁵ Other existing pipes have almost reached their capacity limit. Gas transported through Russia West pipeline is likely to be replaced by TurkStream once it is constructed.

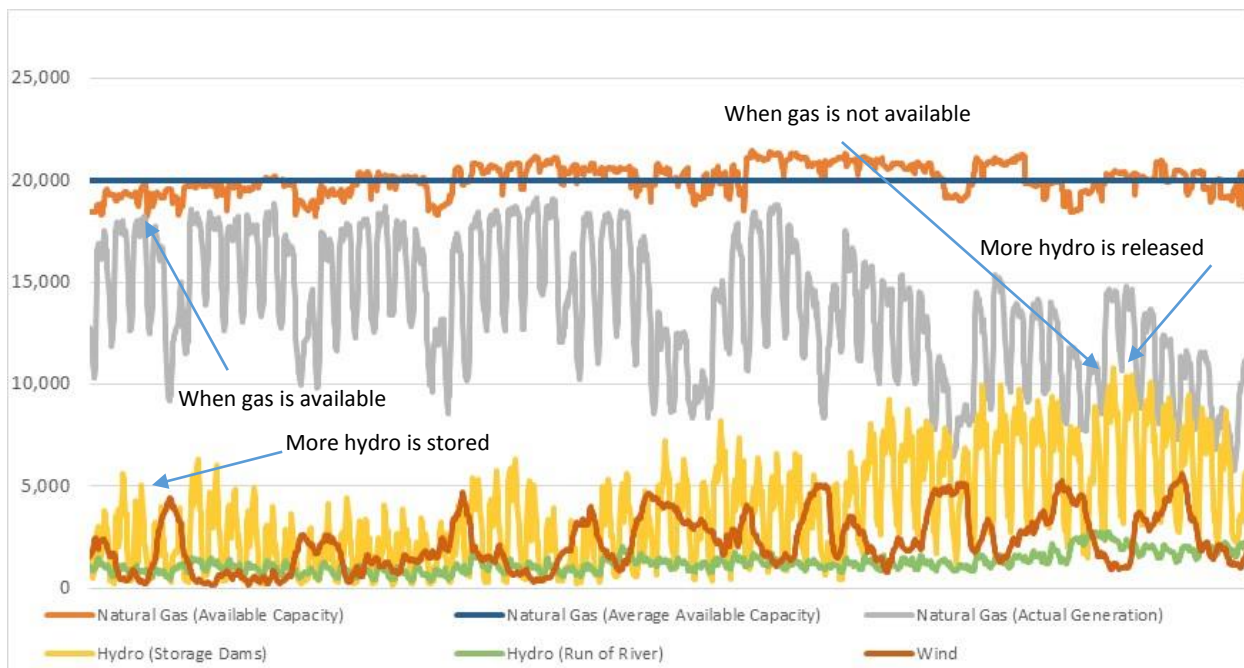


Figure 4: Available Natural Gas Capacity and Actual Generation (June 1 – August 31, 2017, Megawatt-hour [MWh])



Source: TEİAŞ

Figure 5: Available Natural Gas Capacity and Actual Generation (November 1, 2017 – January 1, 2018, MWh)



Source: TEİAŞ

69. **Gas storage will likely have an adaptation/resilience benefit by helping Turkey deal with hydro vulnerability.** As shown in Figure 5, having access to gas storage enables the country to maintain its hydro



reservoir levels and better manage this resource amid droughts and an overall changing climate. As Climate change is a threat to hydropower generation. A World Bank study completed a few years ago concluded that Turkey is one of the countries in the Europe and Central Asia region most likely to experience the greatest increases in climate extremes. Turkey is already experiencing considerable variability in hydro generation and gas-fired generation will continue to enable Turkey to deal with hydro variations in the future.

70. Gas-fired generation also adds significant flexibility to complement the roughly 80 TWh of hydro generation that is projected to be part of the mix in 2021. As the volume of wind and solar is projected to grow to 53 TWh in 2021 (or 17 percent of total generation), this flexibility is very important. Absent significant flexibility in the gas supply system, the onus of managing 17 percent of the generation mix (which in several low demand hours would exceed 50 per cent of the generation) would fall squarely on the storage hydro system. Although storage hydro is the most effective way to manage variability in the system, it would diminish its ability to support the peak especially during the summer months. Gas storage would render the added flexibility to the system so that the gas generators can participate in the primary and secondary reserve ancillary services to balance the system. As gas is typically the marginal fuel in Turkey for most of hours of the day, the frequency control and load following ancillary services can be economically and effectively done by a sub-set of the gas generators. The ability for the gas storage system to provide additional gas during the winter months when in fact there is more spare gas capacity (due to lower demand for electricity) would ensure gas generators can be more effective in responding to contingency events rapidly.

H. Other Safeguard Policies

71. **Safety of the Hirfanli Dam.** Since the fresh water necessary for leaching the salt caverns will be supplied from an upstream dam (Hirfanli Dam and reservoir), the World Bank's policy on dam safety is triggered for the project, as is the case for the ongoing project. The amount of water to be utilized from the reservoir and its impacts on the dam is evaluated in the ESIA. The project will construct a water intake pier at a reservoir rim which will not be significant nor complex, and will not involve any works at the main embankment dam structure. For the proposed project, the Bank's dam safety specialist conducted a due diligence of the Hirfanli Dam in February 2017 and agreed actions with BOTAŞ and the dam operator that were due by appraisal have been met. The State Hydraulic Works (DSI) and the Electricity Generation Corporation of Turkey (EUAŞ) are responsible for the Hirfanli dam structures and the hydro power plant, respectively. DSI is 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 ongoing project, dam safety assurance measures were agreed with DSI and BOTAŞ and EUAŞ for implementation by DSI's field organization. These were: (i) seepage analysis based on 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 (EAP). These measures have been updated and revised in line with the Bank review for the proposed project. The Operations and Maintenance Plan updated in 2017 covering dam safety monitoring protocol will be maintained and implemented. The EAP was reviewed by the Bank and will be finalized in line with the Bank's comments prior to the commencement of construction works related to the water intake pier at the dam reservoir and will thereafter be maintained. The EAP will be prepared with a focus on the detection and evaluation procedure of potentially arising dam safety issues/anomalies as well as timely execution of mitigation measures and notification procedure. Since the dam will supply critical freshwater to salt caverns leaching under the project, safety of the Hirfanli Dam needs to be assured, but the project areas and facilities would not be inundated even in case of dam failure.



I. World Bank Grievance Redress

72. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY : Turkey

Gas Storage Expansion Project

Project Development Objectives

The Project Development Objective is to increase the reliability and security of gas supply in Turkey by expanding underground gas storage capacity in the country.

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Reduction of gas supply curtailments due to available gas storage at the Tuz Golu Expansion Plant		Cubic Meter(m3)	150000000 0.00	0.00	Annual	BOTAS	BOTAS
Description: Reduction in volume of gas curtailment to consumers as a result of storage available to meet gas supply shortages.							

Name: Reduction of spot LNG purchases due to available gas storage at the Tuz Golu Expansion Plant		Percentage	0.00	67.00	Annual	BOTAS	BOTAS
Description: The indicator measures the amount of storage gas available from the Tuz Golu Expansion Plant each year to replace spot LNG gas purchase. As storage capacity expands in the Plant each year, the amount of foregone spot LNG purchase is greater.							



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Increasing gas storage capacity through the Tuz Golu Gas Storage Expansion Plant		Cubic Meter(m3)	0.00	400000000 0.00	Annual	BOTAS	BOTAS
Description: This indicator measures the availability of gas storage from the Tuz Golu Expansion Plant.							

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Turkish gas consumers benefitting from gas supply		Number	14000000. 00	18000000. 00	Annual	GAZBIR	The World Bank
Description: Number of Turkish gas consumers benefitting from gas available from storage. The figure refers to number of subscribers.							

