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Redevelopment of Dharavi Slums

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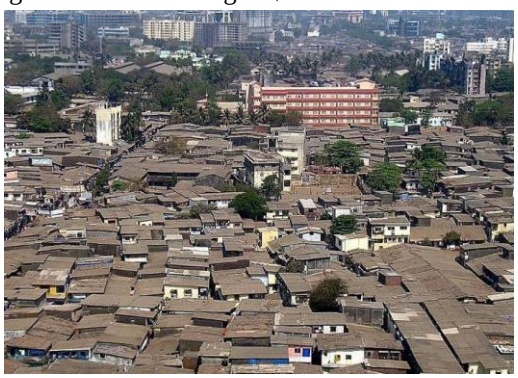
***Abstract*— Dharavi, Asia's largest slum is a home to nearly 700,000 to 1 million people, with an inordinate population density of 277,136 per square km. The dearth of hygiene, miniature homes, low income and lack of awareness has exacerbated the living conditions in the Dharavi dwelling. This paper proposes a synergistic redevelopment model for the**

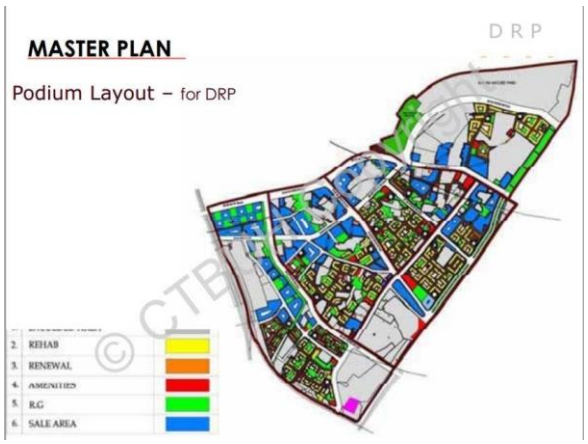
rehabilitation of the local community. In addition, thermal analysis has been carried out for redeveloped model. This paper suggests a sustainable redevelopment approach by draping the new buildings with acopiously growing tropical creeper Vernonia elaeagnifolia. This results in a drop of 3.3^0C, around noon. The HVAC loads showed a decrease resulting in an annual saving of $614.14.

I. INTRODUCTION

Dharavi is locality in Mumbai, Maharashtra, India. It is spread over 557 acres and houses nearly a million people. The present day living conditions of Dharavi are very poor, and the ever rising temperatures in urban areas is another major issue faced by the slum dwellers. We have proposed a synergistic redevelopment model for the rehabilitation of the local community. In addition, we have carried out thermal analysis for redeveloped model. This paper suggests a sustainable redevelopment approach by draping the new buildings with a copiously growing tropical creeper Vernonia elaeagnifolia. This results in a drop of 3.3^0C, around noon. The HVAC loads showed a decrease resulting in an annual saving of $614.14.



II. THE PLAN FOLLOWED BY FOR REDEVELOPMENT IS THE ONE SUGGESTED BY INDIAN ARCHITECT MUKESH MEHTA.



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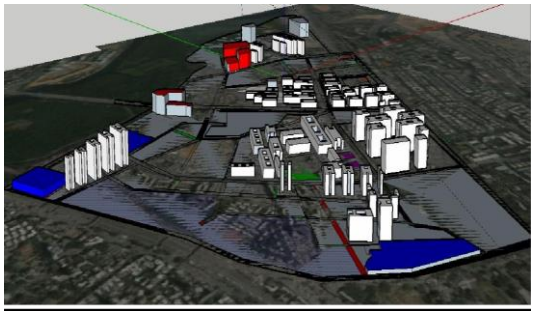
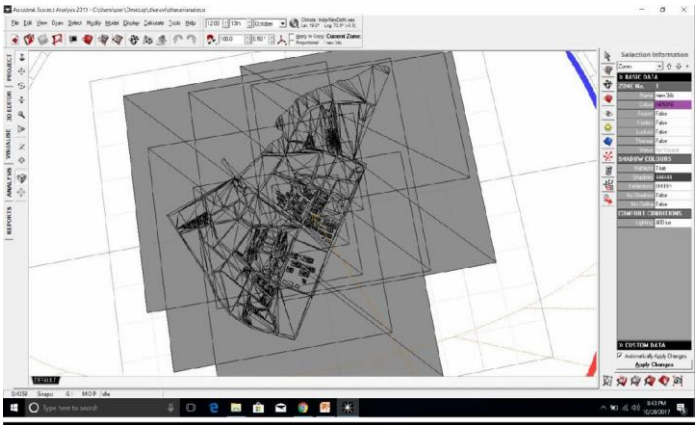
Sketch up model

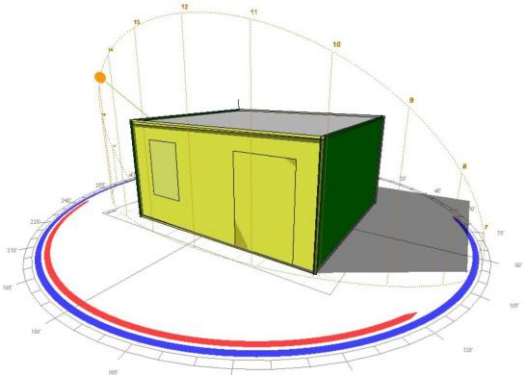


ECOTECT MODEL:



Sides Receiving Direct Sunlight

The sides requiring shading is found out using
the sun path diagram at the co- ordinates of Dharavi (19.042N 72.85E).



