ECONOMIC AND FINANCIAL ANALYSIS

A. Introduction

1. The South Asia Subregional Economic Cooperation (SASEC) Port Access Elevated Highway (PAEH) was originally proposed in Sri Lanka's National Road Sector Master Plan (2007–2017) with the intention of connecting the core of Colombo city with the expressway network. The proposal was further recommended in the Japan International Cooperation Agency (JICA)-funded Urban Transport Masterplan for Colombo Metropolitan Region and Suburbs conducted in 2014, which emphasized the need for a north–south bypass to avoid the congested urban street network in the city. The finalized trace, falling over the existing port access road and internal port main road connecting Galle Face and the JICA-funded New Kelani Bridge, was selected as the best among several alternatives studied under the Asian Development Bank (ADB)-funded Road Project Preparatory Facility in 2014.[1] The construction of this highway will provide (i) north–south traffic bypass for Colombo city, (ii) direct access to the Colombo city core from the expressway network, and (iii) improved access to the Colombo port in addition to reducing congestion on some urban roads.

B. Engineering Design

2. The PAEH has been designed as a four-lane elevated expressway with limited access allowing only for four-wheeled vehicles with designated maximum speed of 80 kilometers per hour (km/h). The highway is accessible at either end and via a port ramp at Colombo port. The cement-concreted structure with asphalt-concreted top surface would provide a 23.4 meter-wide carriageway for motorized vehicles with a 1.0 meter-wide center median. It has 2.5 meter-wide shoulders on both sides. The construction works together with a 3-year defect notification period will be handed over to a contractor selected based on the International Federation of Consulting Engineers (FIDIC) Yellow Book. Construction works are planned to start in the first quarter of 2019 and will be completed in the last quarter of 2021, while opening for traffic in the first quarter of 2022. The design life of the project is assumed as 30 years.

C. Demand Analysis

3. The average annual daily traffic (AADT) for PAEH for the base year (2018) was established based on the traffic counts and origin–destination interviews conducted on three southern access corridors to the PAEH. Both the surveys were conducted for 24 hours and for both directions targeting potential two-way traffic to the PAEH. Based on the results of the origin–destination surveys, the probable share of diversions to the PAEH was determined for different vehicle categories by using diversion curve equations, which take the cost ratio of using the expressway and the existing road network as the determinant.[2] Once the shares of probable diversions were determined for different vehicle types, they were further adjusted for willingness to pay, assessed through a field survey conducted simultaneously with the aforementioned other surveys. Eventually such adjusted shares of diversions were weighted with the counts of respective vehicle categories to establish average daily traffic for the PAEH. Since there is no proper study on seasonal variations of traffic, it is conservatively assumed that AADT is equal to the calculated average daily traffic. The estimated base year AADT for the PAEH together with its composition is given in Table 1 by vehicle categories.

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[1] ADB. 2004. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Democratic Socialist Republic of Sri Lanka for the Road Project Preparatory Facility*. Manila.

[2] L. R. Kadiyali. 2008. *Traffic Engineering and Transport Planning*. 7th Edition. Delhi: Khanna Publishers.

4. Once a portion of traffic is diverted to the PAEH, there will be a reduction in traffic on the alternative roads aligned with the PAEH and, hence, vehicle users on those roads will enjoy comparatively higher speeds, resulting in lower travel times and vehicle operating costs. The users of these alternative roads are the ones who are potentially divertible to the PAEH but will not use it because of their unwillingness to pay the toll and/or ineligibility to use the PAEH (two- and three-wheelers). Such traffic on alternative roads is estimated as the aggregation of the remainder of diverted four-wheeled-vehicle traffic to the PAEH and all two- and three-wheelers having travel desires to use the PAEH. Table 1 presents such estimated AADT together with its composition for alternative roads.

Table 1: Estimated Base Year (2018) Average Annual Daily Traffic for Port Access Elevated Highway and Alternative Roads

		Composition (%)									
Item	**AADT**	**Motor Cycle**	**Three Wheeler**	**Car**	**Van**	**Bus**	**Route Bus**	**Light Goods**	**Medium Goods**	**Heavy Goods**	**Multi-Axle**
PAEH	**15,126**			60.8	22.9	3.7	1.0	2.6	2.2	1.7	5.0
Alternative roads	**37,301**	25.6	36.0	22.7	7.5	1.5	4.5	1.1	0.7	0.4	0.1

AADT = average annual daily traffic, PAEH = Port Access Elevated Highway Project.
Source: Asian Development Bank estimates.

