

# TOWARD ZERO ENERGY DEVELOPMENT BANGALORE, INDIA



# FEATURES OF TZED

- 75 apartments, 16 independent homes
- Gymnasium
- Library
- Swimming Pool
- Restaurant
- Parks
- Amphitheatre
- Centralized security system
- Car wash
- Centralized Laundromat
- Convenience store









# APARTMENT COMPLEX

- Laterite, sun-dried, soil stabilized blocks
- Low energy fly ash bricks
- Water-proof coating
- Flooring of rubber wood, different types of stones
- Frameless door and shutters made of rubber wood
- Wardrobes of rice husk or bamboo boards
- Design to allow maximum sunlight
- Green roofs for thermal modulation
- Connecting bridges between buildings made of steel











# PROVISION FOR WATER

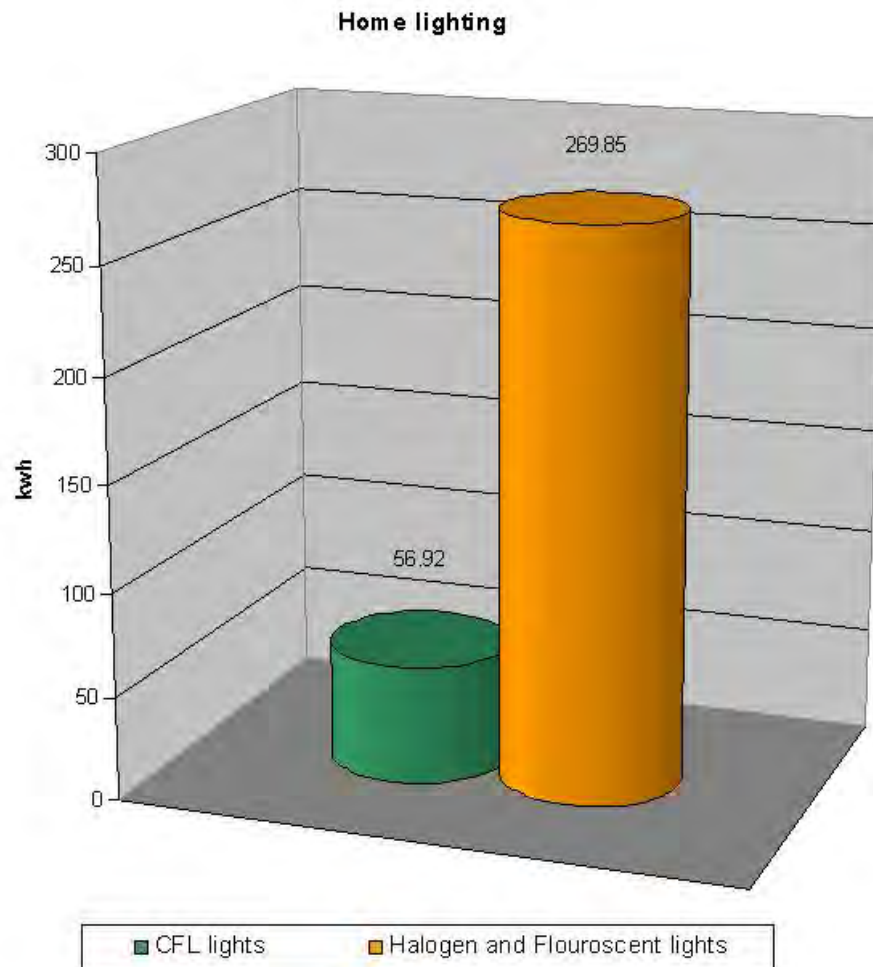
- 30% of water drawn from local water supply
- 70% from rain water harvested, run-off
- Water stored in an underground tank
- Treated with ozone and sent to kitchen, gardens
- Sewage from kitchen, toilet recycled on campus
- Water treatment plant based on DEWATS
- Grey water supplied to toilets, irrigation
- Ozone treated water supplied to bathrooms

