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Validating and the Application of Bruno's Ratio on Naulong Dam and Shogo Sin Hydropower Projects of Pakistan

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Abstract

This study aims to explore the efficacy of applying Bruno's Ratio by calculating the Ratio for two of Pakistan's Hydropower Projects; the Naulong Dam and the Shogo Sin Hydropower project. The Shogo Sin project involves foreign currency investments, whereas the Naulong Dam utilizes domestic currency, albeit some of its inputs are imported, locally available items. Also, some essential purchases are made in foreign currency. It has been useful to assess the price of foreign exchange saved by using this application. Economically, a project is justified if the domestic resource cost or dependency ceiling is less than the official exchange rate. This means that the venture is using less domestic assets to save or produce a unit of foreign exchange that would be required to purchase it at the official exchange rate. Results of the calculations ceiling ratio in PKR 83.26 to USD for the Shogo Sin project, when the official exchange rate was PKR 84.50 to the USD. For the Naulong Dam, the dependency ceiling ratio was PKR 96 to the USD when the prevailing rate was PKR 101 at the time when the project was planned. Hence, the study empirically justifies the use of Bruno's Ratio as one of the tools to assess the desirability of such projects and rationalizes the commitment of foreign exchange resources to their implementation and operation.
Key Words: domestic resource cost**,** Bruno's ratio, shadow prices, hydropower projects, energy crisis.

1 Introduction

The energy crisis has been one of the most emergent issues in Pakistan for the last two decades (Hussain & Hasan, 2019). The gap between demand-supply has constantly widened and pushed the economy towards the verge of collapse (Hussain, 2017). Due to the phenomena of globalization, urbanization and e-commerce, the rapid growth and advancement in electronic gadgets and appliances has not increased worldwide but also been consistently rising in Pakistan, which ultimately requires electricity (Abbas et al., 2011; Adnan et al., 2012; Amjad, 2011; Liu et al., 2011; Mirjat et al., 2017; Qureshi, 2016; & Shahbaz, 2015). The issue of electricity shortage has not only caused suffering in rural areas, but our institutions have also failed to maintain the desired energy output combined with an inability to satisfy the demand for electricity in urban regions of Pakistan, despite apparent efforts on governments' part (Ahmed 2017; Daojiong 2016; Mansoor K. 2015; Rabbi 2017; Hussain & Hasan 2019) to do so.

The energy crisis in Pakistan has affected the economy intimately, in multi-faceted ways; it destroys the domestic industry by rendering it uncompetitive. Additionally, due to the mismanagement of indigenous water resources and little focus on the keen necessity for hydropower projects. The geoeconomic footprint in terms of regional trade of the country is very weak (Hussain, 2017). Similarly, it seriously jeopardizes the agricultural sector due to the lack of rainwater harvesting along with the continuous depletion of existing irrigation systems and fossil water reservoirs (Alarshad 2014 et al.; Asif, M. 2012; Malik A. Mirza 2017; Rabbi M. A 2017). It is a renewable resource not only to resolve the energy crisis but also a store of water for agricultural use (Hellegers 2008; Lawford 2013; Whitman 1973; & Rasul 2014). Hydropower is the most adaptable form of energy production available: most suited to immediately address the instability in demand; it conveys primary load control; the capability for storing power over time if sufficient repositories exists (Lawford 2013 et al; Stout et al 1984; Lee 2013, Kilinc 2014; Liu & Feng 2011; Nepal S. K.2008). According to Bruno (1972), another favourable outcome of hydropower

innovation is the possible large multiplier effects by giving the energy and water supply administrations (e.g., surge control and water system) an impetus, consequently bringing social and monetary advantages.

To deal with the electricity shortfall, several foreign-funded small hydro energy projects have recently been adopted in Pakistan. The country needs more hydro projects, to stay in place. Saundars and Thomas (1997) confirm that a levelheaded, pertinent, and rational financial analysis is not only the official requirement and a pre-requisite, but it is a key to acquire foreign funding. Complying with the litany of "the survival of the fittest" and in today's competitive environment, only the best proposals qualify for foreign funding. As a consequence, it is equally essential to calculate approximately the cost in domestic currency required to earn a saving of foreign exchange from implementing a proposed venture in a country like Pakistan, which, more than often, suffers from balance of payments problems i.e., developing import alternatives, or where export promotion is a significant intention.

