# "A STUDY ON GREENEX (BSE)"

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## ABSTRACT

This paper is confined to the factors which were selected for the analysis purpose on greenex various tools has been applied to measure the effect of environment friendly factors and polluted economic factors . My analysis concludes that environment performance index is found to be effected more by energy and pollution index. In India greenex will be effected more in the near future , by industrialization growth and increasing of automobile vehicle sales .this paper is useful for the investors who wanted to take the advantage of industrialization growth which effect negative impact on environment ,and government institutions who wanted to control the ecological systems of the world.

**Key words: Automobile Sales, Carbonex, Energy Index, Index of Industrial Production**.

## INTRODUCTION:

The Climate change is one of the important present-day priorities. The businesses all over have realized the situation and the response to the climate change and they are concerned about systemic and sector-specific problems associated with it. The countries facing risks such as India have to shift to a low carbon growth. So, low carbon strategies can be applied if the emissions landscape across businesses and its effect on sustainable growth are clearly defined and understood. For this issue and in a new development the BSE launched Green Index and named it as Greenex.

Greenex is the India's first carbon efficient index and has been developed by BSE in IIM Ahmedabad. Greenex will measure the performance of companies in terms of carbon emissions. The Index comprises of 20stocks based on a minimum carbon footprint, market capitalization and turnover. Greenex assesses the energy efficiency of the firms based on energy and financial data. The top-ranking companies from each sector like power, steel, cement have made it to the new index called BSE-GREENEX. -gTrade Carbon Ex Ratings Services Private Limited (gTrade) is a company based in India, which has co-developed the BSE-GREENEX Index in close association with the BSE. The index will allow investors to track companies that invest in energy efficient practices -Investors can invest in a mutual fund that invests in companies that form this Greenex. The Greenex will allow asset managers to create products to help investors put their money in green enterprises.

**ENVIRONMENTAL PERFORMANCE INDEX:** The Environmental Performance Index (EPI) ranks how well countries perform on high-priority environmental issues in two broad policy areas: protection of human health from environmental harm and protection of ecosystems. Within these two policy objectives the EPI scores country performance in nine issue areas comprised of 20 indicators.

Indicators in the EPI measure how close countries are to meeting internationally established targets or, in the absence of agreed targets, how they compare to the range of observed countries. EPI includes 178 countries, or 99 percent of global population, 98 percent of land, and 97 percent of global GDP.

**OBJECTIVES:**

- To find the impact on select economic factors on Greenex (IIP, Automobile and carbonex).
- To know the pollution index and the energy index influence on the environment index.
- To find the international crude oil effect on global carbon credits.
- To find the relation between Nifty, Greenex and Carbonex.
- To find the future movement of Greenex with the help of IIP.
- To find the impact of investment in convertible energy on Greenex.

**LIMITATIONS OF THE STUDY:**

- Appropriate and exact data regarding my project has not been available due to confidential reasons.
- Data regarding alternative energies isn't available anywhere, which proved another major obstacle for my project.
- Environment performance index data year on year is not available.
- Pollution index data has been considered from 2012.
- All the variables were averaged to annual.

**SCOPE OF THE STUDY:**

The analysis is confined for the period of 4 years and micro variables which were collected for the analysis are considered from BSE India. Bench marks for global environmental indices are considered from different exchanges of the world markets. This paper focused to find the factors which are influencing the greenex and carbonex indices during the study period.

**EMPERICAL STUDY:**

**Automobile sales, carbonex, energy index, index of industrialization production, environment performance index.**

**LITERATURE REVIEW:**

**Rajib Bhattacharya:** Environmental concern is becoming an important invest theme for progressive investors the world over. Investors are opting to invest in organizations which utilize environment-friendly technologies and business practices to reduce their carbon footprint. Such businesses are known as green businesses. Investors are preferring organizations which have environmental concerns built into their vision and mission. To provide these progressive investors with a benchmark to assess the performance of green stocks vis-à-vis the rest of the market, certain green stock market indices have been constructed all over the world which constitute of stocks of companies guided green business philosophy. In India BSE-GREENEX is such an index. This paper analyzes the performance of BSE-GREENEX vis-à-vis other broad based indices like the BSE-SENSEX and the BSE-500 to test whether it is financially rewarding too for the investors to invest in green stocks. Moreover this paper also

attempts to model the said three indices for prediction over a very short period of a day. The analysis unveils the superior performance of BSE-GREENEX over BSE-SENSEX & BSE-500

