

# 7. COST ESTIMATE

## 7.1 INTRODUCTION

The capital expenditure for the project has been assessed for Virar – Dahanu Road corridor for a total length 61.778 Km from buffer end at Island Platform 6/7 of Virar to terminating point at Dahanu Road station at Km. 123.636 (ahead of take off point to Reliance Power Siding). The proposed corridor is proposed At-grade section. Corridor connects existing 9 stations. Though no new stations proposed, locations for future development of stations have been identified and track alignment fixed with provision of future stations.

## 7.2 CAPITAL COST ESTIMATE

The cost estimates have been prepared covering Civil, Electrical, Signalling and Tele Communication works, Rolling stock, Environmental protection, Rehabilitation works, etc. The cost estimates are worked out at Jan'13 price level.

While preparing the capital cost estimates, various items have been grouped under three major heads on the basis of (i) route km length of alignment, (ii) number of units of that item and (iii) item being an independent entity. All items related with alignment, at-grade construction, Land, Permanent way, OHE, Signalling and telecommunication, have been estimated at rate per route km/km basis. Other items like Rolling stock, etc. costs have been estimated in terms of number of units required. For items like utility diversions, traffic integration, rehabilitation etc., the lump sump provision is kept in the cost estimates.

The rates of various items have been assessed on the basis of;

- i. Final Feasibility Report for Elevated Corridor from Churchgate – Virar submitted by M/s RITES during January' 2012.
- ii. Cost of Land: Stamp Duty Ready Reckoner & Market Value of Properties in Thane 2012.
- iii. ROB/RUB: Construction of Bitawa RUB by TMC 2012
- iv. Track Items: PWP 2013-14 rates.
- v. Civil Works, COP & FOB: Mumbai Division, Central Railway rates
- vi. Comparable rates of other projects.

The capital cost worked out for proposed quadrupling from Virar –Dahanu Road is presented in **Table 7.1**.

The overall capital cost amounts to **Rs. 3522.27 Crore** at Jan'13 price level including design charges @ 2%, general consultancy charges @ 6% on all items except land and rolling stock and 5% contingencies on all items. These costs cover all taxes, like excise duty, custom duty, VAT, etc.

The Capital cost estimates under various heads are presented at **Table 7.1**.

**Table 7.1: Capital Cost Estimate of Virar –Dahanu Road**

Jan'13 Price Level

Start Chainage = 0 Km, End Chainage = 61.77 Km, Total length of corridor = 61.77Km

At Grade = 61.77 Km, and Bridge = 1.388 Km

Total Stations =9

S. No.	Item	Unit	Qty.	Rate (Rs . Cr)	Amount (Rs.Cr.)
<b>1</b>	<b>Land</b>				
	Land	1000M2	150000	<b>0.5</b>	75.00
	<b>Sub Total (1)</b>				<b>75.00</b>
<b>2</b>	<b>Alignment and Formation</b>				
2.1	Earthwork for Formation/ Embankment	RKM	60.382	7.20	434.75
2.2	Bridge Extension	RM	1581	0.14	221.32
2.3	Construction of new ROB	no	2	15.00	<b>30.00</b>
2.4	Provision of Box under ROB ( 25 MX 12 M)	Each	2	2.89	<b>5.78</b>
	<b>Sub Total (2)</b>				<b>691.85</b>
<b>3</b>	<b>Station Buildings</b>				
3.1	Civil Works	Each	6	5.00	30.00
3.2	E & M works	each	6	1.00	6.00
	<b>Sub Total (3)</b>				<b>36.00</b>
<b>4</b>	<b>P-Way</b>				
4.1	Ballasted track for At-grade	Route. Km.	61.77	3.58	221.14
4.2	Ballasted track for stabling siding	Km.	3.3	2.82	9.31
4.3	Ballasted track for Goods shed & sidings	Km.	6.0	2.82	16.92
	<b>Sub total (4)</b>				<b>247.36</b>
<b>5</b>	<b>Construction of new goods shed at Boisar</b>	LS		5.00	<b>5.00</b>
	<b>Sub total (5)</b>				<b>5.00</b>
<b>6</b>	<b>Traction &amp; power supply incl. OHE, GS, Rolling Stock Maintenance etc.</b>				
6.1	OHE	R.Km.	61.77	1.00	61.77
6.2	TSS	no	3.00	40.00	120.00
6.3	GS	LS	1.00	10.00	10.00
6.4	SCADA	no	1.00	5.00	5.00
6.5	SP/SSP	no	4.00	3.00	12.00
6.6	M&P Items	LS	1.00	50.00	50.00
6.7	Maintenance facility for Rolling Stock	LS	1.00	300.00	300.00
	<b>Sub total (6)</b>				<b>558.77</b>
<b>7</b>	<b>Signalling and Telecom.</b>				
7.1	Sig. & Telecom.	Route. Km.	61.77	3.50	216.20
	<b>Sub Total (7)</b>				<b>216.20</b>