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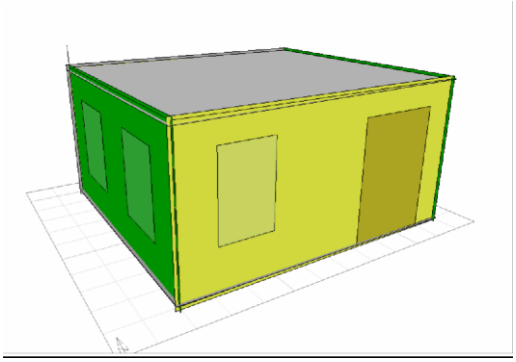
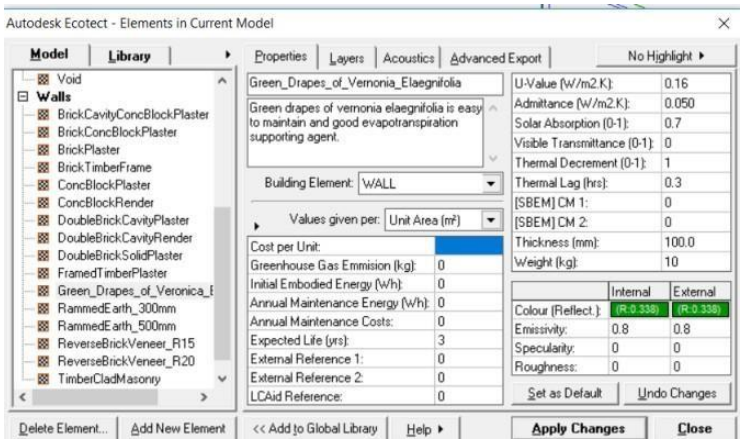
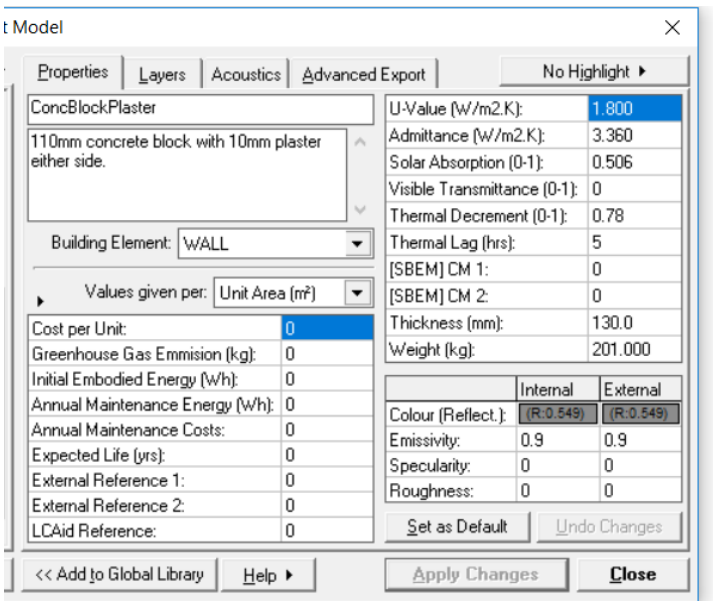
Basic Sketch of Room [2]
Green colour -Vernonia Elaegnifolia drapes 3cm thickness Yellow

Brick concrete Block Plaster







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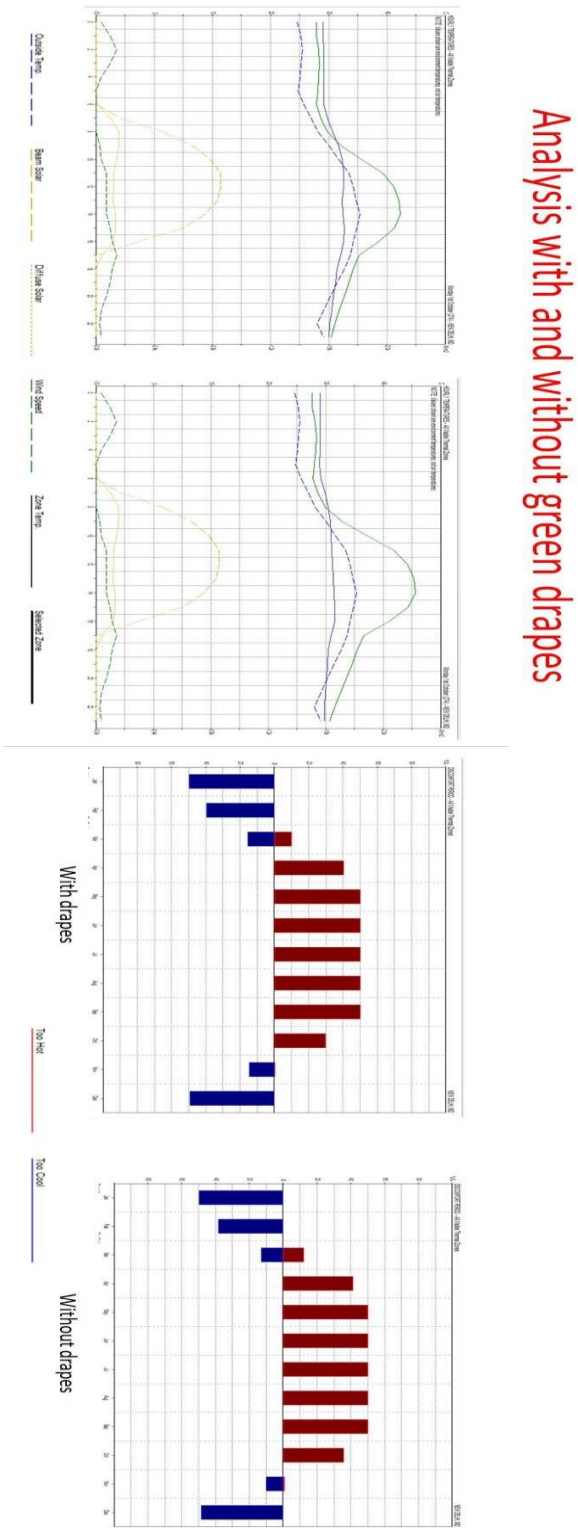

