IPRO 335

Green Building Design Concepts & Integration

Wind Energy

GOAL: PROVIDE 1/3 OF LIGHTING ENERGY FOR FIRST FLOOR

REQUIRED ENERGY: 42,840 KWH

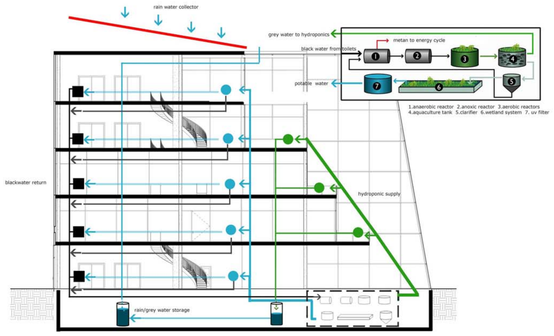
TYPE: VERTICAL WIND TURBINES

URBAN GREEN ENERGY 4Kw 2ND GENERATION

- COST: $21,920 each
- ANNUAL PRODUCTION: 4000 kWh
- SIZE: 9' x 11', 700 lbs
- 11 UNITS REQUIRED
- BREAKEVEN POINT: 18 YEARS

Rainwater Harvesting

- CHICAGO AVERAGE PRECIPITATION: 38.01 in/year
- ROOF AREA: 37,000 SF
  RAIN WATER HARVESTING AREA: 18,700 SF
- TOTAL AMOUNT OF COLLECTED RAINWATER: 35,900 GAL/MONTH
- SAVING 430,800 GALLONS OF RAINWATER PER YR
- 11 - 3000 GALLON TANKS REQUIRED
- TOTAL CONSTRUCTION COST: $12,122

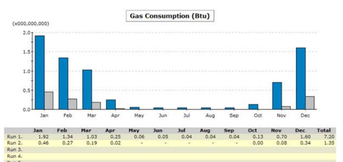


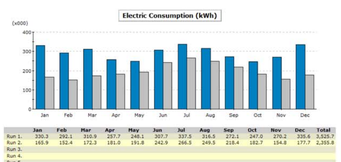
Structural Information

- TRIBUTARY WIDTH= 40FT
- FOR TYPICAL BEAMS FLOORS 2-5, TOTAL SUPERIMPOSED LOAD= 50 + 112.1= 160 PSF
- TOTAL LOADING= 160 PSF* 40 FT = 6400 PLF = 6.4 KLF
- FROM SPANCRETE, SELECT INVERTED SPANCRETE T BEAM, 40" x 36"
- FOR 40' SPAN, MAX LOADING= 8.0 KLF
- FOR TYPICAL SLAB ON FLOORS 2-5, TOTAL SUPERIMPOSED LOAD= 52.1+50 = 102.1 PSF
- FROM SPANCRETE SITE, USE 12" STANDARD FLOOR SLAB, 1.5" STRAND COVER, NO STRUCTURAL TOPPING, SERIES: 1.5D 12712
- ALLOWABLE SUPERIMPOSED LOAD=106PSF
- DEAD LOAD WEIGHT OF SLAB= 86 PSF
- FOR FIRST FLOOR, USE SLAB ON GRADE, POURED ON SITE
- USE 24" X 24" COLUMNS FOR ALL COLUMNS, VARYING REINFORCEMENT.

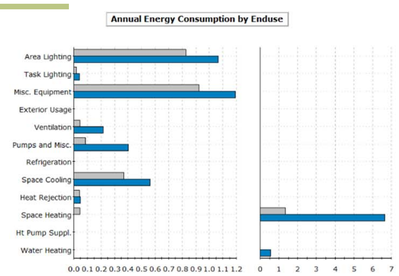
Energy Model

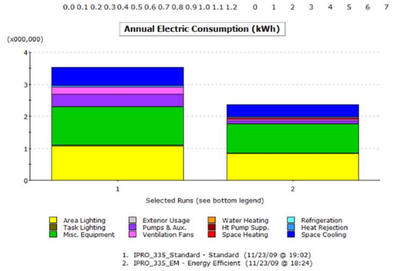
- TYPICAL BUILDING ELECTRICAL USE: 3,525,743 kWh
- IPRO 335 BUILDING ELECTRICAL USE: 2,355,839 kWh
- TYPICAL BUILDING FUEL CONSUMPTION: 7,200.1 MBtu
- IPRO 335 BUILDING FUEL CONSUMPTION: 1,347.8 MBtu





1. IPRO_335_Standard - Standard (11/23/09 @ 19:02)
2. IPRO_335_EM - Energy Efficient (11/23/09 @ 18:24)





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Solar Power

GOAL: UTILIZE THE BUILDINGS SOUTH FACADE TO OFFSET ELECTRICAL CONSUMPTION

TYPE: PHOTOVOLTAIC PANELS

SolarWorld SW 230, 230 Watt Monocrystalline Solar Panel

- USED AS RAINSCREEN CLADDING ON SOUTH FACADE
- 20,265 SQUARE FEET OF SOLAR PANEL AREA
- 230 WATTS PEAK PER PANEL
- 1,125 PANELS REQUIRED
- 424,996 kWh OF POWER
- TOTAL COST: $892,125

Geothermal Energy

GOAL: UTILIZE EARTH'S ENERGY TO PROVIDE HEATING AND COOLING

TYPE: CLOSED LOOP VERTICAL SYSTEM

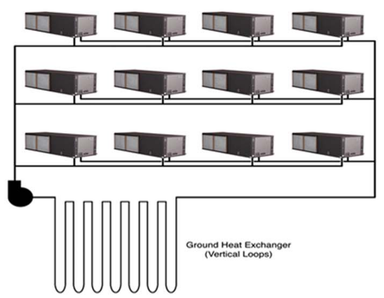
FLORDIA HEAT PUMP - ES SERIES R-410 A

- APPROXIMATELY 430 ton CAPACITY
- CENTRAL PUMPING SYSTEM WITH DECENTRALIZED HEAT PUMPS
- 75 UNITS REQUIRED
- 288 VERTICAL BOREHOLES @ 290' DEEP
- 1.25" POLYETHYLENE PIPES

Geothermal Costs ($)

Annual Costs ($)

	Geothermal	Air-cooled Chiller / Boiler	Savings
Total Power:	44,530.62	60,903.82	16,373.20
CO2 Emissions:	7,421.77	8,916.63	1,494.86
CO2 (tons):	296.9	356.7	59.8
Water:	0.00	0.00	0.00
Water (Gallons):	0.0	0.0	0.0
Maintenance:	22,500.00	168,750.00	146,250.00
Mechanical Room Lease:	0.00	750.00	-312.50
TOTAL:	75,514.89	239,320.45	163,805.56



LEED

- REQUIRED POINT TOTAL FOR LEED PLATINUM: 80+
- IPRO 335 BUILDING POINT TOTAL: 110
- IPRO 335 BUILDING LEED RATING: PLATINUM