**Praveen Saiwal & Shradhanjali**: With the advent of the 21st century, and the new phenomenon of globalization, the world markets have become closer and are shrinking in size and getting highly saturated yet volatile. This gives rise to competition and survival of the fittest makes the competition even more intense. A strong brand increases the level of customer satisfaction and loyalty, and efficiency of business strategy. !rand with great value in the market is an important asset of firm. In the paper, authors analyze the importance of strategic brand management in the conditions of global environment. In modern business conditions and environment, the brand is essentially important for business strategy success. Customers increasingly purchase products on the basis of brand, reputation, and other immaterial attributes and less on the basis of their physical characteristics.

**Mahankali Aruna Kumari , Kapulaneni Divya, Mandali Revanth & L.Swetha:** The following article tries to examine study of carbon credits effect on stock market. Also this article attempts to investigate relative factors which influence stock market in India. The following are the different determinates which we have considered like Carbonex, greenex, powered, msci, population, gold, exports, imports, iip. In India carbon credit decision are taken by Kyoto protocol under united national frame work of climate change (UNFCC).Any fluctuations on population, pollution, iip, etc. will impact on carbon credits. During this analysis we have taken determinants which effects directly or indirectly on stock market returns.

**Madhu Jain & Preeti:** The present study is concerned with a machine repair problem with mixed standbys, permanent and additional repairmen. To deal with the realistic situation, the concepts of balking and reneging are also included. The operating units as well as standby units are assumed to fail in two modes and each mode has the equal probabilities of getting repaired. The provision of the mixed standby is recommended in the machining system for the smooth running of the system due to economic constraints. The units have exponential life time and repair time distributions. In case when the number of failed units is more than the number of the permanent repairmen, the impatience behavior of the care taker is also incorporated. It is also assumed that there is a probability of a switching failure of the mixed standby units to the operating state. The governing equations of the model are constructed using the transient flow rates of different states. The transient state probabilities are obtained by Runge-Kutta method. Some performance indices such as expected number of failed units, expected number of standby units, machine availability etc. are obtained. To determine the expected total cost per unit time, a cost function has been facilitated. The numerical experiment is carried out to validate the analytical results of the developed model. The sensitivity analysis is also performed to explore the effect of different parameters on the performance indices.

**Abhinna Srivastava and Vineet Sing:** In ever changing world scenario, 'Environmental degradation and Loss of ecosystem services' made the word 'Sustainable Development' a sine-qua-non of corporate world. 'Sustainable Development' is a mode of human development in which resources are used to meet human needs and to preserve the environment, focus is given not only to present needs but also for ensuing generation, and it has become a core issue to the strategic decision making of every organisation. Indian corporate world has always laid importance on social and environmental responsibilities. It does not limit itself with contributing only in economic growth of the country but it

provides a number of benefits to the society without harming our ecological system, natural resources and man power. Though a number of articles, research papers, models and frameworks have been made & published yet we do feel a dearth of real life example of initiatives taken by leading organisations, this paper aims at to provide the most recent contributions in this regard, taken by The Hindustan Unilever Limited (HUL), a leading company in India and known for FMCG (Fast Moving Consumer Goods).

## RESEARCH METHODOLOGY:

**Skewness:** Skewness is indicator used in distribution analysis as a sign of asymmetry and deviation from a normal distribution if skewness is greater than zero it is a right skewed distribution which concentrates on left of the mean with extreme values to the right, if skewness is less than zero it is left skewed distribution which concentrates on right of the mean with extreme values to the left, if skewness is zero it is symmetric.

$$S = \sqrt{n}\,\frac{\sum_{i=1}^{n}(X_i - X_{avg})^3}{(\sum_{i=1}^{n}(X_i - X_{avg})^2)^{3/2}}$$

**Kurtosis**: it is an indicator used in distribution analysis as a sign of flattering or peakedness of a distribution, for kutosis 3 is a base value, if kurtosis is greater than 3 it is lepto kurtic distribution sharper than the normal distribution, if kurtosis is less than 3 it is platy kurtic distribution flatter than the normal distribution, kurtosis is equal to 3 it is meso kurtic distribution it means it is normal distribution.

$$kurtosis = \frac{\sum_{i=1}^{N}(Y_i - \bar{Y})^4}{(N-1)s^4}$$

**Correlation:** A correlation study is a research writing that attempts to relate an event to another events or sets of causality which precipitate the event.