Name: Implementing Tuz Golu Resettlement Action Plans to compensate Project Affected Persons		Percentage	0.00	100.00	Annual	BOTAS	BOTAS
Description: Implementing Tuz Golu Resettlement Action Plans to compensate Project Affected Persons							

Name: Registered grievances		Percentage	0.00	90.00	Annual	BOTAS	BOTAS
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Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
addressed within the stipulated time frame							
Registered grievances submitted by women addressed within the stipulated timeframe		Percentage	0.00	90.00	Monthly	BOTAS	BOTAS
Description: Registered grievances addressed within the stipulated time frame							
Name: Number of community consultations held for women in proportion to the total number of consultations held		Percentage	0.00	40.00	Annual	BOTAS	BOTAS
Description: Number of consultations held separately for women as a percentage of total number of consultations on the project							



Target Values

Project Development Objective Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	YR6	YR7	End Target
Reduction of gas supply curtailments due to available gas storage at the Tuz Golu Expansion Plant	150000000.00	150000000.00	150000000.00	800000.00	800000.00	0.00	0.00	0.00	0.00
Reduction of spot LNG purchases due to available gas storage at the Tuz Golu Expansion Plant	0.00	0.00	0.00	0.00	0.00	4.00	31.00	67.00	67.00
Increasing gas storage capacity through the Tuz Golu Gas Storage Expansion Plant	0.00	0.00	0.00	0.00	200000000.00	160000000.00	400000000.00	400000000.00	400000000.00

Intermediate Results Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	YR6	YR7	End Target
Turkish gas consumers benefitting from gas supply	14000000.00	14000000.00	15000000.00	16000000.00	16500000.00	17000000.00	17500000.00	18000000.00	18000000.00
Implementing Tuz Golu Resettlement Action Plans to compensate Project Affected Persons	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00



Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	YR6	YR7	End Target
Registered grievances addressed within the stipulated time frame	0.00	50.00	60.00	70.00	80.00	90.00	90.00	90.00	90.00
Registered grievances submitted by women addressed within the stipulated timeframe	0.00	50.00	60.00	70.00	80.00	90.00	90.00	90.00	90.00
Number of community consultations held for women in proportion to the total number of consultations held	0.00	20.00	25.00	30.00	35.00	40.00	40.00	40.00	40.00



ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY : Turkey Gas Storage Expansion Project

1. **The Tuz Golu Gas Storage Expansion Project consists of three components:**
 - (a) Component 1: Tuz Golu Gas Storage Expansion Plant;
 - (b) Component 2: Consulting Services for Project Supervision; and
 - (c) Component 3: Consulting Services for Environmental and Social Monitoring.
2. **Component 1: Tuz Golu Gas Storage Expansion Plant:**
 - (a) **Water and Brine Pipelines:**
 - (i) Construction of a water intake structure on the reservoir of the Hirfanli Dam;
 - (ii) Construction of a 117-km fresh water supply line (about 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
 - (iii) Construction of a 31-km brine discharge line (1,600 mm diameter) with valves (26 air relief valves, five drain valves and five line valves), and a diffuser, from the project site to the Tuz Golu lake.
 - (b) **Subsurface Facilities:**
 - (i) Drilling and leaching of forty caverns (including with an option for up to eight spare caverns that will be drilled and leached only if necessary), in two phases, to store at least 4 bcm of working natural gas:
 - 12 caverns, each with a net volume of 630,000 m³;
 - 28 caverns with net volumes ranging between 630,000 m³ to 872,000 m³;
 - At least six drilling rigs are expected to be mobilized to complete cavern drilling in the required timeline;
 - (ii) Snubbing of 40 caverns;
 - (iii) Testing all cavern integrity and gas tightness;
 - (iv) First gas filling for each cavern (operational costs are covered under the contract, excluding the cost of cushion gas and working gas);



- (v) Commissioning of each cavern; and
 - (vi) Operation of the facilities.
- (c) **Surface Facilities:**
- (i) The existing surface facility (SF1), developed for the ongoing Tuz Golu project, will be used for the leaching of 6²⁶ of the 40 caverns. It will be connected to 18 of the 40 caverns for gas injection and gas withdrawal;
 - (ii) Construction of a new surface facility (SF2) for the leaching of 34²⁷ 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 gas turbines with turbo-compressor units of 30 MW each (four for operations, one stand-by), heat exchangers, water separators, heating and pressure reducing units, glycol gas absorber and regeneration units and utilities;
 - (iii) Construction of a connection pipeline between the two surface facilities (SF1 and SF2) for first gas filling, operation and maintenance; and
 - (iv) Construction of a gas transmission line to connect the plant to BOTAS' Kayseri-Konya-Seydisehir gas pipeline and national gas grid at Bozcamahmut.
- (d) **Electricity Supply**
- (i) Construction of electricity transmission lines and power supplies for water pumping stations, surface and sub-surface facilities; and
 - (ii) uninterruptible power supply systems.
- (e) **Instrumentation, Control, and Telecommunication Systems**
- (i) SCADA system for the Water Supply and Brine Discharge lines including supply of all necessary central computers, software, instruments and remote terminal units.
 - (ii) SCADA system for the surface facilities including supply of all necessary central computers, software, instruments and remote terminal units.
 - (iii) Communication tools including a remote terminal unit system to enable the SCADA system established at the Tuz Golu Gas Storage Expansion Plant to communicate with BOTAS' general SCADA system in Ankara.
- (f) **Services to be provided by the Contractor**

²⁶ SF1 was designed 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.

²⁷ SF2 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.



- (i) Management - planning, coordination, 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.
- (ii) Detailed design and engineering;
- (iii) Procurement;
- (iv) Installation services;
- (v) Testing and inspection services;
- (vi) Commissioning and operational acceptance; and
- (vii) Training of BOTAŞ’ personnel.

3. Component 2: Construction Supervision Consultancy

- (a) Review and, facilitating approval by BOTAŞ, of detailed engineering drawings, supervision of construction and installation of the facilities as well as the inspection and testing of materials, plant and equipment during the construction and installation phases; and
- (b) 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

- (a) Regular monitoring of compliance of the construction activities with the ESIA and the RAP;
- (b) Review and monitoring in accordance with the frequencies specified in an ESMP that environmental and social standards are fully complied with during construction and installation and that all services provided by the contractor are in full conformity with the ESMP developed by BOTAŞ based on the (WB-approved) ESIA; and
- (c) Monitoring the implementation of the RAP to be prepared by BOTAŞ in line with the World Bank-approved RPF.



ANNEX 2: IMPLEMENTATION ARRANGEMENTS

COUNTRY : Turkey Gas Storage Expansion Project

Project Institutional and Implementation Arrangements

- 1. Implementation Period.** Project implementation started in June 2017 with the issuance of the prequalification invitation. Completion is projected by October 2023. This ambitious completion target will be confirmed during the bidding process.
- 2. Project Implementation Agency.** The project is implemented by Turkey's national gas company BOTAŞ. It was established on August 15, 1974 by the Turkish Petroleum Corporation under Decree No. 7/7871, for the purpose of transporting Iraqi crude oil. Because of Turkey's increasing need for diversified energy sources, in 1987 BOTAŞ expanded its original purpose of transporting crude oil through pipelines to cover natural gas transportation and trade activities.
- 3. Project Implementation Management.** Within BOTAŞ the day-to-day project implementation is carried out by the 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. The organization chart of BOTAŞ is provided in Annex 3. 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.
- 4.** 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 Bank 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. Twenty five out of 55 PMU staff who are working at the headquarters of BOTAŞ are mainly responsible for project contracting and control, as well as environment, social, health and safety. The remaining 30 PMU staff are located at site for implementation and operations. 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). The preparation of safeguards and technical documentation (basic design) were externally supported by an environmental consultant and a design consultant, respectively. Implementation activities of the proposed project will be supported by a construction supervision consultant as well as an ESIA and RAP monitoring consultant to be selected through a competitive process. The work and deliverables of both consultancy contracts will be managed by the PMU. BOTAŞ' organization during project implementation is shown in Figure 6. For the operations phase, the organizational structure is shown in Figure 7.



