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Report No: PAD3503

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF EUR 314.5 MILLION
(US$350 MILLION EQUIVALENT)

TO

THE REPUBLIC OF TURKEY

FOR A

RAIL LOGISTICS IMPROVEMENT PROJECT

June 9, 2020

Transport Global Practice
Europe And Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 30, 2020)

Currency Unit =	Turkish lira (TRY)
TRY 6.8260 =	US$1
US$0.1465 =	TRY 1
EUR 0.8984 =	US$1
US$1.1130 =	EUR 1

FISCAL YEAR
January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

ASA	Advisory Services and Analytics
BOT	Build-Operate-Transfer
COP	Conference of the Parties
CEF	Connecting Europe Facility
COVID-19	Coronavirus Disease 2019
CPF	Country Partnership Framework
DA	Designated Account
DFIL	Disbursement and Financial Information Letter
DGII	Directorate-General of Infrastructure Investments
DGTSR	Directorate-General of Transport Services Regulation
ECA	Europe and Central Asia
EHS	Environmental, Health, and Safety
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESRS	Environmental and Social Review Summary
E&S	Environmental and Social
ESS	Environmental and Social Standard
ETL	Energy Transmission Line
E-T Line	Erzin Station-TAYSEB Line
EU	European Union
FIDIC	International Federation of Consulting Engineers
FIRR	Financial Internal Rate of Return
FM	Financial Management
FS	Feasibility Study
GDP	Gross Domestic Product
GEC	Global Economic Crisis
GHGs	Greenhouse Gases
GoT	Government of Turkey
GPN	General Procurement Notice
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GVCs	Global Value Chains
HSR	High-Speed Rail
IFR	Interim Un-Audited Financial Report
INDC	Intended Nationally Determined Contribution
IPA	Instrument for Pre-Accession Assistance
ITS	Intelligent Transport Systems
KBA	Key Biodiversity Area

LMC	Rail Last-mile Connectivity Site
LMP	Labor Management Procedure
MFD	Maximizing Finance for Development
ML	Management Letter
MoTI	Ministry of Transport and Infrastructure
MoTF	Ministry of Treasury and Finance
MTR	Mid-Term Review
NEP	National Economic Program
NPV	Net Present Value
O-E Line	Osmaniye Organized Industrial Zone – Erzin Port Line
OHS	Occupational Health and Safety
OIZ	Organized Industrial Zone
O&M	Operations and Maintenance
PAP	Project Affected Person
PDO	Project Development Objective
PFMC	Public Financial Management and Control
PIU	Project Implementation Unit
POM	Project Operations Manual
PPSD	Project Procurement Strategy for Development
PSO	Public Service Obligation
QCBS	Quality and Cost Based Selection
RAP	Resettlement Action Plan
RFB	Request for Bid
RLIP	Rail Logistics Improvement Project
SDD	Strategy Development Directorate
SEA/H	Sexual Exploitation and Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
SME	Small and Medium Sized Enterprise
SOE	Statements of Expenditures
SPD	Standard Procurement Document
STEP	Systematic Tracking of Exchanges in Procurement
TA	Technical Assistance
TAYSEB	Adana Yumurtalik Free Zone
TCDD	Directorate General of Turkish State Railways
TEN-T	Trans-European Transport Network
ToR	Terms of Reference
TRRP	Turkey Railways Restructuring Project
UMIC	Upper Middle-Income Country
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WBG	World Bank Group

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Turkey	Rail Logistics Improvement Project	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P170532	Investment Project Financing	Substantial

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
30-Jun-2020	31-Dec-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The project development objective (PDO) is to reduce transport costs in selected rail freight corridors and to strengthen institutional capacity at the Ministry of Transport and Infrastructure (MoTI) to deliver rail freight connectivity and manage rail-enabled logistics centers.

Components

Component Name	Cost (US$, millions)
Construction of Railway Branch Lines and Multimodal Connections at Priority Network Nodes	319.00
Feasibility Studies, Detailed Engineering Designs, Environmental and Social Documentation, and Construction Supervision for Rail Last-mile Connectivity Infrastructure at Additional Freight Nodes	28.00
Phase 2 COVID-19 Response Support, Institutional Strengthening, Capacity Building, and Project Implementation Support	3.00

Organizations

Borrower:	Republic of Turkey
Implementing Agency:	Ministry of Transport and Infrastructure

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	350.00
Total Financing	350.00
of which IBRD/IDA	350.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	350.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023	2024	2025	2026
Annual	0.00	24.18	46.86	64.11	74.70	77.11	63.04
Cumulative	0.00	24.18	71.05	135.15	209.86	286.96	350.00

INSTITUTIONAL DATA

Practice Area (Lead)

Transport

Contributing Practice Areas

Climate Change and Disaster Screening

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

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

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

LA, Schedule 2, Section I.A.1(d). By no later than thirty (30) days after the Effective Date, the Borrower, through MoTI, shall assign or hire a procurement specialist, a financial management specialist, an environmental specialist, a social development specialist, a stakeholder engagement specialist, an occupational health and safety specialist, and an administrative assistant for the Project.

Sections and Description

LA, Schedule 2, Section I.A.1(e). By no later than ninety (90) days after the Effective Date, the Borrower, through MoTI, shall: (i) finalize, and incorporate as part of the Project Operations Manual, and thereafter maintain throughout Project implementation, the Financial Management Manual; and (ii) acquire the necessary systems for Project accounting and reporting; each shall be in be in form and substance acceptable to the Bank.

Sections and Description

LA, Schedule 2, Section I.B.1 and 2. The Borrower, through MoTI, shall maintain, throughout Project implementation, a Project Operational Manual ("POM"), in substance and manner acceptable to the Bank, and shall carry out the Project, and cause the Project to be carried out, in accordance with the arrangements, procedures and guidelines set forth in the POM.

Sections and Description

LA, Schedule 2, Section I.C.1. In carrying out Part 1.C of the Project, unless otherwise agreed to between the Bank and the Borrower, the Borrower, through MoTI, shall appraise the eligibility of proposed subprojects and make selections in accordance with standards, criteria and procedures acceptable to the Bank, as set forth in the POM.

Sections and Description

LA, Schedule 2, Section I.D.1 and 2. The Borrower, through MoTI, shall ensure that the Project is implemented in accordance with the Environmental and Social Standards and the Environmental and Social Commitment Plan ("ESCP"), in a manner acceptable to the Bank.

Sections and Description

LA, Schedule 2, Section I.D.6. The Borrower, through MoTI, shall ensure that all bidding documents and contracts for civil works under the Project include the obligation of contractors, and subcontractors and supervising entities to: (a) comply with the relevant aspects of ESCP and the environmental and social instruments referred to therein; and (b) adopt and enforce codes of conduct that should be provided to and signed by all workers.

Sections and Description

LA, Schedule 2, Section I.E.1(a). The Borrower, through MoTI, shall prepare and furnish to the Bank not later than thirty (30) days after the Effective Date in the first year of implementation, and thereafter, December 15 of each year during the implementation of the Project, a proposed Annual Work Plan and Budget.

Conditions

Type	Description
Effectiveness	Section 4.01 (a). The Borrower, through MoTI, has adopted a Project Operations Manual acceptable to the Bank.
Effectiveness	Section 4.01 (b). The Borrower, through MoTI, has prepared accounting and reporting spreadsheets for the Project, acceptable to the Bank.

I. STRATEGIC CONTEXT

A. Country Context

1. **Turkey is an upper middle-income country of 83 million people with a remarkable record of sustained economic growth, income convergence, and poverty reduction.** Over the 38-year period between 1980 and 2018, the Turkish economy grew at an average annual rate of 4.7% in real terms, more than double the rate of growth of Mexico, Brazil, and South Africa, comparable upper middle-income countries (UMICs) outside of East Asia, over the same period.[1] The main UMICs of East Asia—China (9.5%), Malaysia (5.7%), and Thailand (5.2%)—grew faster than Turkey during this stretch, but only modestly so in the case of Malaysia and Thailand. More recently, since 2002, Turkey's adoption of market and regulatory reforms, and an accompanying expansion of public services, led to an unprecedented period of growth and income gains in the modern history of the country. Specifically, in the 17 years between 2001 and 2018 Turkey's GDP grew at an average annual rate of 5.6% in real terms, again more than twice the economic growth pace of Mexico, Brazil, and South Africa during the same period, and also higher than that of Thailand (4.0%) and Malaysia (5.1%). Turkey's growth during this period was matched by strong gains in standards of living. Specifically, Turkey's income per capita in constant purchasing power parity terms expanded by 4.2% per year during 2001-2018—more than four times the corresponding rate of expansion of Mexico, more than three times that of Brazil and South Africa, and between 20% and 30% more rapidly than the rate of per capita income gains attained by Thailand and Malaysia over the same lapse of time. This process led to a sharp reduction in the percentage of the Turkish population living on less than US$5.5 per day in 2011 international prices, from 35% in 2002 to 9% in 2018.[2]

2. **Most of Turkey's economic growth since the late 1980s was due to factor accumulation—increases in labor supply and the capital stock—with a comparatively limited portion of growth rooted in productivity gains[3].** The removal of constraints to factor mobility over the past 30 years led to significant increases in capital investment, while the size of the labor force nearly doubled between 1988 and 2017. But outside of a few stand-out industries such as automotive, basic metals, wearing apparel, and textiles, the efficiency with which these inputs are used—i.e., firm-level productivity—has stagnated (manufacturing) or declined (construction and services), particularly in the period since the 2009 global economic crisis (GEC). This includes large manufacturing subsectors in terms of value-added and employment share, like electrical and electronic products, machinery and equipment, food, fabricated metals, and furniture, which suffer from lower-than-average productivity levels and are highly transport and logistics intensive. Amid a temporary surge in global liquidity in the wake of the GEC, Turkey's corporate sector was able to extend factor accumulation through borrowing, particularly via credit denominated in foreign currency. As a result, over the past 10 years corporate balance sheets have deteriorated, eventually becoming a drag on growth that has been partially offset by short-term stimulus measures, such as expansionary fiscal policy and credit expansion by state-owned banks, which helped maintain a strong net exports performance. However, these measures are expected to yield diminishing returns on growth over time and do not provide a solid foundation to sustain long-term gains in standards of living. Against this backdrop, Turkey faces the challenge of transitioning towards a more sustainable productivity-led growth model to drive the next phase in its economic development trajectory, break out of the "middle income trap", and attain high-income status.

3. **The onset of the coronavirus disease 2019 (COVID-19) pandemic generated uncertainty in Turkey's short-term economic outlook at a time when economic recovery was underway, and heightened the urgency to more**

[1] IMF World Economic Outlook database, October 2019.
[2] World Bank (2019), *Turkey Economic Monitor, October 2019: Charting a New Course*, Washington DC; World Development Indicators.
[3] World Bank (2019), *Firm Productivity and Economic Growth in Turkey*, Washington DC.

strongly underpin long-term growth. The COVID-19 outbreak struck Turkey during a period of economic recovery, after economic stress in late 2018 and early 2019 resulted in low growth—0.9%—for full-year 2019. By early 2020, with economic growth improving through the first calendar quarter, Turkey needed to extricate itself from the downturn while inflation was still high (15.7% for 2019), unemployment was in double digits (13.8% in December 2019), the Turkish lira had seen 6 consecutive years of double-digit depreciation against the U.S. dollar (peaking at 32.4% in 2018), the external environment was uncertain, and firms continued to struggle with debt. Prior to the pandemic, under 'business as usual' assumptions as of year-end 2019, the World Bank expected Turkey to grow at a rate of between 3% and 4% per year in real terms through the medium-term, or merely half the rate of growth Turkey achieved between 2009 and 2018, and about two-thirds of its long-term 1980-2018 growth pace. The COVID-19 pandemic is likely to further reduce economic growth in the short-term, and elevated uncertainty is likely to remain through the medium term. This increases the urgency to pursue policies, including public sector investment, that can generate jobs, contribute to making firms more competitive, and improve connectivity for better access to markets.

4. **Turkey is increasingly exposed to the risks of climate change.** According to the Global Facility for Disaster Reduction and Recovery's *ThinkHazard!* assessment[4] and to the World Bank's Intended Nationally Determined Contribution (INDC) Profile for Turkey, the country faces the risk of more frequent extreme weather events—including flooding, droughts, land degradation, forest fires, and coastal erosion—due to climate change. Without adequate mitigation measures, these risks could lead, inter alia, to reductions in food production and disruptions in industrial supply chains. There is evidence that this is already taking place. For example, a 2018 survey of large Turkey-based firms (all publicly traded companies, including foreign-invested firms) found that 31% of them had suffered detrimental financial impacts from water-related events during the most recent 12-month period; nearly half of those cases—48%—were due to flooding, with an additional 26% due to drought events.[5]

5. **Turkey faces the challenge of reducing a significant gender gap in labor force participation.** In 2018, Turkey's rate of female labor force participation—38%—was the lowest in the OECD. Turkey's labor force participation gender gap, 40 percentage points, and employment gender gap, 38 percentage points, are also the highest in the OECD[6]. This indicates a marked disparity in economic opportunity for women compared to men, and illustrates the magnitude of the economic potential that bridging this gap represents for Turkey. By one 2016 estimate[7], increasing Turkey's female labor force participation rate to match the OECD average (65% in 2018) would raise the country's GDP by 20% by 2025, entailing an additional US$200-250 billion in economic value added compared to a business-as-usual baseline where gains in female labor force participation over time remain at historical levels.

B. Sectoral Context

6. **Improvements in transport and logistics are particularly well suited to become a source of productivity gains—and a driver of sustained economic growth and job creation—for Turkey.** As an open economy; an exporter of global significance in its own right and a major trading partner of the EU in particular; and a large country with extended freight distances, a central location at the nexus between Asia and Europe, and direct access to the Black Sea and Mediterranean trade corridors, Turkey stands to disproportionately benefit from transport and logistics improvements. This is consistent with the experience of Malaysia, a similarly well-located UMIC that is highly

[4] http://thinkhazard.org/en/report/249-turkey; accessed April 17, 2020.
[5] CDP Worldwide (2018), *CDP Climate Change and Water Report 2018: Turkey Edition*.
[6] OECD.Stat.
[7] McKinsey & Company (2016), *Turkey's Potential for the Future: Women in Business*, 2016 Women Matter Report for Turkey.

embedded in global value chains (GVCs) and is expected to transition to high-income status by the mid-2020s[8]. It is also consistent with the experience of countries that successfully transitioned from upper middle-income to high-income status in less than 20 years, such as Chile, Poland, and South Korea—all of which, in addition to Malaysia, outperform Turkey in logistics performance by the World Bank's Logistics Performance Index (LPI) standard.

7. **International experience shows that improvements in transport and logistics infrastructure provision and service delivery—as a package—are linked to productivity growth through at least 3 main channels.** First, they facilitate access to international markets by expanding connectivity. Firms that are active in international markets—exporters and/or firms linked to GVCs—are exposed to more demanding customers, highly capable competitors, better-quality inputs, and greater levels of technology adoption and learning-by-doing, all of which are either productivity enablers or render productivity gains a condition of market permanency[9]. Second, by reducing the financial cost of transport and logistics services, improvements in transport and logistics infrastructure provision and service delivery increase firm-level profitability and raise returns on capital employed, both of which facilitate productivity-inducing investment in physical and human capital. They also promote gains in the productivity of the transport and logistics industry itself—the productivity of Turkey's transportation and storage industry remains below the services sector average—by improving load factors and avoiding empty miles driven. This reduces input intensity, such as fuel consumption, for a given level of output and, importantly, mitigates environmental externalities associated with transport and logistics activities, which are significant: Turkey's energy sector makes up the largest share of the country's greenhouse gas (GHG) emissions—70%—and a fifth of this is accounted for by transportation. And third, by increasing supply chain reliability, these improvements (a) reduce the need to hold safety stock inventory, allowing firms to reach markets with the same level of demand fill rate at lower levels of input buffers to protect against logistics-related exceptions; and (b) make it more feasible for firms to trade across borders in a synchronized (e.g., time-definite) manner—a major feature, and often a requirement, of GVCs. Consistent with this evidence, already today workers employed by Turkish exporting firms are 8% more productive than those employed by non-exporting firms[10].

8. **Yet Turkey's manufacturing trade intensity, and the productivity premium of Turkish exporters and firms linked to GVCs, remain lower than those of comparator countries, signaling opportunities to expand access to international markets through logistics.** At 51%, Turkey's ratio of merchandise trade to GDP remains well below that of most key UMIC comparators, including Malaysia (130%), Thailand (99%), Mexico (76%), and South Africa (56%). Similarly, the 8% labor productivity premium of Turkish exporting firms over non-exporting firms is lower than that of most EU member states, including Germany (15%), Austria (17%), France (20%), and Spain (28%), and is below that of the U.S. (10%).[11] There is therefore an opportunity for Turkey to more deeply support the participation of firms in international trade. The transport and logistics sector can facilitate this through the provision of improved connectivity between freight generation-attraction nodes, like industrial areas and logistics centers, and major international gateways, such as maritime ports. The removal of connectivity gaps across the Turkish transport network would directly improve firms' prospects in the global economy.

9. **There is room for improvement in Turkey's global standing in logistics performance.** As early as 2012, Turkey was ranked as the 27th best-performing economy in international logistics by the LPI standard. This position

[8] World Bank (2019), *Malaysia Economic Monitor: Re-energizing the Public Service*, June 2019.
[9] Urata, S. and Y. Baek (2019), "Does Participation in Global Value Chains Increase Productivity? An Analysis of Trade and Value Added Data", ERIA Discussion Paper Series No. 301, Economic Research Institute for ASEAN and East Asia.
[10] World Bank (2019), *Firm Productivity and Economic Growth in Turkey*, Washington DC.
[11] Ibid.

has steadily weakened since—to 30th in 2014, 34th in 2016, and 47th today. In the period since 2012, European peers like Poland and Hungary, UMICs like Malaysia and Thailand, and even lower-middle income countries like Vietnam, have all surpassed Turkey in logistics performance. According to LPI component-disaggregated scores, much of this deterioration stems from relative under-performance in infrastructure provision and the quality of logistics services.

10. **The use of rail freight in Turkey is low by international standards, leaving significant economic value on the table.** Rail accounts for only 4% of all freight ton-km transported in Turkey, compared to 14% in China, 17% in the EU, 25% in Mexico, 25% in Brazil, 33% in South Africa, and 47% in the U.S. This is particularly low considering Turkey's commodity mix: finished vehicles, auto parts, iron and steel products, construction materials, bulk edibles like wheat flour, and basic apparel like t-shirts are all among Turkey's main export commodities by volume, and these commodities have value-to-weight ratios, volumetric characteristics, and/or time and cost requirements consistent with the use of rail freight in the international experience. Meanwhile, 74% of Turkey's freight ton-km are transported by trucks, disproportionately contributing to increases in avoidable transport out-of-pocket costs, highway congestion, road infrastructure wear and tear, and emissions of GHGs and local pollutants.

11. For example, as of early 2020, Turkey's prevailing trucking market rates per ton-km (i.e., the out-of-pocket tariffs paid by shippers to transport freight) were approximately 2.6 times higher than those of rail freight, a similar premium to that of the EU. As to environmental externalities, evidence from Western Europe confirms that heavy duty trucks are four times more carbon intensive per ton-km transported, and 50% more intensive in per-unit emissions of mono-nitrogen oxides—local pollutants and indirect greenhouse gases that cause smog formation, environmental acidification, and respiratory diseases—than freight rail[12]. These differentials are exacerbated in the case of Turkey, as the Turkish national fleet of heavy-duty trucks is older on average (16 years) than that of the EU (12 years). As a result, nearly 50% of transport sector GHG emissions in Turkey originate from heavy-duty vehicles, which is above the global average (33%) and well above the corresponding share in the EU (19%) and the U.S. (20%)[13]. Turkey's heavy-duty trucks further contribute to other economic externalities, such as those associated with road safety. According to official data, trucks are more prone to be involved in accidents than any other vehicle type in Turkey's national vehicle fleet except for buses and mini-buses[14].

12. On this basis, an increase in the incidence of rail in Turkey's freight transport task would result in lower out-of-pocket transport costs, lower emissions of GHGs and local pollutants per ton-km transported, and fewer and less damaging freight transport accidents. The emissions impact is especially noteworthy in light of Turkey's multi-prong exposure to the risks of climate change and its INDC commitment of reducing GHG emissions by 21% by 2030 compared to a business-as-usual baseline. It is the country's stated intention that the INDC goal will be achieved, in part, by increasing the share of rail in the freight transport task and by promoting multimodal transport[15].

13. **The economic geography of Turkey suggests that there is a window of opportunity for truck-to-rail modal shift that remains untapped.** In addition to its commodity mix, Turkey's geographic extension, direct connection to the EU's TEN-T network, and ready coastal access to major maritime trades suggest, in principle, that a higher incidence of rail freight is within reach. For example, the average length of haul of heavy-duty articulated trucks in

[12] CE Delft (2017), *STREAM Freight Transport 2016: Emissions of Freight Transport Modes - Version 2.*
[13] Mock, Peter (2016), "The Automotive Sector in Turkey: A Baseline Analysis of Vehicle Fleet Structure, Fuel Consumption, and Emissions", The International Council on Clean Transportation (ICCT); International Energy Agency (2017), *The Future of Trucks: Implications for Energy and the Environment*; EPA (2015), "EPA, DOT Propose Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks."
[14] Turkish Statistical Institute, 2018 statistical tables for transportation.
[15] Republic of Turkey, Intended Nationally Determined Contribution, 2015.

Turkey, estimated at 606 km[16], is above that of both the EU (581 km[17]) and the U.S. (445 km), and is well below Turkey's own average rail length of haul (457 km). In other words, average truck distances are longer in Turkey than in comparable markets with greater incidence of rail freight, and potential long-haul markets are not using rail. This suggests that the cost of at least a portion of Turkey's long-haul truck shipments could be reduced—particularly when measured as economic costs, and not only financial costs—by shifting them to rail. For this to happen, however, shippers require adequate rail infrastructure access combined with rail freight services that are cost effective and that offer levels of reliability that are compatible with shippers' operating requirements. In short, expansions in rail infrastructure provision must be aligned with changes in rail service customer orientation.

14. **According to a recent World Bank survey of Turkey-based shippers, carriers, and logistics service providers[18], there are three binding constraints preventing the rail freight sector from gaining market share: inadequate infrastructure linkages at the last mile; relative high cost compared to equivalent truck-only itineraries; and insufficient service quality.** With regard to gaps in last-mile connectivity, Turkey's rail freight sector has historically suffered from lack of investment in the provision of branching lines and sidings to link the main linehaul portion of the railway network to logistics clusters—places of freight consolidation/deconsolidation—such as industrial zones, free zones, maritime ports, and logistics parks. This stands in contrast to the roads sector, as virtually all demand centers of significant size are connected to the highway network. As such, firms seeking to use rail for their shipments are routinely confronted with additional administrative burdens related to trip planning and time, cost, and reliability monitoring, hurdles which are particularly onerous for small and medium enterprises (SMEs). By contrast, an estimated 50-60% of all rail freight in Turkey is originated from demand nodes with access to private sidings, something typically only available to large shippers. This suggests that connection lines at the last mile increase the attractiveness of rail freight, and that Turkish shippers with ready access to the rail network will tend to make greater use of rail freight transport. One of the most impactful ways of facilitating rail access to a wide range of diversified shippers—firms of different size and commodity profiles—is to provide last-mile connectivity to logistics clusters in particular.

15. **Policy direction in the EU[19], which has designated public and public-private investment in rail last-mile connectivity to/from logistics clusters as a primary component of its effort to develop rail freight corridors, is a relevant benchmark for Turkey**. The EU's rail last-mile connectivity sector is in transition. It has been traditionally dominated by a large amount of fragmented private sidings[20] that are (a) decades old, and (b) with the exception of a small subset of high-volume facilities moving block trains or wagon groups, unsustainably costly to operate. As a result, the EU expects most low-volume private sidings to be abandoned over the medium term (through 2030) and the market to consolidate around rail-connected logistics clusters and rail intermodal terminals acting as multimodal nodes in the railway network. The EU also expects that this transition towards large-volume private sidings paired with significant growth in volume captured by rail-connected logistics clusters and rail intermodal terminals will generate a need for public and public-private investment in the order of EUR9-11 billion over the 2015-2030 period. The EU's policy stance on rail freight corridor development is anchored by 3 key considerations: (i) evidence-based confirmation that last-mile connectivity provision is essential to realizing rail cargo capture potential at the corridor level; (ii) an expectation that, for the vast majority of shippers, rail access will primarily take place to/from logistics

[16] Ozen, Murat and Hediye Tuydes-Yaman (2013), "Truck Freight Transportation Characteristics in Turkey", WCTR 2013 Selected Proceedings.
[17] For cross-border shipments.
[18] World Bank (2019), *Last Mile Connectivity: Options to Improve Freight Rail Logistics in Turkey*, Washington DC.
[19] European Commission (2016), "Design Features for Support Programs for Investments in Last-mile Infrastructure".
[20] As of 2016, private sidings accounted for approximately 70% of Europe's estimated 22,000+ last-mile rail infrastructure facilities.

and industrial clusters that are multimodally connected; and (iii) a recognition that delivering the needed rail last-mile connectivity expansion will entail significant public investment. This project is consistent with all 3 of these pillars.

16. **Findings from the World Bank survey also confirm that infrastructure provision in general, and the provision of last-mile connectivity in particular, is necessary but not sufficient to revitalize rail freight in Turkey; reductions in the relative cost of rail transport and improvements in service quality are also needed.** While expansions in last-mile connectivity will contribute to reducing the cost of rail shipments relative to truck shipments for a given origin-destination-commodity itinerary, other drivers of cost are at play and should be addressed. These include a generalized lack of market-oriented pricing on the part of railway undertakings; circuitous rail routings subject to additional maneuvers, cargo handling points, and delays compared to more direct road connections; and increased logistics management complexity for shippers.

17. **Regarding service quality shortcomings, an important dimension of this issue vis-à-vis rail adoption is the fact that intermodal connection points in Turkey are limited, which reduces the value proposition of truck-rail-truck intermodal shipments.** This is best exemplified by the Government's ongoing plan to develop a network of 25 state-owned and operated logistics centers linked to rail freight terminals within the national railway network, with 11 of them already operational[21]. Although some public investment—upwards of US$200 million to date—has been allocated to these centers, most of them lack multimodal connectivity and market orientation; as a result, utilization rates are low (3-4% in some cases). While turning this around will depend in part on additional investments in the rail linehaul network and in the logistics centers themselves, the root causes behind the centers' limited uptake have to do with shortcomings in land use and capacity planning, facility location decisions, management and operational approaches, and service delivery-market demand alignment. Resolving these institutional challenges will require a concerted effort to adopt new practices on the part of the railway infrastructure manager, the regulatory authority for railway transport, the railway undertakings, and the shippers themselves (current and prospective). The government has adopted a Logistics Masterplan to address these issues, but the need remains to revamp the operational model of the planned network of logistics centers. This project proposes to tackle the challenge of matching infrastructure provision with improvements in service delivery and market orientation through capacity building and institutional strengthening activities owned and implemented by the rail sector public institutions of Turkey that are on the front lines of these issues.

C. Institutional Context

18. **Under its 11th Development Plan (2019-2023), the Government of Turkey (GoT) has adopted the goal of more than doubling rail freight's ton-km market share—to 10%—by 2023.** The 11th Development Plan sets forth the longer-term structural reforms to address the country's development challenges. The objectives of the plan are defined within the framework of a stable export-oriented growth model with an efficient industrial sector playing a key role. The focus areas are a "strong and stable economy", "competitive production and productivity", "livable cities, sustainable environment", "qualified people, strong society", and a pillar on "law, democratization, and good governance". Under the "competitive production and productivity" pillar, investments to improve rail freight transportation are highlighted as a priority. In addition to increasing the share of overland freight transported by rail to 10% by 2023, the plan targets building 294 km of branch rail lines, improving logistics centers, expanding capacity on existing rail lines in bottleneck areas, and supporting a series of other rail projects by that timeframe. The

[21] An additional 2 logistics centers were under construction as of the time of writing. The remining 12 centers were at various preparatory stages of design, land acquisition, and/or procurement.

preceding 10th Development Plan (2014-2018) had also highlighted rail freight as a priority. Specifically, it noted that "the need for a balanced distribution within transportation modes continues", and that the "highway-dominant structure of the transport network continues to be the source of environmental and road safety issues"; to address these challenges, the plan called for policies to encourage the use of railway and multimodal transport[22].

19. **The GoT further detailed its long-term plan for the logistics sector in the 2019 Logistics Masterplan.** The plan aims to develop high-quality logistics infrastructure, raise value-added from the sector, lower logistics costs, and facilitate exports. The plan details a long-term logistics policy roadmap spanning 2020 to 2053. The authorities set out a plan to further establish Turkey as a global logistics hub, by attracting higher transit volumes, enhancing coordination among logistics firms, strengthening sectoral legislation, regulation, and institutions, and employing the latest technology and skills. The masterplan aims to increase transit income from US$1 billion in 2020 to US$54 billion in 2035 and US$214 billion in 2053, with a primary focus on improving rail infrastructure to achieve this. In the near term, eight ongoing railway construction projects are planned for completion by 2023. The authorities also plan to improve the existing railway routes across the country, set up new logistics centers in export-intensive areas, and establish new rail lines to industrial zones and ports. Between 2023-2035, the government plans to build a North-South railway corridor from Samsun to Mersin; a South-East line from Gaziantep to the Iraq border; a North-East line from Trabzon to Erzincan; and a South-Central Anatolia line from Antalya to Kayseri.