Bruno's Ratio deals not only with earning or saving of foreign exchange, but it helps to determine the cost in terms of domestic currency used, for a given amount of foreign exchange saved (Little & Mirrlees, 1974). In Bruno Ratio, the current value of the domestic exchange rate is recognized as a foreign exchange saving when measured against the current value of foreign exchange if the cost of every dollar saved does not exceed the prevailing exchange rate. The financial feasibility of the project is always evaluated at the discount rate set at the opportunity cost of capital. Though, in case of economic analysis, the actual weighted average interest rate, i.e., the rate at which capital is obtained is often wrongly used; as this is a statistic. The more appropriate is to use it for financial analysis, but not suitable for rigorous economic analysis. In public-funded projects, the discount rate is predetermined by the budget wing of the finance division for development loans and advances on an annual basis (Balassa, 1968; Bruno 1976; & Solnik, 1987). When a project is funded through foreign funding, the economic investigation is carried out at a zero discount rate. However, if the analysis is to be rigorous, the opportunity cost of foreign exchange or its shadow price ought to be used. The power sector of Pakistan is not only facing the issue of capital accumulation in the sector but at the same time, the conceived projects are shy of incorporating the shadow price fundamentals in project preparation phases.

2 Literature Review

Notwithstanding, shadow pricing, one of the critical aspects of economic analysis, is applied to review domestic resource cost in terms of foreign exchange by examining two Pakistani hydropower projects, namely; Naulong Dam and Shogo Sin hydropower. Shogo Sin hydropower plant engages foreign investment, whereas Naulong Dam utilizes domestic currency (Kelly et al., 1998; Howarth et al., 2002; Fukuyama, 2008; Khan & Sher, 2012). Furthermore, it evaluates strategies being opted for in two hydro energy ventures: a dam and a store or reservoir (of water) - a hydro venture, respectively. It identifies the cash flows, cost of financing and benefits related to two projects; costs are based on initial investment costs, functional and maintenance costs through the projects' benefits are calculated on an economic basis.

For Naulong Dam's fisheries and agriculture outputs which are enhanced by the implementation of the project. In the Shogo Sin Dam, Long-run marginal cost - the added cost of additional units of service of a commodity derived from changing its capability to reach the lowest cost associated with a unit and the willingness to pay for incremental consumption, was estimated by comparing the current price of electricity with the price from an alternative source of electricity. These are the two significant benefits converted into economic cash flow as it is only a separate hydropower plant.

Domestic Resource Cost or Bruno's ratio is an estimation of the household reserve price which should be less than the current official exchange rate, which means that if a venture is utilizing fewer household assets to accumulate or receive an element of foreign exchange, in the event that it does, then the venture

is economically justified. It is imperative that the 'household' cost of power production is less if domestically produced - than the equivalent cost of power if imported (Winter-Nelson, A. 1995; Georgakakos, A. P., Yao, H., & Yu, Y. 1997). Shadow pricing of factors of production has inadequate application in Pakistan, especially in energy projects hence there were very few case studies available to use as a foundation for this paper.

The other constraint to their applications is that projects, where such techniques have been applied, are mostly two decades old in this context; Bruno's ratio has been applied to very few projects. To quote examples of the existing application of this ratio are; Tarbela and Mangla Dam, which are two hydropower projects in Pakistan funded by the World Bank. Bruno's ratio was used in their economic evaluation as a pre-requisite of the world bank (Mahdi, S. K., Chaudhry, M. M., & Siddique, M. 2005).