Slabs: 0 -0.3 slightly correlated,
0.3-0.7 moderately correlated,
0.7-1 strongly correlated

**Regression:** A statistical measure that attempts to determine the strength of the relationship between one dependent variable (usually denoted by) and the series of other changing variable(known as independent variable).
Y=a+bx
a= the intercept
b= the slope
x= the variable that are using to predict y
y= the variable that are trying to predict

## DATA ANALYSIS AND INTERPRETATION:

**Skewness & Kurtosis Table**

| | skewness | kurt |
|---|---|---|
| greenex-iip | 0.021545 | -2.52707 |
| greenex-auto | 0.575119 | -1.95178 |
| greenex-carbonex | -1.05987 | -3.25117 |

**Interpretation:** Distance correlation has been applied on select economic factors and it has been observed all the factors are negatively correlated with greenex. Expect carbonex which is highly correlated i.e., 0.871. Skewness and kurtosis has been applied on the strongly correlated. Skewness has been applied between iip and automobiles versus greenex and the values are foud to be <1 which indicates left skewed with greenex. Greenex and carbonex values got negative skewed which indicates the data is not normally distributed. Kurtosis has been applied on greenex with IIP and auto variables, all the variables are found to be left kurtic.

**PHILLIP-PERRON T-STATISTIC**

Null Hypothesis: EPI has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | | 0.5 |
| Test critical values: | 1% level | -12.1711851258298 | |
| | 5% level | -5.92632631869510 3 | |
| | 10% level | -4.01309730618261 5 | |

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 2

| | |
|---|---|
| Residual variance (no correction) | 4.72559236663595e-26 |
| HAC corrected variance (Bartlett kernel) | 2.54454973588 0896e-26 |

Phillips-Perron Test Equation
Dependent Variable: D(EPI)
Method: Least Squares
Date: 05/08/14 Time: 17:30
Sample (adjusted): 2 3
Included observations: 2 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| EPI(-1) | - | | | |

| | | | |
|---|---|---|---|
| C | 2.079983380076824<br>147.8693415394173 | | |
| R-squared | 1 | Mean dependent var | 0.384999999999998 |
| S.D. dependent var | 14.15910618647942 | Sum squared resid | 9.45118473327e-26 |
| Durbin-Watson stat | 1.923076923076923 | | |

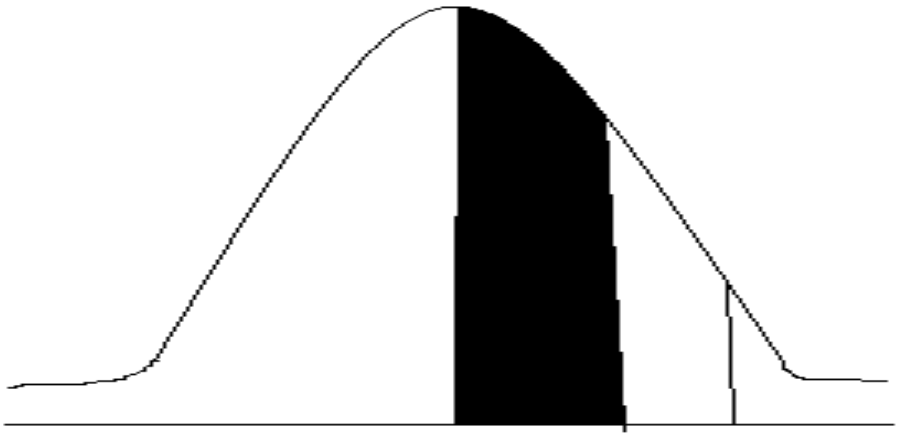
**Interpretation:** Philips perron test has been applied on environment pollution index as a dependent variable based on the independent variable (pollution index and energy index). Adjusted t.statistics values are found to be 0.5, which indicates these two indices (pollution index and energy index) may or may not have the impact on environment performance index.