20. **Turkey's current Government was formed in July 2018, following national elections held in June 2018.** In September 2018 the Government launched the National Economic Program (NEP), which sets forth Turkey's macro-fiscal and structural reform strategy and is a comprehensive statement of the Government's policy intent for the near-term. The NEP calls for emphasis on increasing domestic production and exports, and improvements in the logistics sector have been positioned as a core pillar supporting this goal. The Government believes that further gains in transport and logistics efficiency will be needed to facilitate Turkey's national goals on trade competitiveness, economic growth, and productivity gains, and it has designated the railway sector as a primary enabler of this effort.

21. **The Ministry of Transport and Infrastructure (MoTI) oversees Turkish State Railways (TCDD) and is the lead agency for railway sector development—including an explicit mandate on last-mile connectivity provision.** Article 40 of the *Law on Development of Industry and Supporting Production*[23] states that "the railway and road connections of the Organized Industrial Parks will be provided by the Ministry of Transportation and Infrastructure [MoTI]". TCDD is a 100% government-owned holding company under MoTI. As the national rail infrastructure manager, TCDD is responsible for owning and maintaining the national rail network, and for granting track access rights on a non-discriminatory basis to all licensed railway undertakings, whether state- or privately-owned. MoTI and TCDD jointly plan the railway network; newly-constructed, publicly-financed expansions to the network, including at the last mile, are executed by MoTI and handed over to TCDD for operations and maintenance. As a holding company, TCDD comprises four affiliated companies, including, most notably, TCDD Transport, the 100% government-owned railway undertaking and incumbent provider of passenger and freight rail transport services in Turkey, as well as five subsidiaries[24].

[22] Republic of Turkey Ministry of Development (2014), *The Tenth Development Plan 2014-2018*, Ankara.
[23] Law No. 7033, published in the Official Gazette on July 1, 2017.
[24] Beyond TCDD Transport, the other 3 TCDD affiliated enterprises include rolling stock manufacturers Tülomsaş, Tüdemsaş, and Tüvasaş. As of March 2020, these 3 companies have been merged into a single organization called Turkey Rail System Vehicles Industry, Inc. (Türasaş); nevertheless, their operational integration may take longer to finalize. TCDD's 5 subsidiaries include a switching and railway systems provider, two concrete sleeper manufacturers, and two railway maintenance companies.

22. **More specifically, MoTI's Directorate-General of Infrastructure Investments (DGII) is the lead agency responsible for infrastructure development.** Through Article 485 of Presidential Decree No. 1[25], DGII was entrusted with the mandate of designing and constructing public railways, logistics centers, ports, and airports, as well as delivering rail and road access connections to major ports, airports, industrial facilities, organized industrial zones, and mining areas. As such, the design and construction of public last-mile rail connectivity infrastructure is the responsibility of DGII.

23. **MoTI's Directorate-General of Transport Services Regulation (DGTSR) is responsible, inter alia, for ensuring a free, fair, and sustainable competition environment within the rail sector.** Key elements of DGTSR's mandate include licensing public and private railway undertakings, determining the procedures and principles regarding public service obligation (PSO) contracts, and establishing and observing the rights, obligations, and responsibilities of service providers during their period of operation.

24. **The above institutional framework for the railway sector is both recent and the result of a transformative, multi-year railway reform effort in Turkey.** The most visible component of railway reform is the vertical separation of TCDD—a former vertically-integrated public railway monopoly—and the consequent separation of infrastructure management, which would remain in the public domain, from service provision, which would be opened, for the first time, to private operators, pursuant to the 2013 *Law on Liberalization of Turkish Railway Transportation*[26] and associated secondary legislation. The main goals of railway reform were to enable competition and private sector participation in the provision of rail services, and to do so in a manner that was consistent with best European practice and aligned with the EU *acquis communautaire*. TCDD's current holding company structure became operational in June 2016 and is similar to the institutional framework of EU member states Italy and Germany, both widely considered regional leaders in railway sector development. TCDD Transport, the incumbent state-owned railway undertaking, signed its licensing agreement with TCDD, the public infrastructure manager, in January 2017, becoming the first unbundled operator of the railway reform era[27].

25. **TCDD owns and maintains a network of average geographic density by global standards, but of limited geographic and freight density compared to the rest of Europe.** Turkey's rail network, the 21st longest in the world, is 12,700 km in length, less than 20% the length of its main highway network (68,000 km). Against nearly 800,000 km^2 of territorial extension, Turkey's geographic rail network density—16 km of track per 1,000 km^2—compares favorably to some UMIC networks, such as Brazil (4), Thailand (9), Mexico (12), and China (13), but is lower than that of South Africa (25). Compared to high-income markets, Turkey's geographic rail network density is below that of the U.S. (23 track-km per 1,000 km^2) and falls well short of that of the EU (49 track-km per 1,000 km^2). The Turkish network comprises 1,213 km of high-speed rail (HSR) lines and 11,527 km of conventional lines; 43% of the network is electrified, and about 50% is signalized. In 2018, the network captured freight volumes of 31.7 million tons and freight transport demand of 14.5 billion ton-km. Turkey's freight transport density—1.1 million freight ton-km per

[25] Dated July 10, 2018.
[26] Law No. 6461, published in the Official Gazette on May 1, 2013.
[27] Since the adoption of railway reform, in addition to TCDD Transport two private rail freight undertakings have launched operations in the Turkish market: (i) Körfez Transportation, active since early 2018 and a wholly-owned subsidiary of Turkish fuel refiner Tüpraş; and (ii) Omsan Lojistik, active since mid-December 2017 and a subsidiary of the Oyak Group, a large Turkish industrial conglomerate and investment fund. However, the initial operational viability of these carriers was enabled by the immediate capture of freight transport demand generated by the carriers' own parent companies, over highly targeted portions of the rail network. For example, Omsan launched operations transporting 2 million tons of iron ore from Divriği to Iskenderun, to serve other Oyak Group industrial companies as anchor customers. As of 2019 TCDD Transport continued to account for the vast majority—89%—of Turkey's rail freight market by tonnage and is the sole service provider to most freight rail users in Turkey.

km of track—is only about half that of the EU (2.0 million freight ton-km per km of track). The commodity composition of Turkey's rail freight demand base is concentrated in a few bulk commodities, chiefly including metal ores, thermal and metallurgical coal, construction materials, and petrochemical products. Major manufacturing centers such as Bursa; port cities such as Antalya and Trabzon; established industrial zones in Adana, Osmaniye, and Hatay provinces in the south-central region of Çukurova; and major greenfield nodes under construction, such as Filyos port on the Black Sea coast, do not yet have railway access. This in part explains the observed low transport densities and exemplifies Turkey's rail infrastructure connectivity limitations for freight logistics.

26. **While significant public funds have been allocated to railway sector investments, most of these funds have been directed to the passenger market, leaving a financing gap for freight.** In 2020, approximately US$1.8 billion were allocated for public investment in the railway sector—a substantial 56% share of overall public investment in transport. However, an estimated US$18 billion still needs to be allocated to the current public railway project stock, mainly to support ongoing HSR projects. Against current annual investment ceilings, it will take approximately 8 years to complete these projects. As Turkey has focused extensively on the construction of HSR projects within the last decade, some 62% of the public railway investment budget was channeled towards HSR initiatives. In contrast, only about 5% of the budget is directed at capital investments in freight rail improvements (less than US$100 million in 2020). This is, in context, limited and indicates a funding gap for freight connectivity and capacity expansion, which this project proposes to partially offset.

D. Relevance to Higher Level Objectives

27. **The Rail Logistics Improvement Project (RLIP) will contribute to the World Bank's Country Partnership Framework (CPF) for Turkey for the FY18-FY23 period (Report No. 11096-TR, July 28, 2017), by supporting its Growth and Sustainability Focus Areas.** Specifically, the project is aligned with the Growth Focus Area objective of *enhancing the competitiveness of selected industries*, as it will contribute to improving the profitability, productivity, and access-to-market of firms in rail-relevant sectors, most notably including iron and steel products, cement and construction materials, automotive parts and finished products, and products of apparel and textiles, all of which are among Turkey's main export commodities. The project will also contribute to the Sustainability Focus Area objective of *increasing the sustainability of infrastructure assets and natural capital*, by boosting the energy efficiency and reducing the carbon footprint of the national freight transport task through greater use of rail freight and multimodal transport. It will also promote the climate resilience of Turkey's transport infrastructure, thereby contributing to Turkey's and the CPF's climate change adaptation goals, by supporting the preparation and execution of engineering designs and construction approaches to develop infrastructure that can withstand more erratic weather patterns and severe weather events (in addition to non-climate related natural disasters). As one of the first lending operations in Turkey subject to the World Bank's 2018 Environmental and Social Framework (ESF), the project will contribute to the CPF's goal of using the ESF as a foundation for policy dialogue and capacity building on the social and environmental dimensions of infrastructure provision.

28. **The project will contribute to the recovery and revitalization phases of Turkey's response to the COVID-19 pandemic.** To aid in the medium-term *recovery* phase (~6-18 months from the onset of the pandemic), the project will provide technical assistance to MoTI to (a) diagnose the likely medium- and long-term impacts of COVID-19 on the country's multimodal logistics system, domestic and international supply chains, and the ability of Turkish firms to embed themselves in global value chains; and (b) assess and recommend mitigation measures to reduce this impact. The project's main contribution to Turkey's COVID-19 response will address phase 3 of the response—*sustained economic revitalization* (~2+ years from the onset of the pandemic)—through the provision of last-mile rail

infrastructure connectivity and technical assistance to enhance the quality of rail-based logistics services. These interventions are expected to generate jobs, strengthen the connectivity and business continuity of firms in the target corridors, and make lasting impacts on the environmental sustainability and climate resilience of the supply chains operated by these firms.

29. **The project is aligned with the objectives of the EU's financial assistance for Turkey in support of EU accession under the Instrument for Pre-Accession Assistance (IPA) for the period 2014-2020.** Specifically, the project builds on and supports the goals of IPA's ongoing Bank-executed Technical Assistance (TA) program on urban transport, Intelligent Transport Systems (ITS), and intermodal transport, where the latter component is primarily premised upon the promotion of rail freight and rail intermodal logistics. More broadly, the project is consistent with the objectives of the EU's Indicative Strategy Paper for Turkey 2014-2020, which calls for climate change mitigation through GHG emission reductions; climate change adaptation through the provision of resilient infrastructure; and transport efficiency gains through, inter alia, the provision of improved interconnections among modes and the development of intermodal nodes.

30. **The project will contribute towards meeting Turkey's INDC target submitted to the Secretariat of the UN Framework Convention on Climate Change (UNFCCC) on September 30, 2015.** The project is expected to reduce the emission of GHGs associated with the transportation of freight by removing obstacles to the use of rail; in particular, obstacles that are rooted in gaps in last-mile rail infrastructure connectivity at selected nodes of the national railway network. These nodes were prioritized and selected, primarily, based on their intensity in the generation of freight flows compatible with the economics of rail freight compared to trucking services. In addition to expansion in infrastructure provision, the project is expected to contribute to gains in rail freight market share, and thus to reductions in transport sector emissions, through the provision of technical assistance to MoTI, which will promote enhanced service delivery and more effective regulatory and management practices in support of greater adoption of rail freight by shippers nationally.

31. **The project will contribute towards improved gender outcomes.** RLIP will address gender stereotypes and gender role perceptions as a barrier to the employment of women in the transport and logistics industry. It will do so through a bespoke internship program at MoTI for local female university students and graduates, and through an outreach campaign, including video content on social media and open 'career day' events hosted at MoTI.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

32. The project development objective (PDO) is to reduce transport costs in selected rail freight corridors and to strengthen institutional capacity at the Ministry of Transport and Infrastructure (MoTI) to deliver rail freight connectivity and manage rail-enabled logistics centers.

PDO Level Indicators

33. Progress towards the PDO will be tracked based on the following 6 outcome indicators:

- Average bulk commodity transport cost per ton-km between Karabuk Province and Filyos port in constant 2020 prices;
- Average bulk commodity transport cost per ton-km between Osmaniye Organized Industrial Zone (OIZ) and

Iskenderun Port in constant 2020 prices;
- Rail freight tonnage market share into/out of Filyos port;
- Rail freight tonnage market share into/out of Osmaniye OIZ;
- Uniform rail technical standards adopted by MoTI; and
- Decision to review management model of TCDD-owned logistics centers endorsed by MoTI.

The first two outcome indicators—average bulk commodity transport costs per ton-km at the origin-destination level—will address the *financial* dimension of transport costs, i.e., the out-of-pocket costs borne by shippers when contracting transportation services. In bulk commodity supply chains—the mainstay of RLIP's target corridors—transport costs account for the vast majority of financial logistics costs and are therefore the dominant determinant of logistics competitiveness for this kind of shippers (see Box 1). The third and fourth outcome indicators—rail freight tonnage market shares at two key target nodes—will measure changes in *economic* transport costs, i.e., costs borne by society at large, in the target corridors. They mainly comprise the cost of emissions of GHGs and local pollutants, which are determined by the ton-km balance at the corridor level between truck volumes and rail volumes (i.e., modal shares). The last two outcome indicators will capture the extent to which the project attains its goal of strengthening institutional capacity at MoTI.

Box 1. Definition and Measurement of Financial Logistics Costs

In supply chain management, financial (i.e., shipper-borne) logistics costs at the shipment level are defined as the summation of transport costs and inventory carrying costs. For any given freight itinerary, the 'rational shipper' will seek to choose a routing, modal, and service type option that minimizes total financial logistics costs, rather than either sub-component in isolation. In practice all shippers, explicitly or implicitly, conduct this assessment when deciding how to route cargo from origin to destination. In the international experience, sustained minimization of logistics costs has been shown to be a driver of productivity growth, improved profitability, and higher returns on capital employed for shippers/beneficial cargo owners.

There are two key stylized facts about shipper-borne logistics costs. First, there is an inverse relationship between transport costs and inventory carrying costs in supply chains: choosing faster, more reliable transport modes (such as air freight compared to sea freight) will tend to result in higher transport costs and lower inventory carrying costs, and vice versa. Second, commodities with low value-to-weight ratios and low obsolescence risk, such as bulk freight (e.g., sand, cement, and other construction materials), are associated with low inventory carrying costs compared to transport costs irrespective of modal choice; whereas commodities with high value-to-weight ratios and/or high obsolescence risk, such as high-end electronics, are costly to keep in inventory and this cost is highly sensitive to modal choice. The implication is that logistics costs in bulk commodity supply chains—such as those targeted by the project—are overwhelmingly dominated by transport costs. As a result, reductions in transport costs in bulk commodity supply chains have a disproportionate effect on logistics costs compared to any plausible associated change (i.e., increase) in inventory carrying costs. It follows that, for this kind of commodities specifically, transport costs are nearly operationally synonymous with logistics costs (see **Annex 2** for a quantitative demonstration of this). This is why rail freight tends to have an inherent competitive advantage compared to trucking for the transportation of bulk commodities, and why railway access interventions such as those supported by RLIP can be expected to lead to gains in rail freight market share and truck-to-rail modal shift, and, in the long run, to increased trade competitiveness in the target corridors.

Source: World Bank analysis.

B. Project Components

34. The project will support delivery of last-mile rail and multimodal connectivity infrastructure at well-prioritized nodes of Turkey's national railway network. These interventions will help revitalize the transport and logistics sector, and by extension, contribute to the sustainability of the beneficial cargo owners operating supply chains in the project's target corridors in the aftermath of the COVID-19 pandemic. It will support capacity building and institutional strengthening at the main MoTI sub-agencies involved in the rail sector, to help strengthen MoTI's response to the medium- and long-term impacts of COVID-19 on Turkey's logistics system; improve rail freight service delivery; strengthen railway network planning; and promote multimodality through a more robust operation of TCDD-owned logistics centers. Financial support will also be provided for the staffing and operation of the Project Implementation Unit (PIU) within DGII that will oversee project implementation.

35. Consistent with the above objectives, the project is structured around three components as follows (see **Annex 3** for a more detailed description of the components, and **Annex 5** for maps highlighting the proposed civil works interventions):

- **Component 1: Construction of Railway Branch Lines and Multimodal Connections at Priority Network Nodes (IBRD US$319 million equivalent).** This component will finance the provision of last-mile rail (and in select cases, road/multimodal) connectivity at well-prioritized portions of the Turkish railway network.

  Sub-component 1.1. Last-mile Multimodal Connectivity at Filyos Port (IBRD US$144 million equivalent, including VAT and contingencies). This sub-component will finance 100% of civil works and 100% of engineering design review and construction supervision consulting services for the provision of rail and road connectivity at the last mile directly to/from the greenfield, large-scale maritime port of Filyos, on Turkey's Black Sea coast, and its adjacent industrial zone. Specifically, the sub-component will deliver 4.3 km of last-mile dual carriageway highway connectivity and 13.3 km of last-mile double-track rail connectivity[28], including on-dock rail and two intermodal stations, between the Filyos port complex and the main national highway and railway linehaul networks (see **Annex 3** for a breakdown of the project-financed construction costs by modal infrastructure). The rail connection, with a design speed of 60 km/h, will have a maximum inclination of 1.5%, with 300m minimum horizontal and 5,000m vertical curvature. The existing Gokceler Rail Station will be expanded to 900m^2, while a new Filyos Port Rail Station (1,100m^2) will be built within the scope of the project. The project involves 13m-span, 11m high, and 387m long separate rail and road bridges as the most critical construction item, as well as 7 rail box culverts, 2 additional rail underpasses and bridges, and 1 road box culvert, which will provide reinforced flood protection. It also includes a multi-layer road interchange that will provide connection to the main highway line.

  Expected to become the largest Turkish port on the country's Black Sea coast, Filyos port is under construction, slated to begin operations in 2023 under a long-term concession to a private operator (an approach consistent with global best practice). The port will have a throughput capacity at full build-out of 25 million tons. It will serve an immediate hinterland that is intensive in the production and transportation of heavy bulk freight—linked particularly to the steel production industry. This freight is moved primarily by heavy-duty trucks at present, and over longer distances than the Filyos gateway would allow. Market research confirms a short-term rail freight capture potential for Filyos port in the order of 8 to 8.5 million tons per annum. This level of demand is well above the minimum range needed to operate block trainloads or semi-block trainloads, which reduces operating costs

[28] While initially it is expected that Filyos port will be served by trains with diesel locomotives, the track layout and design are such that they will facilitate transition to electrified traction in the future with minimal additional cost.

and makes rail freight services more competitive by, inter alia, reducing in-terminal and en-route shunting and improving rolling stock utilization.

Filyos port was prioritized as a first-phase investment under RLIP based on four factors: (i) significant cargo capture potential, both in the long-run and, critically, in the very short term, as confirmed by market research and testimony from prominent regional shippers; (ii) the current lack of rail connectivity at most maritime ports in the Western Black Sea region; (iii) high implementation readiness, as key preparatory documentation, including feasibility study, social and environmental impact assessments, and engineering designs, have been completed; and (iv) the national-level relevance and strategic importance of Filyos port as a game-changing infrastructure development project in the Black Sea that has been under consideration by the GoT for decades.

Sub-component 1.2. Last-mile Rail Connectivity for Çukurova Region Industrial Zones and Iskenderun Bay Maritime Ports (IBRD US$115 million equivalent, including VAT and contingencies). This sub-component will finance 100% of civil works and 100% of engineering design review and construction supervision consulting services for the construction of branch line rail links to/from selected operational and prospective industrial zones and free zones in the Çukurova region of South-Central Turkey on the Mediterranean Coast—specifically, in the sub-area formed by southern Osmaniye Province, southeastern Adana Province, and northwestern Hatay Province—and adjacent maritime ports in Iskenderun Bay. The sub-component will construct two double-tracked, electrified railway branch lines (36.1 track km), two connecting electrified lines linking the two branch lines (5.5 track km), and five intermodal stations, including sidings. The rail connections, with a design speed of 80 km/h, will have a maximum inclination of 1.6%, with 360m minimum horizontal and 3,200m vertical curvature. Four entirely new rail stations will be built (Osmaniye OIZ, Yukariburnaz, Adana Yumurtalık Free Zone [TAYSEB], and Erzin Port), each with an area of 1,350m^2; a fifth station, TCDD's existing Erzin city station, will be expanded and modernized to match the capacity of the new stations. The project involves 14 rail bridges, with the longest being 3m-span, 11m high, and 95m long, as well as 36 box culverts, 13 underpasses, and 5 overpasses.

These investments will bring rail connectivity to major freight attraction-generation sites in the region, including Osmaniye OIZ and TAYSEB, as well as to future facilities expected to come online within the next 6-8 years, including Ceyhan OIZ and Erzin port. Market research indicates that the industrial clusters in the target area have a long-term bulk cargo generation-attraction potential conservatively estimated at 17.4 million tons, about 42% of which to/from Osmaniye OIZ. As the largest and most mature of these facilities at present, Osmaniye OIZ is expected to account for the bulk—74%, or 4.6 million tons—of the 6.2 million tons of freight estimated to be 'capturable' by rail freight in the target corridors, from the current use of trucks, in the short term. The relative tonnage share of Osmaniye OIZ will gradually fall over time as the other nodes ramp-up. Capturable cargo volumes in this region primarily include iron and steel products, machinery and equipment, construction material, fertilizer, cement, chemical products, food products, and automotive products, most of which would continue to be transported by trucks in the absence of the rail last-mile connections to be provided under this sub-component.

The Çukurova region connections were prioritized as a first-phase investment target under RLIP based on the following 3 factors: (i) at more than 40 track km in length, the scale of this subproject makes it one of the largest within MoTI's and TCDD's last-mile rail connectivity network gaps under consideration; (ii) a hinterland with high density of bulk freight intensive logistics clusters lacking last-mile rail connectivity, leading to a significant freight rail cargo generation potential, as corroborated by market research; and (iii) high implementation readiness, with key documentation having been completed (similar to the Filyos case).

Sub-component 1.3. Provision of Last-mile Rail Connectivity at Additional Priority Sites to be Selected During Implementation (IBRD US$60 million equivalent, including contingencies and VAT). This sub-component will finance 100% of civil works to provide last-mile rail connectivity to an additional 2 to 3 cargo generation-attraction nodes of similar nature as those targeted under Sub-components 1.1 and 1.2—organized industrial zones, logistics clusters, manufacturing clusters, free zones, and/or maritime ports—that remain disconnected from the national railway network. These additional subprojects will be selected based on the findings of feasibility studies (FS) and engineering designs for a longer initial list of 12 potential rail last-mile connectivity subprojects; this FS and design documentation will be financed by the project (see description of Component 2 below). The selection process will be based on multicriteria analysis comprising three main factors: (i) expected economic returns (including the value of mitigating environmental and other non-market externalities); (ii) risk-adjusted technical feasibility (including environmental and social impact considerations); and (iii) magnitude of expected rail freight volume capture as a proxy for urgency of delivery. The selection process will be conducted by the PIU, in close coordination with TCDD, and will be overseen by DGII.

Component 1 is expected to result in reductions of emissions of GHGs and local pollutants relative to a without-project scenario (see Economic Analysis and GHG Accounting sections below). As a result, all Component 1 activities will contribute to the mitigation of climate change risks. Furthermore, the engineering designs already produced for Sub-components 1.1 and 1.2, those that will be produced for Sub-component 1.3, and the construction execution and supervision approaches to be championed under all Component 1 subprojects will deliver infrastructure assets that can withstand the impact of more frequent extreme weather events associated with climate change (see Box 2 for a discussion of climate vulnerabilities in the Filyos and Çukurova areas and the resilience features of RLIP's proposed investments). Component 1 will therefore contribute to helping Turkey's railway and multimodal transport sector adapt to current and expected future effects of climate change.

Box 2. Climate Risks in the Filyos River Basin and Çukurova Region and RLIP Risk Mitigation Measures

Located in the western part of the Black Sea region of Turkey, the Filyos River Basin comprises an area of approximately 13,300 km^2 and is a sub-component of the broader Western Black Sea Basin, of which it accounts for about 46%. Filyos river is therefore the most important river of the Western Black Sea Basin. The amount of rainfall along coastal areas of this basin, where the Filyos port complex is located, exceed 900mm, well above Turkey's average of 643mm. As a result, and considering the meandering nature of the Filyos river at its delta, the Filyos River Basin is one of the most flood-prone regions of Turkey. These floods have historically affected human settlements in the area with disastrous effects, including the towns of Karabuk, Yenice, Devrek, and Çaycuma. The region is also exposed to erosion and landslides (exacerbated by flooding). To protect against these risks, a 7m dyke has been built by the State Hydraulic Works at the river estuary area to protect adjacent communities from flooding. RLIP-financed multimodal connectivity infrastructure for Filyos port will further incorporate flood protection measures to strengthen the climate and operating resilience of these investments as well as that of the Filyos port complex as a whole—including provision of drainage facilities and elevating the rail lines by an additional 2m above the dyke level.

The Çukurova Region is similarly exposed to flood risk hazards that are increasing in frequency and severity due to climate change. For example, in 2016 the province of Mersin, adjacent to RLIP's Çukurova region sites, suffered nearly 10 days of heavy rainfall that resulted in severe flooding of coastal areas, most notably in the provincial capital city of Mersin (metropolitan area population of 3 million people). The province-wide impact was dire: 5 fatalities; disruption of social and economic activity, including public health deterioration through

the spread of diseases in urban areas; damage to roads, rail, water, and urban infrastructure valued at approximately US$3 million; agriculture economic losses valued at more than US$25 million; and disruptions to Mersin port, Turkey's largest containerized port. The alignment of RLIP-financed investments, located within 200km of Mersin city, are in inland locations relatively less exposed to catastrophic flooding, based on risk-informed land use planning. The investments include flood risk mitigation measures such as drainage facilities, bridges, and overpasses.

Source: Cengiz, B. and C. Cengiz (2017), "Strategies for Sustainable Landscape Management in the Filyos River Delta, Turkey", *Journal of Environmental Biology*, Vol. 28; Harmancioglu, N. and D. Altinbilek, Editors (2020), *Water Resources of Turkey*, Springer: World Water Resources; World Bank and GFDRR (2018), *High-level Critical Infrastructure Risk Assessment (CIRA) in the Region of Çukurova, Turkey*, Summary Report, May 2018; World Bank analysis.

- **Component 2: Feasibility Studies, Detailed Engineering Designs, Environmental and Social Documentation, and Construction Supervision for Rail Last-mile Connectivity Infrastructure at Additional Freight Nodes (IBRD US$28 million, including VAT).** This component will finance 100% of consulting services to produce FS—including the environmental and social dimensions of project feasibility—for 12 potential last-mile rail (and, where necessary, complementary road/multimodal) connectivity infrastructure subprojects at pre-identified freight generation-attraction nodes currently disconnected from the national railway network. These 12 sites, which together entail the provision of an aggregate 82.1 track-km of branch line connectivity[29] and produce aggregate annual transport volumes of 20.4 million tons[30] (see Table A3.2 in **Annex 3** for a more detailed list of the sites), have been designated by MoTI based on objective criteria, including (a) expected economic and financial returns based on incremental costs and market-based pricing, and (b) strategic considerations such as alignment with relevant government plans and stated goals. For those subprojects deemed feasible, Component 2 will finance 100% of consulting services to produce detailed engineering designs, as well as detailed social and environmental documentation. And for the (approximately 2 to 3) of these subprojects that will be selected for implementation under Component 1, based on MoTI's outlined multicriteria prioritization as informed by FS, engineering design, and environmental and social documentation findings, Component 2 will finance 100% of construction supervision consulting services. As a matter of robustness, the FS and engineering design process will incorporate the views and reflect the operating needs of end-users of the proposed facilities—shippers, transport carriers, and logistics service providers—as well as the feedback and needs from members of the surrounding communities. The production of environmental and social documents will comply with ESF requirements and be subject to the Bank's prior review and approval.

  By providing the feasibility, engineering design, and ESF documentation necessary for the implementation of Sub-component 1.3, Component 2 is fully integrated with Component 1. Therefore, Component 2 will contribute to the reductions in emissions of GHGs and local pollutants expected to be realized under Component 1, and to the provision of climate-resilient infrastructure that will help Turkey's railway sector better adapt to ongoing and future climate change impacts.

- **Component 3: Phase 2 COVID-19 Response Support, Institutional Strengthening, Capacity Building, and Project Implementation Support (IBRD US$3 million equivalent, including VAT).** This component will finance 100% of consulting services to provide technical assistance and capacity building in the following areas: (i) support to MoTI to diagnose the medium- and long-term impacts of COVID-19 on multimodal logistics on the demand and supply

[29] The estimated track length of individual subprojects ranges from 1 to 26 km.
[30] The cargo production volume of individual subprojects ranges from 300,000 tons to 5 million tons.

sides, and design public, public-private, and/or purely private interventions, including interventions aimed to tackle behavioral and occupational aspects of risk prevention, to mitigate these impacts; (ii) support to DGII on the uniformization of rail technical standards across the national rail network; (iii) support to MoTI (DGII, DGTSR, TCDD) on the preparation of a strategy document for rail freight sector performance improvement; and (iv) support to TCDD through the development of an operational and management model for rail-enabled logistics centers specified within the framework of Turkey's Logistics Masterplan and in line with Turkey's 11th Development Plan, based on international best practice contextualized to the Turkish environment. Component 3 will also finance expanded staffing of the PIU, through the recruitment of individual consultants external to MoTI (non-governmental, non-civil servants) for the duration of project implementation, as well as training.