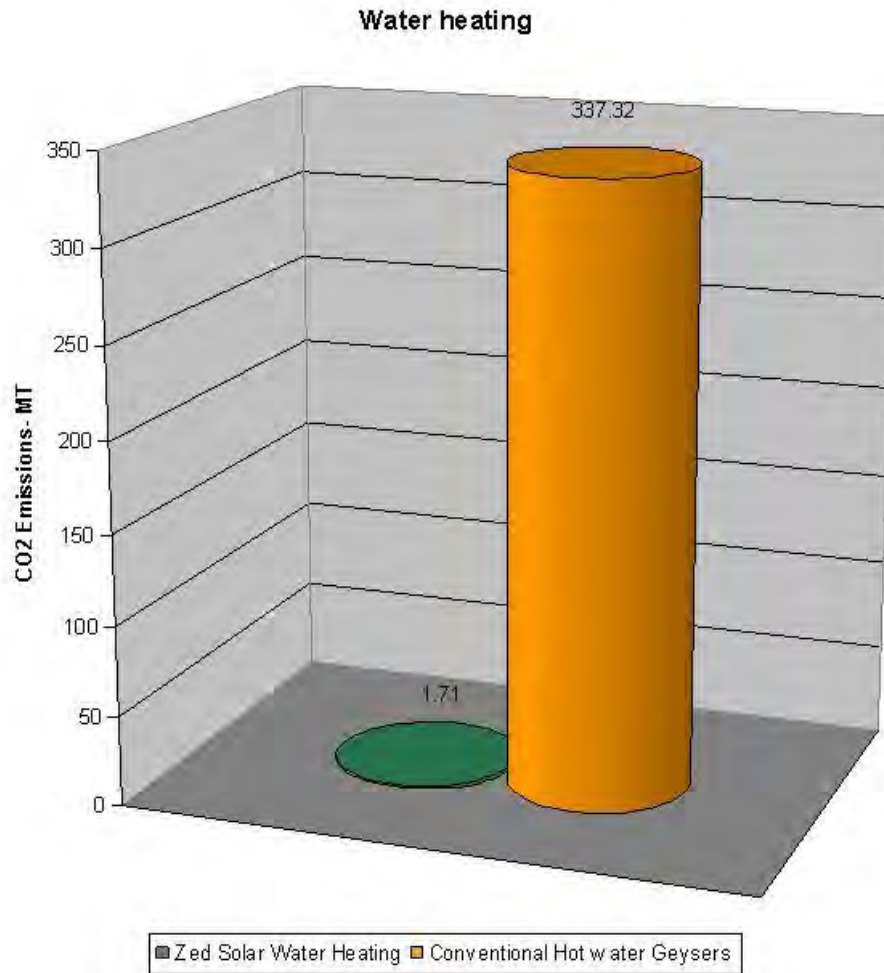


# POWER SUPPLY AND APPLIANCES

- 30% drawn from renewable sources-solar and biodiesel
- Zero electricity refrigerator based on ammonia and cooling brine solution
- Ultrasonic, low water, minimum detergent dishwashers
- Centralized air conditioning with improved air quality
- Solar water heater or low voltage heating elements for winter
- CFL and LED at homes and on campus
- Intelligent light controls and motion sensors







# WASTE TREATMENT

- Waste Treatment facility on campus
- Non- biodegradable, toxic waste given to municipal authorities
- Biodegradable waste is fed to a biogas digester with a capacity of 330 lbs
- Community generates waste of 132 lbs
- Green Council constituted to optimize utilization
- Energy produced from biogas used to power kitchens
- Solid waste used as soil fertilizer, conditioner



# LANDSCAPE

- Aesthetically designed
- Vegetation based landscaping
- Sky gardens
- Soft roads
- Pedestrian and disabled friendly with drop kerbs and speed restrictors



# ISSUES

- Soil stabilized bricks are prone to weathering
- Regular coating for water-proofing
- Green roofs are discouraged due to cracks
- Refrigerator was unsuccessful due to outdated technology; leads to increased power consumption



# NOTEWORTHY EFFORTS OF TZED

- Capital savings of 20,000 tons carbon emissions
- Revenue savings of 1500 tons of carbon emissions
- Annual earning of \$260 from carbon credit savings
- Advanced technology for power generation, water treatment, waste management
- Consumes 60% of regular energy demand
- Residents pay 30% less for power and 20% less for maintenance
- Initiatives such as Million Seed Balls encouraged
- Charging points for electric cars





<http://pgsgrow.com/blog/wp-content/uploads/2009/04/seedball.jpg>





THANK YOU!