S. No.	Item	Unit	Qty.	Rate (Rs . Cr)	Amount (Rs.Cr.)
<b>8</b>	<b>Utilities</b>				
8.1	OHE modifications	LS			20.00
8.2	Modification of Electrical crossings	R Km	61.77	0.50	30.89
8.3	Modification of Signal and Telecommunications Cables including provision of cable duct	LS			20.00
8.4	Relocation of Elect & Signal Building including Provision equipment like Sub Station, SSP,SP etc.	LS			5.00
8.5	Other Utilities diversion/modification	R. Km.	61.77	1.00	61.77
	<b>Sub Total (8)</b>				<b>137.66</b>
<b>9</b>	<b>Development of Traffic Integrations and dispersal facilities</b>				
9.1	Inter Model integration & dispersal facilities				164.00
9.2	Public awareness & education campaign				2.00
	<b>Sub Total (9)</b>				<b>166.00</b>
<b>10</b>	<b>Total of all items (2 to9) except Land</b>				<b>2058.83</b>
10.1	Design charges @ 2 % on all items except land				<b>41.18</b>
10.2	General consultancy and project management services charges @ 6% on all items except land				<b>123.53</b>
10.3	Total of all items including Design and G. Charges				<b>2223.54</b>
<b>11</b>	<b>Rolling Stock</b>	Each	264	4.00	<b>1056.00</b>
	<b>Total of all items (2 to11) except Land</b>				<b>3279.54</b>
<b>12</b>	<b>Total Cost including land</b>				<b>3354.54</b>
<b>13</b>	<b>Contingencies @ 5 %</b>				<b>167.73</b>
<b>14</b>	<b>Gross Total</b>				<b>3522.27</b>

### 7.3 OPERATION AND MAINTENANCE COST

The Operation and Maintenance costs are worked under three major heads:

- Staff costs
- Maintenance cost which includes expenditure towards upkeep and maintenance of the system and consumables and
- Energy costs

The estimation of cost for Additional Rolling Stock and Replacement of assets are considered and worked out in the subsequent years.

### 7.3.1 Staff Cost

The O&M staffs is assumed to be provided @ 35 persons per kilometer and the annual cost on this account for the Virar- Dahanu Road section is estimated at Rs 144.22 crores at 2021 prices. The escalation factor used for staff costs is 5% per annum to provide for growth in salaries.

### 7.3.2 Maintenance Expenses

Maintenance expenses are taken @ Rs.1.5 crores/km. based on the maintenance unit cost of Delhi Metro Phase-I and Phase-II projects and Delhi Metro Phase-III Detailed Project Report. The maintenance cost for Virar- Dahanu Road section Rs.143.74 crores at 2021 prices. These costs have been escalated @5% p.a.