The institutional objectives of Component 3 are expected to result in improvements in railway infrastructure provision and rail freight service delivery, both of which are necessary to drive—and sustain—gains in rail ton-km market share at the national level. Such gains will result, over time, in avoided emissions of GHGs and local pollutants and therefore will contribute to mitigating climate change risks. The Component 3 activity on uniformization of rail technical standards is directly related to the mitigation of disruptions in the operation of Turkey's railway network, including climate-related disruptions. This Component 3 sub-activity will therefore contribute to climate change adaptation.

C. Project Beneficiaries

36. The main project beneficiaries are TCDD and firms—including SMEs—located in the catchment area of the last-mile connectivity infrastructure financed by the project. This will include, but will not be limited to, (i) future end-users of Filyos port; (ii) current and future tenants of Osmaniye OIZ, TAYSEB, and adjacent facilities; (iii) current and future end-users of Iskenderun Port; and (iv) end-users of beneficial cargo owners located within the catchment of the additional last-mile rail connectivity facilities to be financed under Sub-component 1.3. It is expected that the project will provide these firms with improved access to markets and lower average transport costs. The project will also benefit rail freight users in Turkey at large, through the impact of the Component 3 institutional strengthening activities. Specifically, the uniformization of rail technical standards will help TCDD better plan, build, and maintain the national railway network, which would benefit rail freight (and passenger) users nationally. Similarly, the project-financed technical assistance to TCDD on best-practice management models for rail-enabled logistics centers should result, over time, in improved service delivery at these centers, which will benefit the end-users of these facilities at the national level. Lastly, the general public using highways within the cargo hinterland of the targeted industrial zones stands to benefit from the project's impact on removing heavy-duty trucks on those roads, which will make them safer and less congested.

D. Results Chain

37. The project's Results Chain links discrete civil works and consulting service activities with intermediate outputs and, ultimately, with a set of intended short-term and long-term outcomes (see Figure 1). Underpinning the Results Chain is the premise that attaining the project's intended outcomes—reduced financial and economic transport costs, improved access to market, and a higher incidence of rail freight in the project's target corridors; and, in the long-run, increased trade, employment, and economic growth in the target hinterlands, improved utilization of TCDD-owned logistics centers, and a higher incidence of rail freight in the national freight transport task—requires a combination of infrastructure provision and strengthened service delivery.

Figure 1. Turkey: Rail Logistics Improvement Project Results Chain

Bold italics denote PDO indicators

38. The project's civil works under Component 1 aim to expand infrastructure provision at priority nodes, while the technical assistance activities under Component 3 address key aspects of service delivery, such as a more market-oriented operational model for TCDD's logistics centers, the crafting of a public sector strategy to improve the performance of rail freight logistics in Turkey, and a better-informed, evidence-based policy response to mitigate the impact of COVID-19 on multimodal logistics through the medium and long terms. They will also contribute to furthering collaboration among the MoTI sub-agencies of the rail sector. In addition to supporting the implementation of Component 1, the Component 2 activities will help strengthen planning and project conceptualization and preparation practices at DGII.

E. Rationale for Bank Involvement and Role of Partners

39. **World Bank involvement in supporting the provision of last-mile rail infrastructure in Turkey responds to a continued need for public sector funding and is consistent with international experience elsewhere in Europe.** The use of rail for the transportation of heavy freight (and, where justified, for the transportation of containerized freight) as compared to the use of trucks is associated with public goods like reductions in GHG and local pollutant emissions, highway infrastructure wear and tear, highway congestion, and over-the-road accidents involving heavy-duty vehicles. And the availability of rail connectivity at the last mile is a primary driver of rail freight adoption in the first place. As such, there is a case for public funding to address under-provision of last-mile rail connectivity, and to allow for these investments to build a business case for greater future participation of public-private and, where viable, solely private provision of last-mile rail infrastructure, such as industrial sidings. This has been the European experience so far, where dedicated programs exist in countries like Germany, Austria, and Switzerland to allocate public funding, in full or in part, to last-mile rail connectivity development; this is in addition to the use of non-dedicated programs, such as the EU-wide Connecting Europe Facility (CEF), which focuses on deploying public sector funds to better linking beneficial cargo owners and logistics service providers to the core TEN-T network—chiefly including its railway corridors.

40. In Turkey, the insufficient provision of last-mile rail connectivity to date is a de facto indicator of a market failure that justifies public investment. Furthermore, it is expected that RLIP-financed connectivity improvements will act as upstream facilitators of private sector investment in the adjacent port and industrial cluster facilities for which RLIP will provide multimodal and more cost-effective access to market. In time, RLIP may facilitate private and/or public-private provision of last-mile rail infrastructure connectivity elsewhere in the network, with RLIP's selective approach serving as a proof of concept. This is consistent with the Bank's Cascade framework under Maximizing Finance for Development (MFD), and it is aligned with public and public-private approaches elsewhere in Europe.

41. **The World Bank has been engaged in Turkey's rail sector since 2005 and RLIP builds on this experience.** The Bank's most recent investment lending engagement in the transport sector in Turkey, under the Turkey Railways Restructuring Project (TRRP) (2005-2013), combined investments in infrastructure at selected railway corridors—specifically, the Mersin-Toprakkale and Yenice-Bogazkopru lines—with institutional strengthening and capacity building. The latter included preparatory support to help operationalize the sectoral reform that was eventually passed, including helping TCDD develop experience with PSO contracts and initiating a pilot for TCDD to prepare its first Network Statement, a requirement under deregulated access to the national railway network[31]. The subsequent 2014 Sustaining Shared Growth Development Policy Operation, a policy-based loan, included, under Pillar C on

[31] TCDD's efforts towards developing a Network Statement—the document that defines the terms under which competing railway undertakings can be granted access rights to use the national railway network, in accordance with the EU acquis—also benefitted from grant funds from the EU, which allowed for further elaboration and refinement of this document.

Deepening Turkey's Infrastructure Reform, passage of the 2013 railway sector liberalization law as a prior action. It also provided incentives for, inter alia, (a) adoption of secondary railway reform legislation on market access (achieved in 2015-2016), (b) vertical separation of TCDD (achieved in June 2016), and (c) issuance of TCDD's Network Statement for calendar year 2017, its first (achieved in November 2016). A second policy-based loan, the 2017 Resilience, Inclusion and Growth Development Policy Financing included, under Pillar C on *Addressing Structural Bottlenecks to Sustainable Growth*, adoption of the first Network Statement as a prior action and, as a results indicator, that by year-end 2018 a contract would be signed between TCDD Infrastructure and at least one new private operator entering the market. This target was achieved well ahead of the intended deadline, with two contracts signed with rail freight undertakings within 2017. RLIP will build on this experience by making rail transport accessible to more shippers across the targeted hinterlands; by engaging TCDD not only as infrastructure manager but also as operator of logistics centers; and by engaging the MoTI agencies in charge of sectoral regulation and infrastructure development to promote better inter-agency coordination among them and between them and TCDD. These are all additional dimensions of sector reform operationalization.

42. **The project benefits from the findings of analytical work conducted by the Bank in 2019, in close coordination with MoTI and TCDD, on improving rail last-mile connectivity.** The work assessed Turkey's last mile connectivity challenge in the context of national goals and aspirations, domestic and international experience, market requirements, and physical connectivity gaps across the national rail freight network. Through technical assistance, the Bank developed a last-mile investment prioritization tool and conducted a preliminary analysis of the factors that can provide an enabling environment for private sector participation in the provision of this infrastructure. The work confirmed that there are pressing gaps in last mile rail connectivity in Turkey that justify public investment, and that institutional improvements, such as those proposed under Component 3 of the project, can help attract more private sector investment in the future for both infrastructure provision and service delivery.

43. **The project is consistent with and builds on past work that has been supported by other development partners in Turkey, most notably the EU.** The EU has provided financial assistance and technical support to important analytical work in the transport sector in Turkey, most recently including, in 2018, the development of the National Transport Masterplan for Turkey. The Masterplan lays out investments and strategies to achieve a safe, efficient, smart, and integrated transport system at the national level, with a view through 2035. As regards freight transport, the Masterplan aims to support Turkey's exports as a source of growth, and it proposes to improve the integration of transport and logistics as a primary means to achieve this. Such improvements would include, inter alia, investments in 'dry ports' and other inland logistics clusters, and a corridor approach to infrastructure planning and service delivery expansion. The plan also highlights the need to reduce the transport sector's carbon footprint and calls for increases in rail freight market share. RLIP's activities and development objective are well aligned with the Masterplan's principles.

F. Lessons Learned and Reflected in the Project Design

44. **Project design has been informed by international experience with projects aimed to attract freight transport demand to the railway sector.** Experience from North America and Western Europe shows that increases in rail modal share have resulted, inter alia, from the following key factors[32]: (i) an understanding of the inherent competitive advantage of rail to carry heavy bulk commodities, commodities with low value-to-weight ratios, voluminous commodities that make containerization impractical, and commodities in market segments that are less

[32] Aritua, Bernard (2019), *The Rail Freight Challenge for Emerging Economies: How to Regain Modal Share*, The World Bank, International Development in Focus series: Washington DC.

time-sensitive, less exposed to inventory carrying costs but highly sensitive to transport costs, and/or moved over long distances—instead of focusing disproportionately on segments that are better served by trucks; (ii) investments in infrastructure that enables the bundling of cargo, the consolidation and deconsolidation of shipments, and the provision of value-added services with multimodal connectivity that includes rail—such as intermodal terminals directly connected to diversified industrial zones, maritime ports, and inland ports; (iii) regulatory reform that promotes tariff flexibility and service customization vis-à-vis customer demand volumes, logistics requirements, and willingness-to-pay—in short, customer orientation; and (iv) an openness, on the part of railway undertakings, to intermediation in the arrangement of end-to-end itineraries, which is particularly effective at converting into rail freight cargo that originates from SME shippers.

45. RLIP's components are aligned with the above lessons. Components 1 and 2 support the provision of rail connectivity infrastructure to/from cargo consolidation-deconsolidation centers that have historically been served only by trucks and which will be multimodally connected as a result of the project (in the case of Filyos port, this will be only the second maritime port on the Black Sea coast to have access to rail services, as noted earlier). Second, these components will deliver rail connectivity to cargo generation-attraction nodes that are specifically intensive in the movement of commodity types for which rail transport has an inherent competitive advantage, and where shippers have historically expressed a need for rail connectivity (this is particularly true in the case of Filyos' immediate hinterland). The technical assistance and institutional strengthening interventions under Component 3 will round-out the picture by facilitating knowledge transfer and supporting decision making on key rail adoption drivers like customer orientation, tariff and service customization, intermediation, and network management.

46. **Project design reflects lessons learned from the Bank's investment lending experience in Turkey's railways sector under TRRP.** First, TRRP's ability to attain implementation progress was, by design, dependent upon the adoption of railway reform milestones that required acts of Parliament, a typically protracted and uncertain process in any context. In TRRP's case, delays in the passage of reform led to the entire project being delayed, putting the attainment of the project development objectives at risk and ultimately triggering a project restructuring with adjusted objectives and delivery timelines. While RLIP's Component 3 addresses complex institutional challenges critical to Turkey's railway sector goals, these actions do not depend on acts of Parliament and are intended to make the sector more efficient in the provision of rail and multimodal services in the context of the railway sector reform that has already been adopted. Second, the delays that impacted TRRP's own civil works activities were mainly due to (a) a multi-level review process that limited the PIU's decision making abilities, and (b) the targeting of brownfield corridors exposed to ongoing traffic, which increased construction complexity. RLIP's design mitigates these risks by working with an empowered and adequately staffed PIU within DGII, and by financing the construction of newbuild branch lines, with minimal land acquisition and involuntary resettlement requirements (see Social section below).

47. **Project design is also informed by the Bank's experience in railway sector projects globally.** While the Bank has financed only a limited number of rail logistics projects involving civil works in countries comparable to Turkey, there are still a number of common issues observed in those, including (a) soundness of the engineering design (China and India); (b) commitment to and capacity to implement the Bank's environmental and social safeguard policies and procedures (India); (c) staffing of the project implementing agency; (d) underestimation of the political economy constraints in the borrowing country; and (e) lack of a holistic approach needed in developing logistics, with sufficient focus on both construction works (Tanzania) and the policy side (Uzbekistan). In response, RLIP has been prepared based on existing feasibility study documentation and detailed designs. Capacity building, training, and hands-on Bank team support will be provided throughout, particularly during the early implementation stages of the project. And the project balances infrastructure provision with policy-side service delivery support.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

48. **RLIP will be implemented at the working level by DGII as the lead sub-agency for rail infrastructure development under MoTI.** A PIU has been established within DGII to oversee all aspects of project implementation across all 3 components; for relevant Component 3 activities, the PIU will coordinate closely with TCDD and DGTSR to ensure value-for-money in the provision of technical assistance and ensure that the project's institutional strengthening goals are met. The PIU will be led by the Deputy Director General of DGII, and the Deputy PIU Director will be the Head of DGII's Railway Construction Department. The PIU will be staffed by a total of 27 members, of whom 22 are current DGII staff; the remaining 5 PIU members—a procurement specialist, financial management specialist, social development specialist, environmental specialist, and an administrative assistant—will be recruited during project implementation using Bank loan proceeds. The Terms of Reference (ToR) for all external PIU members have been prepared by DGII and confirmed by the Bank as responsive to the Bank's Procurement Framework, Financial Management requirements, and ESF principles.

49. **A Project Operations Manual (POM) will be prepared for the project.** The POM will outline the internal procedures to be followed by the PIU to ensure compliance with World Bank policy regarding procurement, financial management, and social and environmental safeguards. Periodic Bank-led training; regular implementation support missions; and close ongoing communication between the PIU and the Task Team will supplement the POM.

B. Results Monitoring and Evaluation Arrangements

50. The project's outcome and intermediate performance indicators, including their definition, baseline, and target values, are presented in the Monitoring and Evaluation (M&E) framework presented in Section VII. The PIU will be responsible for tracking these indicators over time and measuring their values against the set targets. The measurement of some of these indicators will require market research and/or consultations with other government agencies, whether within or outside MoTI.

51. A mid-term review (MTR) will be conducted to assess implementation progress, identify key issues in need of attention and resolution, and agree on a time-bound action plan to address them. It is expected that the MTR will be held towards the end of calendar year 2023.

C. Sustainability

52. The GoT, through the Ministry of Treasury and Finance (MoTF) as the Borrower and MoTI as project implementing agency, is strongly committed to this project and its long-term sustainability. This is evidenced by the several official plans at the national level that lay out goals for the railway sector and provide a strong policy underpinning to this project. It is further evidenced by the support provided during preparation for the inclusion of the project in full under Turkey's 2020 Investment Program. DGII has been empowered to make timely decisions on project implementation through its PIU and is MoTI's subject matter expert agency on construction of railway infrastructure. Under the existing institutional framework for railways, DGII will transfer the project-financed infrastructure upon completion to TCDD as infrastructure manager, and TCDD has been given an overall mandate for maintenance and utilization of all public rail infrastructure, including at the last-mile. DGII, TCDD, and DGTSR are committed to collaborating to ensure a timely and effective delivery of Component 3 activities, and the knowledge

sharing and capacity building impact of these activities will contribute to a better utilization of railway infrastructure across the network, including that financed under the project. MoTI's preparation and funding of feasibility studies, detailed engineering designs, and environmental and social impact assessments show a commitment to robust project preparation for long-term sustainability. The preidentified subprojects at Filyos and Çukurova reflect the project implementing agency's stated priorities, and the intention to move forward with these and additional similar works (to be further financed under Component 2 and Sub-component 1.3) has been recognized by MoTI for a period of several years.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical Analysis

53. **RLIP's technical design incorporates features that have been proven to drive rail freight demand capture in the international experience, sustain rail freight demand over time, and promote shift freight from trucks to rail.** First, the project focuses on last-mile connectivity in both its civil works and institutional activities. The availability of last-mile rail connectivity is often a major determinant of rail freight modal choice at the shipper level, and therefore the provision of rail connectivity at the last mile has a disproportionate effect on rail freight adoption. This is the main justification for RLIP's technical focus on the provision of branch lines to/from logistics clusters. Second, the project combines infrastructure provision with service delivery by providing technical assistance to the public sector agencies in charge of planning and building the railway network (DGII and TCDD), operating rail freight transport services (TCDD Transport), and regulating the rail transport subsector (GDTSR). These technical assistance activities—3 in total—are targeted in coverage rather than expansive; of digestible size and applied rather than conceptual; and responsive to MoTI's own pre-identified areas of opportunity, to ensure buy-in and post-implementation uptake. The fourth technical assistance activity, on mitigating the long-term impact of COVID-19 on multimodal logistics operations, including rail-based logistics, will, by its nature, emphasize how service delivery may evolve post-pandemic. And third, the design of project-financed civil works is resilient to climate and other shocks, to both increase the reliability of rail logistics as a mode and help Turkey better adapt to the impacts of climate change.

54. The Filyos structures, located in an estuary area in the Black Sea, have been designed to withstand a 1-in-100-year storm surge at flood stage, by incorporating, inter alia, strengthened piling and soil refurbishment, flood-preventing drainage systems, and the use of permeable materials. Similarly, the engineering design of the Çukurova works incorporate modern ballast and drainage standards in line with best European practice. In both cases, provision of double tracking (and in the case of Filyos, dual carriageway road access) increases operational flexibility and cargo carrying capacity. The Çukurova works will be 100% electrified, whereas the Filyos branch line will have the layout and flexibility to transition to electrification in future, once the immediate linehaul corridor to which it will connect is electrified. Engineering designs will be reviewed and updated during implementation by the Construction Supervision Consultant (CSC) to ensure accuracy relative to prevailing conditions on the ground and as a procurement and construction risk mitigation measure, as this will facilitate CSC familiarity with the designs and better inform the planning of construction methods ahead of contractor mobilization.

55. The Filyos road connection has been designed with robust road safety standards. For example, it entails converting the existing at-grade junction to a multi-layer interchange with 800-meter approaches, which will provide heavy-vehicle traffic safety at the junction. Furthermore, the dual carriageway road is designed to enter the facility

without any pedestrian access, and ends at its main entrance without any other junction, thus isolating the road from potentially risky pedestrian or incoming vehicle crossings. A road safety audit of this design will be conducted during implementation.

Economic and Financial Analysis

56. A standard cost-benefit analysis was conducted to assess the economic viability of the project's pre-identified investments under Sub-components 1.1 and 1.2.[33] This assessment indicates that investing in the proposed last-mile rail and multimodal infrastructure at Filyos port and the Çukurova region is economically viable and therefore justified (see Table 1; full details are presented in **Annex 4**). Specifically, providing last-mile multimodal connectivity at Filyos port is expected to yield an Economic Internal Rate of Return (EIRR) of 35%; building the two proposed branch lines in Çukurova is expected to yield a blended EIRR of 22%; and the combined EIRR for both sub-components is estimated at 30%. All economic rates of return are above the Bank-recommended benchmark economic discount rate of 6%[34]. At the latter rate, the proposed investments are expected to yield an Economic Net Present Value (ENPV) of US$790 million, US$239 million, and US$1.0 billion, respectively, at 2020 prices. Sensitivity analysis shows that the economic viability of these investments is robust—in all 3 cases—to simultaneous increases in costs and decreases in benefits of at least 25% relative to base-case assumptions.

Table 1. Economic Evaluation of Project Investments under Sub-components 1.1 and 1.2
Millions of 2020 US$

	Present value of economic costs		Present value of economic benefits					Economic evaluation	
	Capital\1	O&M	Transport costs	Transport safety	CO_2 emissions abatement	PM_{10} emissions abatement	NO_X emissions abatement	ENPV	EIRR
Filyos Investment	(105)	(17)	633	52	95	1	131	**790**	**35%**
Çukurova Investments	(82)	(13)	239	23	37	(0)	34	**239**	**22%**
Blended Filyos and Çukurova Investments	(187)	(30)	871	76	132	1	165	**1,029**	**30%**

1\ Including the offsetting infrastructure residual value at the end of the analysis period (2054).
Source: World Bank analysis and estimates.

57. Notwithstanding their economic viability, the project-financed infrastructure investments will only yield their expected impact if rail services are provided on this infrastructure (and further on the linehaul network to which the branch lines connect) throughout the operating life of the assets. This requires the services in question to be financially viable over the long run at the carrier level. Since it is expected that TCDD Transport will be the primary, and, in the short run, likely the only railway undertaking to serve the project-financed lines, with track access rights granted to it by TCDD Infrastructure, a financial analysis was conducted to assess the viability of operating the

[33] The economic returns to delivering last-mile rail infrastructure connectivity at an additional 2-3 sites nationally, under Sub-component 1.3, will be assessed during project implementation, based on preparatory documentation to be developed under Component 2.
[34] World Bank, "Discounting Costs and Benefits in Economic Analysis of World Bank Projects", 2016.

proposed branch lines from the perspective of 'TCDD as a whole'; that is, taking into account both infrastructure provision and service delivery (see **Annex 4** for details). The results, shown in Table 2, confirm that the Filyos and Çukurova investments are financially viable, as they are expected to yield Financial Internal Rates of Return (FIRRs) that are above the financial discount rate of 2.8%[35]. At the latter rate, the Filyos, Çukurova, and blended investments are expected to yield a financial NPV of US$146 million, US$62 million, and US$208 million, respectively, at 2020 prices. Sensitivity analysis shows that the financial viability of the investments, both standalone and blended, are robust to simultaneous increases in costs and decreases in revenue of between 5% and 6%.

Table 2. Financial Viability of Project Investments under Sub-components 1.1 and 1.2
Millions of 2020 US$

	Present value of infrastructure costs			Present value of rail service provision flows		Fincancial evaluation	
	Branch line capital costs\1	Branch line maintenance costs	Incremental linehaul maintenance costs	Operating revenue	Operating costs	**NPV @ 2.8%**	**FIRR**
Filyos Investment	(81)	(4)	(48)	1,133	(856)	**146**	**9.2%**
Çukurova Investments	(91)	(11)	(25)	608	(418)	**62**	**5.7%**
Blended Filyos and Çukurova Investments	(172)	(15)	(73)	1,741	(1,274)	**208**	**7.5%**

1\ Including the offsetting infrastructure residual value at the end of the analysis period (2054).
Source: World Bank analysis and estimates.

GHG Emissions Accounting

58. A GHG emissions accounting and valuation exercise was conducted as part of the economic analysis of project investments under Sub-components 1.1 and 1.2. Based on World Bank standard guidance[36], the economic value of a ton of CO_2 is assumed to be US$44 in 2024 (the first year the project-financed facilities are expected to become operational), growing gradually in real terms to reach US$50 in 2030, US$63 in 2040, US$70 in 2045, and US$78 in 2050-2054. It is estimated that in 2024 the project will result in the avoidance of 123,235 tons of CO_2, and that this amount will grow to 293,293 tons in avoided emissions of CO_2 by 2054 (see Table 3). In total, over the 30-year period of analysis it is estimated that the project will result in the cumulative avoidance of nearly 6.8 million tons of CO_2, with an estimated present economic value of US$132 million[37].

[35] As of January 1, 2020, the IBRD fixed spread for Pricing Group C, which includes Turkey, was LIBOR+1.80% for the average maturity bucket 18-20 years. As of March 19, 2020, the 6-month US$ LIBOR rate was 0.9795%. As such, the cost of IBRD financing is assumed to be approximately 2.8%.
[36] World Bank, "Shadow Price of Carbon in Economic Analysis Guidance Note", 2017. For conservatism in the assessment of economic viability of the proposed investments, the values used for the social value of carbon refer to the Guidance Note's "low value" case.
[37] Utilizing the "high value" case for the social value of carbon recommended by the World Bank's "Shadow Price of Carbon in Economic Analysis Guidance Note" (2017), the estimated 2020 present value of avoided emissions would be US$264 million, or twice the estimated 2020 present value of avoided emissions under the "low value" case.

Table 3. RLIP: CO_2 Emissions Accounting from Last-Mile Rail and Multimodal Connectivity Interventions at Filyos Port and Çukurova Region, 2024-2054[\1]

Tons of CO_2 per year

	Net CO_2 emisisons	Gross CO_2 emisisons
2024	123,235	86,267
2025	130,488	88,602
2026	137,820	93,010
2027	144,449	97,527
2028	151,391	102,414
2029	157,018	109,701
2030	162,884	117,595
2031	175,912	115,520
2032	180,065	122,794
2033	184,157	130,615
2034	194,429	131,168
2035	199,249	139,077
2036	203,637	145,573
2037	208,792	151,548
2038	214,093	157,640
2039	219,365	164,080
2040	224,597	170,886
2041	229,743	178,110
2042	234,893	185,628
2043	239,725	193,866
2044	259,457	185,386
2045	264,594	193,757
2046	268,325	201,128
2047	271,891	208,799
2048	275,293	216,779
2049	278,864	224,555
2050	282,249	232,609
2051	285,421	240,950
2052	288,353	249,584
2053	291,012	258,519
2054	293,293	268,689
Total 2024-2054	**6,774,695**	**5,162,376**

1\ Net CO_2 emissions are those expected to be avoided due to the project; gross CO_2 emissions are expected emissions in the with-project scenario.

Source: World Bank analysis and estimates.

B. Fiduciary

(i) Financial Management

59. The project's financial management (FM) arrangements are acceptable for entry. The PIU completed the basic FM preparation, such as development of an FM manual describing the roles and responsibilities of the PIU's FM

Unit, the work and information flows, internal controls, and similar procedures. MoTI has no prior experience in implementing World Bank-financed projects. An initial assessment of the FM arrangements for the project was undertaken through February 2020. Accordingly, the FM rating for the project was Moderately Satisfactory and the overall FM risk was assessed as Substantial at appraisal. This assessment and risk rating will be revisited throughout project implementation. An action plan has been prepared to further strengthen FM arrangements for implementation. The action plan is presented in **Annex 1**.

60. Table 4 briefly summarizes the assessment with respect to various elements of country system which will be used for financial management.

Table 4. Country System Financial Management Elements and Use Within the Project

Element of country system	Extent used for this project
Budgeting	The national budgeting procedures will be used. The project is included in the Investment Program. MoTI has initiated the procedures with the Presidency Strategy and Budget Office to provide additional budgetary allocations corresponding to VAT amounts as well.
Internal Controls	MoTI's existing controls, which were established in line with the Public Financial Management and Control Law, will be used. Additional control points specific to the project transactions will be added where necessary. These procedures will be described in the Financial Management Manual to be included in the POM.
Staffing	MoTI Plans and Project Budget Department will appoint staff to the PIU to work on the financial management of the project. Given additional workload caused by the Project, MoTI's PIU will strengthen the FM function with additional staff and consultants.
Accounting and Reporting	The accountant of the Ministry of Treasury and Finance maintains the accounts of MoTI in Turkish lira using their Integrated Financial Management System. MoTI's PIU will establish a parallel system for accounting and reporting for the project. For this purpose, MoTI will acquire off-the-shelf accounting and reporting software.
Flow of funds	A Designated Account will be opened at the Central Bank of Turkey for transfers to and from the loan account.
Auditing	Treasury Controllers will be the auditors of the project as the external auditors for Bank-financed projects implemented by line agencies.

Source: World Bank analysis.

61. The general FM requirements for MoTI throughout implementation will be to:

- Maintain an adequate project financial management system;
- Maintain at least one dedicated financial management staff and one financial management consultant throughout the project implementation period;
- Prepare interim unaudited financial reports for the project on a quarterly basis and submit these to the

Bank no later than 45 days after the end of each quarter;
- Have the project financial statements audited by the Treasury Controllers on terms of reference acceptable to the Bank which will also be attached to the Minutes of Negotiations;
- Submit the annual audited statements of the Project to the Bank within six months of the end of each fiscal year; and
- Make the project audit reports publicly available.

62. The following will be an effectiveness condition:

- Preparation of accounting and reporting spreadsheets.

(ii) Procurement

63. The World Bank Procurement Regulations for IPF Borrowers – July 2016 revised in November 2017 and August 2018 ("Procurement Regulations") will apply to the proposed financing project. 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 project.

64. DGII has developed a Project Procurement Strategy for Development (PPSD) pursuant to paragraphs 4.1 and 4.2 of the Procurement Regulations applicable to the project. The PPSD proposed to apply Procurement Regulations including "Approved Selection Methods" for the procurement of all contracts under the 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.

65. 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. With this understanding, the DGII will initiate the selection of design review and supervision consultants; consultants for feasibility and designs; and PIU consultants immediately after project negotiations upon publication of the General Procurement Notice.

66. A procurement plan has been prepared by DGII in its PPSD. After an international market sounding, DGII has concluded to combine the procurement of two large works contracts, namely "Last-mile connectivity at Filyos" and "Last-mile connectivity at Çukurova" under a single procurement package but in two slices (lots/contracts) to increase the efficiency in procurement process. This procurement was positioned as "strategic critical" in the supply positioning matrix. DGII did not envisage pre-qualification, which may not bring any efficiency to the procurement process as there are many contractors in the local and international market capable of implementing such contracts and the sizes of the contracts are relatively moderate for this sector. Moreover, as proposed in the PPSD, clear and simple post qualification criteria will be specified in the bidding documents to avoid complexity in the bid evaluation. Nevertheless, the PPSD discussed an alternative solution in case substantial delay is observed in the design review of one of the above contracts, and proposed separate procurement of the above individual contracts rather than one single bid package.

