

January, 2009

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# IS YOUR PLUMBING GREEN ?



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# INTRODUCTION



IS YOUR PLUMBING GREEN?

**The word 'GREEN' has entered our daily lives – through newspapers, televisions and every other media.**



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**We attach the word GREEN to anything that is environment friendly, energy efficient and achieves water/energy conservation.**



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**The U.S. Green Building Council (USGBC) established the LEED rating system – Leadership in Energy and Environmental Design. The rating system covers new buildings and renovation of existing buildings. A building that meets or exceeds the LEED Rating System is considered environmentally sustainable.**





**An individual who passes the USGBC certification exams is recognized as 'LEED AP' or LEED Accredited Professional.**



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# GREEN PLUMBING



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**Plumbing or Hydrologic System is an integral part of constructing a Green Building.**



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**A building's hydrologic cycle becomes an endless activity of use and re-use of water. It starts with use of potable water for drinking, washing, cleaning and waste transport. The potable water that becomes wastewater reaches public or private treatment plants. The treated effluent is discharged to fields or surface water sources such as oceans, rivers and lakes. The same water is converted into potable water and distributed to buildings after treatment.**



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**A building's potable water distribution system, irrigation system, fire hydrant and sprinkler systems, waste water and storm water drainage systems play a role in the hydrologic cycle.**



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**Conservation of water accounts for conservation of energy. Moving water from its source to the point of use after treatment requires energy. Lesser the water we use, lesser the energy consumed for transportation and treatment.**



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# WATER – THE DWINDLING ASSET



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**Only 2.5 percent of water on our planet is fresh water of which 75 percent is frozen or otherwise inaccessible.**



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**Only 0.3 percent of water is available to us and this too is from polluted rivers and lakes; requiring treatment before usage.**



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**12 percent of all water consumed is through water distribution systems in buildings. By conserving water in buildings, we could save billions of litres each year.**



**1.1 billion of world's population lack access to clean water and 2.2 billion do not have safe sanitation.**





**Storm water control and rainwater harvesting systems were practiced by our forefathers since ancient times. Storm water drainage system in those times were meant to protect our towns and villages from flooding. When plumbing fixtures and knowledge of transportation of human waste came to existence in the 19<sup>th</sup> century, we polluted our water resources. Now we are compelled to go for rainwater harvesting to conserve water – the original source used for clean water.**



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# THE GREEN BUILDING INITIATIVE IN

# INDIA

– ARE WE ON THE RIGHT PATH?



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**While rushing to replicate the American success story in India, have we taken care of the basics?**



**The Energy Policy Act implemented in the U.S. in 1992 stipulated maximum consumption rates of water for plumbing fixtures as follows:**

- **Water Closets - 1.6 GPF (Gallons Per Flush)**
- **Urinals - 1 GPF**
- **Shower Heads – 2.5 GPM @ 80 PSI**
- **Faucets – 2.5 GPM @ 80 PSI**
- **Metered Faucets – 0.25 GPM per cycle**  
**(1 U.S. Gallon = 3.785 litres)**



**One of the goals of green plumbing system is to reduce water consumption from the permissible limits laid down in the 1992 EPA act.**

- “WATERSENSE” is a partnership programme in the U.S. sponsored by the Environmental Protection Agency to promote water efficient products and practices. The programme was launched in 2006.**





**1,93,400 “Watersense” labelled products are estimated to have saved 277 million gallons of water in 2007!**



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**An Ultra Low Flush toilet using 1.28 GPF instead of the 1.6 GPF, can save up to 4000 gallons of water per year in a typical family. 27 percent of water (excluding irrigation) consumed in a home is flushed down the drain through toilets.**



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**Aerators and other flow restricting devices are used to reduce flow through showers, faucets, etc whereas water closets and urinals need to be designed properly to achieve cleaning with low volume of water.**



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**Dual Flush Cisterns can save up to 67 percent of water in a toilet. Depending on the usage, the two positions of flush actuator can be used to flush 0.8 to 1.00 gallon or 1.28 to 1.6 gallons of water.**



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**A urinal with Ultra Low Flush device using 0.5 GPF instead of 1.0 GPF saves up to 50% of water.**



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**“ENERGY STAR” labelled products in the U.S. include high efficiency plumbing appliances such as clothes washers, dish washers and commercial ice machines.**



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**Clothes Washers consume up to 22% of indoor residential water. Whereas a conventional Clothes Washer uses up to 40 gallons of water per load; an Energy Star model uses half this quantity.**



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**A standard dish washer uses 6 gallons of hot water per cycle whereas an Energy Star model uses 4 gallons and saves up to 4000 gallons of water per year.**



**While trying to imitate USGBC's green building initiative, do we have a legislation like the 1992 EPA Act or industry initiatives like Watersense or Energy Star?**

**To achieve success, co-operation between all stakeholders – government, educators, tradesmen, manufacturers and all other players of the construction trade is necessary.**



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# THE FLIPSIDE



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**Water closets are now marketed claiming usage of only 6 litres of water per flush. We flush several times as one flush does not clean the poorly designed toilet!**





**Treated effluent is used for flushing. No one monitors functioning of the treatment plant and the quality of treated effluent produced. We end up with hundreds of toilet cisterns in large buildings filled with polluted unsafe water causing serious health hazards.**



**Our manufacturers have come up with large urinal bowls to stand up to competition from imported products. However, unlike the imported urinals, the domestic product is rarely supplied with an appropriate flushing device. We use the locally available electronic flush that discharges 0.5 lpf or lesser whereas the large fixture requires 3 to 4 litres of water for cleaning.**



## **Waterless Urinals is another current craze. The effects :**

- **Urine crystals formed over a period of time block the drains.**
- **The additional care needed in venting the drainage system is ignored.**