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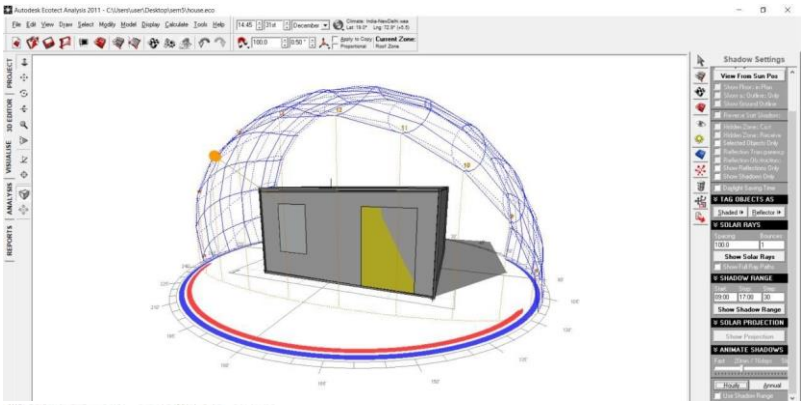
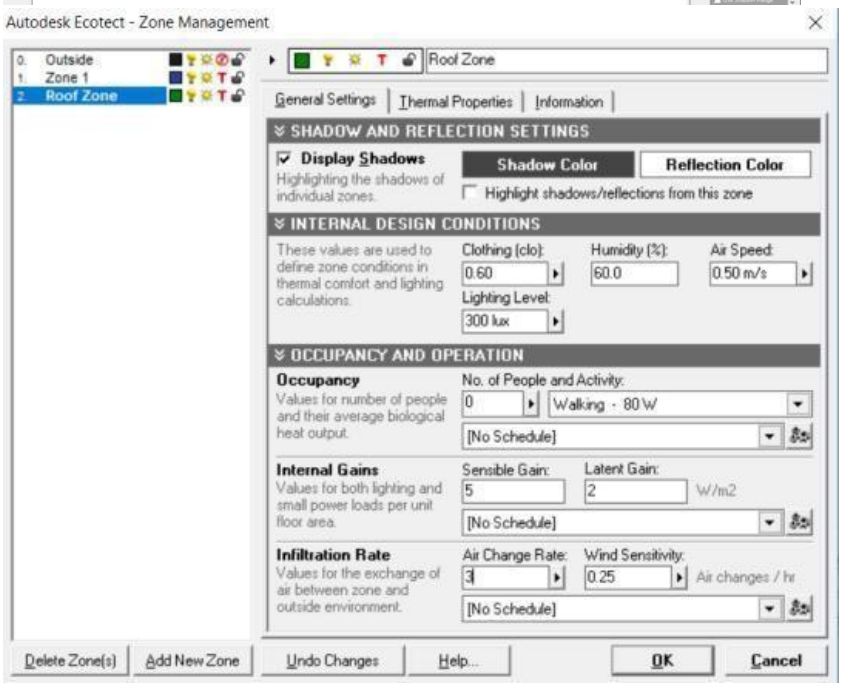
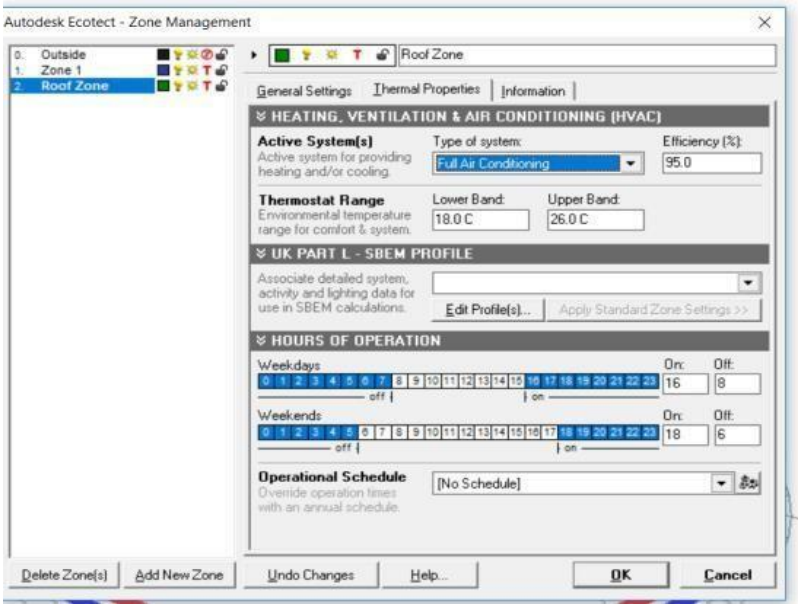
ENERGY REQUIRED FOR HEATING AND COOLING DURING DIFFERENT MONTHS