Figure 6: BOTAŞ organization structure for site personnel (project implementation)

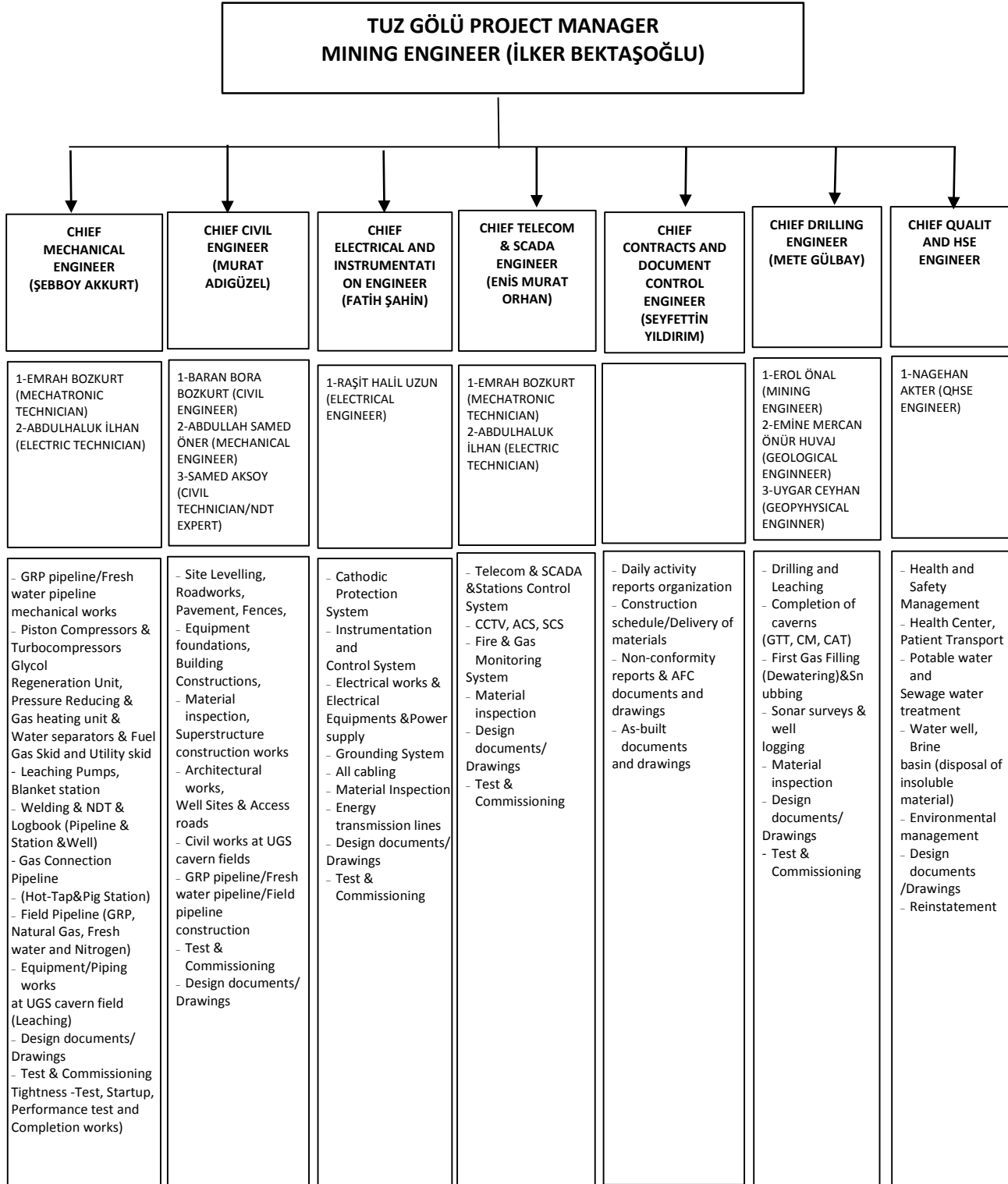
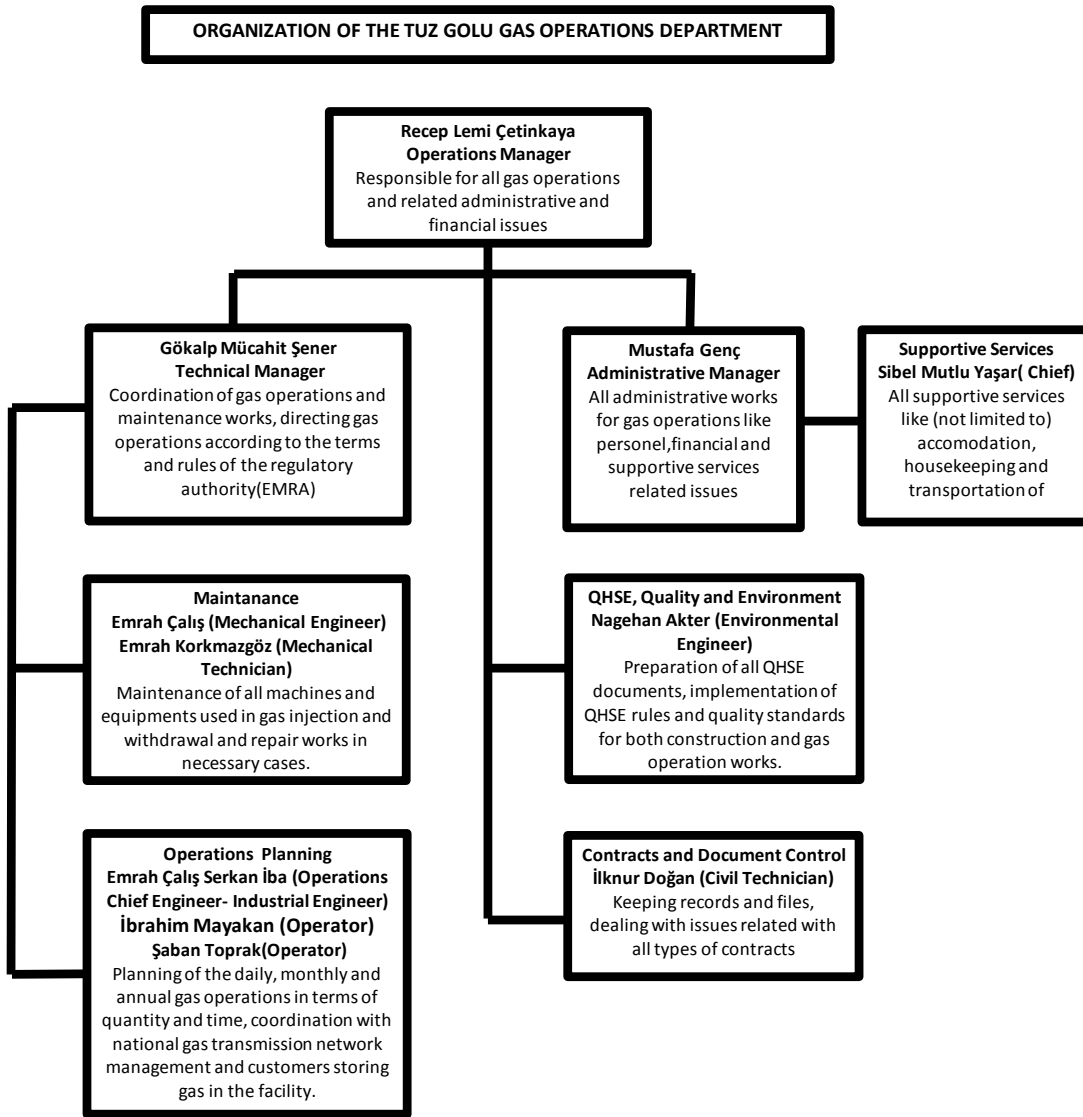




Figure 7: BOTAŞ organization structure for site personnel (gas operations)



Financial Management

5. The financial management arrangements relating to the ongoing project are satisfactory to the Bank. The proposed Project is expected to be co-financed by AIIB in the form of proportionate, joint co-financing in a 50:50 ratio to be applied on an invoice by invoice basis. The Bank will provide disbursement services for AIIB in respect of the parts of the Project to be jointly financed by the Bank and AIIB, including review and approval of Applications for Withdrawal. The financial management arrangements that are assessed as satisfactory to the Bank will also be relied upon for the AIIB loan.

6. **Country Issues.** BOTAŞ will be the main beneficiary for the loan. BOTAŞ 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 (TWF) and Turkish 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.

7. In February 2017, shares of BOTAŞ, Halk Bank, Ziraat Bank, Istanbul Stock Exchange and other companies have been transferred to the TWF from the Treasury. This created some ambiguity relating to the status of the companies with respect to their eligibility for Treasury Guarantee in a World Bank-financed loan. A decree by law has introduced some amendments to the Public Finance and Debt Management Law No. 4749 and provided clarity on the Treasury guarantee. The two changes introduced to the debt law in the decree related to (i) inclusion of BOTAŞ and other companies transferred to the TWF as well as the TWF itself within the scope of Debt Law (as per item 86 of the Decree) and (ii) continuation of the use of repayment guarantee. The related companies are defined as the article 4 of the law relating to the TWF which includes the companies transferred to the TWF. A Council of Minister's decision might still be required for the Treasury to extend a guarantee for BOTAŞ; however, the decree has clarified the foundation of such a guarantee. On the other hand, the operational and financial implications of the transfer to TWF continue to evolve and are not yet fully determined. .