Most of the other evaluated projects are largely industrial and agricultural, and usually foreign agency funded, however, its specific application to the energy sector is very minimal. For this purpose, and to understand the numerical application of the domestic resource cost ratio, we must refer to underdeveloped countries where it has mostly been used in international case studies by donor agencies such as the World Bank and the Asian Development Bank (Awojobi, O., & Jenkins, G. P. 2015). Technically, hydroelectricity is a faster on-line source in comparison to thermal plants, where the start-up process may take a few hours or more, due to which time proficiency is significantly below configuration levels. Moreover, hydropower plants can work ad infinitum and function at fractional loads. As a consequence of this adaptability, hydropower is an ideal supplement to various sustainable but non-continuous sources, such as solar and wind that are available intermittently (except thermal, including geothermal and hydel; all sources of energy are non-continuous) when the sun sparkles or when the wind blows.

Repository levels can be reasonable to supplement power supply for periods of time when there is no breeze or daylight (Glim et al., 1958; Acre et al., 2002; Demetry et al., 2011). Hydropower changes the energy potential of an accumulation of water streaming in a waterway with a specific fall. The potential yearly generation of power of a hydropower venture is defined by the head and watercourse (Acre et al., 2002 & Asif, 2011). Hydro generators, because of adaptability and functionality, stand out amongst the most productive alternatives; as they offer a considerable benefit if auxiliary applications for example in agriculture, horticulture, fisheries, and forestry in a country like Pakistan (Farooq et al., 2013; Javed et al., 2011; Quratullah, 2015; Shakeel et al., 2016).

3 Research Methodology

Bruno's ratio is the current value of the domestic exchange rate to recognize a foreign exchange divided by the current value of the net foreign saving. Bruno's ratio shows the calculation of inputs and outputs collection in tradeable and non-tradeable items. This study focuses on two hydropower projects for the application of Bruno's ratio because most of the equipment for hydropower projects require an import involving huge investment and involves foreign funding. For estimation purpose, two main cash flows; one in foreign exchange gain and the other one in local currency rate are compared and discounted at a suitable discount rate. The suitable discount rate in the case of public sector projects is the one decided by finance division (Balassa, 1968; Bruno 1976; & Solnik, 1987). The descriptive-analytical methodology is employed, most of the statistics on the subject are available from secondary sources; published reports, research articles and studies carried out by professionals. Some interviews taken from focal persons belong to the sector are used as a primary source. Cash flows are discounted at the economic cost of predetermined capital to calculate the yearly economic capital cost and other financial support required to sustain a project. Both hydropower projects are discounted at 12 percent since the official rate for development projects is 11.79 percent.

Pakistan, due to poor management and political instability (Hussain, 2017), lacks an optimal use of economic resources, and while every need cannot also be fulfilled through domestic resources alone (Hoskisson et al., 2000; Le Billion., 2001; & Kwak Y. H. 2002). Like other developing nations, the state must sensibly allocate its domestic resources to optimize the outcome and benefits from foreign funding. In order to articulate the price of generating or banking an element of foreign exchange in terms of domestic resource price, a straight assessment is made against official exchange rates. For an estimation (*ideally – the economic opportunity cost of foreign exchange should be used*) of domestic resource cost in this technique, it is significant to understand: i) the domestic currency rate of generating the output; ii) foreign trade charge earned to generate the result (i.e., foreign trade price of these things like; foreign traded equipment, foreign traded other inputs, etc.); and iii) the intermittently foreign trade value of the input to be generated. The current value of the net of tax overseas trade saving (economical at the prospective price of investment) evaluated against the current value of local rate to realize these savings (Bruno, M. 1972). The quotient involving the two current values; the local resource price and it, therefore, be directly evaluated with the official exchange rate or with shadow exchange costs. The modified Bruno Ratio formula is given below:

$$DREC = \frac{PVDCC}{PVNFS} * OER$$

Where
DREC is Domestic Resource Exchange Cost
PVDCC is Present Value of domestic currency cost in terms of realizing foreign exchange saving
PVNFS is Present value of net foreign exchange saving stated in local currency
OER is Official Exchange Rate