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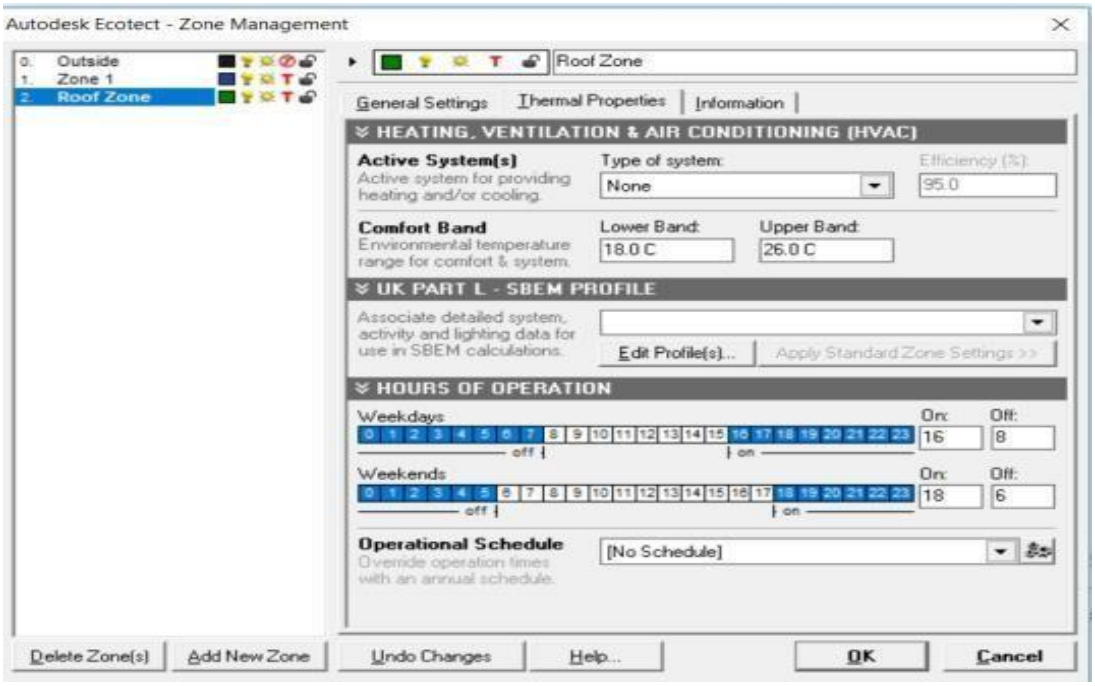
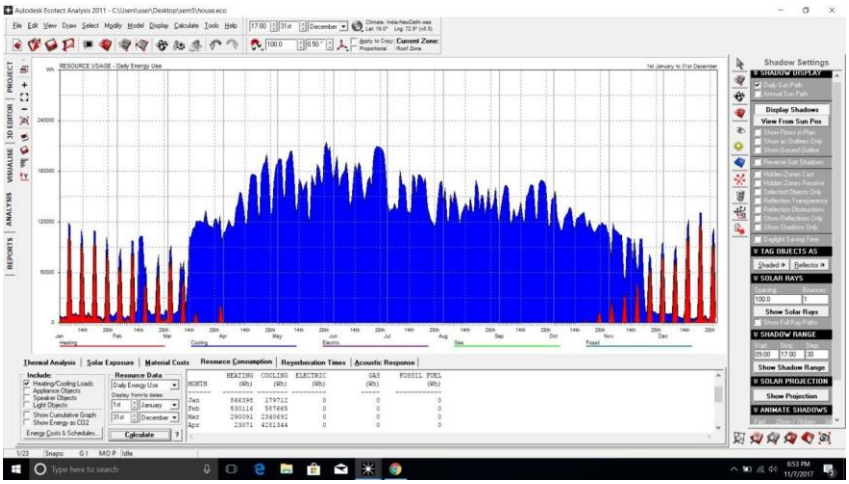
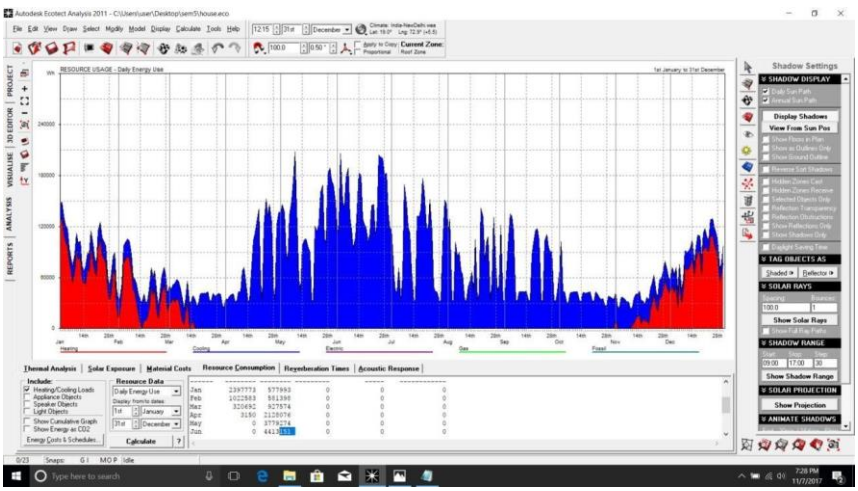


Without drapes



With drapes [6]



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HVAC DATA

Without greendrapes Concrete block plaster walls

MONTH	HEATING (Wh)	COOLING (Wh)	ELECTRIC (Wh)	GAS (Wh)	FOSSIL FUEL (Wh)	total
Jan	866398	179712	0	0	0	1046110
Feb	530116	587665	0	0	0	1117781
Mar	290091	2340692	0	0	0	2630783
Apr	23071	4281344	0	0	0	4304415
May	0	5395574	0	0	0	5395574
Jun	0	5354172	0	0	0	5354172
Jul	0	4608399	0	0	0	4608399
Aug	0	4399482	0	0	0	4399482
Sep	0	4255898	0	0	0	4255898
Oct	28463	3779847	0	0	0	3808310
Nov	325165	1808992	0	0	0	2134157
Dec	971321	272535	0	0	0	1243856
					NET	40298937
						40298.937kW

With green drapes covered on Two sides with
Direct solar exposure

MONTH	HEATING (Wh)	COOLING (Wh)	ELECTRIC (Wh)	GAS (Wh)	FOSSIL FUEL (Wh)	TOTAL
Jan	2397773	577993	0	0	0	2975766
Feb	1022583	581398	0	0	0	1603981
Mar	320692	927574	0	0	0	1248266
Apr	3150	2128076	0	0	0	2131226
May	0	3779274	0	0	0	3779274
Jun	0	4413151	0	0	0	4413151
Jul	0	2929142	0	0	0	2929142
Aug	0	2394686	0	0	0	2394686
Sep	0	2116856	0	0	0	2116856
Oct	0	1271528	0	0	0	1271528
Nov	473975	777390	0	0	0	1251365
Dec	2192060	581050	0	0	0	2773110
					NET	28888351
						28888.351kW