5. In addition to the traffic diversion at base year, there will be a diversion of port cargo traffic to the PAEH in 2027 when a new inspection facility is constructed along the Colombo–Katunayake Expressway or Outer Circular Highway. It is estimated that this new facility will attract an additional 1,880 vehicles per day to the PAEH starting in 2027. The generated traffic due to upcoming developments in the project-influenced area is conservatively disregarded in this analysis because of the uncertainty of the amount of traffic generation and their effective years.[3] Moreover, since the PAEH is tolled, no traffic generated from new connectivity is considered.

6. Growth trends for normal traffic were established by relating growth in per capita income, population, and gross domestic product (GDP) to the growth in private vehicles, public buses, and goods vehicles. Growth trend analysis was confined to the Western Province since more than 90% of trips are within the province. Based on past statistics obtained from published sources, correlations between per-capita income and private vehicles, population, and public buses, and GDP and freight vehicles were established and fitted into equations through regression analysis.[4] Assuming the same correlations continue for the next 30 years for normal traffic, future vehicle fleets by category were estimated for 2030, 2040, and 2050, applying published forecasts for GDP, population, and per-capita income for respective years. The vehicle fleet growth rate thus derived is taken as a proxy for growth rates for normal traffic. Such estimated traffic growth rates are used for projection of normal traffic as given in Table 2.

Table 2: Traffic Growth Rates

(%)

Vehicle Type	**2019–2031**	**2032–2041**	**2042–2051**
Private vehicles	4.4	3.3	2.3
Public buses	2.9	2.3	1.7
Goods vehicles	1.9	1.5	1.3

Source: Asian Development Bank estimates.

[3] Upcoming developments in the project-influenced area include port expansion, the Port City (phases I and II), and the multimodal transport hub in Pettah. These will generate traffic in future and in turn improve the economic internal rate of return calculated herein.

[4] Central Bank of Sri Lanka. 2017. *Economic and Social Statistics of Sri Lanka*. Colombo; and National Transport Commission. 2017. *National Transport Statistics*. Colombo.

7. It should be noted that Colombo Port-oriented cargo traffic is unlikely to follow the same growth rates established for goods vehicles in normal traffic (Table 2), especially with the effect of the upcoming port expansion program. Therefore, port traffic, which accounts for 96% of multi-axle vehicles and 50% of heavy goods vehicles given in Table 1, was treated separately in their forecasting. The growth of these vehicles was estimated at 5.6% for 2019–2025, 3.0% for 2026–2030, and 1.4% for 2030–2051 in line with the gateway demand forecasting for the port.[5] The port traffic expected to divert to the PAEH in 2027 (para. 5) would also follow these growth trends.

D. Economic Analysis

8. The economic analysis was carried out following ADB's guidelines and using the Highway Development and Management Model (HDM IV) by comparing transport costs for road agency and transport users in with- and without-project scenarios.[6] The without-project scenario included routine and periodic maintenance for alternative roads with no capacity improvement. The with-project scenario included the newly built PAEH and all interventions considered for alternative roads under the without-project scenario. The analysis assumed that the length of alternative road is the same as that of the PAEH, considering the geographical orientation of the network.

9. The evaluation was carried out for a 33-year benefit period, including the 3-year construction period commencing in the first quarter of 2019. The PAEH would be opened for traffic in the first quarter of 2022. The project includes newly built structures that have an asset life much longer than the benefit period. Hence, the salvage value of 20% at the end of the benefit period was estimated assuming a 40-year life span for structures. The analysis used 2019 constant prices and a discount rate of 9% to actualize net benefits.

10. The construction cost used in the analysis is based on Road Development Authority estimates prepared for the project. The cost includes those for civil works, the electronic toll collection system, environmental impact mitigation (to control dust, noise, waste, and traffic disruption caused by construction), shifting utilities, quality control, construction supervision, project management, and physical contingencies.[7] The estimated financial cost of the construction is converted to economic cost by leaving out financial contingencies and value-added tax first and then applying a conversion factor of 0.85 to the remainder. The conversion factor is calculated based on the border price numeraire and in accordance with the ADB guidelines by applying a standard conversion factor and a shadow wage rate factor as required to the cost component of the project.[8] The costs for periodic maintenance, routine maintenance, and operational functions were also estimated based on the details provided in the feasibility study. The estimated financial and economic costs are summarized by category in Table 3.