Notably, the domestic resource cost (DRC) is often estimation, not always suitable as per the definitive decision criterion. There are circumstances where it may be ignored, even if adverse, for example: where a significant transfer of technology is involved, strategic projects and development of new, imported capabilities, etc.,

4 Results and Discussion

Pakistan is one of the countries with the severe balance of payment problems and limited foreign reserves. It is pertinent; therefore, the country needs to allocate its resources in an optimal manner. Bruno's ratio is inevitable to estimate the best potential use of the country's foreign reserves'. The calculation provides an estimate of the value of domestic resources used in the development of a particular project when all intermediate inputs are valued at world prices, and all factor inputs are valued at their accurate opportunity cost prices. Therefore, factor inputs are estimated by referring to the benefits that can be obtained when employed in some alternative project - not any alternative project, instead of the project, they would most probably be engaged in if they to explain the concept. DRC does not only take into account the operational cost side but also takes into consideration: functional and the cost of the repair, investment costs or capital inputs, substitution cost and scrap values.

Bruno's Ratio shows the calculation of both the inputs and the outputs of tradable and non-tradable, which are evaluated for the related shadow pricing of these items. The two main cash flows from net foreign exchange gain and in the local currency rate are compared when discounted at suitable discount rates. Considering Naulong Dam, Bruno's ratio is less than the Shogo Sin dam as foreign investment is not involved in this project. However, Bruno's ratio is more desirable in the Shogo Sin project, where foreign investment is an option. The calculated results of Bruno's ratio are less than the prevailing exchange rate enhancing the desirability of the project.

Bruno's ratio in terms of foreign investment in the project is calculated and verified; in both dams, the dependency ceiling ratio is less than the prevailing foreign exchange rate during the implementation of projects. In the case of the Naulong dam, the dependency ceiling ratio is 83.26 against exchange rate of

84.50 whereas, in the Shogo Sin dam the dependency ratio is 96.03 against foreign currency exchange rate of 101. Hence, proves the viability of both projects in terms of, foreign investment. The results clearly validate the implementation of both projects

5 Conclusion and Policy Implications

This measure of the desirability of an investment project is often a prerequisite to foreign currency funding by supranational agencies. This is especially when the major capital inputs acquired use foreign currency(is) as the ratio allows us to assess the price at which we are saving foreign exchange by implementing the project. Ideally, the result of this ratio should be less than the official exchange rate or, preferably, the shadow price or economic opportunity cost of foreign exchange. The possible exception to this is when a project involves a significant and desirable transfer of technology, is strategic in nature, or would result in the development of new hitherto for example. The projects evaluated to illustrate this hypothesis were the Shogo Sin Hydropower project: which involves foreign currency investments directly and the Naulong Dam which is equipped with imported equipment acquired using foreign currency resources. This makes the application of this economic assessment tool all the more appropriate for these two major investments by Pakistan. While confirming the economic soundness of these investments, the study helps to highlight the use by the feasibility assessment of Bruno's Ratio as a measure of the real cost of foreign exchange to a country, of investment made in such projects.

In general, when prioritizing economic projects, especially those requiring foreign funding, in the current scenario when the foreign currency rate has reached at much higher levels as compared to the past decade in Pakistan. This ratio should be considered for all other public investment opportunities when considering their economic benefits (Mahmood, I., Ehsanullah, M., & Habib, A. 2011). Bruno's ratio is, in fact, one of the suitable measures along with many other shadow pricing tools which can be used in other similar projects requiring imported inputs. The study verifies after analyzing a variety of positive impacts of both projects; such as agricultural benefits including an increase in crop yield, fisheries and output. It includes non-agricultural benefits: saved infrastructure and the generation of energy using water in case of the Naulong Dam. While in case of the Shogo Sin Dam the willingness to pay and LRMC estimates are calculated in monetary terms to establish economic benefits of the projects. Both projects verify the beneficial application of Bruno's ratio for the projects' itself. Hence, validates the future application of ratio for similar future ventures which involves foreign funding or using any inputs which are acquired using foreign currency.