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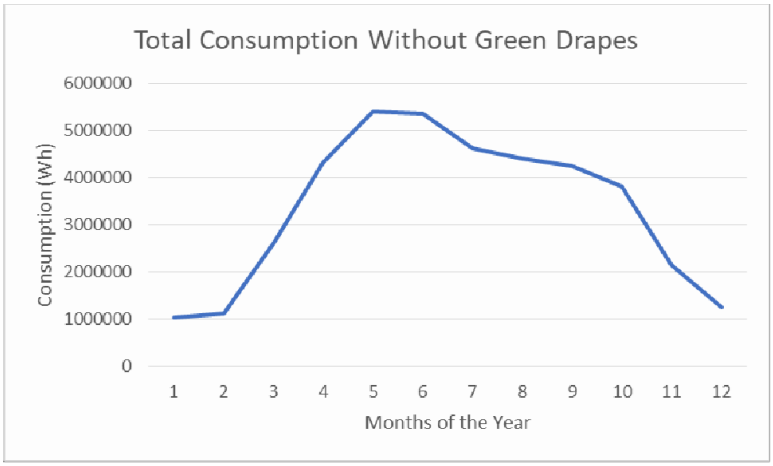
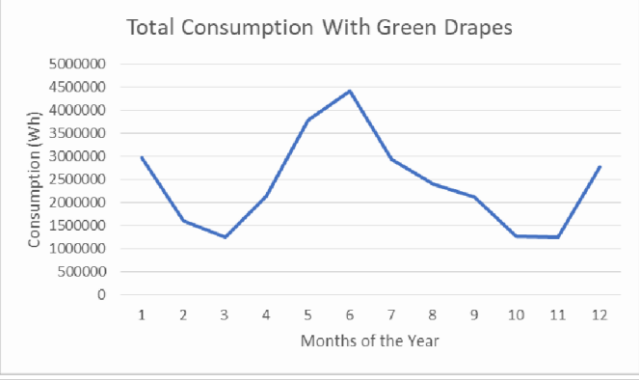
Graphs [4]





Energy Savings		EB(Rs3.5/unit)	
without drapes	40298.937kW		141046
with drapes	28888.351kW		101109
Savings	11410.019kW	Rs39936	
cost savind USD(65Rs/$)			$614.41

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Energy Plus Simulation:

The google sketch up model input for energy plus simulation was:

Input IDF file for energy plus simulation

A midrise apartment was considered, four story, having 31 apartments and an office.

The parameters were as follows:

```
! Midrise Apartment building, new construction 90.1-2004
! Version 1.3_5.0
! EnergyPlus Version 6.0
! ASHRAE Standards 90.1-2004 and 62-1999
!
! Description:  Four story apartment building, 31 apartments plus office
! Form:         Area = 3,135 m2 (33,742 ft2); Number of Stories = 4; Shape = rectangle; Aspect ratio = 2.74
! Envelope:     Envelope thermal properties vary with climate according to ASHRAE Standard 90.1-2004 residential.
!               Opaque constructions: Steel frame wall; Insulation entirely above deck; slab-on-grade floor
!               Windows: window-to-wall ratio = 15.0%,
!               Infiltration in perimeter zones only
!                           = 0.4 cfm/ft2 above grade wall area at 0.3 in wc (75 Pa) adjusted to 0.016 in wc (4 Pa).
!                             Office: 25% of full value when ventilation system on.
! HVAC:         Split system units in each apartment, office; DX cooling and gas furnace
!               Economizer per 90.1-2004 for office system only
!
! Int. gains:   W/m2 (W/ft2)  lights       elec plug     gas plug
!               Apartments    3.88 (0.36)  5.38 (0.50)   0
!               Office        10.8 (1.0)   12.9 (1.20)   0
!               Corridor      5.38 (0.5)   0             0
! Elevators:    1 @ 20 HP, 91% motor efficiency
!
```

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The construction materials chosen were as follows

```
! ***OPAQUE CONSTRUCTIONS AND MATERIALS***
! Exterior Walls

  Construction,
    Steel Frame Res Ext Wall,!- Name
    Wood Siding,             !- Outside Layer
    Steel Frame Res Wall Insulation,  !- Layer 2
    1/2IN Gypsum;            !- Layer 3

  Material,
    Steel Frame Res Wall Insulation,  !- Name
    MediumRough,             !- Roughness
    0.119161363096001,       !- Thickness {m}
    0.049,                   !- Conductivity {W/m-K}
    265.0000,                !- Density {kg/m3}
    836.8000,                !- Specific Heat {J/kg-K}
    0.9000,                  !- Thermal Absorptance
    0.7000,                  !- Solar Absorptance
    0.7000;                  !- Visible Absorptance

! Roof

  Construction,
    IEAD Res Roof,           !- Name
    Roof Membrane,           !- Outside Layer
    IEAD Res Roof Insulation,!- Layer 2
    Metal Decking;           !- Layer 3

  Material,
    IEAD Res Roof Insulation,!- Name
    MediumRough,             !- Roughness
    0.127338688569477,       !- Thickness {m}
    0.049,                   !- Conductivity {W/m-K}
    265.0000,                !- Density {kg/m3}
    836.8000,                !- Specific Heat {J/kg-K}
    0.9000,                  !- Thermal Absorptance
    0.7000,                  !- Solar Absorptance
    0.7000;                  !- Visible Absorptance
   ! Interior Walls

     Construction,
       int-walls,            !- Name
       1/2IN Gypsum,         !- Outside Layer
       1/2IN Gypsum;         !- Layer 2

   ! Interior Floors

     Construction,
       INT-FLOOR-TOPSIDE,    !- Name
       MAT-CC05 4 HW CONCRETE,  !- Outside Layer
       CP02 CARPET PAD;      !- Layer 2

     Construction,
       INT-FLOOR-UNDERSIDE,  !- Name
       CP02 CARPET PAD,      !- Outside Layer
       MAT-CC05 4 HW CONCRETE;  !- Layer 2
```