Table 3: Cost of Construction, Operation, and Maintenance
(SLRs million)

Cost	Financial Cost	Economic Cost
Construction cost/km[a]	9,235.9	7,850.5
Annual operational cost/km	18.0	15.3

[5] Sri Lanka Ports Authority. 2018. *Sri Lanka National Ports Master Plan, Colombo Port Development Plan.* Colombo.
[6] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.
[7] Civil work costs include widening the existing port access road and part of the relocation cost of the maritime facilitation center and a workshop, in addition to the construction cost of the Port Access Elevated Highway.
[8] A standard conversion factor of 0.97 estimated from trade data was used for approximating the border price equivalent of nontraded inputs and outputs. A shadow wage rate factor of 1.0 for skilled and semiskilled workers and 0.72 for unskilled labor was used.

Cost	Financial Cost	Economic Cost
Periodic maintenance cost/km	100.0	85.0
Annual routine maintenance cost/km	6.0	5.1

km = kilometer.
[a] Disbursement of construction cost is calculated at 25% for 2019, 41% for 2020, and 34% for 2021.
Source: Asian Development Bank estimates.

11. The economic analysis has estimated three types of benefits for the diverted traffic to the PAEH: (i) savings in vehicle operating costs due to improved road conditions, (ii) savings in travel time due to increased travel speeds, and (iii) savings in carbon dioxide (CO_2) emission cost. In addition, savings attributable to easing traffic congestion on alternative roads are estimated and added to the total benefits of the project (para. 4).

12. The average speed on the existing urban network is currently about 16 km/h. Following the construction of PAEH, the average speed for diverted traffic will be increased to 70 km/h when using the PAEH. The travel times in the with- and without-project scenarios are estimated by the HDM, and the value of time saved is included in the analysis. The unit value of passenger time used in the HDM is given in Table 4. The values of passenger times were estimated based on current income levels and published data in Sri Lanka using the methodology from the government manual, which defines users of public and private transport by income categories.[9] The value of cargo delay per hour was derived as the opportunity cost of capital tied up in delayed cargo (value of cargo multiplied by the interest rate) and was estimated at SLRs22 for light commercial vehicles and SLRs66 for trucks. This assumes a cargo value of SLRs200,000 per ton for light commercial vehicles and SLRs2,500,000 per ton for trucks, an interest rate of 15%, and two-thirds of cargo vehicles benefited. The shadow wage rate factor for unskilled workers was applied to public transport users' time value, assuming one-third of public transport users are unskilled workers. All time values were converted to the border price equivalent.

Table 4: Value of Travel Time for Passengers and Occupancy Rates, 2018

Vehicle Type	Value of Work Time (SLRs/hr)	Value of Nonwork Time (SLRs/hr)	Occupancy Rate
Two- and three-wheeler	113.6	18.9	1.5
Car and jeep	598.2	99.7	2.5
Van	598.2	99.7	4.5
Public transport	59.2	9.9	25.0–40.0

hr = hour, SLRs = Sri Lanka rupees.
Source: Asian Development Bank estimates.

13. The HDM was used to estimate the vehicle operating cost (VOC) for the traffic under the with- and without-project scenarios. The model estimates VOCs taking into account the speed, travel time, surface quality, road congestion, vehicle characteristics, and economic prices (including capital cost, maintenance cost, crew cost, fuel, and lubricants). The net reductions in VOCs are presented as savings. Furthermore, the emission model built into HDM IV is capable of estimating the net annual change (increase or decrease) of CO_2 in terms of quantity when the project is implemented. For this estimation, the model primarily uses input characteristics data for vehicle fleet and road conditions. Such estimated savings in quantity were monetized by using a unit value of $36.30 per ton of CO_2 in 2016 prices and are expected to increase by 2% annually in real terms (footnote 5). In addition, benefits resulting from easing traffic congestion on alternative roads were estimated as an aggregation of savings in VOCs and travel times. Such

[9] Government of Sri Lanka, Ministry of Finance and Planning. 2001. *Assessing public investment in the transport sector*. Colombo.

benefits are an expected result of an increase in the operating speed of about 16 km/h in the without-project scenario and 18 km/h in the with-project scenario.

14. During the construction phase, there will be no major disruption to normal traffic since the construction site is within port premises and that site itself is a considerable distance from the congested city core. However, the traffic currently using the main internal road in the port may have to detour away from the construction site. Such detours only increase the trip length marginally for a fewer number of vehicles and hence are not considered in the analysis.