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Annexures

Bruno's Ratio of Shogo Sin Hydropower Plant

Discount rate	12.00%

Net Traded Benefits NPV	Capital cost	O&M cost	Discount factor	Discounted benefits	Cumulative
1	Rs(2,651.25)	Rs-	89%	Rs(2,367.19)	Rs(2,367.19)
2	Rs(5,364.47)	Rs-	80%	Rs(4,276.52)	Rs(6,643.71)
3	Rs(4,905.26)	Rs-	71%	Rs(3,491.47)	Rs(10,135.18)
4	Rs(3,330.66)	Rs-	64%	Rs(2,116.70)	Rs(12,251.88)
5	Rs(1,877.79)	Rs-	57%	Rs(1,065.51)	Rs(13,317.39)
6	Rs-	Rs362.61	51%	Rs183.71	Rs(13,133.68)
7	Rs-	Rs362.61	45%	Rs164.03	Rs(12,969.65)
8	Rs-	Rs362.61	40%	Rs146.45	Rs(12,823.20)
9	Rs-	Rs362.61	36%	Rs130.76	Rs(12,692.44)
10	Rs-	Rs362.61	32%	Rs116.75	Rs(12,575.68)
11	Rs-	Rs362.61	29%	Rs104.24	Rs(12,471.44)
12	Rs-	Rs362.61	26%	Rs93.07	Rs(12,378.37)
13	Rs-	Rs362.61	23%	Rs83.10	Rs(12,295.27)
14	Rs-	Rs362.61	20%	Rs74.20	Rs(12,221.07)
15	Rs-	Rs362.61	18%	Rs66.25	Rs(12,154.82)
16	Rs-	Rs362.61	16%	Rs59.15	Rs(12,095.67)
17	Rs-	Rs362.61	15%	Rs52.81	Rs(12,042.86)
18	Rs-	Rs362.61	13%	Rs47.15	Rs(11,995.71)
19	Rs-	Rs362.61	12%	Rs42.10	Rs(11,953.61)
20	Rs-	Rs362.61	10%	Rs37.59	Rs(11,916.01)
21	Rs-	Rs362.61	9%	Rs33.56	Rs(11,882.45)
22	Rs-	Rs362.61	8%	Rs29.97	Rs(11,852.48)
23	Rs-	Rs362.61	7%	Rs26.76	Rs(11,825.73)
24	Rs-	Rs362.61	7%	Rs23.89	Rs(11,801.84)
25	Rs-	Rs362.61	6%	Rs21.33	Rs(11,780.51)
26	Rs-	Rs362.61	5%	Rs19.04	Rs(11,761.46)
27	Rs-	Rs362.61	5%	Rs17.00	Rs(11,744.46)
28	Rs-	Rs362.61	4%	Rs15.18	Rs(11,729.28)
29	Rs-	Rs362.61	4%	Rs13.56	Rs(11,715.72)
30	Rs-	Rs362.61	3%	Rs12.10	Rs(11,703.62)
31	Rs-	Rs362.61	3%	Rs10.81	Rs(11,692.81)
32	Rs-	Rs362.61	3%	Rs9.65	Rs(11,683.16)
33	Rs-	Rs362.61	2%	Rs8.61	Rs(11,674.55)
34	Rs-	Rs362.61	2%	Rs7.69	Rs(11,666.86)
35	Rs-	Rs362.61	2%	Rs6.87	Rs(11,659.99)
Net Present Value	**Rs(10,694.25)**				