- **Are connected to existing drains suitable for old high-volume flushing fixtures. The problem of DRY DRAINS is a hot topic currently in the developed western countries.**
- **The cartridge or liquid that prevents foul odour into living spaces needs periodic messy replacement after fixed number of usages. Who keeps count of usages? In a 3-urinal installation, the one next to the door is used 60 percent of time!**



- **Replacement cartridge costs approximately Rs.2000/- each time.**
- **Emptying a bucket of water will flush away the floating liquid.**
- **The Uniform Plumbing Code stipulates provision of a water connection at each WATERLESS urinal; just in case!**
- **Cleaning of the urinal bowl is to be done manually – not a very pleasant job!**



**While there are no mandatory regulations or enforcement agencies for plumbing installations, the NBC regulations are strictly enforced in most cities by the Fire Department. Millions of litres of water is stored in reservoirs of the numerous buildings in each city to provide reserve storage for fire fighting. This is when water supplies are available in most cities only few days in a week. Most people depend on bought out water in tankers where there are no checks on source of water or means of transport. Poorly designed plumbing often leaves the water in fire tanks stagnant and polluted.**



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**Where municipal water mains exist in cities, up to 40 percent of water distributed is lost through broken or leaking pipes laid decades ago! Up to another 10 percent is pilfered through illegal connections.**



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# DO WE HAVE OUR PRIORITIES RIGHT?



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**Are we rushing to serve desserts to those who had a wholesome meal while ignoring the hungry? The following may provide some answers:**

- **One billion people across the world live in slums. India has the largest slum in Dharavi, Mumbai.**
- **WHO report on “Safe Water, Better Health – 2008” says that among deaths caused due to water and sanitation related causes, 7.5 percent are in India.**



- **88 percent cases of diarrhoea worldwide is due to unsafe water, inadequate sanitation and poor hygiene. India is in the forefront!**
- **60 percent of Indians defecate in the open. The 11<sup>th</sup> Plan (2007-12) proposes to build 7.29 crore toilets for rural homes.**



- **3 lakh toilets were built in schools during the 10<sup>th</sup> Plan. Attendance of students, particularly girl students, improved in schools with existence of toilets.**
- **An advertisement by Ministry of Rural Development says “Do not wake up into darkness, Awake into sunlight!”.**
- **Millennium Development Goal of the UN aims to reduce number of people without access to water and sanitation to half by 2015.**



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# CREDITS AVAILABLE IN LEED FOR GREEN PLUMBING



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## Up to total five credits can be achieved through water efficiency practices:

- One credit for reducing potable water consumption for landscaping by 50 percent.
- Two credits for total elimination of potable water for landscaping. Use of gray water or rainwater is permitted.





- **One credit for innovative waste water technologies resulting in reduction in water consumption and thus reduced waste water flow. Reduce potable water used for sewage conveyance by 50 percent. Treat at least 50 percent of waste to tertiary standards and re-use it or infiltrate it into the ground.**



- **Two credits for reduction in water use. One credit for reduction by 20 percent. An additional credit for reduction by 30 percent.**
- **Use of solar water heaters can garner up to three credits, if it provides 12.5 percent or more of the total building energy use.**



# WHAT CAN WE REALISTICALLY DO?





**For the Green Building initiatives to be successful, some long term and some short term measures need to be adopted. While constructing buildings to LEED standards is a welcome initiative, much more of our urgent attention is needed for sustainable results. Some of these could be:**



- **Make representations to the government to enact legislations like the ones in the USA on permissible water consumption in plumbing fixtures. Issue guidelines to manufacturers.**
- **Like in the developed countries, ensure mandatory implementation of approved plumbing codes in new constructions and renovation works.**



- **Industry bodies must initiate partnership programmes such as WATERSENSE and ENERGY STAR. Create awareness among public on the advantage of insisting on such labelled products.**
- **Stop subsidizing cost of water and charge reasonable price. Anything that comes free or cheap are never conserved. Currently, we pay just about Rs.15/- for 1000 litres of municipal water.**



- **Make representations to government for creation of better infrastructure especially in urban centers for water distribution, sanitary systems and fire-protection network. Since construction and upkeep involves major investments and close monitoring, encouraging Public-Private Partnership may be the only answer. Water distribution systems are handled successfully by private companies in most developed countries.**



- **Rather than concentrating only on new constructions, widen the scope of Green Buildings to existing buildings urgently, by undertaking retro-fit.**
- **Enforce strict regulations on tapping ground water. Monitor source of water and means of conveyance employed by private agencies selling water in tankers.**



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**Ensure use of following minimum guidelines on new and renovation works of plumbing :**



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- **Electronic flushing devices for urinals and lavatory faucets in public toilets.**
- **Rain Water Harvesting.**
- **Dual piping systems for flushing and domestic water distribution.**
- **Proper sizing of water distribution pipe work. Provide recirculation pipe work and insulation of equipment and pipe work on hot water systems.**





- **Treatment and re-use of gray water or gray water and black water.**
- **Provision of oil, grease and sand interceptors on drainage systems.**
- **Provision of protective devices such as backflow preventers, water hammer arrestors, air eliminators, etc on water distribution systems.**





- **Use of drippers, bubblers, emitters, etc with timing devices on irrigation systems.**
- **Use of solar energy for hot water systems.**
- **While designing buildings, ensure that toilet blocks are grouped together in the same vicinity rather than spread at random across the building. Minimize plumbing pipe work.**
- **Use pumping equipment with variable frequency drive**



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**A good plumbing installation should aim at conserving energy and water, while safeguarding the safety aspects.**



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# **“BETTER PLUMBING FOR BETTER LIVING”**



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# THANK YOU



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