8. As part of the Bank's due diligence on the proposed project, consultations were carried out with BOTAŞ, Treasury and MENR to assess possible financial, legal and operational implications on BOTAŞ' transfer to the TWF. The due diligence concluded that while shares of BOTAŞ' have been transferred from Treasury to TWF, BOTAŞ remains subject to Turkey's Decree Law No. 233, which is the primary legislation governing State-owned Enterprises. Therefore, until such time that an amendment is introduced to Decree Law No. 233 or a new law is enacted that supersedes Decree Law No. 233, BOTAŞ will continue to operate as it were prior to its transfer to the TWF. Nonetheless, to mitigate against possible risks arising from this transfer of shares to TWF, the Bank agreed with BOTAŞ on a legal covenant in the loan agreement to provide remedies for the Bank should there be any changes to BOTAŞ' corporate governance, operational and/or financial that may affect, materially and adversely, BOTAŞ' ability to perform any of its obligations under the proposed project.

9. Since BOTAŞ is a state-owned commercial company, the country issues section relating to Turkey focuses mostly on the governance framework of the SOEs and private sector companies in Turkey. The corporate governance framework in Turkey is set by the new Commercial Code applicable to all companies. The commercial code became effective in 2012 and introduced new requirements enhancing corporate governance in companies. SOEs became subject to independent external audits in line with IFRS as of 2015 according to a Cabinet Decree. So far, SOEs have audited their financial statements for the fiscal years starting from 2014.

10. In addition to external auditing, since 2014 the Annual General Investment and Financing Program (established under a Cabinet Decree prepared according to Decree Law No. 233) mandated SOEs to establish internal control systems and internal audit mechanisms. SOEs are currently establishing their internal control systems and recruiting their internal auditors.

11. The size of the SOE sector in Turkey shrunk significantly as a result of the privatization program since the 1980s, however, the remaining 26 SOEs are major players in key sectors of the economy such as energy, transportation and agriculture. There is growing pressure to improve SOE performance. As a result of privatization, market liberalization, and sector reforms, SOEs are facing growing pressures to become more



competitive and improve their performance, requiring them to operate like other companies with higher levels of flexibility and autonomy in operational matters.

12. There is increasing recognition that SOEs underperformance stems from fundamental problems in their governance frameworks. These SOEs are under pressure to become more competitive and to operate like private sector companies, and there is still room for improvement in areas including their governance framework, incentive structure, decision making procedures, transparency and autonomy.

13. **Implementation Arrangements.** BOTAŞ has been implementing the GSDP since (and its additional financing) since 2006 when the original loan became effective. BOTAŞ has a dedicated technical team for the implementation of the proposed project and the Financial Affairs Department is responsible for accounting and registering the payments. The Storage Department has developed integrated excel worksheets and uses these sheets for cost controls and planning. Additionally, the Accruals Unit of the Financial Affairs Department monitors budget allocations and payments against contract ceilings for each payment. Both these departments will assume the same roles for the proposed Project. The workflow is well-defined under the GSDP and the arrangements are satisfactory to the Bank. The same arrangements will be utilized for the implementation of the proposed Project.

14. **Staffing.** The Finance and Accounting Directorate of BOTAŞ consists of the following units: Budgeting, General Accounting, Financial Operations, Investment Accounting, Finance and Credits, Customer Relations and Collections. Approximately 60 staff are working in the Financial Affairs Department. The transactions of the project will be integrated into BOTAŞ' systems; therefore, the staff will be doing the accounting of the proposed project as a part of their routine work. Other financial management requirements specific to the project such as reporting will be the responsibility of the Loans sub-unit. Staff working on the GSDP and TANAP project are highly qualified and experienced and also attend Bank organized training events regularly.

15. **Accounting Policies, Procedures and Internal Controls.** The project expenditures are included in BOTAŞ' annual budget. The Government's investment plan includes the proposed Project and, therefore, the required allocations will be reflected in BOTAŞ' budget annually.

16. Under GSDP the project accounting is maintained at the Financial Affairs Department of BOTAŞ. Accounting for BOTAŞ as an entity is maintained in the accounting module of Enterprise Resource Planning (ERP) and all transactions under the project are also recorded in this accounting module. Project transactions are also entered in spreadsheets that are used for reporting in US dollars. The Financial Monitoring Reports of the project are prepared using the data in these spreadsheets. There is regular reconciliation of the data in the spreadsheets with the main accounting records. There is regular reconciliation with Bank statements and spreadsheets and with bank statements and BOTAŞ detailed accounting records.

17. The project transactions will be integrated into BOTAŞ' daily operations and the control procedures for the project will be aligned with BOTAŞ' existing procedures as they are for the ongoing project. BOTAŞ' flow of documents and internal controls are as follows: after the contracting phase, once a payment request is received from a service/goods provider, the engineering department or the relevant technical spending unit prepares a payment/progress file including a technical review, an acceptance note for the goods/services received and a payment order. This file is then reviewed and signed by four signatories: engineer, unit manager, director and deputy general manager. After all authorizations are obtained, the payment order and invoice are sent to the Financial Affairs Department. The Accruals unit of the Financial Affairs Department records the invoice into the system and sends a payment order to the Finance and Credits unit of the Financial Affairs Department with an internal letter, which executes the payment from the bank. The bank payment orders are authorized with two of



following signatories: the chief, manager, deputy director, director. The loans unit of the Financial Affairs Department only executes the payments and does not conduct any additional controls/checks on the payment orders.

18. As part of its routine internal control procedures, the Financial Affairs Department makes monthly reconciliations of the designated account at Vakifbank with the project accounting records. All reconciliations are verified and signed off by a chief and a manager in the unit. The Financial Affairs Department has access to the World Bank’s client connection system and uses the system to access the monthly disbursement summaries. BOTAŞ has accounting procedures laid out in its accounting regulation dated 2011. The project financial management procedures are detailed in a separate manual.

19. The accounting policies and procedures as well as the internal controls developed for the GSDP are satisfactory to the Bank and the same procedures will be adopted for the proposed project.

20. **External Audit.** BOTAŞ’ financial statements as well as the project financial statements for the GSDP have been audited by external auditors in line with International Standards on Auditing (ISA). The project financial statements have a clean audit opinion for the year ended December 31, 2016. However, BOTAŞ’ auditors issued a qualified audit opinion on the consolidated financial statements of BOTAŞ and its subsidiaries for the year ended December 31, 2016. BOTAŞ is currently strengthening its capacity in the application of TAS/IFRS.

21. As a revenue earning entity as well as being the borrower of the proposed loan, BOTAŞ will be required to have both its statutory accounts and the project financial statements audited. The audited project financial statements are required to be publicly disclosed in a manner acceptable to the Bank. The required audit reports and their due dates are provided in Table 5 below:

Table 5: Required Audit Reports

Audit Report	Due Date
BOTAŞ Entity financial statements	Within nine months after the end of each calendar year and also at the closing of the project.
Gas Storage Expansion Project Financial Statements	Within six months after the end of each calendar year and also at the closing of the project.

22. **Reporting and Monitoring.** BOTAŞ will prepare Interim Unaudited Financial Reports (IFRs) for the project and these IFRs will be submitted to the Bank on a quarterly basis within 45 days following the end of the quarter. The IFRs will consist of Statement of Special Account, Sources and Uses of Funds, Uses of Funds by Investment Activities and Summary Table for the Uses of Funds by Categories. Under the GSDP, BOTAŞ submits the IFRs on a timely basis and they are satisfactory to the Bank.

23. **Funds Flow and Disbursement Arrangements.** The proposed project funds will be disbursed using transaction based disbursements, through advance, direct payment, reimbursement and Special Commitment disbursement methods. Two authorized signatures who will be specified in the project financial management manuals will sign the withdrawal applications. The minimum application size for payments directly from the loan account, reimbursements and for issuance of Special Commitments is specified in the Disbursement and Financial Information Letter. Full documentation in support of statements of expenditures, including completion reports and certificates, would be retained by BOTAŞ for at least two years after the Bank has received the audit report for the fiscal year in which the last withdrawal from the loan account was made. This information will be made



available for review during implementation support missions by Bank staff and for annual audits. AIIB co-financing will be disbursed in the same manner as the IBRD loan, except for the Special Commitment disbursement method which is not yet available for such purposes. BOTAŞ will submit withdrawal applications for both the IBRD and AIIB loans to the Bank using the same supporting documentation. The Bank will review the documentation and approve the withdrawal request using its own policies and procedures, arranging for transfer of IBRD loan proceeds as per its own standard practice, and sending a message to AIIB with an instruction to arrange for transfer of AIIB loan proceeds as per its own standard practice. Therefore, the requested funds will be transferred to the beneficiaries from two different sources, and potentially, with a slight time lag. The DFIL will also serve as instructions for withdrawal of proceeds of the AIIB loan.