15. The results of the economic analysis demonstrate that the project is economically feasible for implementation with an economic internal rate of return (EIRR) of 14.0% and an economic net present value of SLRs18,451.1 million at a 9% discount rate. The analysis further indicates that savings in travel time account for 51.1% of total benefits, whereas savings in VOCs account for 35.3%, and reduction of congestion accounts for 13.1% over the design life of 30 years. The project also has a positive impact on CO_2 emission with 0.5% contribution to total benefits. The cost–benefit stream for the project is shown in Table 5.[10]

Table 5: Cost–Benefit Stream for the Project
(SLRs million, 2019 constant prices)

Year	Capital Costs	Recurrent Costs	VOC Savings	VOTT Savings	CO_2 Saving	Congestion Reduction Saving	Net Benefits	Discounted Benefits
2019	7,821.4	0.0	0.0	0.0	0.0	0.0	(7,821.4)	(7,821.4)
2020	12,827.1	0.0	0.0	0.0	0.0	0.0	(12,827.1)	(11,768.0)
2021	10,637.1	0.0	0.0	0.0	0.0	0.0	(10,637.1)	(8,953.1)
2022	0.0	26.3	1,094.6	1,561.2	32.4	587.3	3,249.2	2,509.0
2023	(40.1)	26.6	1,340.7	1,690.6	36.8	612.6	3,694.2	2,617.1
2024	0.0	26.1	1,182.2	1,840.8	38.5	635.5	3,670.8	2,385.8
2025	0.0	26.1	1,309.8	2,025.4	43.5	660.0	4,012.6	2,392.6
2026	0.0	26.0	1,465.1	2,253.8	50.1	685.3	4,428.3	2,422.5
2027	0.0	25.6	2,066.5	2,735.6	64.2	711.6	5,552.3	2,786.5
2028	0.0	25.2	2,092.9	2,772.0	46.2	738.8	5,624.8	2,589.8
2029	447.8	25.3	2,164.1	2,872.5	44.5	767.0	5,375.1	2,270.5
2030	0.0	25.1	2,300.8	2,976.9	43.9	796.2	6,092.8	2,361.2
2031	0.0	25.0	2,393.5	3,089.9	41.7	826.4	6,326.6	2,249.3
2032	0.0	24.9	2,465.5	3,176.2	39.7	850.3	6,506.8	2,122.4
2033	(40.1)	26.6	2,543.0	3,268.1	38.4	850.9	6,713.9	2,009.1
2034	0.0	24.6	2,476.2	3,362.3	35.5	851.3	6,700.7	1,839.6
2035	0.0	24.5	2,542.0	3,459.2	33.7	851.8	6,862.3	1,728.4
2036	0.0	24.3	2,606.6	3,551.1	32.7	852.3	7,018.4	1,621.8
2037	0.0	24.2	2,671.1	3,642.6	31.8	852.8	7,174.1	1,520.9
2038	0.0	24.1	2,642.5	3,652.3	28.9	853.3	7,152.8	1,391.2
2039	0.0	24.1	2,591.3	3,645.3	26.7	853.8	7,093.0	1,265.6
2040	0.0	24.1	2,537.4	3,636.8	24.7	854.3	7,029.0	1,150.6
2041	447.8	24.1	2,479.2	3,624.7	22.4	854.8	6,509.2	977.6
2042	0.0	24.0	2,520.5	3,606.8	22.9	855.0	6,981.3	961.9
2043	(40.1)	26.5	2,483.3	3,584.8	21.0	855.4	6,958.0	879.5
2044	0.0	24.0	2,303.3	3,560.0	17.3	855.6	6,712.0	778.4

[10] The economic internal rate of return (EIRR) (excluding CO_2 emissions savings) is 13.9%.

Year	Capital Costs	Recurrent Costs	VOC Savings	VOTT Savings	CO_2 Saving	Congestion Reduction Saving	Net Benefits	Discounted Benefits
2045	0.0	24.0	2,251.0	3,532.2	14.8	855.8	6,629.8	705.4
2046	0.0	24.0	2,202.5	3,515.6	11.6	856.1	6,561.9	640.5
2047	0.0	24.0	2,155.1	3,505.1	8.2	856.3	6,500.7	582.1
2048	0.0	23.9	2,104.5	3,493.9	4.4	856.6	6,435.4	528.7
2049	0.0	24.0	2,049.6	3,481.9	0.5	856.8	6,364.8	479.7
2050	0.0	23.9	1,992.4	3,469.2	(3.7)	857.1	6,291.0	435.0
2051	(6,257.1)	23.9	1,933.4	3,455.8	(8.1)	857.3	12,471.6	791.2
TOTAL	**25,803.7**	**744.7**	**64,960.3**	**94,042.6**	**844.9**	**24,108.5**	**157,407.9**	**18,451.1**
							NPV @ 9%	**18,451.1**
							EIRR	**14.0%**

( ) = negative, CO_2 = carbon dioxide, EIRR = economic internal rate of return, NPV = net present value, VOC = vehicle operating cost, VOTT = value of travel time.
Source: Asian Development Bank.