67. Other strategically important procurement packages under the proposed project financing are for (i) design review and construction supervision services of “Last-mile connectivity at Filyos” and “Last-mile connectivity at Çukurova”; and (ii) feasibility studies and detailed engineering designs for “Rail Last-mile Connectivity Infrastructure at 12 Priority Freight Generation Nodes”, for which the supplier risks and contract values are relatively low. DGII’s experience in similar procurements demonstrated adequate interest and competition from the market players. The additional last-mile rail infrastructure connectivity construction contracts that will be decided upon the finalization of the feasibility studies could carry similar market and procurement planning risks as in “Last-mile connectivity at Filyos” and “Last-mile connectivity at Çukurova” contracts and will be supported with supplementary PPSDs during project implementation.

68. More details on the findings of the procurement assessment, the proposed procurement supervision arrangements, risks, and relevant mitigation measures to address them are provided in **Annex 1**.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

Environment

69. The anticipated environmental impacts to occur during the construction and operation of the project-financed railway connections include: (i) air pollution and noise from construction machinery and quarries, and operation phase noise and vibration impacts; (ii) soil disturbance and loss during earth moving; (iii) loss of vegetation; (iv) waste generation and management (including hazardous waste); (v) construction camp management; (vi) community health and safety (traffic safety, earthquakes, avalanches, etc.); (vii) labor and working conditions (including occupational health and safety); (viii) land acquisition induced physical and economic displacement for individuals and businesses; (ix) impacts on biodiversity and on culturally and naturally protected areas (such as habitat loss/fragmentation and/or displacement, invasive alien species, damage to registered cultural/archeological sites and/or assets); (x) use of pesticides for land clearing; and (xi) borrow areas and spoil management. With adequate mitigation and management, these impacts are assessed to be mostly temporary, predictable, and/or reversible.

70. Environmental and Social Impact Assessments (ESIAs) and Environmental and Social Management Plans (ESMPs) have been developed by the Borrower for the Filyos and Çukurova last-mile rail connectivity construction subprojects based on engineering designs developed during project preparation. The World Bank Group (WBG) General Environmental, Health, and Safety (EHS) Guidelines and Industry Sector EHS Guidelines for Railways, Toll Roads, and Electric Power Transmission and Distribution have been applied for the identification of measures to address Environmental and Social (E&S) risks. In addition to the 2 ESIAs and 2 ESMPs, there are 12 additional sub-management plans prepared for the Filyos and Çukurova railway construction subprojects as part of the ESIA package: Construction Impacts Management Plan, Community Health and Safety Management Plan, Community Relations Management Plan, Employment and Training Plan, Aggregate Management Plan, Traffic (Transportation)

Management Plan, Cultural Heritage Management Plan, Pollution Prevention Plan, Waste Management Plan, Emergency Preparedness and Response Plan, Occupational Health and Safety Management Plan, and Biodiversity Management Plan. The ESIAs identified environmentally and culturally sensitive areas located within the area of influence of project activities, and recommended measures and/or alterations to the project design. The ESIAs also specified current information and data gaps in relation to biodiversity and cultural hotspots and suggested studies to be undertaken to inform the assessments and proposed mitigation measures and incorporated into the final railway design. The site-specific ESMPs and sub-management plans for the Filyos and Çukurova subprojects are to be further elaborated based on more detailed information to be collected under detailed site inspections during the early phase of implementation and before the start of bidding process, so that they are reflected in the bidding documents.

71. For the TA under Component 2—Feasibility Studies for 12 Rail Last-Mile Connectivity Sites (LMCs) and Detailed Engineering Design and Construction Supervision services for a subset of these subprojects—the requirements of the ESF have been integrated into the ToR. The outputs of the FS will be used for the decision on 2-3 LMCs to be constructed under Component 1, to ensure their compliance with the ESF. No LMCs with High environmental or social risk based on FS findings will be selected. The site-specific ESIAs and ESMPs for the 2-3 LMCs will be prepared during the implementation stage and before the start of construction.

72. In Çukurova, it was proposed to use existing quarries and camp sites formerly used by the Directorate-General of Highways during construction, and to be further assessed before the commencement of civil works. Suitable quarries and material borrow sites will be confirmed when designs of these two railway lines are finalized based on detailed site inspections, and the exact ES risks and impacts will be addressed through the site-specific ESMPs. There will be no need for temporary access roads in Çukurova since the construction sites are already accessible through existing roads. A 30 kV electrification system will be utilized by the Çukurova railway connections. The details of the substation and energy transmission lines (ETLs), including their location, will be determined during implementation by the design and supervision consultant, and their E&S risks and impacts will be addressed through the ESIA to be updated during implementation.

73. In Filyos, since there is a large construction area for the port nearby the planned subproject area, the utilities of the existing construction site are planned to be used to the extent possible. A 30 kV electrification system will be utilized by the Filyos Port/Industrial Zone connection. It is also stated in the ESIAs that temporary access roads will be required for the construction phase for Filyos. However, the design details of such structures are underway and the related E&S impacts and mitigation measures will be addressed in the final design phase, under the E&S studies to be conducted by the Borrower.

Social

74. The project's social risks and impacts are associated with land acquisition, physical relocation, community health and safety, occupational health and safety (OHS), and cultural heritage. The project does not envisage large-scale physical displacement or resettlement. The land acqusition requirements of the pre-identified subprojects under sub-components 1.1 and 1.2 will result in the relocation of a limited number of houses and other fixed assets, and the expected impacts are mostly on loss of land and non-land assets, as well as temporary access restriction to livelihood resources, such as land use, of the people living in villages adjacent to the areas covered by the subprojects. While impacted land figures and physical displacements are low, both subprojects are expected to cause land losses and economic displacement due to access restrictions onto land use in the right-of-way of the project-financed rail branch lines. Land-induced livelihood impacts are anticipated from access restrictions to pasture land, loss of pasture land and agricultural land, temporary interruption of businesses, and the multiplying effect of the project as project

affected persons (PAPs) in both subprojects have been formerly impacted by other projects.

75. The ESIAs and Resettlement Action Plans (RAPs) prepared for the two pre-identified subprojects have laid out possible categories of PAPs, including vulnerable groups, and have introduced compensation and livelihood restoration measures for the impacts listed above. Although site specific mitigation plans have been prepared, additional amendments to the E&S documents will need to be made once the existing engineering designs are finalized by the design and construction supervision consultant during project implementation. Since the number of affected people in the subprojects are subject to change as expropriation plans and final assets inventory will be completed after final designs, initial findings of the two advanced drafts of RAPs indicate that the project will affect approximately 1,500 land owners (766 PAPs in the Çukurova region and 721 in the Filyos subproject) and a total of 7 informal users in both subprojects.

76. No significant labor influx risks are anticipated. A Labor Management Procedure (LMP) for the project has been prepared. It is expected that project workers will be mainly Turkish nationals, and unskilled labor will be hired from local settlements. It is expected that the two pre-identified subprojects will engage between 250 and 320 construction workers in total, and about 125-170 workers per subproject at peak. In other words, it is expected that the number of workers at either site will not surpass 170 at any one time. The project's Sexual Exploitation and Abuse and Sexual Harassment (SEA/H) risk is assessed as low. The project will implement SEA/H prevention measures such as sensitization/orientation of the PIU, implementation of the Code of Conduct, training of workers on SEA/H prohibition and prevention, awareness sessions with communities and a SEA/H-sensitive grievance redress mechanism (GRM). Community health and safety risks are moderate and include dust, noise, traffic congestions and accidents, and potential damage of crops. The pre-identified subprojects are not located in socially sensitive areas; however, impacts on cultural heritage sites were identified by the ESIA. Consultations with several key stakeholders, including some of the vulnerable and disadvantaged groups, have been carried out during ESIA and RAP preparation works and will continue throughout the project in compliance with the Stakeholder Engagement Plans (SEPs) prepared. A project-specific GRM for external stakeholders, and a workers' GRM, will also be established in line with the World Bank's Environmental and Social Standard (ESS) 10 and ESS 2 requirements, respectively. All E&S documents prepared by the Borrower (ESIAs, ESMPs, SEPs, LMP), as well as the project's Environmental and Social Commitment Plan (ESCP), were publicly consulted and disclosed prior to Appraisal. Public consultations were conducted virtually due to restricted conditions during the COVID-19 pandemic, and will be supplemented by face-to-face consultations when conditions allow it.

77. The project may require limited permanent land acquisition where ownership rights will be established to determine the right-of-way alignment of the branch lines to be constructed. Permanent samll-scale land acquisition will also be required for rail intermodal stations to be constructed in the Çukurova region (5) and in the Filyos Port/Industrial Zone connection (2). There are several human settlements/villages in the area of influence of the Çukurova and Filyos last-mile rail connectivity subprojects. In the Çukurova subproject, though no physical displacement is expected in Yukari Burnaz, the project is expected to result in loss of land, restrictions on land use, and loss of land-based livelihoods. In addition, some labor influx related risks can be expected. Although the project is expected to utilize automatized systems for rail track laying, around 150 laborers are estimated for each of the 2 railway connection subprojects. Labor influx is expected to be limited. Overall, while most of the project risks and impacts are predictable and the project is not expected to generate any significant resettelment or physical displacement, apprporiate plans have been prepared to address the identified impacts.

78. Specifically, in order to mitigate the above risks and meet the Bank's E&S requirements, SEPs and RAPs for the two pre-identified regions/subprojects and a project-wide LMP have been prepared. A project-specific GRM will

be established to ensure systemetic and socially-inclusive project implementation. In addition, project management staff will be equipped with the required knowledge and skills in environmental and social risk management, including through external expertise and resources, to conduct regular monitoring of implementation and risk mitigation plans. This will be done to ensure all ESF requirements are met in a timely and satisfactory manner, per the ESCP.

E. Other Corporate Mandates

Gender Analysis

79. The World Economic Forum's Global Gender Gap Index for 2019 ranked Turkey 130th out of 153 countries (i.e., in the bottom 15% globally) on the prevalence of gender gaps across the dimensions of educational attainment, political empowerment, health and survival outcomes, and economic participation and opportunity. Among these dimensions, it is the latter—economic participation and opportunity—where Turkey's relative gender gaps are the widest, ranking 136th overall[38]. The average earned income differential between men and women in Turkey stands at approximately US$17,600 in purchasing power parity terms[39], confirming that, as Gedikli (2019) points out, in Turkey "women are more likely to be employed in lower-paid occupations than are men and their chances of being employed in lower-ranked occupations across the social hierarchy are even greater"[40].

80. Transport and logistics is a disproportionately male-dominated sector in Turkey. For example, survey data show that "transportation and storage" accounts for a mere 1.9% of female employment, compared to 15.8% in the education sector, 10.5% in human health and social work activities, 6.4% in public administration, and 23.3% in manufacturing[41]. Available data suggests that, as early as the 2012-2013 academic year, already 21 Turkish universities offered transport and logistics courses at the undergraduate level and had departments that conferred degrees in international trade, logistics management, and related fields[42]. However, most of these programs have been launched only recently (e.g., within the last 10 years), and are based primarily in the Istanbul metropolitan area. This signals an opportunity to create greater awareness of freight logistics as a profession, in a way that particularly targets women considering a career in this sector.

81. Throughout the rail freight and logistics industry globally, and broadly in the transport sector, perceptions and gender stereotypes are believed to be one of the most significant challenges to the employment of women. This refers to the image of the sector as highly male-dominated, or physically strenuous, or both, which can dissuade women from even thinking of applying for a job in the sector or seeking formal training that would prepare them for such jobs. Stereotypes about the specific roles and capabilities of men and women have a strong influence on the education choices they make, which see transport positions as a 'male occupation'. Various studies confirm this to be the case in Turkey[43]. This is further exacerbated by the outdated image of the sector as a 'male occupation' that

[38] World Economic Forum (2019), *Global Gender Gap Report 2020*, Geneva.
[39] Ibid.
[40] Gedikli, C. (2019), "Occupational Gender Segregation in Turkey: The Vertical and Horizontal Dimensions", *Journal of Family and Economic Issues*, December 2019.
[41] Sectoral definitions are not necessarily mutually exclusive as regards transport and logistics activities. For example, some women employed in the "manufacturing" sector may perform functions within manufacturing related to transport and logistics. Nonetheless, available data suggest that the participation of women in the transport and logistics profession in Turkey, whether in the public or private sector, is disproportionately low compared to men.
[42] Ozoglu, B. and Arzum Buyukkeklik (2013), "The Transportation and Logistics Sector in Turkish Economy: A Review about Growth Potential and Education Infrastructure", *International Journal of Shipping and Transport Logistics*, January 2013.
[43] See for example Gedikli (2019), and Rich, Judith and Serap Palaz (2008), "Why Has Occupational Sex Segregation in Turkey Increased Since 1975?", *Labour*, Volume 22, Issue 1, March 2008.

some railway companies themselves cultivate voluntarily. As for the physical strain perceived as inherent to many transport occupations, while this may still be the case for a limited amount of jobs, technical progress has largely eliminated this. On the other hand, the recent proliferation of Turkish universities offering transport and logistics courses offers a good opportunity for MoTI to develop, as a start, a public outreach and communications campaign under RLIP to address these perceptions and gender stereotypes in collaboration with relevant partners, such as the Ministry of National Education and vocational and higher education institutions.

Gender Interventions

82. The project will offer three-month internships to 20 female last-year university students and graduates in the MoTI workforce (raising the number of interns from zero to 20), in transportation and logistics roles that are traditionally male-dominated, e.g. engineers, by reaching out to the universities that prepare graduates in the related fields. Given the low share of women employed in the sector and the fact that MoTI is implementing multiple transport sector projects in the country, the proposed activity promises to create a demonstration effect and challenge gender stereotypes about 'acceptable' jobs for women. It will also signal that MoTI is an equal opportunity employer and keen to support gender diversity in its workforce. At the same time, this intervention will facilitate establishing education-employment pathways between MoTI and local universities. Specifically, MoTI will establish a cooperation with at least one Ankara-based university with an existing transport or logistics program, creating an opportunity for MoTI to access a broader pool of qualified female candidates and for these candidates to gain hands-on experience that can improve their job prospects after graduation and better inform future career decisions.

83. In addition, to reduce the existing awareness gap and address unfounded perceptions and gender stereotypes, and to ultimately contribute to reducing the gender employment gap in transport and logistics, the project will support developing short introductory and educational multimedia content online (e.g., videos). The purpose of this content will be to introduce the transport and logistics field as a potential profession to the current generation of young female students and professionals. The content will be hosted and disseminated through social media accounts (e.g., Facebook and Twitter), MoTI's website (and potentially websites of interested partners, such as universities and vocational institutions), and YouTube. The material will emphasize, in age-appropriate and targeted ways, themes supported by RLIP, such as multimodality, modal choice, carbon footprint, climate change mitigation and adaptation, firm- and national-level logistics performance, and the role that transportation plays in these issues that are key to Turkey's future. Furthermore, the material will challenge the image of the sector as male-dominated and physically strenuous and will address gender stereotypes about the specific roles and capabilities of men and women. It will also feature potential senior female role models who have been professionally successful in the field. The project will track number of views of these videos to understand the extent of their reach.

84. MoTI will take several other steps to raise the profile of logistics careers among female students. Like other state agencies in the sector, MoTI is facing many equal opportunity challenges related to the sector's image as being male-dominated. In partnership with TCDD, DGII will participate in a 'career day', where potential candidates (especially women and young people) will be invited to visit the workplace and interact with MoTI staff, which can contribute to challenging or demystifying some aspects of the prospect of seeking a career in multimodal logistics, in addition to bringing potential benefits to these institutions in terms of community outreach and engaging with talent.

Climate Change

85. The project will contribute to both mitigating the risks of climate change and adapting to climate change impacts to which Turkey is already exposed, such as increases in the incidence of flooding and more frequent extreme

weather events. On the mitigation side, the 3 project components are complementary in their role to promote greater use of rail freight and facilitate road-to-rail modal shift, outcomes that are expected to reduce the emission of greenhouse gases (and local pollutants) associated with the transportation of freight in the project's target corridors. Components 1 and 2 are infrastructure development components that will bring last-mile rail infrastructure connectivity to select clusters of logistics activity whose commodity and operational profiles lend themselves particularly well to rail transport yet remain disconnected from the national rail network. The feasibility studies to be conducted under Component 2 will ensure that the additional sites to be connected through infrastructure provision (i.e., beyond Filyos port and the Çukurova region) have rail-compatible hinterlands of sufficient scale and a shipper and logistics service provider community that is underserved and operationally open to reassessing their supply chains through modal shift and/or multimodality. Component 3 completes the picture, as infrastructure provision is a necessary but insufficient element to increase rail freight use. By helping improve the quality of rail freight transportation service provision, the market orientation of logistics centers, the technical resilience of the national railway network, and the crafting of measures to support the freight logistics system in the aftermath of the COVID-19 crisis, Component 3 is a longer-term but critical component of the project's ability to contribute, in particular, to sustaining gains in rail freight transport demand over time. On the adaptation side, the detailed engineering designs for the Filyos and Çukurova structures incorporate structural measures to protect these facilities at flood stage (particularly in the case of Filyos) and to make them resilient to extreme temperatures (particularly in the Çukurova case). These measures will also make the facilities resilient to natural disasters like earthquakes. The engineering designs to be developed under Component 2 will be prepared in a similar manner, building on DGII's experience with the Filyos and Çukurova designs and bringing to bear good international construction and engineering practice, particularly from Western Europe—a process that the Bank is well positioned to facilitate.

Citizen Engagement

86. Citizens and project beneficiaries—such as shippers and logistics service providers in the targeted hinterlands who are project end-users; members of the communities hosting the infrastructure developments, including women, youth, and vulnerable groups; and observers of Turkey's rail and logistics sector at large, e.g. academics, research institutions, and non-governmental organizations (NGOs)—will be proactively engaged to improve project activities and quality of implementation, to inform outputs and outcomes addressing their needs. This will include the following mechanisms. First, annual consultations with shippers and logistics service providers will be conducted by the PIU at each of the targeted areas, starting with the hinterland of Filyos port and the Çukurova region from the first year of implementation. These consultations, which are in addition to site-specific consultations with PAPs, will be held in the form of workshops[44] to enable beneficiaries to express and discuss their views, provide feedback, and/or share concerns, all aimed to ensure that project-financed infrastructure is consistent with shippers' operational needs and that the project follows up after physical delivery of output to assess results. Feedback from a representative cross-section of end-users, including SMEs and women-headed businesses, will be encouraged and prioritized. Second, "Open Door Days" will be conducted by the PIU with host communities at least once a year (during construction, these events may be more frequent) to ensure that community members are aware of and are offered a forum to weigh-in on project goals, approaches, and risk mitigation measures. The PIU will invite local citizens to provide information on the progress of infrastructure developments and to seek their inputs. The Open Door Days will aim to also involve vulnerable local citizens and ensure that dialogue is established to assess needs and gaps and further improve project interventions. Third, participatory monitoring of ongoing construction works

[44] Workshops will be conducted physically or virtually, depending on GoT guidelines at the time regarding prevailing conditions related to COVID-19 and any other public health risks. Other means of outreach, such as e-mail, internet/mobile, and standard mail communication, will be explored as appropriate.

will empower and enable representatives of the local host communities to evaluate the implementation of the investments. And fourth, roundtables with broader observers of the Turkish rail freight and logistics sector will be conducted by the PIU every other year, to gather feedback on progress regarding Component 3 activities, which are long-term, national in scope, and sector-wide in coverage.

V. GRIEVANCE REDRESS SERVICES

87. A project-level Grievance Redness Mechanism (GRM) will be established under DGII's PIU to allow citizens to submit complaints to the PIU on any issue, whether online, over the phone, in writing, or in person, which will be addressed in a responsive and timely manner.

88. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the Bank'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 Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of Bank 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*.

89. For information on how to submit complaints to the World Bank Inspection Panel, please visit *www.inspectionpanel.org.*

VI. KEY RISKS

90. **The overall risk to achieving the development objective is rated Moderate.** This stems from a risk assessment summary conducted at the sub-category level, presented in Table 5 and explained below. This rating points to well-identified risks that are collectively considered manageable through feasible mitigation measures.

Table 5. Project Risk Ratings

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

91. **Political and Governance risk is rated Moderate.** Turkey faces political and governance risks primarily related to external developments, such as conflict in neighboring countries and an influx of refugees from the Syrian civil war. These issues, which may lead to political and governance instability, are actively being addressed by the GoT in close coordination with international partners, most notably but not only the EU, and are not expected to have a material influence on the project's ability to achieve its development objective. Turkey's governance context regarding RLIP specifically, where MoTI as the Implementing Agency and MoTF as the Borrower are the most relevant government agencies involved, is stable and expected to remain so through the project period.

92. **Macroeconomic risk is rated Substantial.** The Turkish economy experienced instability between 2018-2019, following a period of growing macro imbalances and economic overheating in 2017-2018. The economy has stabilized more recently due to important external adjustments, including a reversal in current account imbalances, declining external debt of banks, and a gradual recovery in foreign exchange reserves. These have contributed to currency stability. However, the onset of the COVID-19 crisis is likely to result in significant reductions in aggregate demand combined with supply disruption, which may in turn lead to further currency depreciation. There are four possible transmission mechanisms of macroeconomic risk for the project. The first is currency risk for the implementing agency. There is an ongoing risk of lira depreciation, given uncertainty in global markets, including from the COVID-19 pandemic. The flexibility in the design of the project, which includes flexibility in programming of around one third of project costs, could be used to manage foreign exchange-driven cost overruns within the scope of the project. Second, potential macroeconomic risks realized through the government budget are considered low because the project does not involve counterpart funding beyond moderately-sized compensation payments due under the project's RAPs, and the project is already included in full in the Public Investment Program. Third, while there is a high risk of a sharp global and domestic slowdown that leads to lower freight demand, this is expected to have a moderate impact on this project. As the implementing agency is a government ministry, it is not operating on a commercial basis and is likely to be able to continue operations in this scenario. Finally, Turkey's construction sector was among the most severely hit in the current downturn and will also be severely affected by the pandemic. Leverage and exposure to foreign currency-denominated debt will affect construction companies' ability to respond to an increase in specialized construction investment under the project. Some of this risk is mitigated by the fact that most works are expected to be subject to international competition, and past experience suggests that international and domestic contractors may also present joint bids. The prospect of international contracts, singly or jointly with domestic firms, partly mitigates the risk that the domestic construction sector will be less able to respond under this scenario.

93. **Sector Strategies and Policies Risk is rated Low.** The project is consistent with MoTI's—and the GoT's—goals and strategies for the railway sector. As such, the risk of inconsistency in approaches or a drastic change in policy direction by MoTI vis-à-vis the PDO and the activities pursued by the project is low. MoTI and its sub-agencies are committed to project implementation as the issues tackled by the project, such as support for greater rail freight adoption and more efficient management of rail-enabled logistics centers, are all high-priority areas at the institutional and sub-agency level.

94. **Technical Design risk is rated Moderate.** The engineering-related technical aspects of the project, including construction and equipment deployment risk, are moderate. The works involved are considered of moderate complexity and are common in the international experience. As such, the contractor and construction supervision community, both locally and internationally, is expected to be familiar with the tasks at hand and able to carry them out. Technical risks have been mitigated by MoTI's development of final engineering designs in advance of project launch, which allowed the project preparation process to assess the adequacy of the designs and better understand technical risks. While review and updating of the final designs by the construction supervision consultant will be

required prior to commencement of procurement of civil works, as a further risk mitigation measure and to ensure accuracy vis-à-vis conditions on the ground, existing designs are consistent with good international construction approaches and responsive to the project's end-goals. Turkey is exposed to the risks of climate change, including an increasing incidence of extreme weather events such as flooding, as well as natural risks such as earthquakes. In response, the engineering designs have key resilience features to avoid disruption and ensure the facilities are built in accordance with their expected operating life.

95. **Institutional Capacity risk is rated Substantial.** MoTI, the project implementing agency, has no prior experience with implementation of World Bank projects. This creates risks, in particular, as to potential delays in implementation and is reflected in a rating of Substantial for Institutional Capacity risk. However, MoTI, and specifically DGII, the MoTI sub-agency where the PIU will be established, is the GoT's subject matter expert agency on rail infrastructure development. As such, it has significant experience conceptualizing, designing, and building similar facilities as those proposed under Components 1 and 2, and is a primary stakeholder of MoTI's effort towards adopting uniform technical standards for rail infrastructure, a goal supported by Component 3. With regard to other technical areas covered under Component 3, the project will support close collaboration between DGII, TCDD, and DGTSR through, inter alia, joint preparation of ToRs for technical assistance packages, shared oversight of the delivery of these packages, and periodic feedback and update sessions with representatives of all 3 agencies. The project also recognizes the need for TCDD to be involved in Components 1 and 2, as TCDD will eventually own and maintain the project-financed infrastructure. This will be facilitated during implementation, inter alia, through site visits, technical discussions, and periodic meetings, including during formal Bank implementation support missions. DGII's core technical expertise has already helped strengthen implementation readiness at entry by having produced detailed engineering designs in advance and by setting forth a proactive procurement plan; these measures are expected to reduce the risk of implementation delays. To mitigate risks associated with MoTI's lack of prior experience with World Bank projects, the PIU will be staffed, in part—and with the support of the project—by individual external experts with prior experience with projects financed by international financial institutions (IFIs) and with World Bank processes and procedures, on the core project management functions of procurement, financial management, and environmental and social safeguards. In addition, DGII and the PIU will benefit from Bank support in the form of training, feedback, and ongoing engagement with the Bank's Task Team.

96. **Fiduciary risks are rated Substantial.** The Substantial rating for the fiduciary functions (procurement and financial management) stems from the complexity of the project, its large contract sizes, and DGII's unfamiliarity with Bank procurement and FM procedures. This rating can be lowered to Moderate when agreed risk mitigation actions have been implemented, such as strengthening PIU staffing with experienced procurement and FM specialists, keeping PIU staff turnover to a minimum, and providing training to PIU staff on Bank procedures during project implementation (see the full list of agreed procurement and FM risk mitigation measures in **Annex 1**).

97. **Environmental and Social risks are both rated Substantial.** The key environmental risks identified in relation to the project are (i) air pollution and noise from construction machinery and quarries and operation phase noise and vibration impacts, (ii) soil disturbance and loss during earth-moving, (iii) loss of vegetation, pest management, (iv) waste management, (v) construction camp management, (vi) community health and safety (traffic safety, earthquakes, avalanches etc. and (vii) potential impacts on culturally and naturally protected areas, (such as habitat loss/fragmentation and/or displacement, invasive alien species, damage to registered cultural/archaeological sites and/or assets), the latter being related to the presence of Key Biodiversity Areas (KBAs), a groundwater resources protection area, and endangered species in the area defined for studying the biodiversity impacts for the purpose of ESIA (Biodiversity Study Area). With adequate mitigation and management, these impacts are assessed to be mostly

temporary, predictable and/or reversible. The railway design has been informed by the identified impacts and mitigation measures accordingly. The project involves social risks covering labor, community health and safety, and land acquisition, which will be mitigated through the adoption of ESF-compliant documentation, Bank-led training to PIU staff, local PIU presence at subproject sites, ongoing Bank implementation support, and the establishment of a multi-prong GRM. There is operational risk in that the implementing agency (MoTI/DGII) lacks experience developing complex Bank-financed projects, especially in relation to meeting the requirements of the ESF's Environmental and Social Standards. This risk will be addressed through capacity building activities as part of Bank-provided implementation support, as well as through strengthened PIU staffing through experienced external resources.

98. **Stakeholders risk is rated Low.** The project is strongly supported by MoTI. The engagement between the Task Team and DGII at the working level is strong and trust-based. Prominent members of the shipper community, including large manufacturers of bulk commodity products currently disconnected from the railway network as well as senior representatives of the key logistics clusters targeted by the project, have expressed strong support for the interventions proposed. The project will continue to reach out, engage, and consult with these end-users as project beneficiaries during implementation, to ensure that project outputs are responsive to their logistics needs, as a means to promote early truck-to-rail freight conversion, and to follow-up and corroborate the attainment of intended outcomes. In the wake of the COVID-19 pandemic, there is a risk that face-to-face stakeholder engagement may not be possible for at least a portion of the project implementation period. This risk will be mitigated by the deployment of multiple avenues for engagement, including virtual meetings, electronic means such as e-mail, traditional media (e.g., standard mail), online surveys/questionnaires, and phone conversations.