### 7.3.3 Energy Charges

The cost of electricity is estimated to be a significant part of O&M charges, constituting about 40% of total annual working cost. The traction power tariff of Tata Power Corp. / MSEDCL in Mumbai is about Rs 5.50 per unit in the year 2012. Energy consumption in inception year 2021 is estimated as 60.46 million units. and by assuming esclation of 5% per annum, per unit rate in 2021-22 be around Rs 8.53 and total energy cost will be about Rs. 51.58 crores in 2021-22. Projected energy cost in year 2031 and 2041 is summerized as under;

Year	2021	2031	2041
Headway in min	12	6	4
Energy Consumption in M Units	60.46	109.16	159.54
Unit Cost of energy in Rs	8.53	10,89	13.24
Energy Charges Rs in cr	51.58 at 2021 prices	65.84 at 2031 prices	144.49 at 2041 prices

### 7.3.4 Additional Investment

Year	2021	2031	2041
No. of Cars / Train	12	12	12
Headway in min	12	6	4
Total Rakes	22	38	58
Total Coaches	264	456	660
Cost in cr	1056 at 2012 prices	1940.70 for 192 coaches at 2031 prices	3703.04 for 204 coaches at 2041 prices

Initial investment for rolling stock is taken as Rs 1056 cr at 2012 prices for 264 coaches. Requirement for Rolling Stock will increase to 456 coaches in 2031 and 660 coaches in year 2041. Incremental investment will be required to cope up with growth in traffic for purchase of 192 coaches in 2031 costing Rs. 1940.70 crores , Rs. 3703.04 crores in 2041 for purchase of 204 coaches. The cost figures are updated to prices of year of purchase (ie 2031 or 2041) considering an escalation factor of 5% p.a. These costs have been provided to take care of increased requirement of Rolling Stock and related equipments to take care of the increased traffic as the existing rolling stock would not be sufficient to carry the projected traffic.

### 7.3.5 Replacement Cost

The replacement costs are provided for meeting the cost on account of replacement of equipment due to wear and tear. With the nature of equipment proposed to be provided for the corridor, it is expected that only 10% of the equipment comprising Electrical, P-way and Signalling & Telecom would require replacement or rehabilitation after 20 years. Further 25% of project cost comprising of Rolling stock and traction is expected to have a life of 30 years after which it shall required to be replaced. Accordingly, provision of Rs 1287.67 cr and Rs 5243.68 cr has been made in year 2041 and 2051 respectively for replacement of assets corresponding to 10% (Rs 312.34 cr) and 25% (Rs 782.08 cr) of the project cost excluding land. These figures have been arrived by applying escalation @ of 5% per annum. The year wise total Operation and Maintenance cost for the Virar to Dahanu Road is given in **Table 7.2**

**Table 7.2: Operation and Maintenance Cost (Virar-Dahanu Road Section)**

Year	Staff Cost	Maintenance Expenses	Energy Charges	Total O&M cost	Addition/ Replacement Cost
	Esc @5%	Esc @5%	Esc @5%		
2021	144.22	143.74	51.58	339.54	
2022	151.43	150.93	51.58	353.94	
2023	159.00	158.47	54.16	371.64	
2024	166.95	166.40	54.16	387.51	
2025	175.30	174.71	56.87	406.89	
2026	184.07	183.45	56.87	424.39	
2027	193.27	192.62	59.71	445.61	
2028	202.93	202.25	59.71	464.90	
2029	213.08	212.37	62.70	488.15	
2030	223.73	222.99	62.70	509.42	
2031	234.92	234.13	65.84	534.89	1940.70 #
2032	246.67	245.84	65.84	558.34	
2033	259.00	258.13	124.81	641.95	
2034	271.95	271.04	124.81	667.80	
2035	285.55	284.59	124.81	694.95	
2036	299.82	298.82	131.05	729.70	
2037	314.82	313.76	131.05	759.63	
2038	330.56	329.45	137.61	797.61	
2039	347.08	345.92	137.61	830.61	
2040	364.44	363.22	144.49	872.15	

Year	Staff Cost	Maintenance Expenses	Energy Charges	Total O&M cost	Addition/ Replacement Cost
	Esc @5%	Esc @5%	Esc @5%		
2041	382.66	381.38	144.49	908.53	3703.04 *
2042	401.79	400.45	144.49	946.73	1287.67 \$
2043	421.88	420.47	221.73	1064.09	
2044	442.98	441.50	221.73	1106.21	
2045	465.13	463.57	232.82	1161.52	
2046	488.38	486.75	232.82	1207.95	
2047	512.80	511.09	244.46	1268.35	
2048	538.44	536.64	244.46	1319.54	
2049	565.36	563.47	244.46	1373.30	
2050	593.63	591.65	256.68	1441.96	
2051	623.31	621.23	256.68	1501.23	5243.68 ##

