



SELECTO SYSTEMS PVT. LIMITED
FLAGSHIP PROJECT STATUS UPDATE

APP BATF

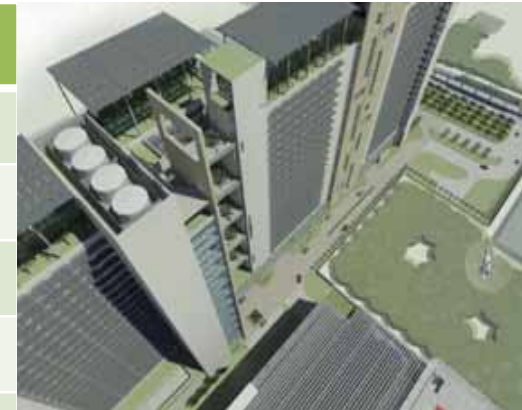
APRIL 2009



Flagship Project
Number: BATF-08-49

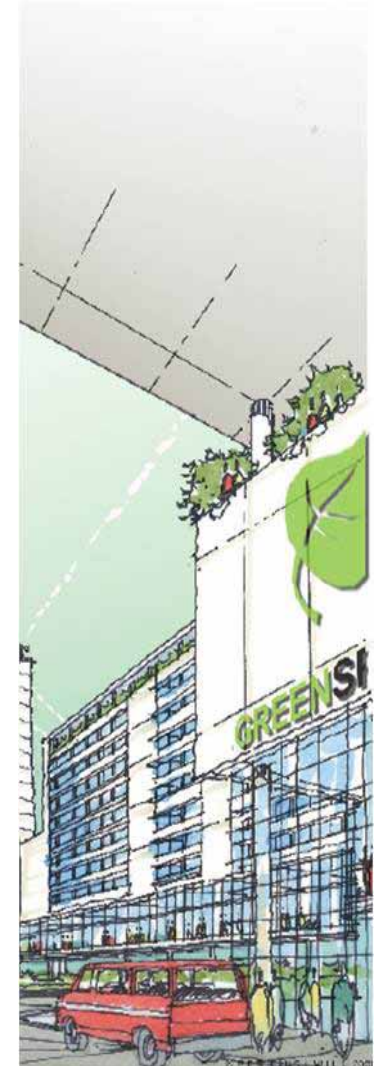
PROJECT SYNOPSIS

Total Plot Area	8.25 Acres
Ground coverage	40%
FAR	250%
Built Up Area	1.75 million sft
No. of towers	4 interlinked towers (3 basements, 23 upper levels) Separate parking block (1 basement, 8 upper levels)
Facilities	IT/ IteS with Retail, Hotel, Medical, Recreation
Floor heights	3.4 M (B2, B3), 6 M (B1, Ground, Podium), 3.75 M (21 upper floors)
Occupancy	8000 day time, 4000 night time
No. of car parks	2087 cars
Floor plate	4 plates per floor @ 8000 sft each carpet area



PROJECT VISION

- Buildings account for 40% of all the energy used by humans on the planet.
- Energy demand is set to increase by 30% in the next 10 years
- 60% of human population will be living in cities in the next 15 years
- There is a growing preference for working and living in air-conditioned spaces
- By reducing the amount of energy used in buildings global environmental destruction is reduced.
- Greenspaces will be more meaningful for society as it will help demonstrate, and walk the talk, that it is possible to reduce the energy used by buildings from 40% to 10% in the world.
- If it can be done in India, then why not elsewhere?



PROJECT GOALS

- Min. energy consumption A 75% reduction over a conventional A grade commercial building
- 24hr business location IT during the day ITeS at night, BPO (voice & data), recycling all waste, opportunities for carbon credits
- Healthiest work place Aimed at reducing attrition in the workplace and creating social sustainability. Maximum use of daylight, high air quality, external views, secure environments & amenities for recreation, well being, learning
- International Certification LEED 3.0 Platinum 103/110 points
TERI GRIHA 98/100 points. 5 star rating.
CDM project
- Economically sustainable To show that 'Green is Green'. Sustainable designed commercial developments are economically viable & profitable.
- Reference project Approved Flagship Project with APP.
- Operational Standards ISO 14001:2004 for *Environment Management System*
ISO 9001:2000 for *Quality Management System*
SA 8000:2001 for *International Standard for Social Accountability*
OHSAS 18001:1999 for *Occupational Health & Safety - Management System*.
ISO 22000: 2005 for *Food Safety Management System* -
Commitment to *UN Global Compact* .