99. **Demand risk is rated Moderate.** The project faces market demand risks, as modal choice will ultimately be up to the logistics management practices and decision making of individual shippers and logistics service providers in the market place. This risk is considered moderate. It is mitigated by the fact that the project, by design, targets corridors that are disproportionately intensive in the generation and attraction of freight flows for which rail freight has an inherent competitive advantage, such as heavy bulk cargo, and project preparation has been informed by market research with major shippers at the targeted hinterland locations.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Turkey
Rail Logistics Improvement Project

Project Development Objectives(s)

The project development objective (PDO) is to reduce transport costs in selected rail freight corridors and to strengthen institutional capacity at the Ministry of Transport and Infrastructure (MoTI) to deliver rail freight connectivity and manage rail-enabled logistics centers.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Reduction in transport costs in selected rail freight corridors			
Average bulk commodity transport cost per ton-km between Karabuk Province and Filyos port in constant 2020 prices (Text)		US$0.063 per ton-km in 2020 prices	US$0.044 per ton-km in 2020 prices
Average bulk commodity transport cost per ton-km between Osmaniye Organized Industrial Zone and Iskenderun Port in constant 2020 prices (Text)		US$0.063 per ton-km in 2020 prices	US$0.044 per ton-km in 2020 prices
Rail freight tonnage market share into/out of Filyos port (Text)		0% of rail freight as a share of total in/out tonnage	40% of rail freight as a share of total in/out tonnage over a 12-month period
Rail freight tonnage market share into/out of Osmaniye OIZ (Text)		0% of tonnage moving in/out of Osmaniye OIZ is accounted for by rail	30% rail tonnage market share with respect to total tons in and out of Osmaniye OIZ over a 12-month period
Strengthen MoTI capacity to deliver rail freight connectivity			
Uniform rail technical standards adopted by MoTI (Yes/No)		No	Yes
Strengthen MoTI capacity to manage rail-enabled logistics centers			

Indicator Name	PBC	Baseline	End Target
Decision to review management model of TCDD-owned logistics centers endorsed by MoTI (Yes/No)		No	Yes

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Construction of Railway Branch Lines and Multimodal Connections at Priority Network Nodes			
Length of last-mile track completed at Filyos Port Complex (Kilometers)		0.00	13.30
Length of last-mile track completed at Çukurova region target corridors (Kilometers)		0.00	36.10
Number of rail intermodal stations built at Filyos Port Complex (Number)		0.00	2.00
Number of rail intermodal stations built or rehabilitated at Çukurova region target corridors (Number)		0.00	5.00
Percentage of grievances responded and resolved within an agreed time frame (Percentage)		0.00	85.00
Shippers and logistics service providers consulted (of which SMEs) (of which women-headed) and engaged during implementation of infrastructure interventions (Number)		0.00	150.00
Percentage of beneficiaries in target communities who report that their engagement (i.e., in feedback workshops, Open Door Days, and roundtables) was effective (Percentage)		0.00	75.00
FS, DED, E&S Documentation, and CS for Rail LMC Infrastructure at Additional Freight Nodes			
Number of Feasibility Study documents completed (Number)		0.00	12.00
Phase 2 COVID-19 Response, Inst. Strengthening, Cap. Building, and Project Implementation Support			

Indicator Name	PBC	Baseline	End Target
Technical Assistance to MoTI on diagnosis of medium- and long-term impacts of COVID-19 on multimodal logistics and assessment of interventions to mitigate these impacts (Yes/No)		No	Yes
Technical Assistance to DGII on uniformization of rail technical standards completed (Yes/No)		No	Yes
Technical Assistance to MoTI on preparation of a strategy document for rail freight sector performance improvements completed (Yes/No)		No	Yes
Technical Assistance to TCDD on operational and management models for rail-enabled logistics centers completed (Yes/No)		No	Yes
Female last-year university students and graduates recruited for 3-month internship program at MoTI in the areas of engineering, transport, logistics, and similar traditionally male-dominated fields (Number)		0.00	20.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Average bulk commodity transport cost per ton-km between Karabuk Province and Filyos port in constant 2020 prices	Average cost per ton-km of transporting representative dry bulk cargo between Karabuk City (capital district of Karabuk Province as the most representative origin point within the province) and Filyos Port across	Yearly	Market research by DGII.	Survey or consultations with trucking companies and data reported by TCDD Transport.	DGII

	available modes (i.e., truck and rail), measured in constant 2020 prices. Changes in this indicator will only become measurable, meaningful, and attributable to the project at least 6 months after completion of civil works to connect Filyos Port via road and rail at the last mile.				
Average bulk commodity transport cost per ton-km between Osmaniye Organized Industrial Zone and Iskenderun Port in constant 2020 prices	Average cost of transporting representative dry bulk cargo between Osmaniye Organized Industrial Zone and Iskenderun Port across available modes (i.e., truck only before project-financed interventions, and truck and rail after project-financed interventions), measured in constant 2020 prices. Changes in this indicator will only become measurable, meaningful, and attributable to the project at least 6 months after completion of civil works to connect Osmaniye Organized Industrial Zone to the national rail linehaul network at the last mile.	Yearly	Market research by DGII	Survey or consultations with trucking companies and data reported by TCDD Transport.	DGII

Rail freight tonnage market share into/out of Filyos port	Tonnage moved in and out of the port via rail as a percentage of total tonnage entering and leaving the port over most recent 12-month period. This indicator will only become measurable, meaningful, and attributable to the project at least 12 months after completion of associated project-financed civil works.	Yearly	Filyos Port operator	Interviews and exchange of information with Filyos Port operator	DGII
Rail freight tonnage market share into/out of Osmaniye OIZ	Tonnage moved in and out of Osmaniye OIZ via rail as a percentage of total tonnage entering and leaving Osmaniye OIZ over most recent 12-month period. This indicator will only become measurable, meaningful, and attributable to the project at least 12 months after completion of associated project-financed civil works.	Yearly	Osmaniye OIZ	Interviews and data exchange with Osmaniye OIZ management	DGII
Uniform rail technical standards adopted by MoTI	MoTI adopts uniform rail technical standards informed by project-financed technical assistance	Yearly	PIU	PIU progress reports	DGII

Decision to review management model of TCDD-owned logistics centers endorsed by MoTI	This indicator tracks MoTI's formal acknowledgment, in the form of an endorsement, of technical assistance and knowledge transfer provided on management and operational models of logistics centers	Yearly	PIU	PIU progress reports	DGII

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Length of last-mile track completed at Filyos Port Complex	Kilometers of track completed and handed-over to TCDD	Yearly	PIU progress reports under Component 1	Site visits and reports from construction supervision consultant	DGII
Length of last-mile track completed at Çukurova region target corridors	Kilometers of track completed and handed-over to TCDD	Yearly	PIU progress reports under Component 1	Site visits and reports from construction supervision consultant	DGII
Number of rail intermodal stations built at Filyos Port Complex	Number of stations for which construction has been completed at Filyos Port Complex	Yearly	Site visits, construction supervision consultant reporting, contractor interviews	Structured interviews, site visits, construction progress reporting	DGII

Number of rail intermodal stations built or rehabilitated at Çukurova region target corridors	Number of stations for which construction or rehabilitation has been completed at Çukurova region target corridors	Yearly	Site visits, construction supervision consultant reporting, contractor interviews	Structured interviews, site visits, construction progress reporting	DGII
Percentage of grievances responded and resolved within an agreed time frame	This indicator measures the efficiency of the GRM management by the PIU. This is a beneficiary feedback indicator that responds to the Bank's Citizen Engagement commitment.	Yearly	PIU records	As reported by PIU	DGII
Shippers and logistics service providers consulted (of which SMEs) (of which women-headed) and engaged during implementation of infrastructure interventions	Number of shippers, carriers, and logistics service providers consulted to inform the delivery of last-mile rail connectivity infrastructure at all stages of the delivery process (procurement, construction, hand-over, and operations)	Yearly	PIU	Workshops, structured interviews, focus groups, individual written or verbal messages, online communications	DGII
Percentage of beneficiaries in target communities who report that their engagement (i.e., in feedback workshops, Open Door Days, and roundtables) was effective	This indicator will track the effectiveness, and not just the magnitude, of the Citizen Engagement process. It will be measured as the	Yearly	PIU	PIU progress reports	DGII

	percentage of beneficiaries that respond, via surveys, that they believe their views and feedback were heard, that consultations were genuine, and that the feedback loop was complete in terms of follow-up. This is what will be understood as "effective" engagement. This indicator will apply to citizen engagement regarding all 3 project components.				
Number of Feasibility Study documents completed	Number of FS documents completed as inputs to select 2 to 3 additional subprojects for implementation under Component 1	Yearly	PIU	PIU progress reports	DGII
Technical Assistance to MoTI on diagnosis of medium- and long-term impacts of COVID-19 on multimodal logistics and assessment of interventions to mitigate these impacts	Indicator tracks the completion of Technical Assistance to MoTI on Phase 2 COVID-19 response support.	Yearly	PIU	PIU progress reports	DGII
Technical Assistance to DGII on uniformization of rail technical standards completed	Indicator tracks the completion of Technical Assistance to DGII on uniformization of rail technical standards	Yearly	PIU	PIU progress reports	DGII
Technical Assistance to MoTI on preparation of a strategy document for	Indicator tracks the completion of Technical	Yearly	PIU	PIU progress reports	DGII

rail freight sector performance improvements completed	Assistance to MoTI on preparation of a strategy document for rail freight sector performance improvements				
Technical Assistance to TCDD on operational and management models for rail-enabled logistics centers completed	Indicator tracks the completion of Technical Assistance to TCDD on operational and management models for rail-enabled logistics centers	Yearly	PIU	PIU progress reports	DGII
Female last-year university students and graduates recruited for 3-month internship program at MoTI in the areas of engineering, transport, logistics, and similar traditionally male-dominated fields	Each year, the implementing agency will recruit 3 to 4 female interns, with the goal of totaling 20 interns by the end of the project.	Yearly	PIU	PIU progress reports	DGII

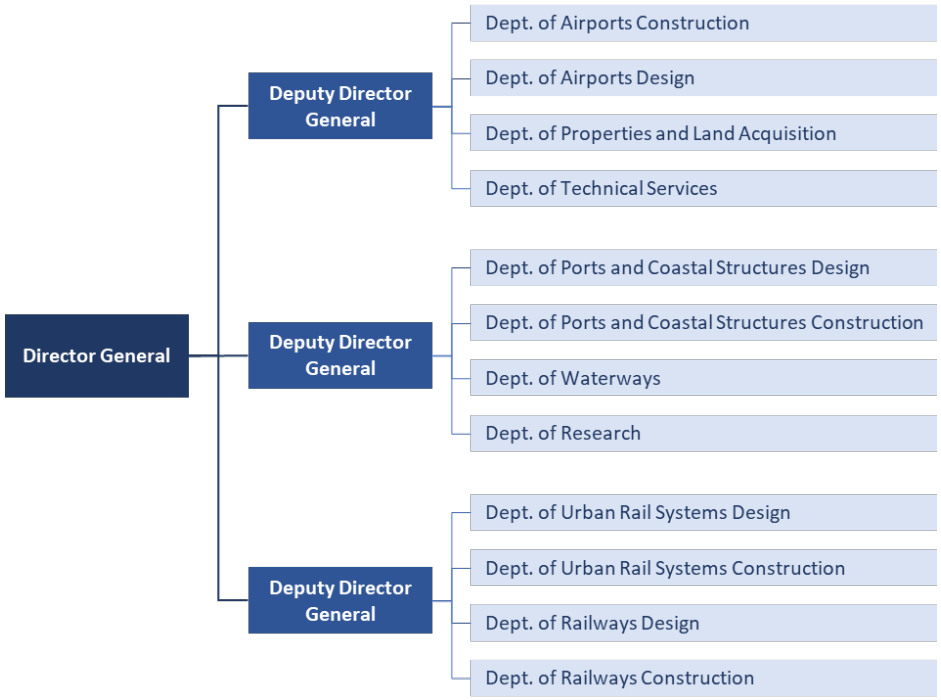
ANNEX 1: Implementation Arrangements and Support Plan

Institutional and Implementation Arrangements

1. **The Directorate-General of Infrastructure Investments (DGII)** at the Ministry of Transport and Infrastructure (MoTI) will assume overall implementation responsibility of RLIP and will serve as its implementing agency at the working level. A Project Implementation Unit (PIU) has been established within DGII to oversee all aspects of project implementation across all 3 components. For relevant Component 3 activities, DGII's PIU will coordinate closely with Turkish State Railways (TCDD), the public railway infrastructure manager, and MoTI's Directorate-General of Transport Services Regulation (DGTSR) to ensure (a) value-for-money and delivery effectiveness in the provision of technical assistance; and (b) that the project's institutional strengthening goals are met. This latter role of the PIU will also contribute to the ongoing railway reform process in Turkey, which aims to have a strong coordination and collaboration among the leading stakeholders in the sector.

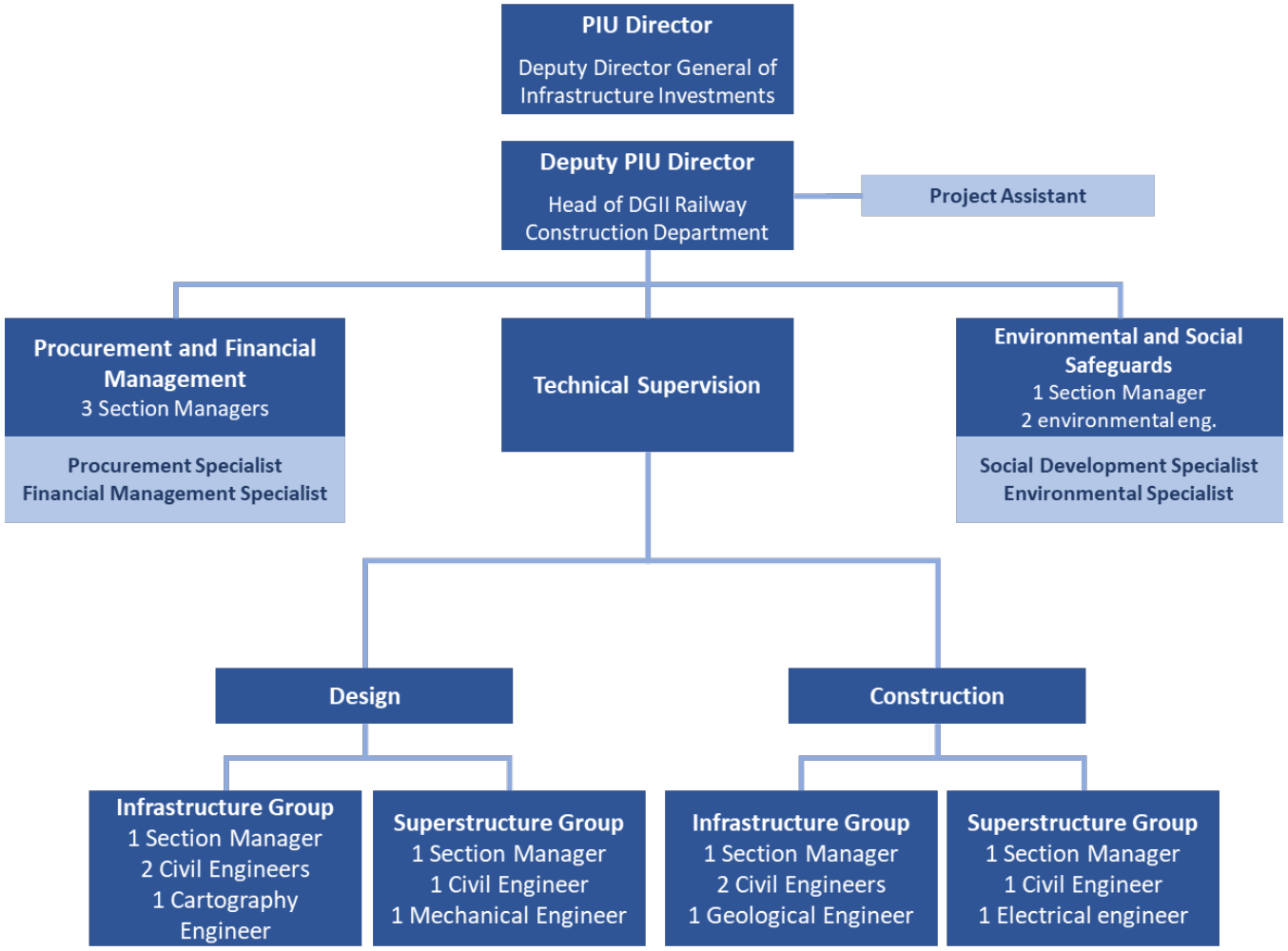
2. The PIU will be led by the Deputy Director General of DGII, and the Deputy PIU Director will be the Head of DGII's Railway Construction Department. The PIU will be staffed by a total of 27 members, 22 of which are current DGII staff; the remaining 5 PIU members—a procurement specialist, financial management specialist, social development specialist, environmental specialist, and an administrative assistant—will be recruited from outside MoTI, and from outside the civil service, during project implementation and using Bank loan proceeds. The Terms of Reference (ToR) for all external PIU members have been prepared by DGII and confirmed by the Bank as responsive to the Bank's Procurement Framework, Financial Management requirements, and ESF requirements. Figures A1.1 and A1.2 lay out the organizational chart of DGII and its PIU.

Figure A1.1. Directorate-General of Infrastructure Investments Organizational Chart



Source: MoTI.

Figure A1.2 Project Implementation Unit Organizational Chart



Source: MoTI.

Procurement

3. **Applicable Regulations.** The World Bank Procurement Regulations for IPF Borrowers – July 2016 revised in November 2017 and August 2018 ("Procurement Regulations") will apply to the proposed Project. A General Procurement Notice (GPN) will be published on the World Bank's external website and United Nations Development Business online immediately after the project negotiations.

4. **Anticorruption Guidelines.** 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.

5. **Project Procurement Strategy for Development (PPSD).** The Procurement Regulations requires the Borrower to develop a PPSD for the Project. DGII has developed a PPSD as of April 2020 and in it proposed to apply Procurement Regulations including "Approved Selection Methods" for the procurement of all contracts under the Project. The PPSD includes a Procurement Plan for all anticipated contracts within the first 18 months of the Project including their, cost estimate, methods, review procedure and envisaged time frame. DGII's PPSD is available in the project's database.

6. The PPSD prepared by DGII addressed 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 and review of:

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

7. After an international market sounding, DGII has concluded to combine the procurement of two large works contracts, namely "Last-mile connectivity at Filyos" and "Last-mile connectivity at Çukurova", under a single procurement package but in two slices (lots/contracts) to increase efficiency in the procurement process. This procurement was positioned as 'strategic critical' in the supply positioning matrix and more detailed analysis has been presented in the PPSD. DGII did not envisage pre-qualification for this procurement, which may not bring any efficiency to the procurement process as there are many contractors in the local and international market capable of implementing such contracts and the sizes of the contracts are relatively moderate for this sector. Moreover, as proposed in the PPSD, clear and simple post qualification criteria will be specified in the bidding documents to avoid complexity in the bid evaluation. Nevertheless, the PPSD discussed an alternative solution in case substantial delay is observed in the design review of one of the above contracts, and proposed separate procurement of the above individual contracts rather than one single bid package.

8. For this procurement, 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. Because the designs were prepared by DGII, the PPSD envisaged the use of the Bank's Standard Procurement Document (SPD), namely "Request for Bids -Works (without prequalification)" for "LMC Works" contracts under the project. This SPD requires to use FIDIC "Red Book" (Conditions of Contract for Building and Engineering Works Designed by the Employer) for the "General Conditions" of the contract. DGII envisages to conduct a design review by a "Design Review and Construction Supervision" consultant before preparing the bidding documents, to ensure and confirm that the designs are in sufficient detail as required in the FIDIC "Red Book". Because the technique to be used in the constructions is well known and common, and the detailed designs will be provided by DGII, bids from the prospective bidders are expected to be of similar quality. Therefore, DGII does not envisage the use of rated criteria to increase

efficiency in the bid evaluation.

9. The PPSD further proposed to procure two “Design Review and Construction Supervision” consultant firms through a competitive process in the international market, by using the Quality and Cost Based Selection (QCBS) method. The contracts will be time-based, as the scope of works depends on the quality of the available designs from DGII and new designs could be prepared by the consultants to meet the FIDIC “Red Book” requirements. Also, construction supervision is required from the consultants. The consultants will support DGII in the preparation of the bidding documents for “LMC at Filyos” and “LMC at Çukurova” works procurements, including preparation of the bill of quantities and drafting of technical specifications. The consultants will assist DGII in the bid evaluation process of the works contracts on technical matters. The consultants will continue to supervise the works in the role of “Engineer” as specified in the FIDIC “Red Book” during implementation of the works contracts with no limitation in its role by DGII. These contracts have been designated as ‘strategic security’ in the supply positioning matrix because the risk of vulnerability is high in case of low performance of the selected consultants, even though the contract values are not large.

10. The PPSD considered consultancy contracts for the “Feasibility Studies and Detailed Engineering Designs for Rail Last-mile Connectivity Infrastructure at 12 Priority Freight Generation Nodes”. The PPSD proposed two consultancy contracts planned so that each contract will cover 6 LMC sites which are in geographic proximity. The consultants will be selected through a competitive process in the international market by using the Quality and Cost Based Selection (QCBS) method. Because the scope of services requires to work on alternative routes and the detailed designs to be prepared for the selected route, time-based contracts are envisaged as the contract type to be used. An expected significant amount of soil investigations and land surveying from the consultants further justified the use of time-based contracts.

11. As proposed in the PPSD, the additional LMC construction contracts that will be decided upon the finalization of the above feasibility studies will be supported with supplementary PPSDs during project implementation. Moreover, construction supervision of these contracts will be performed by the consultants who prepared the designs of the relevant LMCs. The scope of supervision services will be included in the scope of the consultancy contract for “Feasibility Study and Design Services” as a downstream work and will be evaluated in the selection of the consultants in the first instance.

12. The PPSD confirmed that the sizes of the procurements for institutional strengthening and capacity building and project implementation support under Component 3 are generally small and their risks are low. Thus, the selection methods of the goods, consulting services, and non-consulting services under these tasks will be simple and follow streamlined procedures. A market sounding concluded that there is an adequate number of suppliers operating in the national and international market for the envisaged procurement packages. Therefore, the procurements under this component are designated as ‘tactical acquisition’ in the supply positioning matrix. The market sounding concluded that the potential suppliers will see the DGII as a good customer to develop business in their respective field of expertise.

13. The PPSD proposed to hire the individual experts required for the DGII PIU in accordance with the individual consultant selection procedures as specified in the Procurement Regulations. These include, but may not be limited to, a procurement specialist, a financial management specialist, a social development specialist, an environmental specialist, and an administrative assistant.

14. **Procurement Plan and procurement tracking.** The Procurement Regulations require the borrower to use the World Bank's Systematic Tracking of Exchanges in Procurement (STEP), an online procurement tracking tool to prepare, clear, and update its Procurement Plans and conduct all procurement transactions. DGII will create the Procurement Plan through STEP before initiating any procurement activity. The PPSD and the underlying Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs. The Procurement Plan and their updates shall be subject to the Bank's review and approval. All the procurement-related complaints will be recorded in the STEP complaint module by DGII.

15. The contracts agreed by the Bank for financing and included in the Procurement Plan are listed in Table A1.1.

Table A1.1. Summary of RLIP Procurement Plan

Contract Description	Reference No.	Proc. Category	Procurement Method	Estimated Contract Amount including VAT (US$)	Market Approach	Estimated Contract Signing Date	Estimated Contract Completion Date (includes defects liability period)
Construction Works for Connection to the Filyos Port and Filyos Industrial Zone (LOT 1) (Contract No. **AYGM-YAP-2020-WB 01/1)**	**AYGM-YAP-2020-WB 01**	Works	RFB - Single Stage	139,000,000	Open Competition, International Market, Single-Stage	November 2021	May 2025
Construction Works for Branching Lines to the industrial facilities at the Çukurova Region, Yumurtalik Free Zone and the Ports at the Iskenderun Bay (LOT 2) (Contract No. **AYGM-YAP-2020-WB 01/2)**				111,000,000		November 2021	May 2025
Construction Works for Additional LMCs (TBD)	**AYGM-YAP-2020-WB 02, 03, 04….**	Works	RFB - Single Stage	60,000,000	Open Competition, International Market, Single-Stage	June 2023	December 2026
Consulting Services for Design Review and Construction Supervision for Connection to the Filyos Port and Filyos Industrial Zone	**AYGM-DAN-2020-WB 01**	CS	QCBS	5,000,000	Open Competition, International Market	November 2020	May 2025
Consulting Services for Design review and Construction Supervision for Branching Lines to the industrial facilities at the Çukurova Region, Yumurtalik Free Zone and the Ports at the Iskenderun Bay	**AYGM-DAN-2020- WB 02**	CS	QCBS	4,000,000	Open Competition, International Market	November 2020	May 2025

Contract Description	Reference No.	Proc. Category	Procurement Method	Estimated Contract Amount including VAT (US$)	Market Approach	Estimated Contract Signing Date	Estimated Contract Completion Date (includes defects liability period)
Consulting Services for Survey, feasibility studies and preparation of detailed designs and technical specifications/bills of quantity, and construction supervision **(6 LMC - Group 1)**	**AYGM-DAN-2020- WB 03**	CS	QCBS	7,640,100*	Open Competition, International Market	December 2020	December 2026*
Consulting Services for survey, feasibility studies and preparation of detailed designs and technical specifications/bills of quantity, and construction supervision **(6 LMC - Group 2)**	**AYGM-DAN-2020-WB 04**	CS	QCBS	7,640,100*	Open Competition, International Market	December2020	December 2026*
Consulting Services for ESF Services for new LMCs	**AYGM-DAN-2020- WB 05**	CS	CQS	250,000	Open Competition, National Market	July 2022	November 2022
Consulting Services for the Preparation of a strategy document for rail freight improvement	**AYGM-DAN-2020-WB 06**	CS	CQS	250,000	Open Competition, International Market	November 2020	November 2021
Consulting Services for the Development of an operation model for the logistics centers	**AYGM-DAN-2020-WB 07**	CS	CQS	250,000	Open Competition, International Market	November 2020	November 2021
Consulting Services for the Uniformization of rail technical standards	**AYGM-DAN-2020-WB 08**	CS	CQS	250,000	Open Competition, International Market	November 2020	November 2021
Consulting Services for Impact Assessment of COVID-19 on Multimodal Logistics Sector	**AYGM-DAN-2020-WB 09**	CS	CQS	250,000	Open Competition, International Market	September 2020	January 2021
Recruitment of a Project Assistant	**AYGM-PIU-2020-WB 01**	CS	INDV	200,000	Open Competition, National Market	August 2020	December 2026

Contract Description	Reference No.	Proc. Category	Procurement Method	Estimated Contract Amount including VAT (US$)	Market Approach	Estimated Contract Signing Date	Estimated Contract Completion Date (includes defects liability period)
Recruitment of a Procurement Specialist	**AYGM-PIU-2020-WB 02**	CS	INDV	240,000	Open Competition, National Market	August 2020	December 2026
Recruitment of a Financial Management Specialist	**AYGM-PIU-2020-WB 03**	CS	INDV	240,000	Open Competition, National Market	August 2020	December 2026
Recruitment of an Environmental Specialist	**AYGM-PIU-2020-WB 04**	CS	INDV	240,000	Open Competition, National Market	August 2020	December 2026
Recruitment of a Social Specialist	**AYGM-PIU-2020-WB 05**	CS	INDV	240,000	Open Competition, National Market	August 2020	December 2026

CS: Consulting Services; RFB: Request for Bids; CQS: Consultant's Qualification based Selection; INDV: Individual Consultant Selection
*Final amount and completion date will be determined based on the site supervision scope in the contract.

16. **Advance procurement.** 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 World Bank financing the procurement procedures, including advertising, shall be consistent with Sections I, II, and III of the Procurement Regulations which cover the World Bank's Core Procurement Principles of economy, efficiency, transparency, fairness, fit-for purpose, value for money, and integrity. With this understanding, the DGII will initiate the selection of design review and supervision consultants, consultants for feasibility studies and designs, and PIU consultants immediately after project negotiations upon publication of the GPN.

17. **Procurement implementation capacity and procurement risk assessment.** The Bank conducted a procurement assessment for the project, with a focus on DGII in terms of: (i) procurement regulatory framework and management capability; (ii) integrity and oversight; (iii) procurement process and market readiness; and (iv) procurement complexity. DGII is a public entity and subject to the Public Procurement Law under its regular operations. DGII is subject to external audit by the Court of Accounts. Even though the proposed project

procurements will follow the procedures specified in the Bank's Procurement Regulations, findings in the assessment concluded that: (i) applicable procurement policies and the regulatory system are designed broadly to meet the Bank's Core Procurement Principles of value for money, economy, efficiency, effectiveness, integrity, transparency and fairness, and accountability; (ii) DGII has a clear system of accountability on who has control of procurement decisions, with clearly defined responsibilities and delegations of authority; (iii) there is a clearly identified target market for all procurements; and (iv) DGII effectively manages contracts to ensure delivery as per the contract conditions. The assessment was recorded in the Bank's Procurement Risk Assessment and Management System.

18. DGII has strong experience of public procurement rules, and DGII staff have solid technical qualifications for the national procedures. The procurement function is well organized within DGII with clearly defined responsibilities. Procurement is conducted by tender committees established in accordance with the Public Procurement Law, and no procurement is commenced until a budget is provided. The budgeting and internal financial controllers are involved from the outset and, where possible, technical specialists are used from relevant departments to prepare the technical specifications. DGII's technical personnel is experienced in terms of preparation of documents in English language, as they were involved in foreign-financed projects, such as the Marmaray project in Istanbul. Consultants were also used when necessary. However, DGII does not have prior experience in the procurement of Bank-financed projects and is not familiar with the Procurement Regulations.

19. The procurement processes under the project will be conducted by the PIU established under DGII. The PIU will be comprised of professional staff from the Railways Construction Department and the Railways Survey Project Department, as well as other relevant DGII departments and individual consultants. The PIU will be headed by Deputy General Director of DGII, who will act as Project Director. Heads of two respective Departments (Railways Construction Department and Railways Survey Project Department) will manage and implement relevant tasks assigned to them and they will report all activities to the Project Director. The Head of the Railways Construction Department will act as the Deputy PIU Director. The PIU will be supported by one external procurement specialist experienced in the procurement of international financing institutions, and preferably in Bank procurement. The procurement specialist will be hired as individual consultant to work for the PIU immediately after project effectiveness.