- NOTE # This is for procurement of additional 192 coaches in year 2031  
 \* This is for procurement of additional 204 coaches in year 2041  
 \$ This is for replacement of assets requiring replacement after 20 year  
 i.e. in year 2041( 10% of the project cost)  
 ## This is for replacement of assets requiring replacement after 30 year  
 i.e. in year 2051 ( 25% of the project cost)

## 7.4 FINANCIAL ANALYSIS

### 7.4.1 Investment Cost

The Financial Internal Rate of Return (FIRR) has been calculated with completion cost of Rs. 4399 Crore @ 5 % inflation. The cash flow of this investment is presented in **Table 7.3**.

The construction period is taken as 7 years starting from 2014-15 and System/ Corridor will be operational by 2021.

**Table 7.3: Year Wise Investment for Virar-Panvel new suburban corridor**  
(Rs. in Crore)

Year	Construction cost	Land cost	Completion cost
2014-15	345	38	399
2015-16	345	38	418
2016-17	345		399
2017-18	517		629
2018-19	517		660
2019-20	689		924
2020-21	689		970
<b>Total</b>	<b>3447</b>	<b>75</b>	<b>4399</b>

The land cost is divided into two initial years during which it is expected that the land acquisition work would be over and related payments would be released.

## 7.4.2 Revenues

### Fare box revenue

It has been estimated that about 3.97 lakh passengers would use the Corridor in the year 2021, which would increase to about 11.25 lakh by 2041 and 16.83 lakh passengers by 2051.

Fare box revenue has been assessed on the basis of suburban fare structures – with fares assumed to increase by 10 % after every 5 years. As per the current observed suburban passenger trends in Mumbai, 80 % of the passengers are expected to travel by Second Class and 20 % by First Class. With the option of availability of season tickets, 75 % of the Second class and 98 % of the First class passengers are expected to travel by season tickets. As the Corridor is part of the existing Churchgate- Virar – Dahanu Road suburban Corridor, the same fare structure is taken for financial analysis.

Based on expected ridership and composition of second/ first class and single journey/ season ticket passengers, it has been estimated that fare box revenue in 2021-22 (first year of operation) for Corridor shall be Rs. 88 Crore.

### Other sources of revenues

Other sources of revenues could be commercial development and advertisement at station buildings. The advertisement revenue has been estimated at 5% of the fare box revenues during operations. Also, it is possible to raise resources through leasing of parking rights at stations, advertisement on trains and tickets, advertisements within stations and parking lots, advertisements on viaducts, columns and other metro structures, co-branding rights to corporate, film shootings and special events on metro premises.

## 7.4.3 Financial Internal Rate of Return (FIRR)

The project is assumed to be funded entirely by the Indian Railways. The Financial Internal Rate of Return (FIRR) has been worked out upto the year 2051.

It is seen that the project has negative FIRR with even O&M expenses not being met by the revenue stream. This can be made positive with non-fare box revenue being increased to about 325 % (presently taken as 5 %) of fare-box revenue each year.

Alternatively, if only O&M costs are considered (i.e. capital costs being considered as sunk money), the project can have breakeven with non-fare box revenue upwards of about 155 % of fare-box revenue.