INDOOR AIR QUALITY : RESEARCH AT PBC™-STIP

- Mr. Kamal Meattle, CEO of Paharpur Business Centre & Software Technology Incubator Park (PBC™-STIP), New Delhi, India, heads EcoTrust Capital Advisors, developing the GreenSpaces project.
- PBC™-STIP is a Government of India recognized private infrastructure service provider (ISP) for software exporters.
- With only three varieties of plants, PBC™-STIP has shown how to “grow our own fresh air” indoors, to keep them healthy. It publishes its IAQ readings daily on www.pbcnet.com
- This also allows to have reduced fresh air supplied to buildings and yet meet Industry standards for healthy indoor air.

“The Living Room Plant”



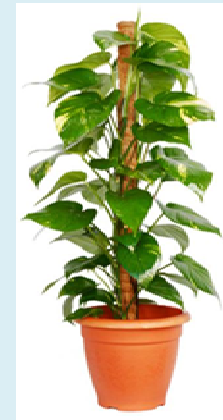
(*Chrysalidocarpus lutescens*)
Areca Palm

“The Bedroom Plant”



(*Sansevieria trifasciata*)
Mother-in-law's Tongue

“The Specialist Plant”



(*Epipremnum aureum*)
Money Plant

For more information on these plants, visit:

http://www.ted.com/index.php/talks/kamal_meattle_on_how_to_grow_your_own_fresh_air.html



GREENSPACES - DESIGN APPROACH

Design Features

- ❑ IT/ITES office spaces with facilities including Retail, Hotel, Medical, Recreation
- ❑ 1.75 million sft Built Up Area
- ❑ 8,000 (daytime) to 4,000 (nighttime) users
- ❑ 4 interlinking towers - 3 basements, ground, podium level and 21 office floors and a greenhouse on the roof covered by PV panels
- ❑ Independent parking block with helipad and PV panels on top
- ❑ Floor heights: 3.4 M (B2, B3), 6 M (B1, G, Podium), 3.75 M (all upper floors)
- ❑ 8.4 M column to column grid for efficient space utilization
- ❑ The office floor plates are column free
- ❑ Structural design for Seismic zone IV
- ❑ Fully serviced office spaces
- ❑ Optional hot desking facility



GREENSPACES - DESIGN APPROACH

Passive energy saving features

- Orientation of building massing – minimize solar gain and maximize use of daylight
- 16 M floor depth to maximize daylight
- Glass technologies for greater thermal insulation with maximum permissible daylight
- Window design to allow optimum daylight and view
- Increased insulation to walls and roof
- Façade wall with 25% glazed area
- Shading of façade to reduce solar heat gain

Specifications

- Extensive use of local building material - reduced carbon footprint
- Extensive use of recycled and rapidly renewable content in building and interior finishing material - reduced carbon footprint
- Materials with low VOC



GREENSPACES - DESIGN APPROACH

Green power

- ❑ 1 MW of solar power generation from roof mounted PV modules
- ❑ Bio-methanation process for generation of methane from on-site waste to power fuel-cells/ cooking gas for kitchen
- ❑ Hydro-power to be wheeled in from available sources.

Lifestyle Changes and House Rules

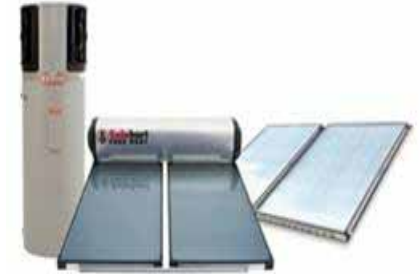
- ❑ Occupants will use energy efficient laptops.
- ❑ Servers will be located in the green data center
- ❑ No jackets or ties allowed during summer
- ❑ Ventilated (bottom and back) chairs for thermal comfort
- ❑ Food and snacks only allowed in dedicated eating area for better IAQ and hygiene



GREENSPACES - DESIGN APPROACH

Services – PUBLIC HEALTH & FIRE FIGHTING

- Water efficiency – to make every drop count
- Treated Waste Water for Flushing, Cooling Tower make-up and landscape
- Drinking water will be UV treated RO water
- low flow fixtures and waterless urinals
- Dual flush water closets with 2/4 litre for flush
- Solar hot water system for hot water requirement
- Rain water harvesting system
- native/adapted landscaping thus reducing the irrigation water requirement
- zero discharge of waste water
- Terrace rain water is captured, stored and used for cleaning of basements, for car washing, site landscape irrigation etc
- STP - high efficiency Membrane Bio Reactor (MBR) treatment scheme based on high efficiency ultra filtration hollow fibre membranes
- Automatic sprinkler system on all floors
- Recycling or sale of all generated wastes