**Carbon Emission Table**

| Year | Carbon Emissions( billion metric tonnes per year) | crude oil | |
|---|---|---|---|
| 2012 | 9.7 | 67.63 | 2.14687E-08 |
| 2011 | 9.47 | 72.3 | |
| 2010 | 9.19 | 99.06 | |
| 2009 | 8.74 | 58.2 | |
| 2008 | 8.77 | 76.38 | |
| 2007 | 8.57 | 90.52 | |
| 2006 | 8.37 | 88.11 | |
| | | 2.15E-08 | |
| | table value | 2.447 | |
| | dof | (n-1)=6 | |

**Two Tailed Significance Table**

| Two Tailed Significance | | | | | | |
|---|---|---|---|---|---|---|
| Degrees of freedom (n-1) | $\alpha = 0.20$ | 0.10 | 0.05 | 0.02 | 0.01 | 0.002 |
| | | | | | | |
| 1 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 | 318.300 |
| 2 | 1.886 | 2.920 | 4.303 | 6.965 | 9.925 | 22.327 |
| 3 | 1.638 | 2.353 | 3.182 | 4.541 | 5.841 | 10.214 |
| 4 | 1.533 | 2.132 | 2.776 | 3.747 | 4.604 | 7.173 |
| 5 | 1.476 | 2.015 | 2.571 | 3.305 | 4.032 | 5.893 |
| | | | | | | |
| 6 | 1.440 | 1.943 | 2.447 | 3.143 | 3.707 | 5.208 |
| 7 | 1.415 | 1.895 | 2.365 | 2.998 | 3.499 | 4.785 |
| 8 | 1.397 | 1.860 | 2.306 | 2.896 | 3.355 | 4.501 |
| 9 | 1.383 | 1.833 | 2.262 | 2.821 | 3.250 | 4.297 |
| 10 | 1.372 | 1.812 | 2.228 | 2.764 | 3.169 | 4.144 |
| | | | | | | |
| 11 | 1.363 | 1.796 | 2.201 | 2.718 | 3.106 | 4.025 |
| 12 | 1.356 | 1.782 | 2.179 | 2.681 | 3.055 | 3.930 |
| 13 | 1.350 | 1.771 | 2.160 | 2.650 | 3.012 | 3.852 |
| 14 | 1.345 | 1.761 | 2.145 | 2.624 | 2.977 | 3.787 |
| 15 | 1.341 | 1.753 | 2.131 | 2.602 | 2.947 | 3.733 |



0.5 2.146 2.447

**Interpretation:** T-test has been applied on global carbon credits with crude oil, the calculated value of t-hypothesis has fallen in significance region that is below the table value. Hence crude oil is influencing the global carbon emission.

Ho-null hypothesis

Accept the hypothesis if crude oil influences the carbon emission.

Ha-alternative hypothesis

Reject the hypothesis if the crude oil does not influence the carbon emission.

**CORRELATIONS:**

| | | greenex | carbonex | Nifty |
|---|---|---|---|---|
| greenex | Pearson Correlation | 1 | .074 | .995** |
| | Sig. (2-tailed) | | .926 | .005 |
| | N | 4 | 4 | 4 |
| carbonex | Pearson Correlation | .074 | 1 | -.022 |
| | Sig. (2-tailed) | .926 | | .978 |
| | N | 4 | 4 | 4 |
| | | | | |
| nifty | Pearson Correlation | .995** | -.022 | 1 |
| | Sig. (2-tailed) | .005 | .978 | |
| | N | 4 | 4 | 4 |

**. Correlation is significant at the 0.01 level (2-tailed).

**Interpretation:** Correlation has been applied to find the relationship between the nifty, greenex and carbonex. It is found that there is a moderate relationship between the nifty and the greenex .and there is a strong relationship between the carbonex and nifty.

**REGRESSION EQUATION:**

| a | b | x | y=a+bx |
|---|---|---|---|
| 1685.49 | 1573.134 | -7.50354 | -10118.6 |

**Interpretation:** Regression equation has been applied to predict the future direction of greenex by considering IIP as X variable. Equation had given negative value which indicates that in near future greenex is expected to move downside. As an when the production activity goes upside it is effecting the greenex to go down side.

**CORRELATIONS:**

| | | agil | agxil | solarex | Greenex |
|---|---|---|---|---|---|
| agil | Pearson Correlation | 1 | .995** | .666 | .735 |
| | Sig. (2-tailed) | | .005 | .334 | .265 |
| | N | 4 | 4 | 4 | 4 |
| agxil | Pearson Correlation | .995** | 1 | .731 | .670 |
| | Sig. (2-tailed) | .005 | | .269 | .330 |
| | N | 4 | 4 | 4 | 4 |
| solarex | Pearson Correlation | .666 | .731 | 1 | -.017 |
| | Sig. (2-tailed) | .334 | .269 | | .983 |
| | N | 4 | 4 | 4 | 4 |
| greenex | Pearson Correlation | .735 | .670 | -.017 | 1 |
| | Sig. (2-tailed) | .265 | .330 | .983 | |
| | N | 4 | 4 | 4 | 4 |

## Convertible Energies Table

Global alternative energy index Extra liquid

* Weight Estimation.