Bruno's Ratio of Naulong Dam

Non Trade Cost NPV	Capital cost	O&M cost	Discount factor	Discounted non traded cost	Cumulative
1	Rs(2,396.00)		89%	Rs(2,139.29)	Rs(2,139.29)
2	Rs(4,848.00)		80%	Rs(3,864.80)	Rs(6,004.08)
3	Rs(4,433.00)		71%	Rs(3,155.32)	Rs(9,159.40)
4	Rs(3,010.00)		64%	Rs(1,912.91)	Rs(11,072.31)
5	Rs(1,697.00)		57%	Rs(962.92)	Rs(12,035.24)
6		Rs327.70	51%	Rs166.02	Rs(11,869.21)
7		Rs327.70	45%	Rs148.23	Rs(11,720.98)
8		Rs327.70	40%	Rs132.35	Rs(11,588.63)
9		Rs327.70	36%	Rs118.17	Rs(11,470.45)
10		Rs327.70	32%	Rs105.51	Rs(11,364.94)
11		Rs327.70	29%	Rs94.21	Rs(11,270.74)
12		Rs327.70	26%	Rs84.11	Rs(11,186.62)
13		Rs327.70	23%	Rs75.10	Rs(11,111.52)
14		Rs327.70	20%	Rs67.05	Rs(11,044.47)
15		Rs327.70	89%	Rs292.59	Rs292.59
16		Rs327.70	80%	Rs261.24	Rs553.83
17		Rs327.70	71%	Rs233.25	Rs787.08
18		Rs327.70	64%	Rs208.26	Rs995.34
19		Rs327.70	57%	Rs185.95	Rs1,181.29
20		Rs327.70	51%	Rs166.02	Rs1,347.31
21		Rs327.70	45%	Rs148.23	Rs1,495.54
22		Rs327.70	40%	Rs132.35	Rs1,627.90
23		Rs327.70	36%	Rs118.17	Rs1,746.07
24		Rs327.70	32%	Rs105.51	Rs1,851.58
25		Rs327.70	29%	Rs94.21	Rs1,945.78
26		Rs327.70	26%	Rs84.11	Rs2,029.90
27		Rs327.70	23%	Rs75.10	Rs2,105.00
28		Rs327.70	20%	Rs67.05	Rs2,172.05
29		Rs327.70	89%	Rs292.59	Rs292.59
30		Rs327.70	80%	Rs261.24	Rs553.83
31		Rs327.70	71%	Rs233.25	Rs787.08
32		Rs327.70	64%	Rs208.26	Rs995.34
33		Rs327.70	57%	Rs185.95	Rs1,181.29
34		Rs327.70	51%	Rs166.02	Rs1,347.31
35		Rs327.70	45%	Rs148.23	Rs1,495.54

Net Present Value	**Rs(10,537.41)**
Exchange rate	**84.50**
Dependency Ratio Ceiling	**83.26**

Discount rate	12.00%

Net Traded Benefits NPV	Capital cost	O&M cost	Discount factor	Discounted benefits	Cumulative
1	Rs6,829.23	Rs196.98	89%	Rs6,097.53	Rs6,097.53
2	Rs9,562.01	Rs261.91	80%	Rs7,622.78	Rs13,720.31
3	Rs10,927.86	Rs64.94	71%	Rs7,778.23	Rs21,498.54
4	Rs-	Rs261.91	64%	Rs166.45	Rs21,664.99
5	Rs-	Rs261.91	57%	Rs148.62	Rs21,813.61
6	Rs-	Rs261.91	51%	Rs132.69	Rs21,946.30
7	Rs-	Rs261.91	45%	Rs118.48	Rs22,064.78
8	Rs-	Rs261.91	40%	Rs105.78	Rs22,170.56
9	Rs-	Rs261.91	36%	Rs94.45	Rs22,265.01
10	Rs-	Rs261.91	32%	Rs84.33	Rs22,349.34
11	Rs-	Rs261.91	29%	Rs75.29	Rs22,424.63
12	Rs-	Rs261.91	26%	Rs67.23	Rs22,491.86
13	Rs-	Rs261.91	23%	Rs60.02	Rs22,551.88
14	Rs-	Rs261.91	20%	Rs53.59	Rs22,605.48
15	Rs-	Rs261.91	18%	Rs47.85	Rs22,653.33
16	Rs-	Rs261.91	16%	Rs42.72	Rs22,696.05
17	Rs-	Rs261.91	15%	Rs38.15	Rs22,734.20
18	Rs-	Rs261.91	13%	Rs34.06	Rs22,768.26
19	Rs-	Rs261.91	12%	Rs30.41	Rs22,798.67
20	Rs-	Rs261.91	10%	Rs27.15	Rs22,825.82
21	Rs-	Rs261.91	9%	Rs24.24	Rs22,850.06
22	Rs-	Rs261.91	8%	Rs21.65	Rs22,871.70
23	Rs-	Rs261.91	7%	Rs19.33	Rs22,891.03
24	Rs-	Rs261.91	7%	Rs17.26	Rs22,908.29
25	Rs-	Rs261.91	6%	Rs15.41	Rs22,923.69
26	Rs-	Rs261.91	5%	Rs13.76	Rs22,937.45
27	Rs-	Rs261.91	5%	Rs12.28	Rs22,949.73
28	Rs-	Rs261.91	4%	Rs10.97	Rs22,960.70
29	Rs-	Rs261.91	4%	Rs9.79	Rs22,970.49
30	Rs-	Rs261.91	3%	Rs8.74	Rs22,979.23
31	Rs-	Rs261.91	3%	Rs7.81	Rs22,987.04
32	Rs-	Rs261.91	3%	Rs6.97	Rs22,994.01
33	Rs-	Rs261.91	2%	Rs6.22	Rs23,000.23
34	Rs-	Rs261.91	2%	Rs5.56	Rs23,005.78
35 to 53	Rs-	Rs261.91	2%	Rs4.96	Rs23,010.74
Net Present Value	Rs19,982.31				