**Table 7.5 Financial Analysis of Project Based on Suburban Fare Structure**

(Rs. in Crore)

Year	COST STREAM					REVENUE STREAM				
	Construction cost	Land cost	Completion cost	Replacement cost	O&M cost	TOTAL COST	Fare box Revenue @ fares as per Suburban Fare	Revenue from property deve & advt@5% of fare box rev	Total Revenue	Net Cash Flow
2014-15	345	38	399			399			0	-399
2015-16	345	38	418			418			0	-418
2016-17	345		399			399			0	-399
2017-18	517		629			629			0	-629
2018-19	517		660			660			0	-660
2019-20	689		924			924			0	-924
2020-21	689		970			970			0	-970
2021-22					340	340	88	4	93	-247
2022-23					354	354	103	5	108	-246
2023-24					372	372	109	5	114	-258
2024-25					388	388	115	6	121	-267
2025-26					407	407	121	6	128	-279
2026-27					424	424	129	6	135	-289
2027-28					446	446	150	7	157	-289
2028-29					465	465	158	8	166	-299
2029-30					488	488	167	8	176	-312
2030-31					509	509	177	9	186	-324
2031-32				1941	535	2476	187	9	197	-2279
2032-33					558	558	216	11	227	-331
2033-34					642	642	227	11	238	-404
2034-35					668	668	238	12	250	-418
2035-36					695	695	249	12	262	-433
2036-37					730	730	262	13	275	-455
2037-38					760	760	302	15	317	-443
2038-39					798	798	317	16	333	-465
2039-40					831	831	332	17	349	-482
2040-41					872	872	349	17	366	-506
2041-42				3703	909	4612	366	18	384	-4228
2042-43				1288	947	2234	419	21	440	-1795
2043-44					1064	1064	436	22	458	-606
2044-45					1106	1106	454	23	477	-630
2045-46					1162	1162	473	24	496	-665
2046-47					1208	1208	492	25	517	-691
2047-48					1268	1268	563	28	592	-677
2048-49					1320	1320	587	29	616	-704
2049-50					1373	1373	611	31	641	-732
2050-51					1442	1442	636	32	668	-774
2051-52				5244	1501	6745	662	33	695	-6050
									<b>FIRR</b>	<b>- ve</b>



## 7.5 ECONOMIC ANALYSIS

### 7.5.1 ECONOMIC ANALYSIS APPROACH

The economic appraisal of Vitar-Dhanu Suburban Corridor in Mumbai has been carried out within the broad framework of Social Cost –Benefit Analysis Technique. It is based on the incremental costs and benefits and involves comparison of project costs and benefits in economic terms under the “with” and “without” project scenario. In the analysis, the cost and benefit streams arising under the above project scenarios have been estimated in terms of market prices and economic values have been computed by converting the former using appropriate shadow prices. This has been done to iron out distortions due to externalities and anomalies arising in real world pricing systems. The annual streams of project costs and benefit have been compared over the analysis period of 36 years to estimate the net cost/benefit and to calculate the economic viability of the project in terms of EIRR.

The Economic Internal Rate of Return (EIRR) for the project has then been arrived using Discounted Cash Flow technique to the net benefit stream at economic prices.

## 7.6 ESTIMATION OF BENEFITS

The VIRAR-DHANU Suburban Corridor will yield tangible and non-tangible savings due to equivalent reduction in road traffic and certain socio-economic benefits. The Introduction of fast track rail corridor will result in reduction in number of buses, usage of private vehicles, air pollution and increase the speed of road-based vehicles. This, in turn, will result in significant social benefits due to reduction in fuel consumption, vehicle operating cost and travel time of passengers. Reduction in accidents, pollution and road maintenance costs are the other benefits to the society in general.

The benefit stream that has been quantified includes:

- Capital and operating cost (on present congestion norms) of carrying the total volume of passenger traffic by existing bus system and private vehicles in case fast track rail corridor is not taken up.
- Savings in operating costs of all buses and other vehicles due to de-congestion including those that would continue to use the existing transport network even after the fast track rail corridor is introduced.
- Savings in time of commuters using the new fast track rail corridor over the existing transport modes because of faster speed.
- Savings in time of those passengers continuing on existing modes, because of reduced congestion on roads.
- Savings on account of prevention of accidents and pollution with introduction of fast track rail corridor.

- Savings in road infrastructure and development costs that would be required to cater to increase in traffic, in case fast track rail corridor is not introduced.
- Savings in fuel consumption on account of less number of vehicles on road and decongestion effect with introduction of fast track rail corridor are included in those of vehicle operating cost.
- The quantification of benefits in monetary terms in coming paragraphs has been done at 2013 prices.