E. Sensitivity Analysis

16. The construction cost and benefit estimates involve uncertainties as the cost estimates are not based on the actual contract award amounts, and traffic growth rates are estimated based on past economic and vehicle fleet growth trends. The sensitivity analysis was carried out with respect to adverse changes in the costs and benefits that can influence the project's economic viability. The results of the analysis indicate that the project holds an EIRR of 12.9% in the case of a 10.0% increase in estimated construction cost and 12.8% with a 10.0% decrease in estimated benefits, indicating the investment is securely feasible under those independent cases. Even in the worst case, the EIRR stays over 11.8%, showing that the investment is strongly risk free and remains feasible.

F. Financial Analysis

17. The financial analysis examines the financial viability of the PAEH by assessing the adequacy of its generated revenue to cover the cost incurred during the 30-year benefit period. The project revenue was estimated based on tolls imposed on road users. The Road Development Authority calculated appropriate toll rates per trip for different vehicle users of the PAEH at SLRs160 for cars and light goods vehicles, SLRs180 for vans and minibuses, SLRs200 for standard buses and medium and heavy goods vehicles, and SLRs270 for multi-axle vehicles. The financial costs include the construction cost of SLRs42,819.3 million, annual maintenance costs of SLRs31.8 million, and annual operational costs of SLRs94.6 million. The annual cost–revenue stream was used to determine the financial internal rate of return (FIRR), and compared it with the weighted average cost of capital (WACC) to ascertain the financial viability of the project. The analysis was carried out in 2019 constant prices and in accordance with ADB guidelines.[11]

18. The WACC is the discount rate used in the financial cost–benefit analysis and is calculated in real terms and after tax by incorporating the funding arrangement between funding sources. Table 6 presents the calculation of the WACC together with its input elements by source: financing components, nominal costs, tax rates, and inflation rates. The nominal cost for ADB's loan was used as the London interbank offered rate (LIBOR) of 2.0% plus a margin of 0.4% for ADB. The nominal cost for government funds was assumed to be 11.5%, taking a proxy value for the government's cost of debt. The government's corporate tax rate of 28.0% was used as the

[11] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.

tax rate for the ADB loan while using 5.2% as inflation rate for government funds and 1.6% for the ADB loan. The WACC, in real terms and after tax, was estimated to be 1.14%.

Table 6: Weighted Average Capital Cost

(%)

	Description	ADB Loan	Government Funds	Total
A	Amount (SLRs million)	36,396.40	6,422.9	42,819.30
B	Weight	85.00	15.0	100.00
C	Nominal cost	2.40	11.5	
D	Tax rate	28.00	0.0	
E	Tax adjusted nominal cost [Cx(1–D)]	1.73	11.5	
F	Inflation rate	1.60	5.2	
G	Real cost [(1 + E) / (1 + F) – 1]	0.13	6.0	
H	**Weighted component of WACC (BxG)**	**0.11**	**0.9**	**1.01**
			WACC	**1.01**

ADB = Asian Development Bank, SLRs = Sri Lanka rupees, WACC = weighted average cost of capital.
Source: Asian Development Bank estimates.

19. Table 7 presents the incremental cash flows of the project, taking the calculated annual cost and revenue into account. The net cash flow provides an FIRR of 2.11%, which is satisfactorily above the WACC of 1.01%, indicating the financial viability of the project over its design life. It also provides a positive financial net present value (FNPV) of SLRs9,400.2 million at a discount rate of 1.01% (WACC).