20. Given the complexity of the project and the large contract sizes, as well as DGII's unfamiliarity with Bank procurement procedures, the overall procurement risk is assessed as Substantial for the proposed project. The risk rating can be lowered to Moderate when the agreed actions below have been put in place.

21. **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 DGII and are presented in Table A1.2.

Table A1.2. Identified Risks and Agreed Action Plan

Action No.	Identified Risk	Mitigation Measure	Responsible Party	Time Frame
1.	Delays in the procurement process due to lack of experience of DGII in the Bank's Procurement procedures	A PIU will be set up within DGII and one experienced procurement specialist will be recruited to support the procurement function. Work closely with World Bank Procurement Specialist.	DGII	PIU will be established immediately after the loan negotiations. ToR for the procurement specialist will be prepared by the DGII and the position will be advertised in advance before project effectiveness. Contract will be signed immediately after project effectiveness (within the 1st month).
2.	Delay in design review study of either "LMC Filyos" or "LMC Çukurova" that may delay the simultaneous procurement of both works contracts	DGII may decide to initiate the procurement of the works contract package for which the design review completed in consultation with the Bank.	DGII/PIU	May 2021
3.	Lack of proposal/bid participation or consultants'/bidders' constraints to prepare health proposal/bids due to disruption in the supply chain as a result of COVID-19 outbreak	DGII may allow electronic proposal/bid submission and also closely follow the market dynamics which may require reconsideration of the bidding strategy.	DGII/PIU	November 2020
4.	Incomplete environmental and social safeguard studies and work permits may delay commencement of the contract implementation	All safeguard studies will be completed before signing of the contracts. DGII will provide support to the contractors to obtain permits from the national authorities.	DGII/PIU	Throughout the project
5.	Misinterpretation of the terms and conditions of the contracts	Establishment of a Dispute Avoidance/Adjudication Board in accordance with the conditions of the contracts.	DGII/PIU	Immediately after issuing the letter of acceptance for the relevant contract

Action No.	Identified Risk	Mitigation Measure	Responsible Party	Time Frame
6.	Frequent turnover of the staff assigned to the Project to carry out procurement and contract management.	Required capacity will be maintained in the PIU.	DGII	Throughout the project
7.	Insufficient and/or delayed allocation of funds in the Government's budget.	DGII will accurately estimate the funds required annually to complete the contracts timely and maintain that required funds are allocated in the Governments budget.	DGII	Throughout the project
8.	Time and cost overruns in the construction contracts (Critical Contracts).	DGII will agree with the contractor on a contract management plan and key contract performance indicators. DGII will submit to the Bank a contract monitoring report every 6 months, including information for the achievement of the performance indicators and agreed management activities.	DGII/PIU	At the contract creation stage, and throughout the implementation stage of contract

22. **Bank review of procurement transactions.** The World Bank will review the procurement arrangements performed by the DGII including contract packaging, applicable procedures, and the scheduling of the procurement processes, for their conformity with the legal agreement. Procurements that did not have ex-ante due diligence by the World Bank will be subject to ex-post due diligence on a sampling basis in accordance with the procedures set forth in Paragraph 4 of Annex II of the Procurement Regulations. A post review of the procurement documents will normally be undertaken annually and/or during the World Bank's supervision mission, or the World Bank may request to review any particular contract at any time. In such cases, the PIU will provide the World Bank the relevant documentation for its review.

23. The PIU in DGII 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.

24. **Operational costs** will not be considered under procurement implementation. Such operational costs are reasonable incremental expenses directly incurred on account of the implementation, management, and monitoring of the Project by the DGII; such costs may include, as relevant, and as the Bank may agree, for the following: (a) travel, accommodation, and *per diem* associated with training, workshop, and study tour participants and trainers,

and other training-related miscellaneous costs; (b) office supplies; (c) office rental; (d) vehicle rental; (e) office and equipment maintenance and repair; (f) communications; (g) translation and interpretation; (h) travel and Project supervision; (i) publication fees; (k) ownership of intellectual property rights; and (l) other miscellaneous expenses directly associated with the Project and agreed between the Bank and the DGII.

Financial Management and Disbursements

Budgeting

25. MoTI is a general budget institution subject to the Public Financial Management and Control (PFMC) Law numbered 5018. Accordingly, the project will follow the national planning and budgeting procedures, and thus can only make expenditures up to the ceiling indicated in the Investment Program for this project.

26. The overall responsibility for budget preparation and monitoring lies with the Strategy Development Directorate (SDD) of MoTI. The investment budget of MoTI is prepared under the coordination of the SDD that is responsible for compiling the investment proposals of the spending units and preparing the final investment budget proposal of MoTI. SDD then sends the proposed MoTI budget to the Presidency's Strategy and Budget Office in the third quarter of the year. Upon agreement, the institutional budget is then included in the general budget and becomes effective upon enactment of the Budget Law by the Turkish Grand National Assembly before the start of the new fiscal year.

27. In line with the procedures described above, the project is in the 2020 investment program of the Government and adequate budgetary allocations are made in the 2020 Budget. The spending unit for this project is the Directorate General of Infrastructure Investments. However, MoTI would need to ensure that the budgetary allocation for the project is enough under Budget Code 7 that indicate external/foreign resources for expenditures. The World Bank funding will be used for 100% of expenditures, including taxes and dues. For that purpose, MoTI has initiated the procedures with the Presidency Strategy and Budget Office to ensure that additional allocation corresponding to the VAT amounts are added to the investment program.

Accounting System and Procedures

28. MoTI is listed among Chart I institutions in the PFMC Law and thus its accounting is maintained in the Integrated Public Information Management System of the Ministry of Treasury and Finance (MoTF) in Turkish lira, in accordance with the chart of accounts predetermined by MoTF. As it is not possible to maintain the accounting in foreign currency in sufficient detail to enable detailed project reporting, the PIU, established within DGII, will maintain a separate accounting system to follow up the funds flows on a cash basis in foreign currency and to generate regular project reports. The PIU will acquire an off-the shelf accounting and reporting software for project purposes. The procurement plan will include an allocation for the purchase of such software. As a transitional measure until the software becomes operational, accounting and reporting will be done using Excel spreadsheets. These spreadsheets will be prepared by Effectiveness.

29. The PIU prepared a draft project Financial Management Manual (FM Manual). The FM Manual, which will be a component of the POM, will include (a) the financial and accounting policies and procedures for the project; (b) organization of the FM unit, functions, staffing, and relevant job descriptions with special emphasis on the segregation of duties; (c) the flows and templates for various transactions; (d) disbursement procedures; (e) project

budgeting, planning procedures, and financial forecasting; (f) project reporting and auditing. The FM Manual will be reviewed within 3 months of loan effectiveness and updated as necessary to reflect changes that may be required after commencement of implementation.

Staffing

30. The Directorate General of Infrastructure Investments appointed one staff responsible for financial management to the PIU. Considering the additional workload that will be brought by the Project, MoTI will recruit one Financial Management Specialist with Terms of Reference (ToR) acceptable to the Bank. The draft ToR has been prepared and the recruitment will be initiated within 2 months of loan effectiveness.

Internal Controls and Internal Audit

31. MoTI applies the internal control mechanisms set forth in the PFMC Law. Accordingly, the Directorate General of Infrastructure and Investments will be the accountable spending unit and will utilize the Project funds in line with the agreed Project documents. The Directorate General Infrastructure and Investments will be responsible for all stages of procurement, as well the verification of the receipt of goods and services and preparation of supporting documentation for payments. DGII will also be responsible for submitting payment orders with supporting documents to the Ministry of Treasury and Finance Accounting Officer (Sayman) at MoTI. The payment orders will be signed by the authorized personnel and will be submitted, along with all other pertinent documentation, including authorizations, acceptances, and approvals for payment, to the FM Specialist in the Plans and Project Budget Unit (BU) appointed to the PIU. The BU will undertake the verification for completeness of documentation and the accuracy of the payment orders, and will prepare the payment orders/bank transfer orders for execution of payments. The BU will also be responsible for the disbursement arrangements from the Loan account to the Designated Account in line with the Disbursement and Financing Letter.

32. The MoTF Sayman will execute basic controls on the payment orders and will send them to the Central Bank of the Republic of Turkey (CBRT) for processing from the designated account. The related accounting entry to the Public Financial Management system will be made by the MoTF Sayman based on the approved payment order. Besides, the expenditures in the proposed project will be subject to pre-financial control as per the pre financial control directive of MoTI. According to this directive, the expenditures exceeding certain amount are subject to the pre-financial control. All the procedures and the documentation to be provided in the control files are described in this Directive. A parallel Project accounting will be maintained by the PIU.

33. MoTI has an Internal Audit Department. The Internal Audit Department is responsible for auditing selected processes of the whole Ministry based on their risk analyses and annual audit plans. For that reason, the project will not use the internal audit function of MoTI, but will organize meetings with them during implementation.

Reporting and Monitoring

34. The MoTI PIU will maintain records and will ensure appropriate accounting for the funds provided on a cash basis. The interim un-audited financial reports (IFRs) will be prepared quarterly and will be submitted to the Bank no later than 45 days after the end of the quarter. The format and the contents of the IFRs will be agreed upon with the Bank and attached to the Minutes of Negotiation.

35. The IFRs will include the following reports at a minimum:

- Expenditure tables per activity, including explanation of significant variances between budgeted and actual figures;
- Expenditure tables per category, including explanation of significant variances between budgeted and actual figures;
- Designated account statement; and
- Contract management tables.

External Audit

36. Annual project financial statements will be audited by the Treasury Controllers based on the International Standards on Auditing and in line with a term of reference acceptable to the World Bank. The audit reports, including a Management Letter (ML) providing recommendations for improving implementation, will be provided to the World Bank within six months of the end of each fiscal year. The audit reports excluding the ML will be publicly disclosed by the PIU and the World Bank.

37. The following table summarizes the audit requirements for the Project:

Audit Report	Due Date
Project financial statements	Within six months of the end of each fiscal year and at the closing of the project

Funds Flow and Disbursement Arrangements

38. MoTI, through MoTF, will open a designated account (DA) in the currency of the loan at the Central Bank of Turkey. Payments to the contractors, suppliers and consultants will either be made directly from the loan account or from the Designated Account with the authorization of the responsible personnel. Advances should be requested to the DA based on project needs and planned project expenditures. All movements in this account will correspond to documented project income or expenditures. Two signatures indicated in the list of authorized signatures submitted by MoTI will be required on the withdrawal applications.

39. Disbursements from the Loan Account will follow the transaction-based method, i.e., traditional World Bank procedures: Advances, Direct Payments, Special Commitments and Reimbursement (with full documentation and against Statements of Expenditures (SOEs). The withdrawal applications will be prepared and authorized by the DGII.

40. A detailed Disbursement and Financial Information Letter (DFIL) will be provided to the PIU. The disbursements below specific thresholds indicated in the DFIL will be made according to certified SOEs. Full documentation in support of SOEs would be retained by MoTI for at least 2 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 supervision by World Bank staff and for annual audits which will be required to specifically comment on the propriety of SOE disbursements and the quality of the associated record-keeping.

Overall Conclusion

41. The FM risk is Substantial, and the FM arrangements are assessed as acceptable at entry. The risk level and rating will be revisited throughout implementation. The following Action Plan was developed for MoTI to commence implementation:

Action	Indicative Deadline
MoTI to prepare accounting and reporting Excel spreadsheets	By Effectiveness[1]
MoTI, through MoTF, to open a Designated Account for the project	Within 3 weeks after Effectiveness
MoTI to acquire the necessary systems for project accounting and reporting and tailor them according to project needs	Within 3 months after effectiveness
MoTI to initiate the recruitment procedures for a Financial Management Specialist to support PIU staffing	Within 2 months after effectiveness
MoTI to finalize the draft FM Manual including workflows, internal controls, and all FM arrangements of the project	Within 3 months after effectiveness

1\ Effectiveness condition.

Supervision Plan

42. During project implementation, the Bank will supervise the project's financial management arrangements as follows: (i) during the Bank's implementation support missions, financial management and disbursement arrangements will be reviewed to ensure compliance with the Bank's minimum requirements; (ii) the project's quarterly interim unaudited financial reports, as well as the project's annual audited financial statements and auditor's management letter, will be reviewed. As required, a Bank-accredited Financial Management Specialist will assist in the supervision process.

Environmental and Social Appraisal Summary

Social (including safeguards)

43. **The project involves social impacts on people, their properties, and livelihoods in the areas covered under the project, which will be mitigated through disclosed action plans.** Main impacts of the project are associated with risks such as community health and safety, OHS, cultural heritage, and land acquisition. Land acqusition requirements

of the subprojects will result in the relocation of a limited number of assets, as well as loss of land and access restrictions to livelihood resources of the people living in villages adjacent to the areas covered by two subprojects. Even though figures on the extent of land impacted are low, both pre-identified subprojects (Filyos port and Çukurova Region) shall cause physical displacement/relocation of some houses, businesses (in the Çukurova subproject only), and other fixed assets, and potential economic displacement due to access restrictions onto land use in the right of the way (ROW) of the rail branch lines to be constructed. Land-induced livelihood impacts are anticipated to be generated from restrictions to pasture land, loss of pasture land, agricultural lands, temporary interruption of businesses, and the multiplying effect of the project as PAPs in both pre-identified subprojects have been formerly impacted by other projects. Initial findings of the assessments and resettlement planning exercise indicate that the project will affect approximately 1,500 land owners (766 PAPs in Çukurova and 721 in Filyos sub projects) and a total of 7 informal users in both subprojects. Although there are no labor influx issues resulting from foreign workforce envisaged under the project and workers will be mainly local (Turkish nationals), there will be some unskilled work opportunities for the local communities as well. While most of the social impacts and risks have been identified and mitigation measures proposed, there are still many unknown and residual impacts, including construction induced impacts, that remain to be assessed during project implementation. In addition to the two main (pre-identified subprojects (Filyos and Çukurova), 2-3 LMC sites are proposed and feasibility studies (FS) for them will be conducted during project implementation. The social risks and impacts of these future subprojects are still to be assessed and the ToRs of the FSs will include social risk mitigation measures and request the client to adhere to required social due diligence to avoid and/or minimize adverse social impacts in implementing these LMCs. The initial assessments conclude that there are no 'associated facilities' related to the project and the other ongoing or proposed development projects in the areas covered by the project are independent investments by the Government or other agencies/entities.

44. **ESIAs, ESMPs, and RAPs prepared for the pre-identified subprojects have defined possible categories of PAPs, including vulnerable groups, and have introduced compensation and livelihood restoration measures for the impacts listed.** Although site-specific mitigation plans have been prepared, additional amendments to the E&S documents will need to be made once the railway detailed designs are finalized by the design and supervision consultant during project implementation. The number of affected people in the subprojects are subject to change as expropriation plans and final asset inventories will be completed after completion of detailed engineering designs. Regarding other social impacts, no significant labor influx risks are anticipated. A Labor Management Procedure (LMP) for the project has been prepared. It is expected project workers will be mainly Turkish nationals, and unskilled labor will be hired from local settlements. It is expected that the project will engage between 250 and 330 construction workers in total, and about 170 per rail line/subproject for the two pre-identified subprojects. The project SEA/H risk was assessed as low. The project will implement SEA/H prevention measures such as sensitization/orientation of the PIU, implementation of the Code of Conduct, training of workers on SEA/H prohibition, awareness sessions with communities, and establishment of a SEA/H-sensitive grievance redress mechanism. Community health and safety risks are moderate and include dust, noise, traffic congestions and accidents, and potential damage to crops. Although the pre-identified subprojects are not located in socially sensitive areas, impacts on cultural heritage sites were identified in the ESIA. Consultations with several key stakeholders, including some of the vulnerable and disadvantaged groups, have been carried out during ESIA and RAP preparation works and will continue throughout the project. A project-specific GRM for external external stakeholders and a workers' GRM will also be established in line with the ESS 10 and ESS 2 requirements, respectively.

45. **For the TA under Component 2 (feasibility Studies of 12 LMCs, and Detailed Engineering Designs and Construction Supervision of selected LMCs), the requirements of the ESF have been integrated into the ToR for this**

activity. The outputs of the FS will be used for the decision on 2-3 LMCs to be constructed under Component 1, to ensure their compliance with the ESF. No LMCs with High environmental or social risk based on the FS will be selected. The site-specific ESIAs, RAPs and SEPs for the 2-3 LMCs will be prepared during the implementation stage and before the start of construction.

46. **Stakeholder Engagement Plans (SEP) have been developed to ensure the process of continuous interaction with the project-affected and other interested parties in the Filyos port and Çukurova Region subprojects.** These SEPs prepared for the project, and other ESF instruments (ESIAs, ESMPs, RAPs, LMP), were disclosed by DGII on April 29, 2020 and were publicly consulted. Due to the COVID-19 pandemic and guidance by the government on social distancing and self-isolation, it was not advisable and possible to carry out face-to-face consultation meetings. Instead, advanced drafts of the E&S documents prepared by the Borrower (ESIAs, ESMPs, SEPs, LMP, and ESCP) were disclosed virtually prior to Appraisal. DGII prepared a video presentation about the project, which was posted online and shared with stakeholders, including PAPs, via email, social media, and different messaging channels and applications. DGII established an online form and phone feedback mechanism for the stakeholders to provide feedback about the project. This feedback was included in the finalized ESF documents, which were subsequently disclosed prior to Appraisal.

47. Due to inconclusive scientific evidence about the retention of the novel coronavirus on paper surfaces, and hesitation of local people to receive paper mail during the pandemic, the project did not prepare project brochures for the purposes of consultations amid the COVID-19 pandemic. After the COVID-19 situation improves in Turkey and government eases social distancing guidelines, DGII will carry out an additional round of local consultations with PAPs, including those affected by land acquisition and displacement, face to face. Based on feedback received from the stakeholders, SEPs, ESIAs, ESMPs, and RAPs will be revised and redisclosed as needed.

Environment (including safeguards)

48. The environmental risk is rated Substantial. This is related to the impacts expected to occur during the construction and operation of the railway connections financed by the project, including: (i) air pollution and noise from construction machinery and quarries and operation phase noise and vibration impacts; (ii) soil disturbance and loss during earth moving; (iii) loss of vegetation; (iv) waste generation and management (including hazardous waste); (v) construction camp management; (vi) community health and safety (traffic safety, earthquakes, avalanches, etc.); (vii) labor and working conditions (including occupational health and safety); (viii) land acquisition induced physical and economic displacement for individuals and businesses; (ix) impacts on biodiversity and on culturally and naturally protected areas (such as habitat loss/fragmentation and/or displacement, invasive alien species, damage to registered cultural/archeological sites and/or assets); (x) use of pesticides for land clearing; and (xi) borrow areas and spoil management. With adequate mitigation and management, these impacts are assessed to be mostly temporary, predictable, and/or reversible.

49. The ESIAs and ESMPs have been developed by the Borrower for the Filyos and Çukurova railways construction based on the designs prepared during project preparation. The WBG General Environmental, Health, and Safety (EHS) Guidelines and Industry Sector EHS Guidelines for Railways, Toll Roads, and Electric Power Transmission and Distribution have been applied for the identification of measures to address E&S risks. In addition to the 2 ESIAs and 2 ESMPs, there are 12 additional sub-management plans prepared for the Filyos and Çukurova railway construction subprojects as part of the ESIA package. The ESIAs identified environmentally and culturally sensitive areas located within the area of influence of project activities, and recommended measures and/or alterations to the project design. The ESIAs also specified current information and data gaps in relation to biodiversity and cultural hotspots

and suggested studies to be undertaken to inform the assessments and proposed mitigation measures and incorporated into the final railway design. The site-specific ESMPs and sub-management plans for the Filyos and Çukurova railways construction are to be further elaborated based on more detailed information to be collected under detailed site surveys during the early phase of implementation, and before the start of bidding process, so that they are reflected in the bidding documents. The potential environmental impacts associated with the construction of 2-3 additional LMC subprojects, to be selected during implementation, will be addressed within the scope of site-specific ESIAs and ESMPs under respective Feasibility Studies and detailed engineering designs to be prepared as part of the Component 2 technical assistance activities before the start of construction.

50. The project will be implemented by the General Directorate for Infrastructure Investments (GDII) under the Ministry of Transport and Infrastructure (MoTI). The Project Implementation Unit (PIU) within DGII has been established with dedicated staff responsible for environment, land acquisition, procurement, and financial management already assigned. MoTI and/or the PIU does not have experience applying the new ESF, nor did it receive the ESF borrower training. The Bank will provide ESF support during project implementation and will carry out an ESF launch workshop after project effectiveness.

ANNEX 2: Financial Logistics Costs by Mode in Representative Supply Chains

1. Financial logistics costs are defined as the summation of shipper-borne transport costs and inventory carrying costs. Logistics costs are a sub-set of "total landed costs", or the costs that a shipper incurs in bringing a product to market, from manufacturing origin to end-use destination. Typically, in supply chains there is an inverse relationship between transport costs and inventory carrying costs, in that more expensive transportation options, by virtue of being faster and/or more reliable, tend to be associated with lower inventory carrying costs at the shipment level. The opposite is also true: savings in transport costs that imply the use of a transport mode, transport service type, and/or a transport routing that may be relatively slower and/or less predictable will, all else being equal, result in the need to keep higher levels of inventory on-hand and therefore in higher inventory carrying costs. The 'rational shipper' makes logistics decisions—routing, modal, and service type choices—in such a way as to minimize the summation of transport costs and inventory carrying costs (i.e., total logistics costs), rather than minimize one or the other alone. For example, there may be commodities and origin-destination pairs for which the impact of incurring higher transportation costs for better service may be more than offset by the inventory carrying cost implications (i.e., cost reductions) of such a decision, thereby resulting in lower overall logistics costs.

2. Inventory carrying costs comprise the cost of holding 3 types of inventory that arise in beneficial cargo owners' operations: in-transit inventory, cycle inventory, and safety stock inventory.

3. In-transit inventory refers to the goods shippers hold while transporting them from origin to destination, whereby the vehicle used to transport these goods (say, a truck or a vessel) acts, in effect, as a moving warehouse. Cargo held in-transit incurs inventory costs in the form of capital costs (the opportunity cost of the capital tied up in inventory), obsolescence costs (the cost associated with the goods becoming obsolete or expired), and "shrinkage" costs (a catch-all term to refer to any action that leads to the impairment of goods, such as pilferage, spoilage, damage, loss, or involuntary diversion). In-transit inventory carrying costs are primarily determined by the delivery lead time, that is, the transportation time between origin and destination. The implication is that faster transport modes would result, all else being equal, in lower in-transit inventory carrying costs at the shipment level.

4. Cycle inventory is the inventory that cargo owners must keep in hand to feed into their everyday operations. For example, manufacturing lines consume inventories of parts and other inputs at a certain rate, and cycle inventories must be maintained in sufficient quantities on-hand to avoid costly stoppages in production. Cycle inventories are determined by the associated production process (or, in the case of final products, by the 'base' or predictable component of underlying demand). The implication being that cycle inventories are independent from shippers' logistics and cargo routing decisions. As such, a valuation of cycle inventory is not necessary when comparing the logistics costs of two or more routing options.

5. Safety stock inventory is the inventory that cargo owners keep on hand to protect themselves against unforeseen circumstances, such as unexpected spikes in demand or disruptions in the delivery chain. Therefore safety stocks are primarily determined by the *variability of demand* for a given product, the *variability of the delivery lead time* of the chosen routing, and the shipper's desired *service level,* or the probability not to stock out during a given delivery cycle. The implication is that safety stock inventories are determined by the predictability of supply chains: all else being equal, predictable supply chains will be associated with lower levels of safety stock inventory for a given service level target, whereas unpredictable supply chains will be associated, all else being equal, with higher levels of safety stock inventory (and therefore with higher safety stock inventory carrying costs) for a given service level target. Safety stock inventory incurs, in addition to capital costs, obsolescence costs, and shrinkage costs, the cost of

warehousing. From a routing/modal choice point of view, the key parameter impacting safety stock levels for a given service level is the variability of the delivery lead time: the choice of transport modes that are relatively more predictable as to their delivery lead times (such as, typically, trucks compared to rail freight, or air freight compared to sea freight) will result, all else being equal, in lower levels of safety stock for a given target service level, and vice versa.

6. The rational shipper's tradeoff between transport costs and inventory carrying costs in order to minimize logistics costs, while typically not obvious, tends to be straightforward at either end of the commodity value-to-weight ratio spectrum. Specifically, the logistics costs of supply chains of commodities with low value-to-weight ratios and little to no obsolescence risk—such as low-value bulk commodities like sand, cement, and other construction materials—tend to be overwhelmingly dominated by transport costs, such that, in almost every realistic scenario, reductions in transport costs will result in reductions in overall logistics costs. This is why these kinds of commodities are best transported—and indeed in the international experience, most commonly transported—in the modes of transport offering the lowest available cost per ton-km transported, such as rail freight and inland waterway transport; this is also why the latter modes tend to be generally understood as having a "competitive advantage" in the transportation of bulk and other low-value-to-weight-ratio commodities relative to other modes. Meanwhile, at the other end of the value-to-weight ratio spectrum the opposite is true: the logistics costs of supply chains of high-value and/or highly perishable commodities, such as semiconductors or cut flowers, tend to be moderately to heavily dominated by inventory carrying costs, and decisions that lead to reductions in the latter, even if they mean (as they typically do) incurring higher transport costs, often lead to overall reductions in logistics costs. This is why semiconductors, cut flowers, and high-end fashion apparel tend to be transported by air freight instead of sea freight (or trucks instead of rail). To be sure, the vast majority of commodities transported on a daily basis globally fall somewhere in between these two extremes of the value-to-weight and obsolescence risk spectrum, meaning that modal choice and routing options for most commodities and most itinerary types (e.g., whether inter-continental, regional, or purely domestic shipments) require active management by shippers and/or their logistics service providers, often aided by technology, to find combinations of transport costs and inventory carrying costs that minimize logistics costs. In some cases this can be done by finding mid-market multimodal products or expedited services.

7. In the case of RLIP, the project will bring last-mile rail infrastructure connectivity to logistics clusters that specialize in the generation/attraction of bulk commodity freight flows, such as construction materials, fertilizer, wood products, and bulk chemicals. These commodities are at the low-end of the value-to-weight ratio spectrum, i.e., commodities that are voluminous and physically dense, yet low in value per ton and with little exposure to obsolescence risk. These commodities are, in principle, most efficiently transported in modes that can generate economies of scale to minimize transport costs—such as unit trains—with a disproportionate, dominant effect on logistics costs vis-à-vis any likely increases in inventory carrying costs compared to the use of more expensive transport modes, such as trucking.

8. To illustrate this principle, tables A2.1 and A2.2 show a typical bulk and containerized commodity supply chain, respectively, where the key parameters and cost drivers shown are representative of what is observed in the international experience and reflect length-of-haul and transport cost rates applicable to—and currently prevailing in—RLIP's target corridors. Specifically, Table A2.1 shows the case of a typical bulk commodity supply chain, such as a chain moving iron ore, construction materials, or steel products (all of which are common in RLIP's target corridors) with an estimated weighted average value of US$350 per ton (representative of RLIP's target markets). As Table A2.1 illustrates, financial logistics costs for this supply chain are significantly reduced if the cargo in question is moved via

rail compared to trucks, and the composition of logistics costs is overwhelmingly dominated by transport costs in both cases (97%+). A key implication of this is that truck-to-rail modal shift scenarios where increases in inventory carrying costs would more than offset the savings in transport costs are implausible. For example, even assuming that the rail lead time is 20 times longer than the truck lead time (a highly unlikely outcome in any context), the total logistics costs of the rail itinerary would be, all else being equal, US$3.4 million, still significantly below the truck modal choice scenario, and transport costs would still account for 85% of logistics costs. It is on this basis that RLIP is expected to result in gains in rail freight market share, road-to-rail modal shift, lower transport costs, and, by extension, lower logistics costs, in its target corridors, given these corridors' commodity mix profile.

9. Table A2.2 presents the other end of the spectrum: a high-value commodity supply chain, which could be represented by fashion apparel/footwear or high-end electronics, at a typical value of US$20,000 per ton. In this scenario, the truck modal choice results in lower overall logistics costs than the rail choice, despite the latter offering significantly cheaper transport costs. Also in this scenario, inventory carrying costs are either dominant (rail) or near-dominant (trucking) as a component of total logistics costs.

Table A2.1. Financial Logistics Costs in a Bulk Commodity Supply Chain

	Truck transport	Rail transport
Freight transport demand (tons)	1,000,000	1,000,000
Freight value (US$/ton)	350	350
Length of haul (km)	100	120
Transport speed (km/h)	80	40
Delivery lead time (hours)	1.3	4.0
Coefficient of variation of demand\1	10%	10%
Coefficient of variation of delivery lead time\1	40%	80%
Service level\2	95%	95%
Transport cost (US$/ton-km)	0.063	0.024
In-transit inventory cost rate per year	20%	20%
Safety stock inventory cost rate per year	25%	25%
Transport costs (US$)	6,300,000	2,904,000
In-transit inventory costs (US$)	9,989	31,963
Safety stock inventory costs (US$)	12,185	54,984
Total logistics costs (US$)	**6,322,173**	**2,990,948**
Transport costs in % of logistics costs	99.6%	97.1%

1\ Coefficient of variation is a measure of dispersion, defined as the standard deviation divided by the mean.
2\ Probability of not stocking out during the delivery cycle.
Source: World Bank analysis.

