

WATER IS A VITAL RESOURCE

- Potable water is a vital resource that is often taken for granted—it seems that you simply need to open a tap and an unlimited supply of fresh, clean water is readily available.
 - However, in reality, potable water is a diminishing natural resource that, according to many experts, is subject to looming shortages that, if not addressed, will have a profound negative effect on living standards and conditions.
- In addition to seeking new sources of potable water, it is vital that we conserve the known existing supply of fresh water. Hence, prudent water conservation is an essential part of protecting our supply of potable water.
- It must also be remembered that assuring a supply of potable water also consumes energy. Energy is used to treat, transport, and heat water. Hence, minimizing the use of potable water also helps save energy. Consider:
 - Supplying one gallon of water per minute that was heated with an electric water heater requires the same amount of electricity used to light 180 60-watt incandescent light bulbs
 - About 20% of a home's energy use is to heat water
 - 7 percent of US electricity is used to pump water
- The 'flip side' is that, in most types of generating plants, water is needed to produce electricity:
 - NREL (National Renewable Energy Laboratory) estimates that 2.0 gallons of water is used to generate one kilowatt-hour of electricity.
- Conservation is vital:
 - Approximately 90% of hot water energy used in a home simply goes down the drain. Reducing hot water usage would benefit both water and energy conservation efforts.
 - One way to conserve water is to use 'low' flow-rate fixtures (e.g., toilets, faucets)
 - Another way is to utilize appliances that minimize water use, such as new, more efficient clothes washers and dish washers
 - Minimizing the use of water for outdoor irrigation is also extremely beneficial. It has been estimated that as much as 40% of all domestic water use is for outdoor irrigation
 - Personal-use habits can also affect water usage. Simple changes in daily routine can dramatically affect water consumption. Taking steps such as shorter showers, not letting water run continuously while brushing teeth or shaving, hanging towels to dry and reusing them, and only washing full loads of laundry can, over time, save a significant amount of water—especially considering that there about 120 million houses in the US.

PLASTIC PIPING SYSTEMS HELP CONSERVE WATER

There are numerous ways in which plastic piping systems can help conserve water. Some of the most noteworthy are:

- Use plastic pipe in "Gray" water systems that are used to 'recycle' domestic water. For example, instead of simply flushing clothes washing water down the drain, it can be captured, treated,

and re-used to flush toilets or do sub-surface outdoor irrigation, for example. One way to capture gray water is to use a segregated drainage system made from plastic pipe. Such a drainage system allows certain water to be segregated from other waste water and diverted to a treatment system. Also, other types of plastic pipe can be used to transport the treated gray water to toilets, irrigation systems, or other water-usage points where gray water may be used.

- Rainwater collection also employs plastic pipe. Excess rainwater, that runs off from a roof for example, can be used in applications such as subsurface irrigation. Plastic pipe can help collect the runoff as well as transport it to the irrigation system.
- The design of a plumbing system plays a vital role in water conservation. Employing low-flow hot water fixtures is truly only effective in conserving water if the plumbing pipe that supplies water to the faucets is properly sized (i.e., diameter and length) and laid out in a configuration that promotes water conservation. Some rules of thumb are:
 - Minimize the distance (as measured in length of pipe) from the water heater to the hot water faucets
 - Use pipe that has the smallest diameter allowed by the plumbing code
- Another way to conserve water with plastic piping systems is to configure the plumbing so that once hot water is delivered to a single fixture; it is then readily available at other nearby faucets. Clustered or consecutive uses of hot water are common in household patterns, and a well designed plastic plumbing system helps minimize wasted water in such use patterns.
- The type of plastic pipe used in plumbing systems also provides an often overlooked dividend in water conservation compared to copper pipe: because the “bore” (inside diameter) of plastic pipe is smaller than that of comparable copper tube, there is less water contained in any given length of plastic pipe. Hence, less cooled hot water has to be flushed from the plastic pipe while waiting for hot water to arrive at a faucet. Hence, less water is lost down the drain.
- Plastic piping systems also work very well with on-demand hot water recirculation. On-demand systems return unused previously-heated water back to the water heater for re-use rather than flushing that water down the drain while waiting for newly-heated water to arrive at a faucet. On-demand recirculation systems operate a small pump only when the recirculation system is activated (e.g., via a button or a motion sensor)—thus, minimizing the amount of time that the pump actually operates.
- Insulation of pipe also helps conserve water. Insulation helps maintain the temperature of the water within the pipe—cold water stays colder and hot water stays hotter. This is of particular benefit in the conservation of water by reducing waiting time for hot water to flow from a faucet. If the temperature of hot water in a pipe remains hotter longer (due to the effect of insulation), it is possible to have extended intervals of time between hot water uses without

having to flush cooled water (that was previously heated) down the drain while waiting for freshly-heated water to arrive.

PLASTIC PIPE CAN CONTRIBUTE TO CONSERVATION IN OTHER WAYS

- Fire sprinkler systems constructed from plastic pipe help save structures and lives. It is difficult to think of something that is more sustainable than preventing the loss, or harm to, life and the preservation of building products made from valuable resources. In addition, fire sprinklers help prevent the release of excessive toxic smoke by minimizing the extent of a fire, and they reduce the amount of contaminated water runoff (because far less water is discharged if a fire is extinguished by fire sprinklers rather than put out by the large amount of water discharged by high volume fire hoses).
- Plastic pipe is used to circulate hot water in, or below, the floors of buildings that are heated by radiant floor heating systems. In addition to being highly energy-efficient, radiant heating systems also contribute to improved thermal comfort for occupants and better IEQ (Indoor Environmental Quality) due to less airborne allergens and dust as well as reduced noise levels (compared to conventional forced air systems).
- Plastic pipe is an environmentally sound choice. Life Cycle Inventory (LCI) data for common plastic piping products is available, and, based on available data, indicates that plastic pipe is preferable compared to metallic pipe used in like applications. In addition, raw material feedstocks such as crude oil or natural gas are far better used in long-lasting and durable products like plastic pipe rather than in one-time use applications such as fuel for automobile engines and home heating furnaces.