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```
! ***WINDOW/DOOR CONSTRUCTIONS AND MATERIALS***

  Construction,
    Window Res Operable,      !- Name
    Res Operable Assembly Window;  !- Outside Layer

  WindowMaterial:SimpleGlazingSystem,
    Res Operable Assembly Window,  !- Name
    3.80426,                  !- U-Factor {W/m2-K}
    0.39,                     !- Solar Heat Gain Coefficient
    ;                         !- Visible Transmittance

! ***COMMON CONSTRUCTIONS AND MATERIALS***

  Construction,
    InteriorFurnishings,      !- Name
    Std Wood 6inch;           !- Outside Layer

  Material,
    Std Wood 6inch,           !- Name
    MediumSmooth,             !- Roughness
    0.15,                     !- Thickness {m}
    0.12,                     !- Conductivity {W/m-K}
    540.0000,                 !- Density {kg/m3}
    1210,                     !- Specific Heat {J/kg-K}
    0.9000000,                !- Thermal Absorptance
    0.7000000,                !- Solar Absorptance
    0.7000000;                !- Visible Absorptance
```

The no of people per apartment was chosen to be four.

The electric loads were also defined as follows:

```
Lights,
  G NW Apartment_Lights,    !- Name
  G NW Apartment,           !- Zone or ZoneList Name
  APT_LIGHT_SCH,            !- Schedule Name
  Watts/Area,               !- Design Level Calculation Method
  ,                         !- Lighting Level {W}
  3.88,                     !- Watts per Zone Floor Area {W/m2}
  ,                         !- Watts per Person {W/person}
  0.0000,                   !- Return Air Fraction
  0.7000,                   !- Fraction Radiant
  0.2000,                   !- Fraction Visible
  1.0000,                   !- Fraction Replaceable
  General,                  !- End-Use Subcategory
  No;                       !- Return Air Fraction Calculated from Plenum Temperature
```

```
ElectricEquipment,
  G SW Apartment_PlugMisc_Equip,  !- Name
  G SW Apartment,           !- Zone or ZoneList Name
  APT_EQP_SCH,              !- Schedule Name
  Watts/Area,               !- Design Level Calculation Method
  ,                         !- Design Level {W}
  5.38,                     !- Watts per Zone Floor Area {W/m2}
  ,                         !- Watts per Person {W/person}
  0.0000,                   !- Fraction Latent
  0.5000,                   !- Fraction Radiant
  0.0000,                   !- Fraction Lost
  General;                  !- End-Use Subcategory
```

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```
! ***HVAC EQUIPMENT***

  Fan:OnOff,
    SPLITSYSTEMAC:01_Unitary_Package_fan,  !- Name
    ALWAYS_ON,               !- Availability Schedule Name
    0.53625,                 !- Fan Total Efficiency
    622.0,                   !- Pressure Rise {Pa}
    AUTOSIZE,                !- Maximum Flow Rate {m3/s}
    0.825,                   !- Motor Efficiency
    1.0,                     !- Motor In Airstream Fraction
    OA-SPLITSYSTEMAC:01_Unitary_PackageNode,  !- Air Inlet Node Name
    SPLITSYSTEMAC:01_Unitary_PackageCoolCoil air inlet,  !- Air Outlet Node Name
    ,                        !- Fan Power Ratio Function of Speed Ratio Curve Name
    ,                        !- Fan Efficiency Ratio Function of Speed Ratio Curve Name
    Unitary Fans;            !- End-Use Subcategory
```

```
  Coil:Heating:Fuel,
    SPLITSYSTEMAC:12_Unitary_Package_HeatCoil,  !- Name
    ALWAYS_ON,                !- Availability Schedule Name
    NaturalGas,               !- Fuel Type
    0.8,                      !- Burner Efficiency
    AUTOSIZE,                 !- Nominal Capacity {W}
    SPLITSYSTEMAC:12_Unitary_PackageHeatCoil air inlet,  !- Air Inlet Node Name
    SPLITSYSTEMAC:12 Supply Equipment Outlet Node;  !- Air Outlet Node Name
```

```
AirLoopHVAC,
  SPLITSYSTEMAC:13,         !- Name
  ,                         !- Controller List Name
  ,                         !- Availability Manager List Name
  AUTOSIZE,                 !- Design Supply Air Flow Rate {m3/s}
  SPLITSYSTEMAC:13 Air Loop Branches,  !- Branch List Name
  ,                         !- Connector List Name
  SPLITSYSTEMAC:13 Supply Equipment Inlet Node,  !- Supply Side Inlet Node Name
  SPLITSYSTEMAC:13 Zone Equipment Outlet Node,  !- Demand Side Outlet Node Name
  SPLITSYSTEMAC:13 Zone Equipment Inlet Node,  !- Demand Side Inlet Node Names
  SPLITSYSTEMAC:13 Supply Equipment Outlet Node;  !- Supply Side Outlet Node Names
```