Table A2.2. Financial Logistics Costs in a High-Value Containerized Commodity Supply Chain

	Truck transport	Rail transport
Freight transport demand (tons)	1,000,000	1,000,000
Freight value (US$/ton)	20,000	20,000
Length of haul (km)	100	120
Transport speed (km/h)	80	40
Delivery lead time (hours)	1.25	4.0
Coefficient of variation of demand\1	30%	30%
Coefficient of variation of delivery lead time\1	40%	80%
Service level\2	98%	98%
Transport cost (US$/ton-km)	0.063	0.024
In-transit inventory cost rate per year	40%	40%
Safety stock inventory cost rate per year	45%	45%
Transport costs (US$)	6,300,000	2,904,000
In-transit inventory costs (US$)	1,141,553	3,652,968
Safety stock inventory costs (US$)	3,624,071	9,168,256
Total logistics costs (US$)	**11,065,624**	**15,725,224**
Transport costs in % of logistics costs	56.9%	18.5%

1\ Coefficient of variation is a measure of dispersion, defined as the standard deviation divided by the mean.
2\ Probability of not stocking out during the delivery cycle.
Source: World Bank analysis.

ANNEX 3: Detailed Project Description

Country Context

1. Turkey has high growth potential, but recent shocks—most recently, and above all, the COVID-19 pandemic's onset—have affected the sustainability of its economic gains since the early 2000s. Turkey achieved rapid economic and social development results in the 2000s, with poverty incidence more than halving and Gross Domestic Product (GDP) per capita tripling to over US$10,000 by 2008. However, after the Global Financial Crisis (GFC) in 2008-2009, growth was increasingly driven by credit expansion and accumulation of (mostly foreign exchange denominated) private sector debt, together with short-term temporary stimulus policy. This led to declining productivity growth and macroeconomic imbalances, even as exports performance remained, on the whole, strong. Exogenous factors, including multiple election cycles, regional conflict, and difficult international relations, created further volatility and tested the resilience of the Turkish economy.

2. Economic vulnerabilities that had accumulated over the past four years came to a head in mid-2018. Policy stimulus in the aftermath of the 2016 failed coup attempt led to economic overheating. Though growth accelerated to 7.4 percent in 2017, this came at a cost of double-digit inflation and a large current account deficit. A hardening of external economic conditions in mid-2018, together with tense international relations, led to a marked depreciation of the lira. This profoundly affected the real and financial sectors. Corporates and banks suffered due to high foreign exchange debt, annual inflation peaked at 25 percent in October 2018, the economy went into recession in the second half of 2018, and unemployment rose from 10 percent in January 2018 to 14 percent by June 2019.

3. The economy experienced major adjustments over the last year. Current account imbalances have declined, banks have reduced their exposure to external and foreign currency denominated debt, and demand has started to recover. These adjustments have lessened the external vulnerabilities that had accumulated in the run up to the August 2018 currency shock and have contributed to a more stable lira, notwithstanding sporadic bouts of currency volatility. These developments were supported by some agile policy responses and accommodative global monetary conditions as the outlook in developed economies has weakened. Even so, foreign exchange reserves have eroded over the past two years, and external financing requirements remain relatively high, leaving Turkey exposed to external market pressure.

4. It was against this already challenging backdrop that the Turkish economy and society were struck by the COVID-19 pandemic. The outbreak, and its national and global aftermath, are likely to result in reductions in aggregate demand and disruptions in the supply sectors in the short-term and a potentially protracted recovery period, which may keep economic growth going forward at lower levels than expected at the end of 2019.

5. Prior to the COVID-19 crisis Turkey faced a twofold challenge: in the near-term, to solidify the ongoing recovery from a downturn while inflation and corporate indebtedness were still high though clearly declining, and amid an uncertain external environment; and to implement policy measures embedded in government plans—such as the 11th Development Plan, the Export Master Plan, and others—to support a shift to a sustainable medium-term growth model. The pandemic has only heightened the urgency, but also the complexity, of meeting these challenges. While prior to the outbreak the Turkish economy had stabilized in the short-term and GDP was projected to rebound to 3% to 4% annual growth through the medium-term, the outlook during the spread of the outbreak (nationally and globally) is now of much lower, potentially recessionary economic growth in the short term. The degree of uncertainty in the global outlook, which was already high pre-COVID, is now elevated. As a result, restoring

confidence, reducing domestic risk premia with an array of policies to respond to the crisis, including long-term public investment, would be key for sustaining recovery. Polices that boost the productivity and market competitiveness of firms in Turkey will also play an important role in establishing a sustainable new engine for growth post-crisis.

Project Description

6. The project will support the delivery of rail and multimodal infrastructure investments at well-prioritized nodes of Turkey's national railway network. These interventions will help revitalize the transport and logistics sector, and by extension, contribute to the sustainability of the beneficial cargo owners operating supply chains in the project's target corridors in the aftermath of the COVID-19 pandemic. It will support capacity building and institutional strengthening at the main MoTI sub-agencies involved in the rail sector, to help strengthen MoTI's response to the medium- and long-term impacts of COVID-19 on Turkey's logistics system; improve rail freight service delivery; strengthen railway network planning; and promote multimodality through a more robust operation of TCDD-owned logistics centers. Financial support will also be provided for the staffing, training, and operation of the Project Implementation Unit (PIU) within DGII that will oversee project implementation. Consistent with these objectives, the project is structured around three components, as follows:

Component 1: Construction of Railway Branch Lines and Multimodal Connections at Priority Network Nodes (IBRD US$319 million). This component will finance the provision of last-mile rail (and in select cases, road/multimodal) connectivity at well-prioritized portions of the Turkish railway network. It comprises 3 sub-components, as follows.

Sub-component 1.1. Last-mile Multimodal Connectivity at Filyos Port (IBRD US$144 million, including contingencies and VAT). This sub-component will finance 100% of civil works and 100% of engineering design review and construction supervision consulting services for the provision of rail and road connectivity at the last mile directly to/from the greenfield maritime port of Filyos, on Turkey's Black Sea coast, and its adjacent industrial zone. Specifically, the sub-component will deliver 4.3 km of last-mile dual carriageway highway connectivity and 13.3 km of last-mile double-track rail connectivity[45], including on-dock rail and two stations, between the Filyos port complex and the main national highway and railway linehaul networks.

The rail connection, with a design speed of 60 km/h, will have a maximum inclination of 1.5%, with 300m minimum horizontal and 5,000m vertical curvature. The existing Gokceler Rail Station will be expanded to 900m^2, while a new Filyos Port Rail Station (1,100m^2) will be built within the scope of the project. The project involves 13m-span, 11m high, and 387m long separate rail and road bridges as the most critical construction item, as well as 7 rail box culverts, 2 additional rail underpasses and bridges, and 1 road box culvert, which will provide reinforced flood protection. It also includes a multi-layer road interchange that will provide connection to the main highway line.

A long-time aspirational investment of the Government of Turkey (GoT) that is now coming to fruition, Filyos port will be equipped with dedicated dry bulk, general cargo, and container terminals protected by dual breakwaters. It will have a cargo handling capacity of 25 million tons at full build-out, which will make Filyos the largest Turkish port on the country's Black Sea coast and one of the largest ports nationally. Through the interventions under this sub-component, Filyos will be only the second Turkish maritime port in the Black Sea to have rail access. The port is expected to primarily serve cargo hinterlands in the Marmara region (anchored by the Istanbul, Kocaeli, and Bursa provinces), the northern portion of the Central Anatolia region (anchored by Ankara province), and the immediately

[45] While it is initially expected that Filyos port will be served by trains with diesel locomotives, the track layout and design are such that they will facilitate transition to electrified traction in the future with minimal additional cost.

adjacent markets of Karabuk and Zonguldak provinces, all of which are accessible by rail. The Karabuk hinterland alone is expected to generate upwards of 7 million tons of bulk cargo throughput—primarily in the iron and steel supply chain, but also in mining, cement, ceramics, and machinery and components—to be routed via Filyos in the short term, most of which is currently transported by truck to/from alternative ports farther afield. In all, Filyos is expected to attract approximately 8 to 8.5 million tons per annum within its first two years of operation.

By connecting Filyos to the national railway network, this sub-component will also help establish a direct link between Filyos and Mersin Port—Turkey's largest container port and second largest port overall by volume—on the Mediterranean coast. This will effectively enable a rail land bridge between the Mediterranean and Black Seas, thus providing an alternative to the increasingly congested Turkish Straits for cargo moving to/from the Black Sea catchment and enhancing network resilience in the process. Under construction as of the time of writing, the infrastructure of Filyos port (quay walls, breakwaters, access channel, berthing areas, back-up apron) is expected to be completed by year-end 2020; superstructures are expected to be constructed under long-term concession arrangements expected to be awarded in 2021; and the port is expected to become operational by year-end 2023. The expected delivery timing of this sub-component is consistent with this timeline.

Table A3.1 shows a breakdown of the project-financed investment costs for the Filyos last-mile connectivity subproject by mode.

Table A3.1. Estimated Cost of Project-financed Last-Mile Connectivity Infrastructure At Filyos Port
US$ millions, inclusive of VAT

Rail Construction Costs	
Railway line	64.8
Traction systems	9.3
Stations	9.4
Bridge	8.9
Loading dock	0.1
Rail construction sub-total	**92.4**
Road Construction Costs	
Construction	21.0
Overpass	1.1
Bridge	15.9
Road construction sub-total	**38.0**
Total construction	**130.4**
Design review and construction supervision	2.6
Total baseline costs	**133.1**
Contingencies	10.6
Total costs	**143.7**

Source: MoTI.

Sub-component 1.2. Last-mile Rail Connectivity for Çukurova Region Industrial Zones and Iskenderun Bay Ports (IBRD US$115 million, including contingencies and VAT). This sub-component will finance 100% of civil works and 100% of engineering design review and construction supervision consulting services for the construction of branch line rail links to/from selected industrial zones in the Çukurova region of South-Central Turkey on the Mediterranean Coast—specifically, in the sub-area formed by southern Osmaniye Province, southeastern Adana Province, and northwestern Hatay Province—including adjacent maritime ports in Iskenderun Bay. Specifically, the sub-component will construct two double-tracked electrified railway branch lines, two connecting electrified lines linking the two branch lines, and five associated intermodal station facilities, including sidings.

The rail connections, with a design speed of 80 km/h, will have a maximum inclination of 1.6%, with 360m minimum horizontal and 3,200m vertical curvature. Four entirely new rail stations will be built (Osmaniye OIZ, Yukariburnaz, Adana Yumurtalık Free Zone [TAYSEB], and Erzin Port), each with an area of 1,350m^2; a fifth station, TCDD's existing Erzin city station, will be expanded and modernized to match the capacity of the new stations. The project involves 14 rail bridges, with the longest being 3m-span, 11m high, and 95m long, as well as 36 box culverts, 13 underpasses, and 5 overpasses.

The first branch line, 19.8 km in length, will link the Osmaniye OIZ and the greenfield Erzin Port (O-E line). Osmaniye OIZ is an active industrial cluster home to 78 firms in the metal, machinery, and construction industries (primarily), as well as in the agri-food, furniture, mining, chemicals, plastics, textiles, and automotive industries (secondarily). In 2018 it produced total inbound and outbound cargo flows of 14.4 million tons of mostly bulk freight (Table A3.2), all of which transported by trucks in the absence of last-mile rail connectivity at Osmaniye OIZ.

Table A3.2. Inbound and Outbound Freight Volumes at Osmaniye OIZ: 2018

		Tons		
Sector	Number of active firms	Inbound	Outbound	Total
Metal, machinery and construction	35	6,881,266	6,211,730	13,092,996
Food	6	160,500	160,000	320,500
Mining	3	87,820	81,857	169,677
Textiles, apparel, and leather	13	42,681	34,184	76,865
Forestry products and furniture	2	32,000	30,500	62,500
Automotive	2	3,673	3,332	7,005
Chemicals and plastics	7	3,420	3,300	6,720
Other	10	455,493	242,748	698,241
Total	**78**	**7,666,853**	**6,767,651**	**14,434,504**

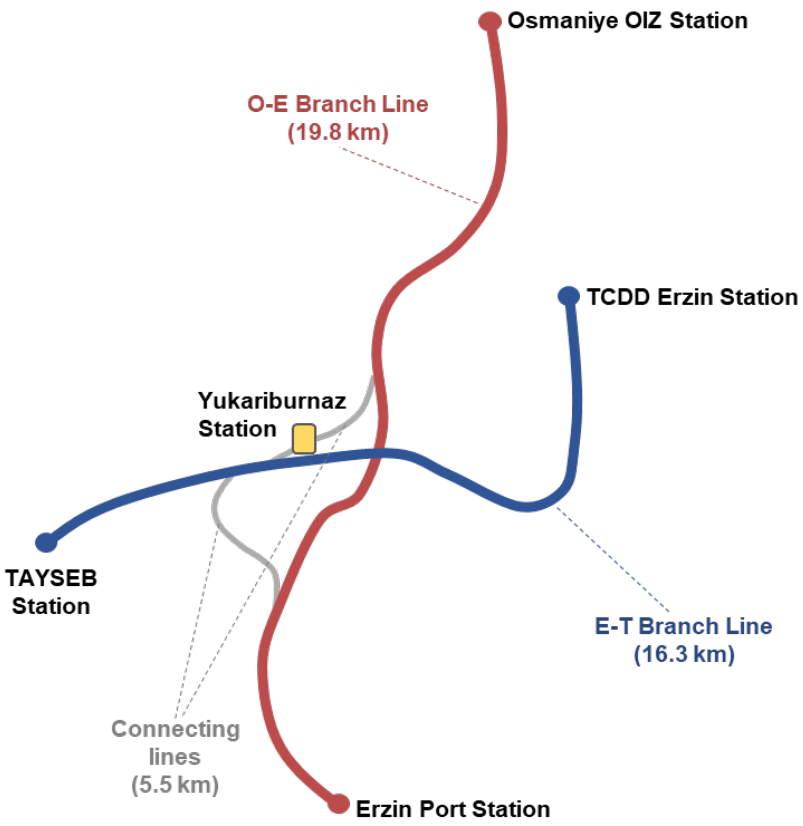
Source: MoTI.

The second branch line, 16.3 km in length, will link TCDD's Erzin Station with the Adana Yumurtalık Free Zone (TAYSEB) and adjacent industrial facilities (E-T line). The Toros Adana Yumurtalık Free Zone Founder and Operator Company (TAYSEB) is the concessionaire of a long-term Build-Operate-Transfer (BOT) agreement, originally granted in 1990 and since extended through 2030, by the Ministry of Trade for the operation of the Adana Yumurtalık Free Zone. As of the time of writing, this free zone, commonly referred to as TAYSEB, hosted 25 firms operating in the cement,

chemicals, construction materials, and food industries, generating an annual bulk cargo volume of 2 million tons, all currently transported by heavy-duty trucks. TAYSEB is immediately adjacent to several other current and future bulk freight generation facilities. The active facilities include a fertilizer plant and a bulk cargo marine terminal, with current aggregate bulk volumes of 5.5 million tons (0.5 million tons at the fertilizer plant and 5 million tons at the marine terminal). The prospective iron and steel-focused Ceyhan OIZ, with an expected long-term bulk cargo generation potential of 2.5 million tons, will become operational in 2026.

These two branch lines intersect, forming an approximate "+" shape (see Figure A3.1), and will be interlinked via a rail intermodal station at Yukariburnaz and two connecting lines of 5.5 km in aggregate length. In addition to Yukariburnaz, the sub-component will finance newbuild stations at Osmaniye OIZ, Erzin port, and TAYSEB, and will expand the cargo handling capacity of TCDD's existing Erzin Station. Through TCDD's Erzin Station, both the O-E and E-T lines will connect to the national linehaul network, thus providing the target hinterland with direct access to national markets and, critically, larger rail-connected international gateways in the region, most notably including Iskenderun port (currently the main maritime gateway of the industrial zones targeted by this sub-component) and Mersin port.

Figure A3.1. Schematic of Last-mile Rail Connections in Çukurova Region



Source: MoTI.

According to market research with local beneficial cargo owners, the facilities in the targeted hinterland have a long-term bulk cargo generation potential conservatively estimated at 17.4 million tons, approximately 42% of which to/from Osmaniye OIZ. As the largest and most mature of the facilities in the target hinterland at present, Osmaniye OIZ is expected to account for the bulk—74%, or 4.6 million tons—of the Çukurova region volumes estimated to be 'capturable' by rail freight in the short term (again, a conservative estimate given total current volumes at Osmaniye OIZ of 14.4 million tons of primarily bulk freight), and this share will gradually fall over time as the E-T line nodes around TAYSEB Station ramp-up, including greenfield nodes like Ceyhan OIZ. The capturable cargo volumes in the Çukurova hinterland primarily include iron and steel products, machinery and equipment, construction material, fertilizer, cement, chemical products, food products, and automotive products, most of which would continue to be transported by trucks in the absence the rail last-mile connections to be provided under this sub-component.

Sub-component 1.3. Provision of Last-mile Rail Connectivity at Additional Priority Sites to be Selected During Implementation (IBRD US$60 million, including contingencies and VAT). This sub-component will finance 100% of civil works to provide last-mile rail connectivity to an additional 2 to 3 cargo generation-attraction nodes of similar nature as those targeted under Sub-components 1.1 and 1.2—organized industrial zones, logistics clusters, manufacturing clusters, free zones, and/or maritime ports—that remain disconnected from the national railway network. These additional subprojects will be selected based on the findings of feasibility studies and engineering designs for a longer initial list of 12 potential rail last-mile connectivity subprojects; this preparatory documentation will be financed by the project (see description of Component 2 below). The selection process will be based on multicriteria analysis to include three main factors, including (i) expected economic returns (including the value of mitigating environmental externalities); (ii) risk-adjusted technical feasibility (including environmental and social impact considerations); and (iii) magnitude of expected rail freight volume capture as a proxy for urgency of delivery. The selection process will be conducted by the PIU, in close coordination with TCDD, and will be overseen by DGII.

Component 2: Feasibility Studies, Detailed Engineering Designs, Environmental and Social Documentation, and Construction Supervision for Rail Last-mile Connectivity Infrastructure at Additional Freight Nodes (IBRD US$28 million, including VAT). This component will finance 100% of consulting services to produce feasibility studies (FS)—including the environmental and social dimensions of feasibility—for 12 potential last-mile rail (and, where necessary, complementary road/multimodal) connectivity infrastructure subprojects at pre-identified freight generation-attraction nodes currently disconnected from the national railway network. These 12 sites (see basic details in Table A3.3; the sites' geographic location is shown in the maps of Annex 5) together entail the provision of an aggregate 82.1 track km of branch line connectivity, ranging in individual length of track from 1 km to 26 km, and produce annual aggregate transport volumes of 20.4 million tons. They have been designated for further assessment by MoTI based on objective criteria, including (a) expected economic and financial returns based on incremental costs and market-based pricing, and (b) strategic considerations such as alignment with relevant government plans and stated goals. For those subprojects deemed feasible, Component 2 will finance 100% of consulting services to produce detailed engineering designs. And for the (approximately 2 to 3) of these subprojects that will be selected for implementation under Component 1, based on MoTI's outlined multicriteria prioritization as informed by FS and engineering design findings, Component 2 will finance 100% of ESF documentation and construction supervision consulting services. As a matter of robustness, the FS and engineering design documentation process will incorporate the views and reflect the operating needs of end-users of the proposed facilities—shippers, transport carriers, and logistics service providers—as well as the feedback and needs from members of the surrounding communities. The production of ESF documents will comply with Bank policy and be subject to the Bank's prior review and approval.

Table A3.3. List of Priority Sites for Last-Mile Rail Infrastructure Provision to be Assessed under Component 2

Site No.	Node name	Key commodities	Branch line length (km)	Tons per year (mil)	Average length of haul (km)	Facilities to be served
1	Kütahya-2 OIZ	Containers, ceramics, paper	2.0	5.0	500	1 OIZ
2	Kütahya-1 OIZ	Containers, ceramics glass	1.0	4.0	500	1 OIZ
3	Konya-2 OIZ	Containers, agricultural products	10.0	3.6	500	1 OIZ
4	Sakarya-2 OIZ	Agricultural products, containers	26.0	2.5	200	1 OIZ
5	Akhisar OIZ	Earthenware, ceramics, containers	3.5	1.5	100	1 OIZ
6	Bilecik Bozüyük OIZ	Plaster, ceramics, containers	4.0	1.0	500	1 OIZ
7	Izmit Arslanbey OIZ	Containers	5.0	0.7	75	1 OIZ
8	Kahramanmaraş/Narli Cement	Cement, clinker	6.0	0.5	355	1 factory
9	Izmit Asim Kibar OIZ	Containers, automobiles	6.0	0.5	350	1 OIZ and 1 factory
10	Çorlu Ergene-2 OIZ	Food, containers, paper	9.6	0.5	153	1 OIZ and 1 factory
11	Türkoğlu Paper Mill	Paper products	5.0	0.4	220	1 factory
12	Denizli Oiz	Containers, copper wire, textiles, chromium	4.0	0.3	260	1 OIZ

Source: MoTI.

Component 3: Phase 2 COVID-19 Response Support, Institutional Strengthening, Capacity Building, and Project Implementation Support (IBRD US$3 million, including VAT). This component will finance 100% of consulting services to provide technical assistance and capacity building in the following areas: (i) support to MoTI to diagnose the medium- and long-term impacts of COVID-19 on multimodal logistics on the demand and supply sides, and design public, public-private, and/or purely private interventions to mitigate these impacts; (ii) support to DGII on the uniformization of rail technical standards across the national rail network; (iii) support to MoTI (DGII, DGTSR, TCDD) on the preparation of a strategy document for rail freight sector performance improvement; and (iv) support to TCDD through the development of an operational and management model for rail-enabled logistics centers consistent with international best practice, properly contextualized to the Turkish environment. Component 3 will also finance expanded staffing of the PIU, as well as training of PIU staff, for the duration of project implementation.

ANNEX 4: Detailed Economic and Financial Analysis

Economic Analysis

1. A standard economic evaluation was conducted to assess the viability of the project's proposed investments in last-mile rail and multimodal infrastructure connectivity at Filyos port and Çukurova region industrial clusters and Iskenderun Bay ports under the project's Sub-components 1.1 and 1.2, respectively. A discounted resource flow analysis of the expected economic benefits and costs of these investments, over a period of 30 years—through 2054—was used to estimate the economic returns to RLIP's interventions relative to a "business-as-usual", without-project baseline. The economic returns to delivering rail last-mile infrastructure connectivity at an additional 2 to 3 sites nationally, under RLIP's Sub-component 1.3, will be assessed during project implementation, based on evidence to be provided by feasibility studies to be conducted under Component 2 of the project.

2. **Strategic Rationale for Investment.** Turkey is a major exporter, importer, and domestic producer of bulk and voluminous commodities that in the international experience, notably in North America and Western Europe, have historically been transported by rail freight. On the exports side this primarily includes construction materials such as cement, limestone, and marble; minerals such as feldspar; finished vehicles (cars, trucks, and other transportation equipment) and automotive parts; steel and steel products, such as bars and rods; and edible bulks such as wheat flour. On the imports side this primarily includes major dry bulks like iron ore, metallurgical coal, and aluminum; major edible dry bulks such as wheat, corn, and soybeans; and major liquid bulks like petroleum products. And many of these products are also transported domestically, for example within the steel products supply chain feeding into vehicle manufacturing plants. Yet several production/consumption nodes across the country lack rail connectivity, particularly at the last mile, and as a result the use of rail for the movement of freight is limited to only 4% of total freight ton-km transported in Turkey—a fraction of the rail freight market share of comparable upper middle income and high income countries with large hinterlands and/or intense production of bulk cargo, including the U.S. (47%), South Africa (33%), Brazil (25%), Mexico (25%), the EU (17%), and China (14%).

3. According to recent survey-based evidence[46], Turkey-based shippers see lack of access to rail connections, poor quality of available rail freight services, and high relative cost of rail freight itineraries as the 3 most pressing impediments to greater use of rail in industrial supply chains. And if the experience of upper middle income and high-income countries is any guide, as Turkey's income per capita continues to improve, the movement of containerized freight will grow with it, opening up opportunities for rail intermodal container transport in the country, particularly over long-distance corridors. In sum, available evidence suggests that there is a sizable unserved or under-served bulk freight market in Turkey that has remained captive to trucking services due to gaps in railway connectivity at the last mile and shortcomings in service delivery, and that, should these gaps be addressed, there is a window of opportunity to shift freight from trucks to rail services if well-targeted investments in rail infrastructure provision, particularly at the last mile as a priority, are realized. Such is the objective of RLIP, with the greenfield, large-scale Filyos port and the industrial clusters and maritime ports of select portions of the Çukurova region and Iskenderun Bay—both high-volume bulk commodity freight hinterlands unconnected to the rail network—as flagship investments[47]. By removing trucks from the roads, these investments are expected to reduce transport costs, increase freight transport safety, and reduce the emission of greenhouse gases and local pollutants per ton-km transported.

[46] World Bank (2019), *Last Mile Connectivity: Options to Improve Freight Rail Logistics in Turkey*, Washington DC.

[47] With associated priority aspects of service delivery being addressed through technical assistance and capacity building provided under Component 3 of the project.

4. **Beyond savings in transport costs, freight transport safety improvements, and reductions in emissions footprints, RLIP's last-mile rail infrastructure connectivity investments are expected to generate wider economic benefits through firm-level productivity gains.** By providing shippers in the targeted hinterlands with more cost-competitive, and more predictable freight transport options, the project is expected to contribute to improvements in firm-level profitability, which would free-up capital for research and development (R&D) and other productivity-inducing drivers. By improving the multimodal connectivity of select maritime ports, the project will facilitate access to international markets, which can better allow firms to embed themselves in global value chains, and international experience and empirical evidence shows that importers and exporters as well as firms that participate in global value chains are more productive than purely domestically active firms. By reducing shippers' exposure to highway congestion, RLIP's investments are expected to reduce firms' levels of safety stock inventory kept on hand, thus contributing to lower levels of inputs for a given level of output. And by targeting corridors with relatively high likelihood of rail conversion based end-user commodity and logistics profiles, any modal shift that may be facilitated by the project would contribute towards mitigating Turkey's exposure to the risks of climate change and towards reducing the mission of local pollutants, both of which are likely to have an impact on productivity through fewer climate-related supply chain disruptions and better health outcomes in local communities. Ultimately, productivity gains are associated with improvements in standards of living and enhanced prospects for economic growth.

Rail Freight Demand Assessment

Filyos Port Hinterland

5. **Filyos is expected to generate rail freight demand in the short term of more than 8 million tons, owing to the pent-up, under-served nature of the port's immediate Karabuk Province hinterland; the port complex, including an industrial zone and free zone, should be able to ramp up volumes from there over time.** Currently in advanced stages of infrastructure construction (80%+), Filyos port is expected to become operational in 2024, will have a throughput capacity at full build-out of 25 million tons, and is expected to become to largest Turkish port on the Black Sea coast. Its immediate hinterland includes large-scale iron and steel production plants that are already generating millions of tons of import-export and domestic freight throughput that is largely captive to truck movements, and over longer distances than Filyos port would make possible as a new international, rail-connected gateway (with RLIP support, by the time it becomes operational Filyos will be only the second rail-connected Turkish maritime port on the Black Sea coast). Table A4.1 shows the projected Filyos port throughput for the 2024-2054 period under the with- and without-project scenarios, where (a) the with-project scenario reflects delivery of multimodal investments as proposed under Sub-component 1.1; and (b) the without-project scenario assumes truck-only "business-as-usual" last mile connectivity access to/from the port, and controls for the negative impact that gate-in/gate-out highway congestion would be expected to have on the port's ability to attract cargo an utilize its available throughput capacity.

6. These throughput projections, which show average growth rates over time slightly higher than the expected growth of the Turkish economy as a whole, are considered conservative, as greenfield maritime ports in under-served hinterlands typically see much higher throughput growth to GDP growth multipliers in the international experience. The model then converts port throughput tonnage into hinterland transport demand by assigning lengths of haul to the inbound and outbound port traffic by mode. It is assumed that in the with-project scenario, truck shipments have generally longer lengths of haul than rail shipments. This is a reflection of the commodity types that are likely to be routed via trucks (e.g., containerized freight and general cargo with higher value-to-weight ratios than bulk cargo); these flows are more likely to travel longer distances than heavy bulk freight, as they are primarily destined for or

originated in major consumption and production areas farther afield in the Marmara and North-Central Anatolia regions. It is also assumed that lengths of haul will generally increase over time for both rail and road, as (a) shippers grow more comfortable with the use of rail freight, and (b) rail intermodal containerized shipment become more common.