24. **Financial Covenants.** The financial covenants for the proposed project are as follows:

- (a) Maintaining a financial management system satisfactory to the Bank throughout project implementation;
- (b) Annual IFRS based audit of BOTAŞ' financial statements; and
- (c) Annual audit of the project financial statements in accordance with ISA.

Disbursements

25. BOTAŞ will open one Designated Account for the project that will be used for both IBRD and AIIB loans. Payments made by BOTAŞ to its contractor and consultants eligible for IBRD and AIIB financing will form the basis of disbursements from the Bank, at a 50:50 ratio between IBRD and AIIB financing. BOTAŞ will be responsible for submitting the withdrawal applications to the 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 the Disbursement and Financial Information Letter.

Procurement

26. The World Bank Procurement Regulations for IPF Borrowers – July 2016 revised in November 2017 (“Procurement Regulations”) will apply to the Project (“Procurement Regulations”). The World Bank’s “Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants”, dated October 15, 2006 and revised in January 2011 and as of July 1, 2016 (Anti-Corruption Guidelines)” will also apply to the proposed Project.

27. Procurement Regulations Paragraphs 5.1 and 5.2 (Advance Contracting and Retroactive Financing) permits that the Borrower may wish to proceed with the procurement process before signing of the Legal Agreement. In such cases, if the eventual contracts are to be eligible for Bank financing the procurement procedures, including advertising, shall be consistent with Sections I, II and III of the Procurement Regulations which cover the Bank’s Core Procurement Principles of economy, efficiency, transparency, fairness, fit-for-purpose, value-for-money and integrity.

28. **Project Procurement Strategy for Development.** The Procurement Regulations requires the Borrower to develop a PPSD for the Project. BOTAŞ developed the PPSD in May 2017 and in it proposed to apply Procurement Regulations including “Approved Selection Methods” for the procurement of all contracts under the Project. BOTAŞ’ PPSD is available in the project’s database.



29. The PPSD prepared by BOTAŞ addresses how procurement activities will support the development objectives of the project and deliver best value for money under a risk based approach. The PPSD provided an analysis on and review of:

- (a) Ongoing project experiences;
- (b) Operating context and BOTAŞ capacity;
- (c) Present situation in the supply market;
- (d) Project and procurement risks;
- (e) Stakeholder analysis;
- (f) Project objectives and approach options;
- (g) Contract management arrangements.

30. The PPSD concluded that regardless of the contract size (4 times larger than the ongoing project) the suppliers in the market supported the option of a single large contract for the construction of plant as in the case of the ongoing project contract. The PPSD further noted that the scope of works can be accurately specified, risks are reasonable identified and a single contract minimizes integration and delays as a single supplier will be accountable for all activities under the contract.

31. Although the market players have found the construction duration very tight, they indicated that construction can be completed within the scheduled time frame by mobilizing appropriate equipment and manpower, as well as by utilizing appropriate planning and management tools.

32. The PPSD confirmed that the best procurement approach would be a single-stage request for bid (RFB) through the process of competition in the international market with one envelope. Due to the high bidding cost, and to minimize risks of evaluation committee members are influenced by the bid prices, the PPSD proposed the prequalification of prospective applicants before issuing the RFB. The PPSD also highlighted that for the ongoing project, a similar approach was successfully implemented after cancellation of two bidding attempts for the procurement of the fresh water pipeline supply.

33. Since the share of equipment cost is estimated to be around 62 percent of the cost of facility and detailed functional guarantees are required from the contractor, the PPSD proposed a single responsibility design, supply and installation (DS&I) contract with a lump-sum contract price. Moreover, considering the duration of the contract, the PPSD proposed to apply price adjustment to the contract price. The PPSD also proposed to initiate the Project procurements as early as possible for timely implementation of the contracts to meet the ambitious implementation time schedule.

34. **Procurement Plan and Procurement Tracking.** The PPSD proposed three major contracts for the Project; these are: (i) Facility construction (DS&I Contract); (ii) Construction Supervision Consultancy; and (iii) ESIA and RAP Monitoring Consultancy. Among these contracts, the facility construction contract was positioned as “strategic critical” in the supply positioning matrix while the construction supervision consultancy positioned “strategic security” and ESIA and RAP monitoring consultancy was positioned as “tactical acquisition” in terms of their business impact and relative values. All three contracts are located in the “core” business activity of the



suppliers’ preference matrix. Hence, all proposed contracts need attention by BOTAŞ for procurement planning.

35. The Procurement Regulations require the Borrower to use the Bank’s Systematic Tracking of Exchanges in Procurement (STEP) online procurement tracking tool to prepare, clear and update its procurement plans, and conduct all procurement transactions. BOTAŞ created the procurement plan through STEP and it was approved by the Bank prior to initiating the prequalification for the procurement of the DS&I contract.

36. The contracts agreed by the Bank for financing and included in the approved procurement plan are listed in Table 6 below:

Table 6: Summary of Procurement Plan²⁸

Contract Package	Contract Description	Category	Estimated Contract Amount (US\$000)	Procurement Method	Market Approach	Estimated Contract Signing Date	Estimated Contract Completion Date (excludes defects liability period)
G-1-2	Tuz Golu Gas Storage Expansion Plant	Goods/Plant (DS&I)	2,000,000	RFB -PQ- Single Stage	Open-International	14 September 2018	14 March 2024
CS-1-2	Construction Supervision Consultancy	Consultant Services	17,000	Quality and Cost Based Selection	Open-International	24 August 2018	14 March 2025
CS-1-4	ESIA and RAP Monitoring Consultancy	Consultant Services	3,000	Quality and Cost Based Selection	Open-International	03 September 2018	14 March 2025

37. **Procurement Implementation Capacity.** Procurement activities have been carried out by the PMU established within BOTAŞ’ Storage Department. An assessment of the PMU’s capacity has been conducted

²⁸ Estimated Costs, Contract Signing and Contract Completion Dates are Updated based on the new information available between June 19, 2017 (the approval date of the procurement plan in STEP) and loan negotiations.



between March-July 2017 by the Bank's procurement specialist. The assessment reviewed the organizational structure and procedures for implementing the project procurements. The assessment recorded in the Procurement Risk Assessment and Management System of the Bank.

38. BOTAŞ is familiar with WB procurement procedures through its experience in implementing the GSDP. On the other hand, the proposed project is subject to the Bank's New Procurement Frameworks of which BOTAŞ has limited knowledge. The PMU staff have been trained by the Bank's procurement specialist in February 2017 on the new features of the Bank's Procurement Framework as well as online procurement tracking system (STEP).

39. BOTAŞ' PMU has demonstrated adequate capacity to conduct procurement activities as the PPSD was prepared in a timely manner and the prequalification process was completed within 6 months from June 2017 to January 2018. The PMU consists of 55 staff, most of whom are experienced in various engineering disciplines (civil, mechanical, petroleum and gas, mining, geophysics, geology, electronics and environmental). The PMU is also supported by BOTAŞ' legal department, and where needed, the PMU is able to utilize expertise from other departments including the Procurement and Contracting Department. During the implementation of the proposed project, the PMU will be in close coordination with the Construction and Expropriation Department, Survey and Project Department, Financial Affairs Department and others as needed.

40. BOTAŞ' PMU core team will be in Ankara, and overall project management, procurement and contracting activities will be handled centrally by the core team in Ankara. The PMU will establish a site team for the daily management of activities at the project site. The site team will closely work with the DS&I contractor and project consultants and any major implementation issues will be elevated to the core team in Ankara. The PMU is also implementing the Silivri Gas Storage Project in parallel to the Gas Storage Expansion Project and seven of the 55 PMU staff are assigned to the Silivri project.

41. In the PPSD, BOTAŞ proposed a "Project Management Committee" comprised of (i) BOTAŞ; (ii) DS&I Contractor; (iii) relevant specialized sub-contractors; (iv) Construction Supervision Consultant; and (v) ESIA and RAP Monitoring Consultant. The committee would meet weekly or twice each month to review progress of project activities and resolve implementation issues. Also, BOTAŞ will also establish an Advisory Group comprised of industry experts not affiliated with the proposed project with a primary role to provide independent advice on critical technical matters. Both teams will be in place at the time the proposed project contracts are signed.