GREENSPACES - DESIGN APPROACH

Services – FIRE DETECTION & ALARM, SECURITY, BMS

- ❑ Latest generation intelligent addressable smoke detection system
- ❑ Inergen/Nitrogen based Gas Suppression system for Data Centre
- ❑ Water leak detection System for Data Centre
- ❑ Oil leak detection System for HSD bulk oil storage tanks
- ❑ Latest generation of perimeter and indoor security system with CCTV, access control, biometrics, boom barriers, etc
- ❑ Open protocol IP based integrated building automation system



GREENSPACES - DESIGN APPROACH

Indoor air quality

- ❑ Use of green planting to improve IAQ by cleaning & oxygenating the Air and removal of VOC, SOX, NOX, SPM, RSP

Landscape

- ❑ Open space for landscaping with native/adaptive vegetation for reduced water needs
- ❑ Green roofs and vertical gardens

Transportation

- ❑ Independent parking block with helipad and PV panels on top
- ❑ Green parking - Charging points for hybrid/ electric cars at car-park
- ❑ Space for Bicycle parking, with showers and lockers
- ❑ Direct access to NH2 (national highway), connecting Delhi and Agra
- ❑ Direct access to proposed Delhi Metro stop – proposal for green certified metro station named GreenSpaces
- ❑ Re-generative elevators for vertical transportation



GREENSPACES - ENERGY CONSERVATION MEASURES (ECM)

- Insulated Wall
- Insulated Roof
- Fins & Overhangs
- Lower lighting power
- Occupancy Sensors
- Daylight Sensors
- Variable frequency drives on Air handling units, Secondary Pumps, Cooling towers
- Chilling machines with high coefficient of performance (COP)
- Thermal Energy Storage system
- Under Floor Air Displacement System
- Free cooling during favorable outside conditions
- Pre cooling of fresh air by using dual wheel
- Change in operating set point - 25°C
- Cooling towers with approach of 5°F
- Solar hot water



DEMAND COMPARISON

	Conventional Building	GreenSpaces
Air-conditioning Cooling Load	150 SFT/TR	600 SFT/TR
Electrical Demand Load	10 WATT/SFT	4 WATT/SFT
Lighting Power Density - office area	2 WATT/SFT	< 0.6 WATT/SFT
Lighting Power Density – retail area	4 WATT/SFT	< 1 WATT/SFT
Lighting Power Density – parking area	1 WATT/SFT	< 0.15 WATT/SFT
Potable Water Demand	45 Liters per day per person	20 Liters per day per person

Note:

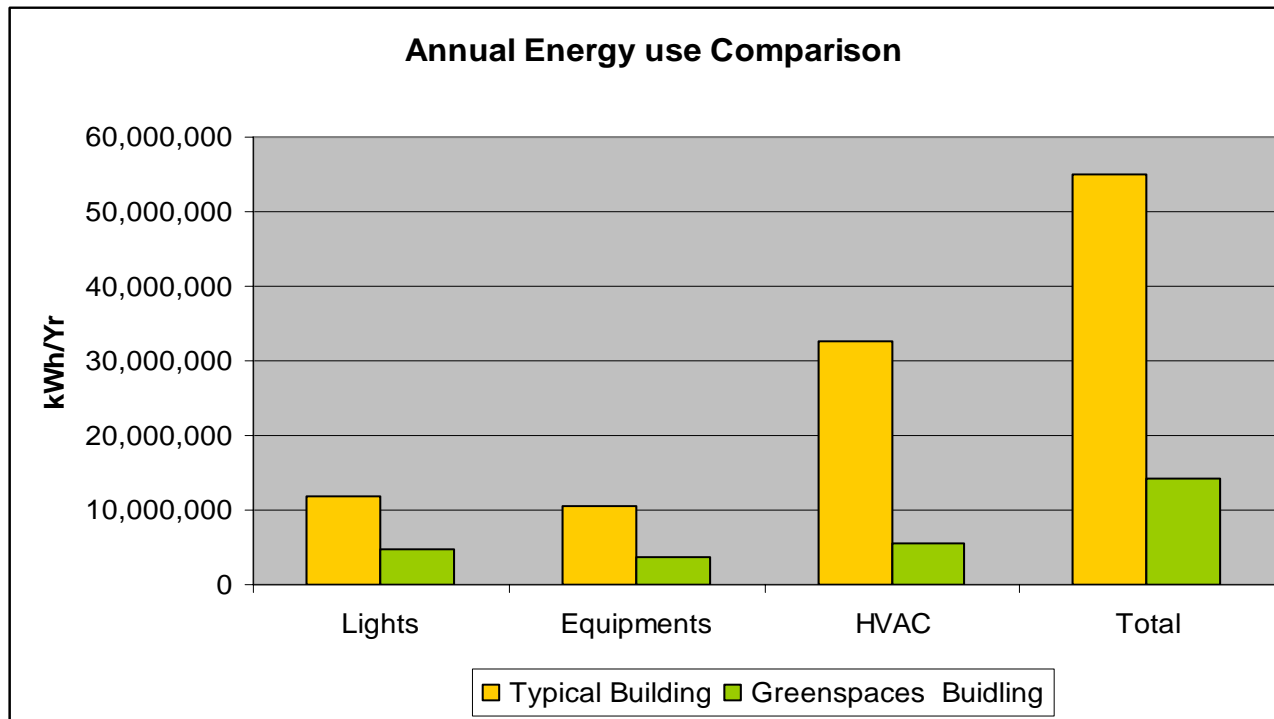
- As per Haryana Government guidelines for providing electrical connection, the demand load should be taken as **25 Watt/sft** of covered area for commercial buildings.
- Whereas, the demand load for **GreenSpaces** is at **4 Watt/sft** – a reduction of **84%**.
- The green data center being set up in association with IBM, with an area of 15,000 sft, is expected to have a Electrical Load Demand of an additional 2 MW. This is under review for finding ways and means to reduce it with the help of LBNL, USA.



GREENSPACES – ANNUAL ENERGY USAGE COMPARISON

Electrical End-use Totals (kWh/Yr)

Alternative	Lights	Equipments	HVAC	Total	% savings
Typical Building	11,955,350	10,448,170	32,585,113	54,988,620	
GreenSpaces	4,845,896	3,743,084	5,507,870	14,096,850	74.4



PROJECT STATUS - APPROVALS

Key Approvals obtained

- SEZ Notification from Government of India
- Environmental Impact Assessment (EIA) from Ministry of Environment & Forests, Government of India
- NOC from Haryana State Pollution Control Board, Government of Haryana
- Flagship Project under APP BATF
- HAREDA approval for 1 MW PV power plant (Grid Incentive Scheme)

Submissions (Stage 1) pending approval

- National Highways Authority of India (NHAI) - access highways – submitted on 10th Nov 08
- Approval for high rise building from Airport Authority of India (AAI) - submitted on 14th Nov 08
- Master Plan approval from Haryana State Government – submitted on 8th Oct 08

Submissions (Stage 2) to be done after approval of Stage 1

- Detailed Building Plans for approval by Haryana Govt
- Approval from Haryana Govt Fire Fighting Authorities
- Approval of Helipad from DGCA and Haryana Govt



PROJECT STATUS – TIME FRAME



- FORMATION OF DESIGN TEAM June 2008
- CONCEPT STAGE September 2008
- SCHEMATIC DESIGN October 2008
- TURN OUT COST (TOC) December 2008
- TOC REVIEW August - October 2009
- DETAILED DESIGN October 2009
- CONSTRUCTION DOCS November 2009
- START CONSTRUCTION December 2009
- COMPLETION September 2012
Shell & core

“creating India’s healthiest & most fun working environment”



GOVERNMENT SUPPORT : INDIA

- ❑ It is a notified SEZ.
- ❑ Both National and State Governments have offered various direct & indirect taxes incentives to the project including exemption from Income Tax, VAT, Excise Duties, Service Tax & Custom duties.
- ❑ The Ministry of Environment & Forests, Government of India has also cleared the project from an Environment angle and given the best rating to the project.
- ❑ In June 2008, Bureau of Energy Efficiency (BEE) Govt. of India (GOI), Ministry of Power, after consultation with TERI had recommended the Project to the Ministry of Environment and Forests, New Delhi.
- ❑ The Ministry of Environment and Forests proposed the Project as a Flagship Project on 27 June 2008.
- ❑ MoU has been signed with HAREDA for 1 MW of solar power generation from roof mounted PV modules.