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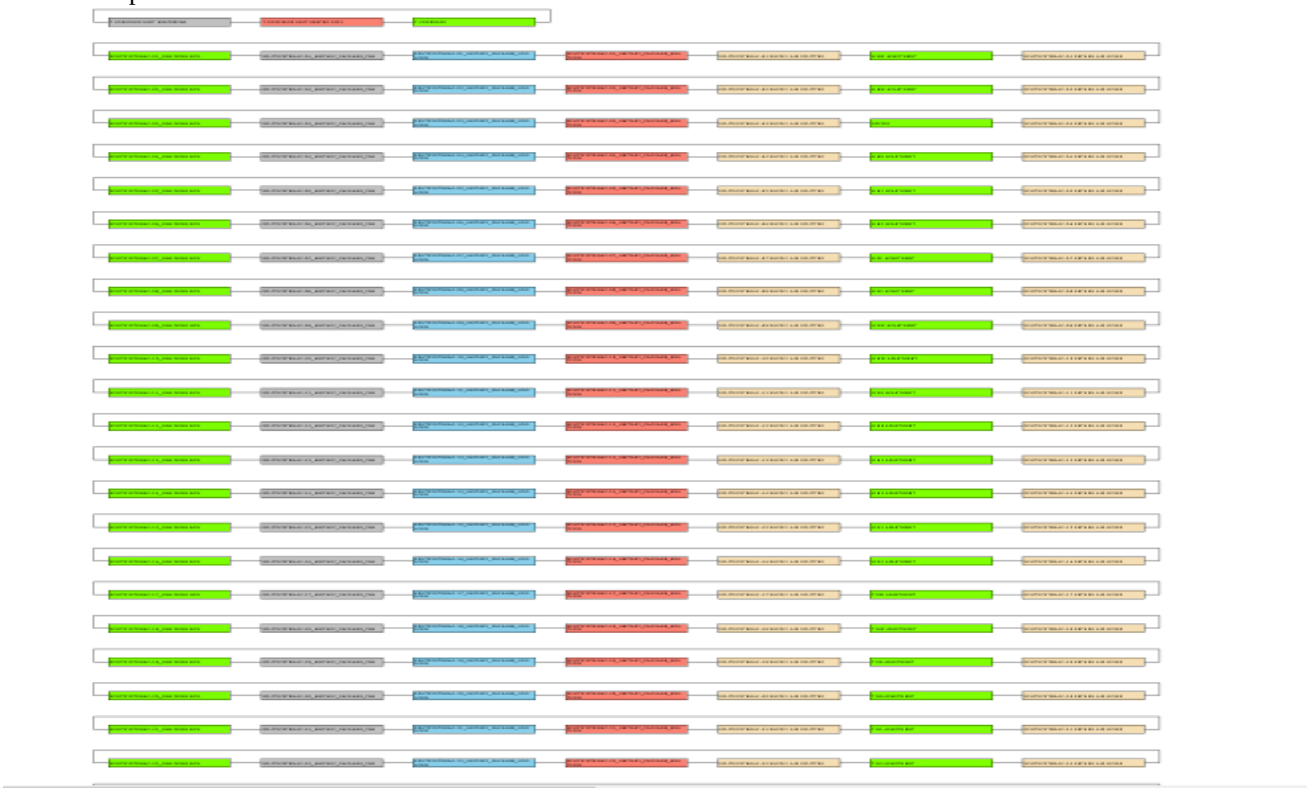
A layout of the 31 apartments and their HVAC loads



Weather file was imported as well. The following results were obtained. [6]

Site to Source Energy Conversion Factors

	Site=>Source Conversion Factor
Electricity	3.546
Natural Gas	1.092
District Cooling	0.848
District Heating	1.647
Steam	0.585
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil #1	1.050
Fuel Oil #2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

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Building Area

	Area [m2]
Total Building Area	3134.59
Net Conditioned Building Area	3134.59
Unconditioned Building Area	0.00

ENVELOPE

Window-Wall Ratio

	Total	North (315 to 45 deg)	East (45 to 135 deg)	South (135 to 225 deg)	West (225 to 315 deg)
Gross Wall Area [m2]	1542.01	564.78	206.22	564.78	206.22
Above Ground Wall Area [m2]	1542.01	564.78	206.22	564.78	206.22
Window Opening Area [m2]	231.09	83.23	33.42	83.23	31.21
Gross Window-Wall Ratio [%]	14.99	14.74	16.20	14.74	15.13
Above Ground Window-Wall Ratio [%]	14.99	14.74	16.20	14.74	15.13

Conditioned Window-Wall Ratio

	Total	North (315 to 45 deg)	East (45 to 135 deg)	South (135 to 225 deg)	West (225 to 315 deg)
Gross Wall Area [m2]	1542.01	564.78	206.22	564.78	206.22
Above Ground Wall Area [m2]	1542.01	564.78	206.22	564.78	206.22
Window Opening Area [m2]	231.09	83.23	33.42	83.23	31.21
Gross Window-Wall Ratio [%]	14.99	14.74	16.20	14.74	15.13
Above Ground Window-Wall Ratio [%]	14.99	14.74	16.20	14.74	15.13

Skylight-Roof Ratio

	Total
Gross Roof Area [m2]	783.65
Skylight Area [m2]	0.00
Skylight-Roof Ratio [%]	0.00

PERFORMANCE

Zone Summary

	Area [m2]	Conditioned (Y/N)	Part of Total Floor Area (Y/N)	Volume [m3]	Multipliers	Above Ground Gross Wall Area [m2]	Underground Gross Wall Area [m2]	Window Glass Area [m2]	Opening Area [m2]	Lighting [W/m2]	People [m2 per person]	Plug and Process [W/m2]
G SW APARTMENT	88.25	Yes	Yes	268.96	1.00	58.52	0.00	8.55	8.55	3.8800	35.30	5.3800
G NW APARTMENT	88.25	Yes	Yes	268.96	1.00	58.52	0.00	8.55	8.55	3.8800	35.30	5.3800
OFFICE	88.25	Yes	Yes	268.96	1.00	58.52	0.00	8.55	8.55	10.7600	44.12	12.9000
G NE APARTMENT	88.25	Yes	Yes	268.96	1.00	58.52	0.00	8.55	8.55	3.8800	35.30	5.3800