42. Given the complexity of the project and the large contract sizes, the overall procurement risk is assessed as Substantial for the proposed project. The risk rating can be lowered to Moderate when the agreed actions no. 1, 2 and 3 in Table 7 below have been put in place. The rating can be further lowered to Low when no delays have been encountered due to site access (agreed action no. 4) and the contract monitoring reports (agreed action no. 5) demonstrate that both contracting parties are complying with contractual provisions, with value for money is achieved with results on the ground as scheduled.

43. **Agreed Action Plan.** As indicated above, the complexity of managing a project of this size presents risks that have been assessed by the Bank and mitigation measures were identified for project implementation. The risks are associated with both procurement and contract management activities. The risks and the action plan to mitigate these risks have been agreed with BOTAŞ are presented in Table 7.



Table 7: Identified Risks and Agreed Action Plan

Action No.	Identified Risk	Mitigation Measure	Responsible Party	Time Frame
1.	Delays in the procurement process due to limited familiarity of BOTAŞ PMU with the Bank’s New Procurement Framework and STEP.	BOTAŞ’ PMU to work closely with the Bank’s procurement specialist	BOTAŞ	Throughout the project
2.	Allocation of geological risks	DS&I contract will include clear provisions for the allocation of geological risks.	BOTAŞ	During preparation of bidding documents
3.	Misinterpretation of the terms and conditions of DS&I contract	Establishment of a Dispute Board in accordance with the Conditions of the DS&I Contract	BOTAŞ	Immediately after contract signing
4.	Delays in land acquisition and site access	BOTAŞ will closely follow up on the contractor’s program and apply to the Project Management Committee to determine priorities	BOTAŞ	Throughout the implementation stage of DS&I contract
5.	Time and cost overruns in the facility construction contract	<p>BOTAŞ will agree with DS&I contractor on a Project Management plan and will submit to the Bank a contract monitoring report including the following:</p> <ul style="list-style-type: none"> contract information (name, amount, supplier, agreed price, completion time etc.) requirements of agreed contract management plan are met; risks are managed or mitigated before they materialize; the contract is progressing on agreed work plan/completed on time and budget; 	BOTAŞ	At the contract creation stage, and throughout the implementation stage of DS&I contract



Action No.	Identified Risk	Mitigation Measure	Responsible Party	Time Frame
		<ul style="list-style-type: none"> contract variations are properly justified; the outcome meets the objectives set at the start; and BOTAŞ's technical and commercial requirements are met or exceeded within the budget. 		

44. **Bank review of procurement transactions.** All the contracts in the agreed procurement plan are subject to the Bank's prior review by their contract amount and "substantial risk" associated to the project. In addition to the prior review, supervision to be carried out from Bank offices, the capacity assessment of the implementing entity recommended semi-annual implementation support missions to visit the field to carry out post review of procurement actions.

45. The PMU in BOTAŞ will keep a complete and up-to-date record of all procurement documentation and relevant correspondence in its files which will be reviewed by Bank staff during implementation support missions. Procurement and contract management monitoring reports will be submitted semi-annually as an integral part of the reporting on project implementation.

Environmental and Social (including safeguards)

46. Within the PMU, BOTAŞ created a Quality, Health, Safety and Environment (QHSE) Branch and appointed a QHSE manager, an environment expert, social expert and a communications specialist. This headquarters-based QHSE team has been the main focal point for safeguard matters including the preparation of the safeguard instruments (ESIA, SEP, RPF, RAP Procedure, etc.) Moreover, the QHSE team will be responsible for reviewing the environmental assessment studies for the electricity transmission line, access roads, camp sites, etc. to be carried by the awarded contractor. They will also update or revise the safeguard documents as well as other plans and procedures defined in BOTAŞ' ESMS in line with the outcomes of these additional studies. For successful implementation of the proposed project and to ensure full compliance with the safeguard instruments, the QHSE team shall be sustained during the entire project implementation period. In addition, a similar team will be set up at the project site. Both headquarters and site personnel will be responsible for monitoring the contractors' work and reviewing the monitoring reports submitted by the ESIA & RAP Monitoring Consultant.

47. As stated in the ESIA, BOTAŞ is required to establish an Environmental and Management System which describes the roles and responsibilities of all parties (BOTAŞ team, contractor, construction supervision consultant, and ESIA & RAP Monitoring consultant) with regards to review, approval of any changes/revisions in the safeguard documents and monitoring of the safeguard documents including all sub-management plans (i.e. waste management plan, cultural heritage management plan, labor influx management plan, etc.). BOTAŞ is required to send the safeguards documents to the World Bank for review and approval which includes any material changes to the approved content (latest document referred in the Loan Agreement). Moreover, it is also



agreed that BOTAŞ' ESIA & RAP Monitoring Consultant will share the quarterly monitoring reports simultaneously with the Bank and BOTAŞ to create the independent line of reporting.

48. The Occupational Health and Safety (OHS) system of BOTAŞ that was described in the ESMS of the ESIA needs to be improved and finalized as soon as the contract is awarded since the final responsibility of plan preparation is given as a responsibility to the contractor. Then, in line with the final OHS Plan, BOTAŞ is required to sustain a dedicated team for the proper implementation and monitoring of the OHS Plan. BOTAŞ is required to inform the Bank as soon as possible, but no later than five (5) days, in case of any significant event occurring during project implementation.

Monitoring and Evaluation

49. BOTAŞ will be responsible for monitoring all project activities and reporting to the Bank on project progress. Project implementation will be reported and evaluated at a number of different levels. The DS&I contractor, construction supervision consultant and the ESIA and RAP monitoring consultant will report to BOTAŞ. BOTAŞ will begin reporting to the Bank under the proposed project as soon as the loan agreement has been executed. Data on Turkey's natural gas imports will be sourced from EMRA. The Bank will carry out implementation support missions every six months or more frequently as may be required from time to time. Support will be provided to BOTAŞ by a team from the World Bank Headquarters in Washington, DC and its office in Ankara. Most of the fiduciary and safeguards specialists are located in the World Bank office in Ankara, which facilitates close interaction in-between formal implementation support missions.

50. BOTAŞ' RPF for the Project provides comprehensive monitoring and evaluation arrangements including establishing a data base management system, external monitoring, completion audit and end-term impact evaluation. The World Bank's "Operational Policy 4.12 on projects with significant involuntary resettlement risks provides for the client to retain independent professionals to advise on compliance and verify the clients' monitoring information including consultations with affected people. BOTAŞ has engaged environmental and social monitoring consultants under the ongoing project and will engage monitoring consultants also for the proposed project. An independent external monitoring consultant that will prepare a RAP Completion Report will also be hired by BOTAŞ to assess RAP implementation once all RAP activities are completed. BOTAŞ and the Bank have agreed that the ESIA and RAP monitoring consultants will submit their quarterly ESIA and RAP monitoring reports simultaneously to the Bank at the same time as they are submitted to BOTAŞ.

Role of Partners (if applicable)

51. The Bank and AIIB are proposing to jointly co-finance the Project, with the Bank taking the lead. The co-financing arrangements for the proposed project will follow the co-financing framework agreement signed by the respective Presidents of the two institutions in April 2016. A project co-lenders agreement will be signed by both lenders that specifies the financing arrangements for the proposed project with the Bank taking primary responsibility for administering the AIIB loan. World Bank policies and procedures on safeguards, procurement, financial management, project monitoring, and reporting will be used for the proposed project activities to be financed in whole, or in part, out of the loan proceeds of the Bank and AIIB. This joint World Bank/AIIB collaborative approach is being successfully implemented in the ongoing TANAP project.



ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY : Turkey Gas Storage Expansion Project

Strategy and Approach for Implementation Support

1. The implementation support plan ensures that the Bank mobilizes the required resources to provide BOTAŞ with the necessary support to implement the project.
2. BOTAŞ is the borrower and implementing entity of the Bank-financed GSDP that is supporting the implementation of the Tuz Golu underground storage facility. While the project activities are similar to the ongoing project, the scale and challenges will be much larger owing to the very ambitious construction schedule. BOTAŞ will be supported by two consultancy firms on construction supervision and ESIA and RAP monitoring.
3. Close monitoring and supervision of construction activities and implementation of ESMPs will be critical. The proposed project will require a high supervision cost given its' scale and Bank management will allocate a supervision budget based on the premise that it requires significant expertise in a highly specialized area (underground gas storage construction), the High risk rating on safeguards, and for the several IFIs and partners with whom coordination will be necessary.
4. The plan will be undertaken by Bank staff and is based on three major principles: (i) consistent review of fiduciary procedures and controls within BOTAŞ; (ii) frequent field-based monitoring of project activities; and (iii) continual high-level policy dialogue on improving institutional capacity of BOTAŞ.
 - (a) *Procurement*: The pre-qualification step of the main DS&I contract is completed but the bid stage is expected to take long to complete due to the contract size and specialized nature of the works and risks. The Bank will review progress on each of the three contracts to be financed by the loan and monitor the progress during the implementation period against the Procurement Plan agreed with BOTAŞ.
 - (b) *Financial management*: The Bank would review the project's financial management systems, including but not limited to accounting, reporting, internal controls. The Bank will also review withdrawal applications for disbursements against eligible expenditures.
 - (c) *Environmental and Social Safeguards*: The Bank will supervise and provide support to BOTAŞ for the implementation of the ESMP and RAP. This will require significant level of effort given the scope and depth of documentation and processes to ensure compliance with all agreed management plans and actions.
 - (d) *Citizen Engagement and Outreach*: Considering the extent to which the project will engage communities in the project area, the Bank will continue to support BOTAŞ with its outreach with local communities.



Implementation Support Plan and Resource Requirements

5. The Bank team will consist of staff located in Headquarters in Washington, DC, Ankara and potentially other Bank offices. Fiduciary and safeguards staff are located in Ankara in order to ensure timely, efficient and effective implementation support to BOTAŞ. Formal implementation support and site visits (as required) would be carried out semi-annually or as often as necessary in line with implementation needs.

- (a) *Technical inputs:* Gas storage expertise. The Bank team will provide in-house expertise or contract individual external experts to bring in the required expertise, primarily on gas storage. During construction and until commissioning, implementation support will be carried out to ensure contractual obligations are met. Fields visits will be carried out to project sites as needed.
- (b) *Fiduciary requirements and inputs:* The Bank team will support BOTAŞ as required.
- (c) *Safeguards:* The project's environmental and social impacts management plans are extensive and BOTAŞ will be responsible for ensuring that the ESMP and RAP are properly implemented. BOTAŞ will be supported by third-party monitoring consultancy for the environmental and social performance of project implementation and conduct audits of contractor compliance with environment and social safeguard requirements. Environment and social specialists will provide guidance and inputs to BOTAŞ and monitor the progress of implementation of the ESMP, RAP and other action plans.
- (d) *Operations:* Task Team Leaders will provide day-to-day implementation support of all operational aspects and coordination with the client and among the Bank team members.

The budget for this Implementation Support Plan is estimated at US\$130,000 per annum. The following tables list the skills required and an estimate of resources to support project implementation.



Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Detailed Technical design	TTLs; Senior Gas Storage Specialist	2x6 staff weeks; 1x4 staff weeks	-
	Procurement and bidding	Senior Procurement Specialist	1x6 staff weeks	
	Environmental and Social Monitoring	Senior Environmental Specialist	1x6 staff weeks	
		Environmental Specialist	1x4 staff weeks	
		Senior Social Development Specialist	1x4 staff weeks	
	Financial Management, Disbursement, Reports	Social Development Specialist	1x6 staff weeks	
		Financial Management Specialist	1x2 staff weeks	
12-48 months	Construction phase	TTLs; Senior Gas Storage Specialist	2x6 staff weeks; 1x4 staff weeks	
	Contract Management	Senior Procurement Specialist	1x4 staff weeks	
	Environmental and Social Monitoring	Senior Environmental Specialist	1x4 staff weeks	
		Environmental Specialist	1x2 staff weeks	
		Senior Social Development Specialist	1x2 staff weeks	
	Financial Management, Disbursement, Reports	Social Development Specialist	1x4 staff weeks	
		Financial Management Specialist	1x2 staff weeks	

Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task Team Leaders	2x6 Annually	Field trips as required	International and Country Office based
Senior Gas Storage Specialist	4 Annually	Field trips as required	International
Senior Environmental Specialist	6 Annually	Field trips as required	Country office based
Environmental Specialist	4 Annually the first 18 months then 2 Annually	Field trips as required	Country office based
Senior Social Development Specialist	4 Annually the first 18 months then 2 Annually	Field trips as required	International
Social Development Specialist	6 Annually	Field trips as required	Country office based
Senior Procurement Specialist	6 Annually	Field trips as required	Country office based
Senior Financial Management Specialist	2 Annually	Field trips as required	Country office based
Senior Finance Officer	1 Annually	Not required	N/A
Client Support Staff	1x6 Annually	Not required	Country Office based

Partners

Name	Institution/Country	Role
AIIB	IFI	Partner financier
IsDB	IFI	Partner financier

ANNEX 4: ECONOMIC AND FINANCIAL ANALYSIS

COUNTRY : Turkey Gas Storage Expansion Project

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 8: 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 bcm²⁹ will expire by late 2021 and the rest will be gradually expiring by 2026³⁰.

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

²⁹ Russia West – 14bcm, Azerbaijan Shah Deniz 1 – 6.6bcm, Nigeria LNG – 1.3bcm, Algeria – 4.4bcm

³⁰ 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.

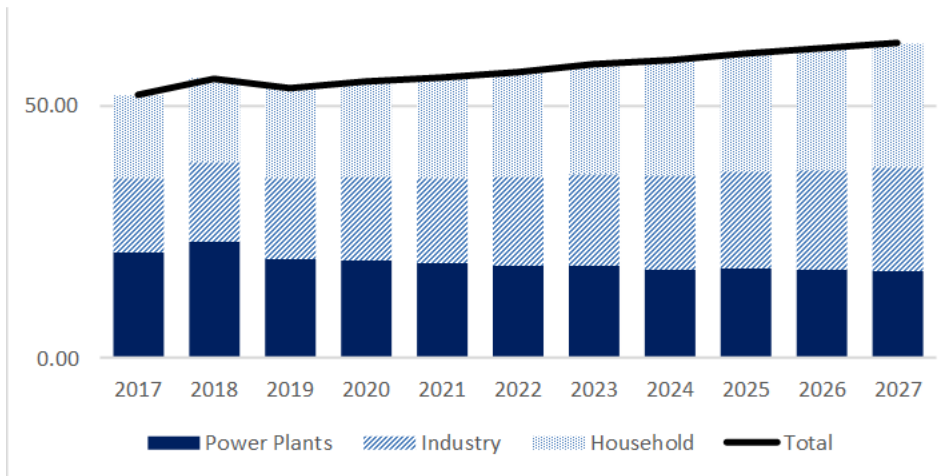


supply-demand imbalances. As a response, BOTAŞ and other importers were given the freedom to import LNG from the spot market. As a result, the total imported spot LNG volume increased from less than 1 bcm in 2013 to more than 3 bcm in 2017³¹.

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 9.

Table 9: Forecasted Gas Demand by consumer category (bcm)³²



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

³¹ 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 Aliğa 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.

³² 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.



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. The drought condition requires 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. Overall 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 TANAP³³. 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 under construction 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 per 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

³³ the remaining TANAP capacity of 10 bcm are contracted by others

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 BOTAŞ 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.

Table 10: 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 ³⁴ 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

³⁴ Once completed, TurkStream can provide more than 14 bcm, potentially serving as reserve margin for Turkey.



that were not quantified as shown in Table 11 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. 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 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.

18. 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 BOTAŞ 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.

19. 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.

20. 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.

21. **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.

22. 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 BOTAŞ' implementation schedule.

23. 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 percent³⁵.

³⁵ 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



Table 11: 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

24. **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.

25. 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)³⁶ 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 12, 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

(<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.

³⁶ As spot price purchases are confidential, NBP data is used as a price proxy for spot LNG imports.

prices. Shifting gas imports from winter to summer therefore would yield a 14 percent swing in price benefits.

Table 12: 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

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

27. The Tuz Golu expansion (4 bcm), 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.

28. **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 13.

Table 13: 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



29. Regularly during the winter, the maximum daily supply does not meet the demand on the coldest days as shown in Table 14. 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 winter³⁷. 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).

Table 14: 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

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

31. 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.

32. **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 years³⁸.

33. The benefit of storage for security of supply was evaluated by considering a one in 10 years probability

³⁷ 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.