### 7.6.1 TRANSPORT DEMAND ON VIRAR - DHANU SUBURBAN CORRIDOR

At present the corridor is served by rail, bus system and IPT modes in addition to private vehicles. The total transport demand and demand estimated on this Suburban corridor for various years is given in **Table 7.7**

**Table 7.7: Transport Demand Forecast on Virar-Dhanu Suburban Corridor of Mumbai**

I T E M	2012	2019	2031	2041
Daily Total Trips (Lakh)	25.45	33.77	41.99	52.00
Daily Trips on (Virar-Dhanu Corridor (Lakh)	2.07	3.97	6.97	11.25
Daily Trips by other modes (Lakh)	23.38	29.80	35.01	40.74

The traffic on suburban corridor will come due to shifting of traffic from buses, IPT and private modes and also from train, once a more efficient system is available. From road, the shifting of traffic would be from both buses and private vehicles. It has been estimated that 109 buses will decrease with the introduction of this corridor. This will save Rs. 67 Cr in the year 2021 towards capital and operating cost of bus system. The saving in respect of private vehicles will be approx. Rs. 266 Cr.

### 7.6.2 SAVINGS IN TRAFFIC CONGESTION

New Corridor will contribute towards reducing the congestion and journey time on roads because of diversion of some traffic to this corridor. Reduction in traffic congestion will save the necessary capital investment and vehicle operating cost as well as increase in time saved per vehicle. With the implementation of this corridor, the savings from operating costs due to decongestion effect has been estimated to be Rs 13 Cr in the year 2021.

### 7.6.3 PASSENGER TIME SAVING

With the introduction of Virar-Dhanu Suburban Corridor, there will be reduction in traffic congestion on the roads and correspondingly, there will be saving in time of commuters travelling by various modes of road transport. With the improved technology, the new system is expected to be faster than the existing suburban system and there will be saving in passenger time shifting o the new rail system. With the implementation of the project, the passenger time savings are estimated at Rs. 110 Cr for the year 2021.

#### 7.6.4 SAFETY

The reduction in traffic volumes on roads brought about by modal transfer to Virar-Dhanu Suburban Corridor is expected to reduce number of accidents. Any reduction in number of accidents will involve savings from damage to vehicles and savings towards medical and insurance expenses to persons involved in accidents. The benefits because of accidents prevented with the introduction of this MRTS corridor works out to Rs.3.5 Cr in the year 2021.

#### 7.6.5 REDUCED AIR POLLUTION

The benefits because of saving in cost of prevention of vehicular pollution, with the implementation of Virar-Dhanu Suburban Corridor in Mumbai in the year 2021 are expected to be Rs 20 Cr.

#### 7.6.6 SHADOW PRICING

The value of Project cost and benefits have been expressed in terms of market prices. These prices, however, do not reflect the real resource cost and value of benefits derived from the project to the economy. The market prices are distorted due to variety of factors. These factors could be controlled/administered prices of inputs, monopolistic market of inputs, tax structure etc. The factors used for converting project inputs and output to economic costs are given in following **Table 7.8**

**Table 7.8: Factors used for Converting Project Inputs and Output to Economic Costs**

S.No	Item	Factor
1	Capital Cost	0.85
2	Operations & Maintenance Cost	0.80
3	Savings In Capital & Operating Cost Of Buses	0.89
4	Savings In Capital & Operating Cost Of Private Vehicles	0.8
5	Savings In Passenger Time	1.0
6	Savings In VOC	1.1
7	Savings In Accident Costs	1.0
8	Savings In Pollution Costs	1.0

#### 7.6.7 RESULT OF ECONOMIC ANALYSIS

The cost and benefit streams for 36-year period in the economic prices have been worked out and presented in **Tables 7.9** for Virar-Dhanu Suburban Corridor of Mumbai. The residual value of facilities (e.g. Rail corridors, equipment for power supply and tele-communication, rolling stock, etc.) in last year has not been taken into account as benefit in these tables. The total cost worked out on the above basis is then subtracted from the total benefits to estimate the net benefit of the project. This flow is then subjected to the process of discounting to work out the internal rate of return on the project, to examine the viability of the Project in Economic terms. Thereafter, the Project EIRR in economic terms has been arrived by using shadow prices.