Table A4.1. Projected Cargo Throughput at Filyos Port and Associated Hinterland Freight Transport Demand, 2024-2054

						CAGR\1			
	2024	2030	2040	2050	2054	'24-'30	'30-'35	'35-45	'45-'54
With-project Scenario									
Total port throughput (mil of tons)	8.1	10.7	15.7	22.0	24.8	4.8%	4.1%	3.7%	3.1%
Of which:									
Bulk cargo (mil of tons)	7.8	10.0	13.5	17.9	19.9	4.2%	3.0%	3.1%	2.6%
Containerized cargo (mil of tons)	0.3	0.7	2.2	4.0	5.0	17.4%	16.0%	7.4%	5.5%
Containerized cargo ('000 of TEU)\2	24	65	218	433	530	18.6%	16.5%	7.9%	6.5%
Port throughput capacity utilization	32%	43%	63%	88%	99%				
Hinterland transport demand									
Rail (billions of ton-km)	1.3	1.8	2.7	3.9	4.5	5.8%	4.6%	4.2%	3.4%
Road (billions of ton-km)	0.4	0.5	0.8	1.2	1.5	3.6%	4.8%	4.1%	4.5%
Without-project Scenario									
Total port throughput (mil of tons)	7.3	9.3	12.6	15.8	17.0	4.1%	3.4%	2.7%	2.0%
Port throughput capacity utilization	29%	37%	50%	63%	68%				
Hinterland transport demand									
Road (billions of ton-km)	1.5	2.0	2.9	3.8	4.2	4.6%	3.9%	3.2%	2.5%
Addendum: Turkey real GDP growth						4.5%	3.8%	3.2%	2.6%

1\ CAGR = Compounded Annual Growth Rate.
2\ Including laden and empty containers.
Source: MoTI Feasibility Study; World Bank analysis and estimates.

Çukurova Region Hinterland

7. **The targeted hinterland in Çukurova under Sub-component 1.2 comprises multiple industrial and logistics clusters with significant cargo generation-attraction potential over time.** Specifically, the targeted clusters include (i) Osmaniye OIZ, in southwestern Osmaniye Province, as the main node of the proposed O-E branch line, to be served via the Osmaniye OIZ Station (see Figure A3.1 in Annex 3); and (ii) a series of adjacent facilities—in effect, a cluster of clusters—in southeastern Adana and northwestern Hatay Provinces, including the TAYSEB free zone (operational), the active Ceyhan fertilizer plant, the Ceyhan maritime bulk cargo terminal, and the prospective Ceyhan OIZ (expected to become operational in 2026), all to be served by the proposed E-T branch line via the proposed TAYSEB Station.[48] Table A4.2 shows the projected "rail capturable" freight transport demand for this hinterland in the

[48] Other facilities, clusters, and ports in this subregion, across the two proposed branch lines and connecting lines, are expected to benefit

associated transport volumes in the with and without project scenarios. It has been assumed that, in the with project scenario, these road-to-rail "capturable" volumes (which are a subset of the total volumes expected to be generated by the target demand nodes) are moved by rail to key destinations in the region, such as Iskenderun Port, based on current origin-destination flows; furthermore, it is assumed that, over time, in the out-years of the projected period, shippers take advantage of their expanded rail connectivity to extend their supply chains over longer lengths of haul to reach better-connected, more capable regional gateways, most notably Mersin port. As such, it is assumed that the average length of haul for the target nodes in the with-project scenario increases over time and is generally longer than that of the without-project, truck-only scenario. Specifically, under the without-project scenario it is assumed that all in-principle road-to-rail "capturable" volumes continue to be moved by over-the-road heavy-duty vehicles, with limited economic ability on the part of shippers to expand their lengths of haul over time.

Table A4.2. Projected Freight Transport Demand for Addressed Çukurova Hinterland, 2024-2054

						CAGR\1			
	2024	2030	2040	2050	2054	'24-'30	'30-'35	'35-45	'45-'54
Road-to-rail capturable tonnage (millions)	6.2	9.8	13.3	16.4	17.4	8.1%	3.7%	2.6%	1.6%
Of which:									
Osmaniye OIZ	4.6	5.2	6.0	6.9	7.3	2.1%	1.7%	1.5%	1.2%
TAYSEB and adjacent facilities\2	1.6	4.6	7.3	9.5	10.2	19.5%	5.8%	3.5%	1.8%
With-project scenario									
Rail transport demand (billions of rail ton-km)	0.6	1.0	1.5	2.0	2.1	9.3%	6.2%	3.1%	1.9%
Of which:									
Osmaniye OIZ	0.4	0.6	0.9	1.1	1.1	7.2%	6.4%	2.4%	1.8%
TAYSEB and adjacent facilities\2	0.2	0.4	0.7	0.9	1.0	13.3%	5.9%	3.8%	2.1%
Without-project Scenario									
Road transport demand (billions of truck ton-km)	0.5	0.7	0.9	1.2	1.2	6.0%	3.6%	2.7%	1.7%
Of which:									
Osmaniye OIZ	0.3	0.4	0.5	0.5	0.5	2.1%	1.8%	1.5%	1.2%
TAYSEB and adjacent facilities\2	0.1	0.3	0.5	0.6	0.7	13.3%	5.9%	3.8%	2.1%

1\ CAGR = Compounded Annual Growth Rate.
2\ Including Ceyhan fertilizer plant, Ceyhan maritime terminal, and Ceyhan OIZ.
Source: MoTI Feasibility Study; World Bank analysis and estimates.

Economic Cost-Benefit Analysis

8. **An economic cost-benefit analysis was conducted through a spreadsheet-based model of rail and road transport flows.** The model takes into consideration (i) the unit-cost differential between truck and rail freight

from the last-mile rail infrastructure connections provided under the project's Sub-component 1.2; these include, inter alia, Erzin port and associated Erzin OIZ on the O-E branch line, and the Ceyhan Energy Specific OIZ on the E-T line. For conservatism in the estimation of economic returns, only the five facilities listed here—Osmaniye OIZ, TAYSEB, Ceyhan fertilizer plant, Ceyhan maritime terminal, and Ceyhan OIZ—are being considered for analysis.

services in Turkey, which is primarily determined by the freight conveyance capacity of these modes and reflects the average size of heavy-duty trucks and railway lengths and wagon-load capacities in Turkey and how these are expected to evolve over time; (ii) the expected capacity of the infrastructure facilities under consideration, including the changes over time in the throughput capacity of Filyos port and the vehicle and train carrying capacities of the road and rail connections available to shippers in the targeted hinterlands; (iii) differences in the cost of accidents between road and rail itineraries per ton-km transported; and (iv) the road-vs.-rail emission factor differential per ton-kilometer transported for greenhouse gases (CO_2 equivalent), which contribute to the risks of climate change, and local pollutants (particulate matter [PM_{10}] and mono-nitrogen oxides [NO_X]), which cause smog and are associated with respiratory disease in local populations. The model takes into consideration differentiated average lengths of haul by mode, and the likely ways in which average lengths of haul may change over time—with the key assumption being that rail average lengths of haul are likely to increase over time.

9. **Typology of Net Economic Benefits.** For each of the proposed investments, the model assesses three sources of net economic benefits when comparing the with- and without-project scenarios: (i) changes in transport costs incurred by shippers and beneficial cargo owners when deciding how to route their goods from origin to destination, in terms of truck vs. rail itineraries; (ii) changes in the cost of traffic accidents associated with the freight transport safety profile differential between trucking and rail freight services; and (iii) changes in the emissions of CO_2, PM_{10}, and NO_X. The project's civil works interventions under Sub-components 1.1 and 1.2 are expected to result in net economic savings in transport costs, freight transport accident costs, and the cost of emissions of greenhouse gases and local pollutants. Based on World Bank standard guidance[49], the economic value of a ton of CO_2 is assumed to be US$44 in 2024 (the first year the proposed investments become operational), growing gradually in real terms to reach US$50 in 2030, US$63 in 2040, US$70 in 2045, and US$78 in 2050-2054. Based on Europe-specific parameters[50], the economic value of a kilogram of PM_{10} and a kilogram of NO_X in 2024 is assumed to be US$24 and US$13, respectively, and growing in real terms at the same rate of growth assumed for the unit value of a ton of CO_2. A residual value of 20% of the 2020 economic cost of the infrastructure investments was assumed to be recovered as a benefit at the end of the appraisal period. Table A4.3 summarizes the key parameters used to model the economic benefits of project interventions, based on differences in transport costs, safety profile, and emission factors by mode[51].

10. **Typology of Economic Costs.** Implementation costs for the Filyos and Çukurova rail and multimodal infrastructure expansion interventions include the cost of civil works and acquisition and installation of equipment, inclusive of construction supervision consulting services. Financial costs were converted to economic costs by removing VAT and exclude land acquisition and resettlement compensation payments, which are considered net economic transfers. The economic cost estimates, shown in Table A4.4, were obtained from DGII's feasibility studies

[49] World Bank, "Social Value of Carbon in Economic Analysis Guidance Note", 2017. For conservatism in modeling assumptions, the Guidance Note's "low case" for the shadow price of carbon was used throughout.

[50] CE Delft (2018*), Environmental Prices Handbook EU28 Version: Methods and Numbers for Valuation of Environmental Impacts*. For conservatism in modeling assumptions, the report's "lower level" values of atmospheric emissions were used. These values consider the correlation between pollutant emissions and are based on a combination of characterization models, impact pathway analyses (including dose-response functions), and valuation methods to arrive at the social cost of pollution, or "environmental prices". These prices estimate "the loss of economic welfare that occurs when one additional kilogram of the pollutant finds its way into the environment."

[51] The emissions factors for CO_2, PM_{10}, and NO_X were taken from Europe-specific estimates, as provided by CE Delft (2016), *STREAM Freight Transport 2016: Emissions of Freight Transport Modes*; and by ECTA/CEFIC (2011), *Guidelines for Measuring and Managing CO_2 Emission from Freight Transport Operations*, and further informed by Turkey-specific drivers such as average size of trucks and trains and commodity types in the targeted hinterlands.

for both subprojects. It was further assumed that (a) routine maintenance on all facilities is to be conducted yearly, with an economic cost equal to 0.5% of the economic cost of civil works and equipment; and (b) periodic maintenance is conducted every 5 years, with an economic cost equal to 4% of the economic cost of civil works and equipment.

Table A4.3. Key Transport Parameters Used to Model Economic Benefits

Transport costs (2020 US$ per ton-km transported)	
Trucking	0.063
Rail	0.024

Unit cost of accidents (2020 US$ per ton-km transported)	
Trucking	0.003
Rail	0.0004

Emission factors (grams per ton-km transported)

	CO_2	PM_{10}	NO_X
Trucking (15-tons)	104	0.009	0.7
Rail (up to 935 ton capacity)	23	0.006	0.3
Rail (up to 1,400 tons)	18	0.005	0.2
Rail (up to 1,870 tons)	15	0.005	0.2

Source: MoTI Feasibility Study; ATRI; Kirbas and Bas (2018); CE Delft; ECTA/CEFIC; World Bank analysis and estimates.

Table A4.4. Economic Costs of Construction[1]

Millions of 2020 US$ excluding VAT

Filyos Port Complex Connections

Rail Construction Costs	
Railway line	54.9
Traction systems	7.8
Intermodal stations	7.9
Bridge	7.6
Loading dock	0.1
Rail construction sub-total	**78.3**
Road Construction Costs	
Highway	17.8
Overpass	0.9
Bridge	13.5
Road construction sub-total	**32.2**
Engineering services	2.2
Total baseline costs	**112.8**
Contingencies	9.0
Total costs	**121.8**

Çukurova Connections

	Osmaniye OIZ-Erzin Port Line	**Erzin Station-TAYSEB Line**	**Total**
Route earth works	3.4	6.5	9.9
Engineering structures	0.5	0.7	1.2
Bridges and viaducts	2.4	3.1	5.5
Station facilities	4.2	4.2	8.3
Culverts, creek crossings	0.5	0.5	1.0
Infrastructure transfers	0.6	0.7	1.3
Superstructure works	16.4	20.3	36.7
Electrification works	4.5	5.6	10.1
Signaling works	3.0	3.7	6.6
Telecommunications	2.5	3.2	5.7
Construction costs	**38.1**	**48.5**	**86.5**
Engineering Services	1.6	2.1	3.7
Total baseline costs	**39.7**	**50.5**	**90.2**
Contingencies	3.2	4.0	7.2
Total costs	**42.9**	**54.6**	**97.4**

1\ In the Filyos case, the difference in costs between this table and Table A3.1 is that data in the latter include VAT.
Source: MoTI Feasibility Study; World Bank analysis.

11. **Economic Returns and Sensitivity Analysis.** Comparing the economic benefits and costs of the with- and without-project scenarios for each of the subprojects yields an Economic Internal Rate of Return (EIRR) of 35% for the Filyos investment, 24% for the O-E Branch Line, 20% for the E-T Branch Line, a blended 22% for both Çukurova branch lines, and an overall EIRR of both subprojects combined of 30%, all of which are above the recommended economic cost of capital for Turkey of 6%[52] (see Table A4.5). At this rate, these interventions generate an Economic Net Present Value (ENPV), respectively, of US$790 million, US$108 million, US$131 million, US$239 million, and US$1.0 billion. On this basis, it is concluded that RLIP's proposed investments under Sub-components 1.1 and 1.2 are economically viable, will create net economic value to the Turkish economy, and are therefore desirable as a manner of economic efficiency and public policy. Sensitivity analysis indicates that the economic viability of these investments is robust—in all cases—to simultaneous increases in costs and decreases in benefits of at least 25%.

Table A4.5. Economic Evaluation of Standalone and Blended Filyos and Çukurova Investments under RLIP Sub-components 1.1 and 1.2
Millions of 2020 US$

	Present value of economic costs		Present value of economic benefits					Economic evaluation	
	Capital\1	O&M	Transport costs	Transport safety	CO_2 emissions abatement	PM_{10} emissions abatement	NO_X emissions abatement	ENPV	EIRR
Filyos Investment	(105)	(17)	633	52	95	1	131	**790**	**35%**
Çukurova Investments									
Osmaniye OIZ-Erzin Port Branch Line (O-E)	(46)	(7)	115	12	18	(0)	15	**108**	**24%**
Erzin Station - TAYSEB Branch Line (E-T)	(36)	(6)	123	11	19	0	20	**131**	**20%**
Blended Çukurova Investments	(82)	(13)	239	23	37	(0)	34	**239**	**22%**
Blended Filyos and Çukurova Investments	(187)	(30)	871	76	132	1	165	**1,029**	**30%**

1\ Including the offsetting infrastructure residual value at the end of the analysis period (2054).
Source: World Bank analysis and estimates.

Financial Analysis

12. A financial analysis was conducted to assess whether the Filyos and Çukurova last-mile rail infrastructure investments[53] are viable in purely financial terms, i.e., at the level of the firm—in this case, at the level of TCDD *as a whole*, across the public infrastructure manager (TCDD) and the incumbent public rail freight carrier (TCDD Transport). The relevance of this analysis is that the project-financed infrastructure will only deliver its intended

[52] World Bank, "Discounting Costs and Benefits in Economic Analysis of World Bank Projects", 2016.
[53] In the case of Filyos, this excludes the last-mile road infrastructure investments.

economic impact if rail services are indeed provided on these branch lines and on through TCDD's main linehaul network; and for this to happen, these services must be financially viable, inclusive of the cost of infrastructure provision and rail service operating costs. These services are expected to be provided by TCDD Transport, under track access rights granted by TCDD.

13. The typology of revenues and costs for this financial analysis includes branch line infrastructure construction costs, branch line and linehaul infrastructure maintenance costs, rail transport operation costs, and rail transport revenues. This combination of costs and revenues is in practice borne by different entities. Last-mile infrastructure development costs are borne by MoTI (through DGII) and are expected to be at least partially defrayed by track access revenue captured by TCDD; branch line and linehaul infrastructure maintenance costs are borne by TCDD, and they too are expected to be at least partially defrayed by track access charge revenues; the cost of operating rail freight services is borne by TCDD Transport; and the revenues from delivering rail freight services, including branch line/siding and linehaul revenue, are captured by TCDD Transport. The most meaningful way to assess the financial viability of the proposed investments is to do so from the perspective of TCDD as a whole, including both infrastructure management and transport service delivery. Such an analysis excludes track access charges, as these are a revenue line item for the infrastructure manager (TCDD) and a cost line item for the railway undertaking (TCDD Transport).

14. The goal of the "whole of TCDD" approach is to determine whether the expected revenues from rail services, when compared to the various categories of cost just listed, generate financial returns that are above the financial discount rate. The latter is defined as the cost of IBRD financing, assumed to be in the vicinity of 2.8%.[54] Because the costs and revenues involved in this analysis are financial and not economic in nature, capital costs include VAT and the cost of land acquisition, but exclude contingencies. The expected transport demand volumes for the branch line investments used in this analysis are the same as those presented in the Economic Analysis section above.

15. A key component of the financial analysis is a differentiation between the construction and maintenance cost of using branch line infrastructure compared to using linehaul infrastructure. The use of branch line infrastructure, which under RLIP refers to entirely greenfield investments, should be fully costed, including the cost of infrastructure provision and maintenance. The use of linehaul infrastructure, on the other hand, should reflect marginal or incremental costs only, because this infrastructure already exists and therefore has sunk cost elements to it. As a result, only incremental costs in the maintenance of linehaul infrastructure are included in the analysis; the cost of constructing the linehaul infrastructure in the first place is, from the perspective of the RLIP-financed branch lines, a sunk cost, and therefore irrelevant for investment decision making purposes regarding the branch lines. Based on TCDD information, it is assumed that branch line infrastructure maintenance costs are US$14,000 per km; the marginal maintenance cost of linehaul infrastructure is assumed to be US$1.0 per every 1,000 ton-km transported.

16. Similarly, the cost of operating trains along branch lines and the linehaul network must be assessed on an incremental basis—to avoid double-counting—and it should reflect the unique characteristics of the project-targeted corridors. For example, the Filyos and Çukurova rail corridors are expected to generate sufficient freight volumes to justify the deployment of block or semi-block trainloads, which reduces operating costs and increases rolling stock utilization compared to average operations network-wide. Based on data provided by TCDD, it is estimated that the incremental train operation cost for the corridors targeted by the project are US$0.018 per ton-km in the case of

[54] As of January 1, 2020, the IBRD fixed spread for Pricing Group C, which includes Turkey, was LIBOR+1.80% for the average maturity bucket 18-20 years. As of March 19, 2020, the 6-month US$ LIBOR rate was 0.9795%. As such, the cost of IBRD financing is assumed to be approximately 2.8%.

Filyos and US$0.017 per ton-km in the case of Çukurova. These incremental costs are approximately 30% lower than the costs applicable network wide.

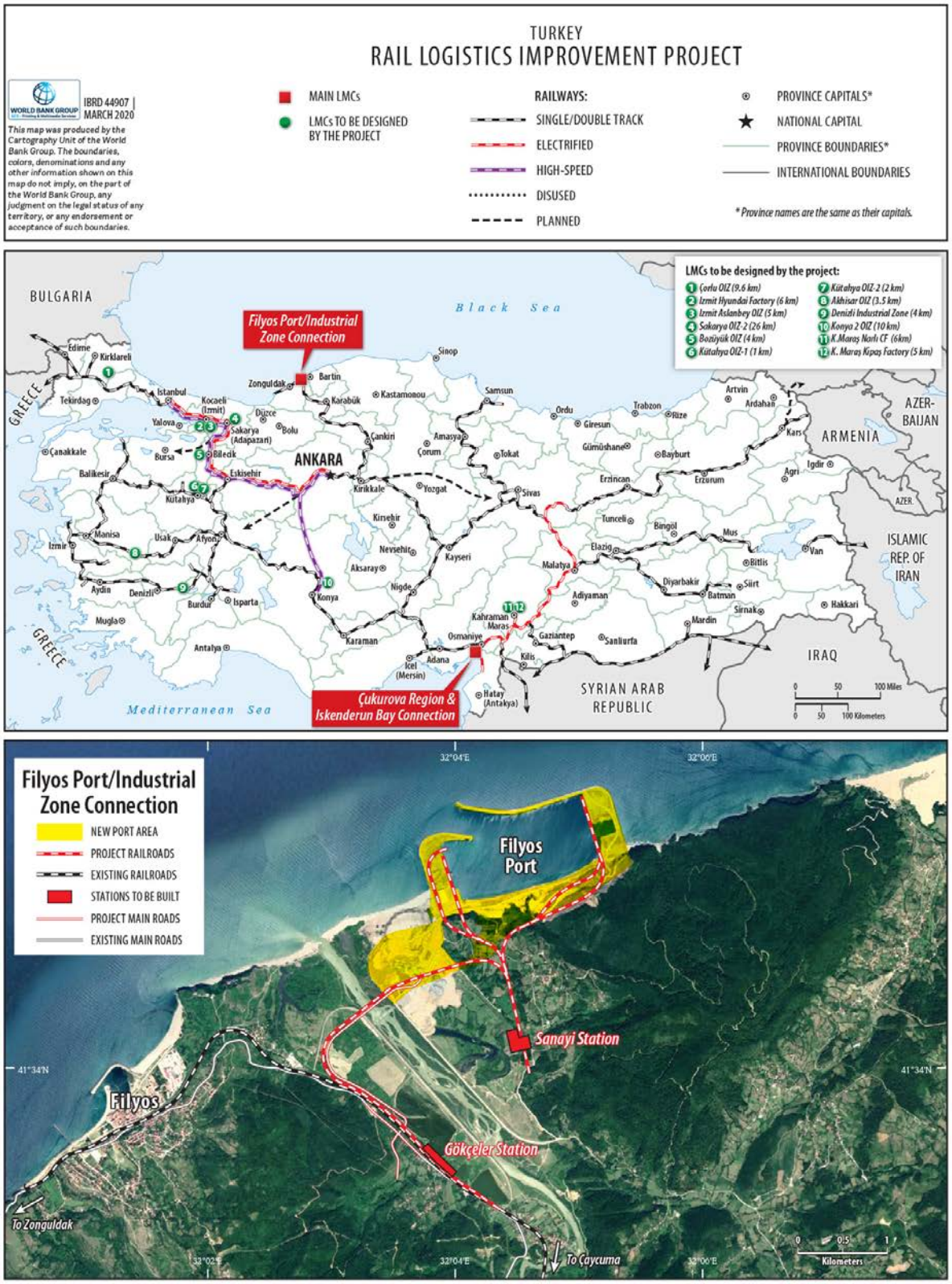
17. The results of the financial analysis are presented in Table A4.6. Similar to the economic analysis parameters presented earlier, this analysis assumes the launch of train operations in 2024 for both regional investments, a rail transport tariff of US$0.024 per ton-km (as reported by TCDD Transport), and an analysis period of 30 years (2024-2054). The results show that all investments are financially viable relative to the cost of IBRD financing. Specifically, it is estimated that the Filyos investment will yield a FIRR of 9.2%, the blended Çukurova investments a FIRR of 5.7%, and the blended Filyos and Çukurova investments a FIRR of 7.5%. At the financial discount rate of 2.8%, the investments are estimated to yield an NPV of US$146 million, US$62 million, and US$208 million, respectively, in 2020 prices. Sensitivity analysis confirms that the financial viability of the standalone and blended investments is robust to simultaneous increases in costs and decreases in revenue of between 5% and 6%.

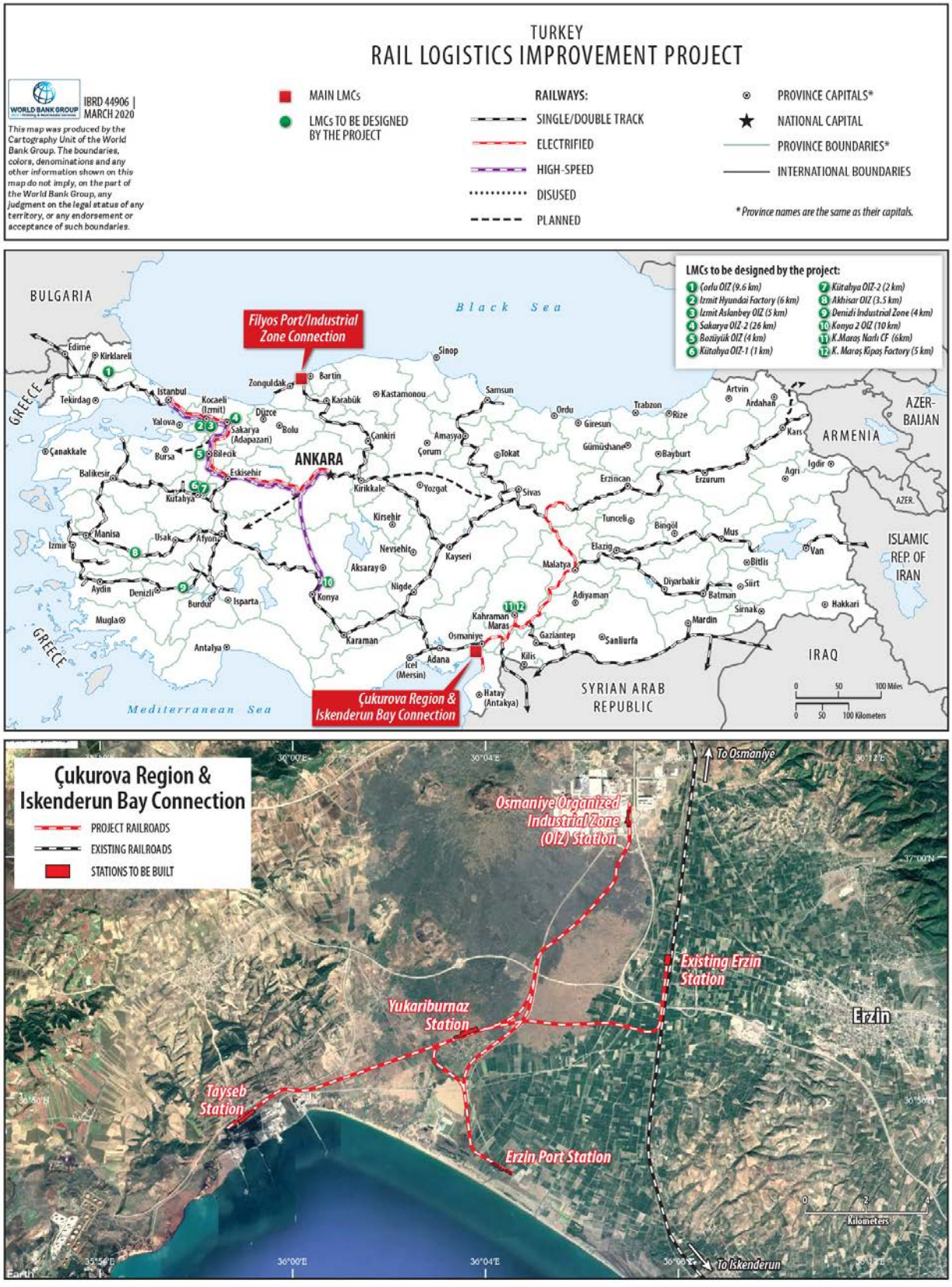
Table A4.6. Financial Evaluation of Standalone and Blended Filyos and Çukurova Investments under RLIP Sub-components 1.1 and 1.2 from the Perspective of Infrastructure Provision and Service Delivery
Millions of 2020 US$

	Present value of infrastructure costs			Present value of rail service provision flows		Fincancial evaluation	
	Branch line capital costs\1	Branch line maintenance costs	Incremental linehaul maintenance costs	Operating revenue	Operating costs	**NPV @ 2.8%**	**FIRR**
Filyos Investment	(81)	(4)	(48)	1,133	(856)	**146**	**9.2%**
Çukurova Investments							
Osmaniye OIZ-Erzin Port Branch Line (O-E)	(51)	(6)	(14)	341	(235)	**35**	**5.8%**
Erzin Station - TAYSEB Branch Line (E-T)	(40)	(5)	(11)	267	(184)	**27**	**5.6%**
Blended Çukurova Investments	(91)	(11)	(25)	608	(418)	**62**	**5.7%**
Blended Filyos and Çukurova Investments	(172)	(15)	(73)	1,741	(1,274)	**208**	**7.5%**

1\ Including the offsetting infrastructure residual value at the end of the analysis period (2054).
Source: World Bank analysis and estimates.

ANNEX 5: Project Area Maps




TURKEY
RAIL LOGISTICS IMPROVEMENT PROJECT
IBRD 44906 | MARCH 2020
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MAIN LMCs
LMCs TO BE DESIGNED BY THE PROJECT
RAILWAYS:
SINGLE/DOUBLE TRACK
ELECTRIFIED
HIGH-SPEED
DISUSED
PLANNED
PROVINCE CAPITALS*
NATIONAL CAPITAL
PROVINCE BOUNDARIES*
INTERNATIONAL BOUNDARIES
* Province names are the same as their capitals.
LMCs to be designed by the project:
1 Çorlu OIZ (9.6 km)
2 Izmit Hyundai Factory (6 km)
3 Izmit Aslanbey OIZ (5 km)
4 Sakarya OIZ-2 (26 km)
5 Bozüyük OIZ (4 km)
6 Kütahya OIZ-1 (1 km)
7 Kütahya OIZ-2 (2 km)
8 Akhisar OIZ (3.5 km)
9 Denizli Industrial Zone (4 km)
10 Konya 2 OIZ (10 km)
11 K.Maraş Narlı CF (6km)
12 K. Maraş Kipaş Factory (5 km)
Filyos Port/Industrial Zone Connection
Çukurova Region & Iskenderun Bay Connection
BULGARIA
GREECE
Black Sea
Mediterranean Sea
ANKARA
SYRIAN ARAB REPUBLIC
IRAQ
ARMENIA
AZER-BAIJAN
ISLAMIC REP. OF IRAN
Çukurova Region & Iskenderun Bay Connection
PROJECT RAILROADS
EXISTING RAILROADS
STATIONS TO BE BUILT
Osmaniye Organized Industrial Zone (OIZ) Station
Existing Erzin Station
Yukariburnaz Station
Tayseb Station
Erzin Port Station
To Osmaniye
To Iskenderun
Erzin