³⁸ The last occurrence of such event was in 2009 when disputes between Russia and Ukraine over natural gas supply resulted in interruptions to Turkey.

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.

34. **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 15.

35. 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 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 15: 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%

36. **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 16: 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

37. **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.

38. 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.

39. 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:

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

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 (%),
- i_t: is the amount allocated for amortization of investments in tariff year t,
- iG_t: is the regulated operating costs set for the tariff year t,
- I_tSG_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.

40. 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.

41. **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.

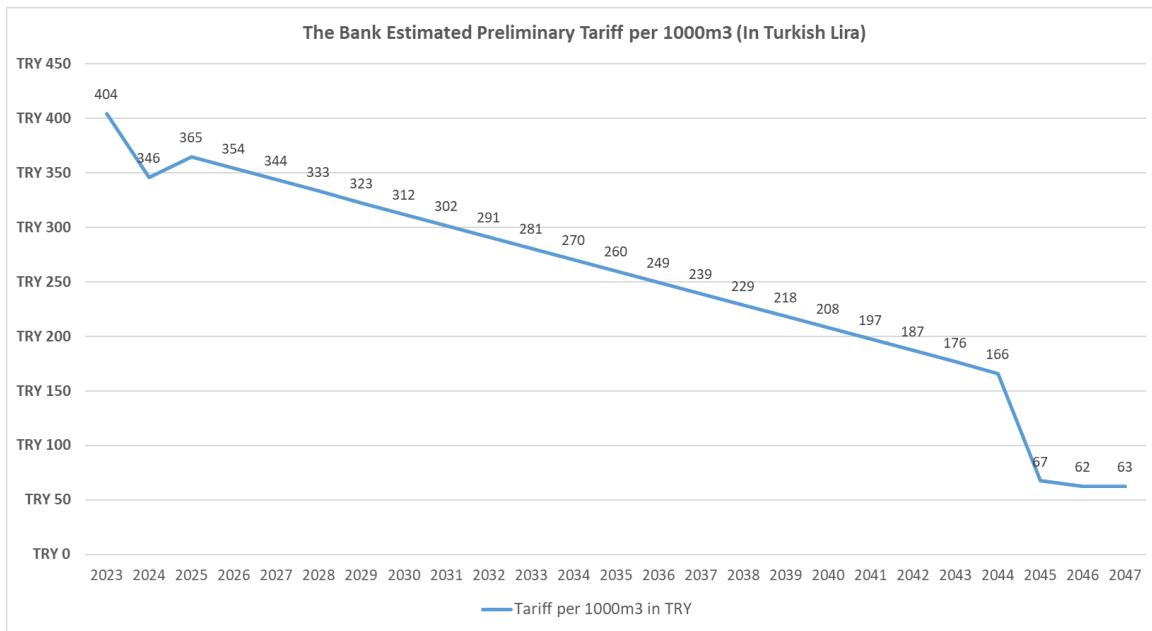
42. The cushion gas purchase cost is capitalized and recovered starting from the year that the cushion gas is injected into the storage. As per the tariff setting guideline, capitalized cushion gas purchase costs are not depreciated. As a result, BOTAŞ can apply the same rate of return on the value of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

43. The Bank estimate uses a 12.07 percent rate of return in nominal terms following the advice from BOTAŞ 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.

44. 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.

45. Based on the tariff method described above, the Bank team estimated the annual tariff requirement for the project as shown in Figure 8 below. The estimate follows the *Tariff Calculation Principles and Procedures for Underground Natural Gas Storage Companies* described above.

Figure 8: Calculated Tariff (TL/1000m3)



46. *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 17 below.



Table 17: Sources and Uses of Funds³⁹

Financing Plan - USD mln	2018	2019	2020	2021	2022	2023	Total	%
<i>Use of Funds</i>								
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%
<i>Source of Funds</i>								
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%

47. *Revenue calculation.* It is assumed that the only source of revenue is generated from tariffs in the financial analysis. The principle of tariff calculation is discussed above.

48. *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 18.

Table 18: 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%

49. *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.

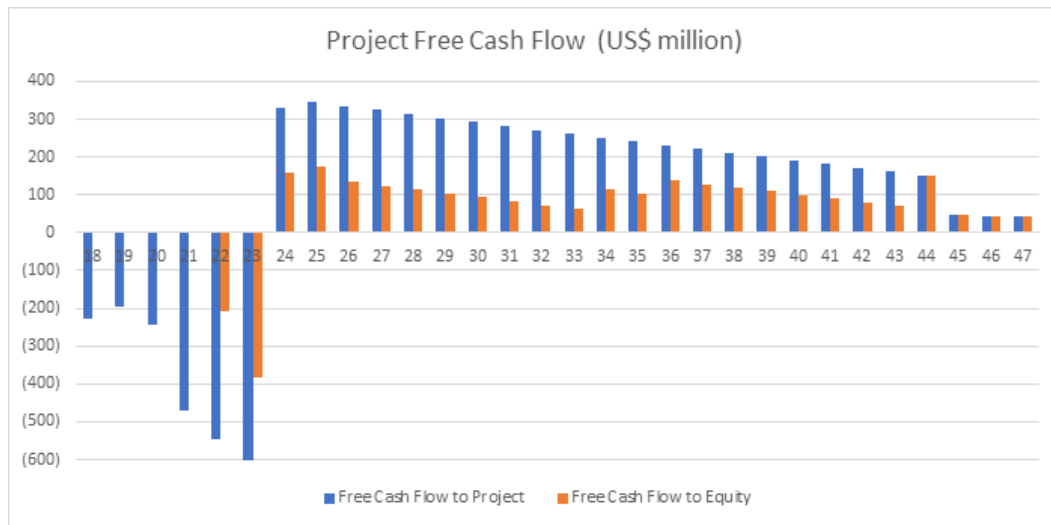
³⁹ CAPEX includes contingencies in the amount of US\$350 million shown for funding purposes only.



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

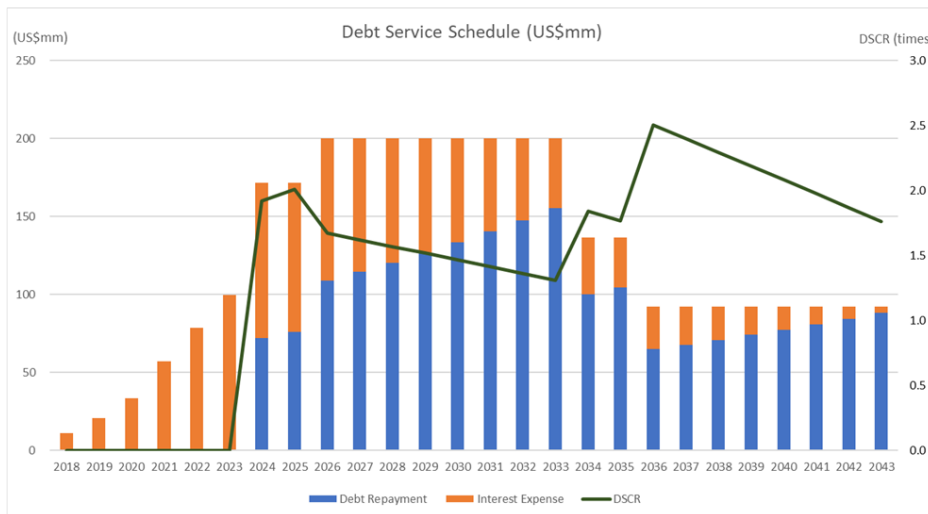
51. **Project Financial Analysis Results.** The Project is expected to generate sufficient cash to cover its operating expenditure, service its debt and pay taxes. The accumulated net cash flow is estimated to reach US\$2.6 billion over the 30-year life of the project. The Free Cash Flow to Project and the Free Cash Flow to Equity are estimated and shown in Figure 9 below.

Figure 9: Project Free Cash Flow



52. *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 10.

Figure 10: Debt Repayment Profile



53. *Summary of Financial Analysis.* **Error! Reference source not found.** 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.

54. *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 19 below.

Table 19: 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

55. 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 BOTAŞ to generate more returns but there is no impact on the FIRR.

56. If project costs increase by 50 percent with no corresponding tariff increase (scenario b in Table 19), 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.

57. 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 BOTAŞ’ 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.

58. The existing storage tariff regulation allows for a minimum 10 percent rate of return (in real terms) for storage facilities. Assuming BOTAŞ 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.

59. 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 BOTAŞ 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 BOTAŞ’ at the corporate level.



Map – IBRD 43572