Non Trade Cost NPV	Capital cost	O&M cost	Discount forecast	Discounted non traded cost	Cumulative
1	Rs6,310	Rs182	89%	Rs5,633.93	Rs5,633.93
2	Rs8,835	Rs242	80%	Rs7,043.21	Rs12,677.14
3	Rs10,097	Rs60	71%	Rs7,186.85	Rs19,863.98
4		Rs242	64%	Rs153.80	Rs20,017.78
5		Rs242	57%	Rs137.32	Rs20,155.09
6		Rs242	51%	Rs122.60	Rs20,277.70
7		Rs242	45%	Rs109.47	Rs20,387.17
8		Rs242	40%	Rs97.74	Rs20,484.91
9		Rs242	36%	Rs87.27	Rs20,572.17
10		Rs242	32%	Rs77.92	Rs20,650.09
11		Rs242	29%	Rs69.57	Rs20,719.66
12		Rs242	26%	Rs62.12	Rs20,781.78
13		Rs242	23%	Rs55.46	Rs20,837.24
14		Rs242	20%	Rs49.52	Rs20,886.76
15		Rs242	89%	Rs216.07	Rs216.07
16		Rs242	80%	Rs192.92	Rs408.99
17		Rs242	71%	Rs172.25	Rs581.24
18		Rs242	64%	Rs153.80	Rs735.04
19		Rs242	57%	Rs137.32	Rs872.36
20		Rs242	51%	Rs122.60	Rs994.96
21		Rs242	45%	Rs109.47	Rs1,104.43
22		Rs242	40%	Rs97.74	Rs1,202.17
23		Rs242	36%	Rs87.27	Rs1,289.44
24		Rs242	32%	Rs77.92	Rs1,367.35
25		Rs242	29%	Rs69.57	Rs1,436.92
26		Rs242	26%	Rs62.12	Rs1,499.04
27		Rs242	23%	Rs55.46	Rs1,554.50
28		Rs242	20%	Rs49.52	Rs1,604.02
29		Rs242	89%	Rs216.07	Rs216.07
30		Rs242	80%	Rs192.92	Rs408.99
31		Rs242	71%	Rs172.25	Rs581.24
32		Rs242	64%	Rs153.80	Rs735.04
33		Rs242	57%	Rs137.32	Rs872.36
34		Rs242	51%	Rs122.60	Rs994.96
35 to 53		Rs242	45%	Rs109.47	Rs1,104.43

Net Present Value	**Rs18,999.27**
Exchange rate	**101**
Dependency Ratio Ceiling	**96.03**