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Exterior Fenestration

	Construction	Glass Area [m2]	Frame Area [m2]	Divider Area [m2]	Area of One Opening [m2]	Area of Multiplied Openings [m2]	Glass U-Factor [W/m2-K]	Glass SHGC	Glass Visible Transmittance	Frame Conductance [W/m2-K]	Divider Conductance [W/m2-K]	Shade Control	Parent Surface	Azimuth [deg]	Tilt [deg]	Cardinal Direction
GWINDOW1	WINDOW RES OPERABLE	5.20	0.00	0.00	5.20	5.20	3.809	0.389	0.274			No	G SWALL SWA	180.00	90.00	S
GWINDOW2	WINDOW RES OPERABLE	3.34	0.00	0.00	3.34	3.34	3.809	0.389	0.274			No	G WWALL SWA	270.00	90.00	W
GWINDOW4	WINDOW RES OPERABLE	5.20	0.00	0.00	5.20	5.20	3.809	0.389	0.274			No	G NWALL NWA	0.00	90.00	N
GWINDOW6	WINDOW RES OPERABLE	3.34	0.00	0.00	3.34	3.34	3.809	0.389	0.274			No	G WWALL NWA	270.00	90.00	W

Cooling Coils

	Type	Design Coil Load [W]	Nominal Total Capacity [W]	Nominal Sensible Capacity [W]	Nominal Latent Capacity [W]	Nominal Sensible Heat Ratio	Nominal Efficiency [W/W]
SPLITSYSTEMAC:01_UNITARY_PACKAGE_COOLCOIL	Coil:Cooling:DX:SingleSpeed		3482.68	2431.20	1051.48	0.70	3.67
SPLITSYSTEMAC:10_UNITARY_PACKAGE_COOLCOIL	Coil:Cooling:DX:SingleSpeed		7567.22	5282.55	2284.67	0.70	3.67
SPLITSYSTEMAC:11_UNITARY_PACKAGE_COOLCOIL	Coil:Cooling:DX:SingleSpeed		6913.01	4825.85	2087.15	0.70	3.67
SPLITSYSTEMAC:12_UNITARY_PACKAGE_COOLCOIL	Coil:Cooling:DX:SingleSpeed		6921.80	4831.99	2089.81	0.70	3.67

Heating Coils

	Type	Design Coil Load [W]	Nominal Total Capacity [W]	Nominal Efficiency [W/W]
T CORRIDOR UNIT HEATER COIL	Coil:Heating:Electric		882.95	1.00
G CORRIDOR UNIT HEATER COIL	Coil:Heating:Electric		0.00	1.00
M CORRIDOR UNIT HEATER COIL	Coil:Heating:Electric		0.00	1.00
SPLITSYSTEMAC:01_UNITARY_PACKAGE_HEATCOIL	Coil:Heating:Fuel		5225.73	0.80
SPLITSYSTEMAC:10_UNITARY_PACKAGE_HEATCOIL	Coil:Heating:Fuel		10419.55	0.80

Zone Sensible Heating

	Calculated Design Load [W]	User Design Load [W]	User Design Load per Area [W/m2]	Calculated Design Air Flow [m3/s]
G SW APARTMENT	2390.37	3179.20	36.03	0.105
G NW APARTMENT	2384.26	3171.07	35.93	0.105
OFFICE	4122.72	5483.21	62.13	0.180

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Zone Sensible Cooling

	Calculated Design Load [W]	User Design Load [W]	User Design Load per Area [W/m2]	Calculated Design Air Flow [m3/s]	User Design Air Flow [m3/s]
G SW APARTMENT	1292.10	1718.49	19.47	0.084	0.112
G NW APARTMENT	1182.28	1572.43	17.82	0.077	0.102
OFFICE	2228.20	2963.51	33.58	0.145	0.193

Fans

	Type	Total Efficiency [W/W]	Delta Pressure [pa]	Max Air Flow Rate [m3/s]	Rated Electric Power [W]	Rated Power Per Max Air Flow Rate [W-s/m3]	Motor Heat In Air Fraction	End Use
T CORRIDOR UNIT HEATERFAN	Fan:ConstantVolume	0.54	49.80	0.03	2.80	92.87	1.00	Unit Heater Fans
G CORRIDOR UNIT HEATERFAN	Fan:ConstantVolume	0.54	49.80	0.00	0.00		1.00	Unit Heater Fans
M CORRIDOR UNIT HEATERFAN	Fan:ConstantVolume	0.54	49.80	0.00	0.00		1.00	Unit Heater Fans
SPLITSYSTEMAC:01_UNITARY_PACKAGE_FAN	Fan:OnOff	0.54	622.00	0.14	162.67	1159.91	1.00	Unitary Fans
SPLITSYSTEMAC:10_UNITARY_PACKAGE_FAN	Fan:OnOff	0.54	622.00	0.30	353.46	1159.91	1.00	Unitary Fans
SPLITSYSTEMAC:11_UNITARY_PACKAGE_FAN	Fan:OnOff	0.54	622.00	0.28	322.90	1159.91	1.00	Unitary Fans

CONCLUSION

We find that the interior temperature of room is lesser when two of the sides of walls are covered with drapes. The maximum drop in temperature was during 12pm, of about 3.3 deg celcius.

This drop in temperature reduces energy consumption which in turn saves a large amount of money for redeveloped Dharavi township.

The shift towards blue side in the PMV values also indicate the comfort.

The desired temperature band for calculations was taken as 18-26 degree Celsius.

The required HVAC loads were calculated for thermal comfort of 5 people in each apartment which was airconditioned for 18hrs during weekends and 16 hours during working days.

It is observed that the room's consumption is decreased especially during the summer due to the temperatue drop by evapotranspiration of green drapes of Vernonia Elaegnifolia which in turn reduces the internal temperature within rooms.

It is found that annual reduction in electricity bill of Rs 39936 was observed which is USD614.41 each year per household.Therefore for the 14000 households in Dharavi the savings would be USD8,601,740 annually.

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REFERENCES

[1] The credibility of slums : Informal housing and urban governance in India
[2] Numerical study of mixed convective heat transfer coefficient for building cluster
[3] Analysis of Convective Heat Transfer in Building Facades in Street Canyons
[4] Study on heat transfer experiments and mathematical models of the energy pile of building
[5] Froude –Stanton modeling of heat and mass transfer in large vertical spaces of high-rise buildings
[6] Electricity access in urban slum households of Bangladesh : A case of Dhaka