TSET NEWVAR=NONE.

WLS greenex WITH agigl agxil solarex/SOURCE greenex /POWER -2 TO 2 BY 0.5

## Weighted Least Squares Analysis

## Best Model Statistics Model Summary

| | |
|---|---|
| Multiple R | .965 |
| R Square | .931 |

| | |
|---|---|
| Adjusted R Square | .794 |
| Std. Error of the Estimate | .031 |
| Log-likelihood Function Value | -19.706 |

**ANOVA**

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | .013 | 2 | .007 | 6.768 | .262 |
| Residual | .001 | 1 | .001 | | |
| Total | .014 | 3 | | | |

**Coefficients**

| | Unstandardized Coefficients | | Standardized Coefficients | | | |
|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | Std. Error | T | Sig. |
| (Constant) | 1528.564 | 166.833 | | | 9.162 | .069 |
| Agigl | 3.029 | 1.097 | 7.302 | 2.645 | 2.760 | .221 |
| Agxil | -2.610 | 1.042 | -6.628 | 2.645 | -2.506 | .242 |

**Interpretation:** For the above variables by-variant correlation has been applied with two tailed and the α level 0.01. Global alternative energy index is found to be stronger and AGIXL (Ardour Global Alternative Energy Index Extra Liquid) is found to be moderately correlated with greenex.

AGIGL, (**Ardour** Global Alternative Energy Index Composite). And AGIXL (Ardour Global Alternative Energy Index Extra Liquid) are found to be very strong correlated with each other.

Solar index is found to be negative correlated with greenex. Weighted least square analysis has been applied from he strongly correlated variables with greenex by BY-VARIANT analysis. It has been observed both the indices are significant with the greenex because the calculated values are found to be < 0.5. it shows that alternative energy indices can influence greenex index.

**FINDINGS:**

- Distance correlation has been applied and it has been observed all the factors are negatively correlated with Greenex except carbonex which is highly correlated i.e. 0.87%
- Skewness has been applied and values are found to be <1, which indicates left skewed with Greenex.
- Kurtsis has been applied and values are found to be left kurtic.
- Philips person test has been applied and adjusted. T statics values are found to be negative but the probability is found to be 0.5, which indicates it may or may not have the impact on environment pollution idex.
- T test has been applied and the evaluated value of T hypothesis has fallen in significance region that is below the table value. Hence crude oil is influencing the global carbon emission.
- Regression equation has been applied. It has given negative values which indicates Greenex to move downside in future.
- By variant correlation has been applied and α level which is 0.01, is found to be stronger and AGIXL is found to be moderately correlated with Greenex.
- AGIGL & AGIXL are found to be very strongly correlated with each other.
- Solar Index is found to be negatively correlated with Greenex.
- Weighted least square analysis has been applied & it is found both the indices are significant with the Greenex because the calculated value is found to be <0.5. It shows alternative energy indices can influence Greenex Index.

**SUGGESTIONS:**

- Regulation and exchange need to create awareness about the carbon credits to the investor's fraternity. India is gaining 32% shares on carbon emission in the world, but the Indian investors (equity) are not aware about the carbon trading system.
- In carbon credit $ 4 billion worth of market .In the coming global years it is expected to touch $ 100 billion. So there is a wide scope for the investment to create the wealth.
- There is need to improve the regulatory system the Kyoto protocol to the UNFCCC to reduce the emission of greenhouse gases.
- In India only industries are utilizing the carbon credit revenues whereas other sectors are not utilizing the carbon credit market to make revenues. I suggest government should take proactive steps to include the other sectors like deforestation, agriculture, natural resource mining, and household Emission.
- There is a need to adopt the ultra modern technologies through which industries can reduce carbon emission without compromising on their growth.

**CONCLUSION:**

- I conclude the study on Greenex for the period of 2010-14 distance co-relation analysis has been applied on select economic factors. skewness and kurtosis analysis shows that IIP and automobile sector influence is more on Greenex global carbon credits emission is influenced by crude oil during the analysis period . Alternative energy indices agigl, agxl, solarx impact has been observed on Greenex. Hence there is a further scope to do research and to prove the analysis on Greenex in the area of how industrialization growth and automobile sector effecting greenex in India.

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