The EIRR in economic terms works out to **22.56 %** for VIRAR-DHANU Suburban Corridor of Mumbai Suburban System.

### 7.6.8 SENSITIVITY ANALYSIS

A sensitivity analysis of the EIRR with 10% cost overrun and 10% reduction in traffic materialization (separately) has been carried out. The EIRRs under these scenarios are given in **Table 7.10**

**Table 7.10: EIRRs - Sensitivity Analysis**

Sensitivity Parameter	EIRR (%)
Basic EIRR	22.56
With increase in cost by 10%	21.41
With decrease in traffic by 10%	22.22
With increase in cost by 10% & decline in traffic by 10%	21.09

It can be seen from the above table that 10% increase in cost affects economic viability more than 10% decline in traffic. Accordingly, it is recommended that controls should be exercised to keep the cost of construction under control.

**Table 7.9 Cost and Benefit Stream for Virar-Dhanu Rail Corridor : ECONOMIC PRICES**

Units: Rs in Crores

YEAR	CAPITAL COST	RUNNING EXPENSE OF MRTS	TOTAL COSTS	SAVINGS BUSES	FROM OTHERS VEHICLES	SAVINGS FROM			TOTAL SAVINGS	NET CASH FLOW
						TIME	VOC	ACC/POL		
2014-15	340	0	340	0	0	0	0	0	0	-340
2015-16	355	0	355	0	0	0	0	0	0	-355
2016-17	339	0	339	0	0	0	0	0	0	-339
2017-18	534	0	534	0	0	0	0	0	0	-534
2018-19	561	0	561	0	0	0	0	0	0	-561
2019-20	785	0	785	88	314	162	21	35	620	-165
2020-21	825	0	825	100	355	183	24	39	700	-124
2021-22	0	272	272	113	400	207	27	44	791	519
2022-23	0	283	283	127	452	234	30	50	893	610
2023-24	0	297	297	144	511	264	34	56	1009	711
2024-25	0	310	310	162	577	298	38	64	1139	829
2025-26	0	326	326	183	651	336	43	72	1286	960
2026-27	0	340	340	207	735	380	49	81	1452	1113
2027-28	0	356	356	234	830	429	55	92	1640	1283
2028-29	0	372	372	264	937	484	62	103	1852	1480
2029-30	0	391	391	251	1023	466	69	112	1920	1529
2030-31	0	408	408	279	1136	517	76	124	2132	1725
2031-32	1650	428	2078	310	1261	574	85	138	2369	291
2032-33	0	447	447	344	1401	638	94	153	2631	2184
2033-34	0	514	514	382	1556	709	105	170	2922	2409
2034-35	0	534	534	424	1729	787	116	189	3246	2711
2035-36	0	556	556	471	1920	874	129	210	3605	3049
2036-37	0	584	584	524	2132	971	144	233	4004	3420
2037-38	0	608	608	582	2369	1079	159	259	4447	3840
2038-39	0	638	638	646	2631	1198	177	288	4940	4302
2039-40	0	664	664	651	3017	1222	362	331	5584	4919
2040-41	0	698	698	717	3323	1346	399	365	6150	5453
2041-42	3148	727	3874	790	3660	1483	439	402	6775	2900
2042-43	1095	757	1852	870	4032	1634	484	443	7462	5610
2043-44	0	851	851	958	4441	1799	533	488	8219	7368
2044-45	0	885	885	1055	4891	1982	587	537	9054	8169
2045-46	0	929	929	1162	5388	2183	647	592	9972	9043
2046-47	0	966	966	1280	5935	2405	712	652	10984	10018
2047-48	0	1015	1015	1410	6537	2649	785	718	12099	11085
2048-49	0	1056	1056	1554	7200	2918	864	791	13327	12272
2049-50	0	1099	1099	1711	7931	3214	952	871	14680	13581

**IRR 22.56%**