Table 7: Incremental Cash Flows and Financial Internal Rate of Return

(SLRs million, 2019 constant prices)

Year	Capital Cost	O&M Costs	Gross Revenue	Tax	Net Cash Flow	Discounted Net Cash Flow
2019	10,413.2				(10,413.2)	(10,413.2)
2020	17,583.3				(17,583.3)	(17,407.5)
2021	14,822.8				(14,822.8)	(14,527.9)
2022		126.4	1,205.0		1,078.6	1,046.6
2023		126.4	1,257.5		1,131.1	1,086.5
2024		126.4	1,315.9		1,189.5	1,131.2
2025		126.4	1,369.6		1,243.1	1,170.4
2026		126.4	1,429.4		1,303.0	1,214.5
2027		126.4	1,680.6		1,554.2	1,434.1
2028		126.4	1,752.6		1,626.2	1,485.5
2029	526.8	126.4	1,817.8		1,164.6	1,053.2
2030		126.4	1,890.7		1,764.2	1,579.6
2031		126.4	1,966.5		1,840.1	1,631.0
2032		126.4	2,028.2		1,901.8	1,668.9
2033		126.4	2,080.6		1,954.1	1,697.7
2034		126.4	2,140.2	204.6	1,809.2	1,556.1
2035		126.4	2,201.7	275.3	1,800.0	1,532.7
2036		126.4	2,271.4	304.8	1,840.1	1,551.1
2037		126.4	2,330.5	331.2	1,872.9	1,563.0
2038		126.4	2,397.9	359.0	1,912.4	1,580.0
2039		126.4	2,467.4	386.9	1,954.1	1,598.3
2040		126.4	2,546.0	416.4	2,003.1	1,622.0
2041	526.8	126.4	2,612.9	310.9	1,648.8	1,321.7
2042		126.4	2,668.0	465.3	2,076.3	1,647.8

Year	Capital Cost	O&M Costs	Gross Revenue	Tax	Net Cash Flow	Discounted Net Cash Flow
2043		126.4	2,724.4	487.9	2,110.0	1,657.8
2044		126.4	2,789.6	512.3	2,150.8	1,673.0
2045		126.4	2,840.8	532.8	2,181.6	1,680.0
2046		126.4	2,900.9	555.1	2,219.4	1,692.0
2047		126.4	2,962.3	577.4	2,258.5	1,704.6
2048		126.4	3,033.4	601.7	2,305.2	1,722.5
2049		126.4	3,089.3	621.9	2,340.9	1,731.6
2050		126.4	3,154.8	644.2	2,384.1	1,745.9
2051	(8,563.9)	126.4	3,221.8	666.6	10,992.5	7,969.6
TOTAL	**35,309.0**	**3,793.4**	**68,147.6**	**8,254.3**	**20,790.9**	**9,400.2**
				FNPV (SLRs million) @ 1.01%		**9,400.2**
					FIRR	**2.11%**

( ) = negative, FIRR = financial internal rate of return, FNPV = financial net present value, O&M = operation and maintenance, SLRs = Sri Lanka rupees.
Source: Asian Development Bank.

20. A sensitivity analysis was carried out to investigate the impact of adverse changes in key project variables on the base-case FIRR. The sensitivity analysis scenarios include (i) 10% increase in capital cost, (ii) 10% increase in operation and maintenance cost, and (iii) 10% decrease in revenue. Table 8 summarizes the results of the sensitivity analysis. In each sensitivity scenario, the FIRR exceeds the WACC and the FNPV remains positive, demonstrating that the project is financially viable even if it is influenced by adverse changes in key variables.

Table 8: Sensitivity Analysis

Scenario	FIRR (%)	FNPV (SLRs million @ 1.01%)
Base case	2.11	9,400.2
Capital cost – 10% increase	1.64	5,786.2
O&M cost – 10% increase	2.07	9,080.8
Revenue – 10% decrease	1.63	5,165.5
Worst case – combination of above 3 scenarios	1.15	1,232.2

FIRR = financial internal rate of return, FNPV = financial net present value, O&M = operation and maintenance, SLRs = Sri Lanka rupees.
Source: Asian Development Bank estimates.

G. Conclusion

21. The project is economically and financially feasible for implementation and operation. The project's base-case EIRR of 14.0% exceeds the minimum threshold of 9.0% and remains robust against independent and combined cases of increased estimated construction cost and decreased predicted benefits. Hence, implementation of the project benefits the national economy as a whole. Moreover, the financial analysis, which provides a positive FNPV and an FIRR of 2.11% that exceeds the WACC (1.01%), demonstrates that the project will be financially viable and sustainable at the project level. In other words, these results reveal that the project will generate adequate financial revenue to ensure its sustainability—covering capital, operation, and maintenance costs to be incurred during its life span. In conclusion, both economic and financial analysis suggest that the proposed PAEH is a risk free, economically and financially feasible, and sustainable investment to proceed for implementation.