GOVERNMENT SUPPORT : USA

Oak Ridge National Laboratory

The US Department of Energy is providing full support to the project and sponsored workshop on Geothermal Energy conducted by Mr. John Shonder, Oak Ridge National Laboratory, USA at project office in New Delhi in November, 2008.

Lawrence Berkeley National Laboratory

On 19th February 2009, a Talk on Energy Efficiency in Data Centers' was conducted by Mr. Dale Sartor of Lawrence Berkeley National Laboratory, USA at the project office for BEE/CII meeting and given important tips and advice for setting up of a Green Data Centre at GreenSpaces in association with IBM.

On May 19, 2009, our project proponent, Mr. Kamal Meattle is meeting with Mr. Arun Mazumdar of Lawrence Berkeley National Laboratory, USA in relation to the energy efficiency verification & certification of the project.



FINANCIAL STATUS

- ❑ As per Information Memorandum (IM) provided by Deloitte, the estimated project cost is USD 263 Million
- ❑ We are ready for financial closure and have lined up potential funding of approximately USD 227.5 Million, which is 86% of the project cost.
- ❑ Debt will be USD 121.34 Million and should be available from OPIC, for which the preliminary due diligence has been completed.
- ❑ We still need USD 35.5 Million as Equity (25%) and out of this USD 30.5 Million is required to be from US based investors as per OPIC rules.
- ❑ The project cost is expected to come down due to the present day market trends.
- ❑ As per the IM, the IRR's are 30%. However, even if the current downturn continues, we would be able to achieve an IRR in excess of 15%.
- ❑ CDM revenues have been considered in the financial model.
- ❑ In addition, we are looking at the following options for further reduction of project cost:
 - ❑ Scope of reduction in material cost
 - ❑ Search for efficient and more cost effective alternative technologies
 - ❑ Active technology/ sourcing support from APP member countries



TECHNO-COMMERCIAL ISSUES FOR SUSTAINABILITY

Regenerative elevators

- The current technology for re-generative elevators is proprietary and almost double the cost of the conventional high-efficiency elevators
- Need advise on alternative technology and energy saving opportunities in elevators.

Efficient space lighting

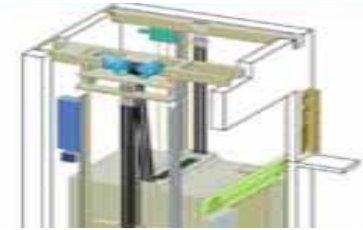
- Current efficiency for LED based space lighting is very low, and the life cycle cost is significantly higher than energy efficient Super T8 lamps.
- Assistance needed for lighting technology for reducing the life cycle cost at higher efficiency.

PV panels

- The state government (HAREDA) has provided an incentive for on-site renewable power only if it is ploughed back to grid (under Grid Incentive Scheme).
- Huge power loss in the process of transforming low voltage DC power from PV to 66kV AC power of the grid.
- Incentive should still be provided to GreenSpaces even if it uses PV power directly.
- Current cost of PV is about 5 USD/Watt. Supplier/ technology information is requested to achieve lower cost and a higher efficiency system.

Façade works

- integrated insulated façade technology is not available in India as per required design
- currently the average façade cost is estimated at 12 USD/ sft.
- Assistance in finding alternative cost effective technology/ suppliers will be helpful.



TECHNO-COMMERCIAL ISSUES FOR SUSTAINABILITY

- ❑ **Energy efficient HVAC systems**
 - Under Floor Air Displacement Ventilation
 - High cost of system
 - Adapting to hot and humid climate zone
 - Limited experience of radiant cooling systems in hot and humid climate
- ❑ **Geothermal cooling**
 - We need special permission from GOI to draw ground water and put it back in a closed loop, for geothermal cooling.
 - Support has been provided by APP through ORNL
- ❑ **Energy generation through on-site bio methanation**
 - Boi-methanation to produce methane from on-site waste to power fuel-cells.
 - Bio reactor technology available from TERI (TEAM – TERI's Enhanced Acidification and Methanation process)
 - Request support for integrating fuel cell technologies
- ❑ **Waste water treatment technology**
 - Current proposed technology is MBR from GE
 - Exploring Sustainable waste water management technology from Organica (www.organica.hu) – use of green plants for creating a sustainable ecosystem of micro-organisms for treating waste water
 - Assistance required for evaluating other similar technologies

