

WATER CONSERVATION

Liquid Carbon

About 4% of all the electricity in the U.S. is dedicated to water and wastewater processing and pipeline transport for public and private utilities. This translates into 4% of U.S. carbon emissions produced from electric production. Moreover, this estimate is far from complete. It probably underestimates the considerable energy needed to pump and transport water used for agricultural purposes, and excludes the vast amount of embodied energy it took to build the country's water treatment plants, reservoirs, dams, pipelines, irrigation canals, and agricultural water pumps.



On the surface, Austin's water utility buys almost all of its electric supply from wind power. However, the Texas (ERCOT) system, which Austin depends on to balance its intermittent renewables, received only 15% of its supply from renewable energy in 2016. Almost 3/4 of ERCOT electricity that year was generated from carbon emitting fuels.

Five Ways to Save Water (and Carbon)

1. Check for Leaks

Water leaks do not make noise, but they are not silent either. They scream money for higher water bills, and from property damage if the leaks are in the building structure.

Once a year, remove the lid that covers your water meter. (They can be heavy; the handle of a caulking gun is a good make-shift tool.)

Mark the meter needle with a colored pencil or felt-tip pen and wait for 10 minutes to see if the needle moves while using no water in your house. If it does, there is a serious possibility of a leak that needs repair. Another leak detection method for homes is to put food dye in toilet tanks. If the color leaks into the bowl prior to flushing, the flapper is failing and needs replacement.

2. Managing or Changing Your Lawns

About a third of all water in single-family homes in Texas is used to irrigate landscapes. Key strategies can greatly reduce outdoor water use.

A. Good Soil – Adding compost and good soil increases the moisture retention, allowing turf, plants, and trees to go longer without watering. This will also provide nutrients to encourage plant growth.

During home construction, much or all of the original topsoil is removed. What remains is often compacted by heavy equipment. Many builders simply add a couple

inches of soil and then attempt to establish a lawn. Turf on these poorly designed lawns becomes reliant on frequent watering, chemical fertilizers, and pesticides.

Adding a half-inch of soil a year to existing lawns can minimize expenses while allowing the grass and some plants to adapt in place. While the goal is to get to 6 to 18 inches in soil depth, too much soil at once can kill the lawn.

Austin is fortunate to have a number of good retail outlets and manufacturers of soil products and amendments to assist plants organically. Though many retailers carry these products in small amounts, the retailers listed on the next page generally have the best variety at volume prices.

These retailers sell compost rated by the U.S. Composting Council for its Seal of Testing and Assurance (STA). The STA rating verifies that pathogens and heavy metals do not exceed certain levels. It also gives specifications for pH, nutrients, stability, maturity, percent of organic matter, and moisture content.

It is more cost effective to add the right soil and soil depth at the beginning when the home is constructed and the lawn is created. Since the landscapers will be on site anyway, doing it right the first time will save money.

B. Drought-Tolerant Plants – Trees, plants, and turf native to Central Texas will often survive better without water than plants native to other U.S. regions and other countries. Austin's water conservation program began promoting "xeriscape" low-water use and native plants over 30 years ago, and they are incredibly easy to find at most nurseries and garden stores.

Low-water use plants for this region can be researched through the LBJ Wildflower Web site: wildflower.org/plants

Another great resource to plan xeriscape is the City of Austin Watershed Protection Grow Green Web site: austintexas.gov/department/grow-green-resources. A lot of information is downloadable; hard copies can also be requested by mail.

A note of caution: replacing lawns and plants with rocks and rock gardens is not the most environmental option. While this will save water, it also creates other problems. Hardscape retains heat, adding to the heat island effect that makes urban areas hotter than the surrounding countryside. To the extent that these hardscapes are close to buildings, they can be a direct cause of increased air conditioning load.

Rock gardens can also be difficult to maintain. To keep a uniform appearance, undesired grass and plants must constantly be removed, often tempting homeowners to use dangerous herbicides.

Water Conservation pages sponsored
by Save Barton Creek Association



MAJOR AUSTIN COMPOST AND MULCH VENDORS SELLING STA CERTIFIED PRODUCTS			
Austin Landscape Supplies – Georgetown	5317 N. IH 35	(512) 930-2311	austinlandscapesupplies.com
Austin Wood Recycling – Austin	9201 FM 812	(512) 259-7430	austinwoodrecycling.com
Austin Wood Recycling – Cedar Park	3875 E. Whitestone	(512) 259-7430	austinwoodrecycling.com
Countryside Nursery & Landscape	13292 Pond Springs Road	(512) 249-0100	countrysideaustin.com
Enchanted Rock and Landscape Supplies	11892 Old FM 2243	(512) 260-2747	sudderthbros.com
Garden-Ville – Creedmoor	3606 FM 1327	(512) 329-4900	garden-ville.com
Garden-Ville – San Marcos	2212 Old Ranch Road 12	(512) 754-0060	garden-ville.com
Garden-Ville – Georgetown	250 W.L. Walden Road	(512) 930-8282	garden-ville.com
Garden-Ville – Bee Cave	4001 Ranch Rd. 620 S.	(512) 219-5311	garden-ville.com
Geogrowers – Austin	12002 Highway 290 W.	(512) 288-4405	geogrowers.net
GreenThumb Compost – Austin	P.O. Box 41539, 78704	(512) 369-0998	greenthumbcompost.com
JV Dirt + Loam – Austin (Not all batches certified)	NA	(512) 927-1977	jvdirt.com
Natural Gardener – Austin	8648 Old Bee Cave Road	(512) 288-6113	naturalgardeneraustin.com
Organics By Gosh – Austin	13602 FM 969	(512) 276-1211	organicsbygosh.com
Rock N Dirt Yard	8401 S. 1st Street	(512) 461-7607	rockndirtyard.com
Whittlesey Landscape Supplies – Austin	629 Dalton Lane	(512) 385-0732	989rock.com
Whittlesey Landscape Supplies – Round Rock	3219 IH 35 S.	(512) 989-7625	989rock.com

C. Grass – Some grasses are more drought resistant than others. Few species can survive with no irrigation at all. A study done by the Williamson County Agricultural Extension Service, conducted between 1997–2000, showed only 4 grass species sold in Central Texas could survive without irrigation after 3 years.

These were: *Nebraska 909* and *Top Gun Buffalo Grass*; *Floritam St. Augustine*; and *Jamur Zoysia*. This is not to say that your grass will look lush after 3 years without enough water, but in a harsh drought, (most) people prefer to use essential water for drinking instead of watering their lawns.

Replacing an entire lawn at once can be expensive. Better strategies include overseeding bare patches of lawn, and preferably, establishing the right lawn to begin with for a new home.

D. Irrigation Systems and Devices – As a rule, owners of homes with automatic irrigation systems use more water than those using a hose and sprinkler. Many do not know how to properly adjust the controllers. Others may leave the system on even after it has rained.

Bearing this in mind, several irrigation systems and retrofits exist to make automatic systems considerably more efficient. Some devices and technologies might work in concert with each other, though there will be diminishing savings for each new measure added.

Rain Shut-off Devices – These devices override irrigation controllers when significant rain occurs.

Pressure Regulating Valves (PRVs) – PRVs are inserted into a customer’s plumbing to prevent misting and evaporation losses in irrigation systems. This can occur when high water pressure sprays water at greater force than sprinkler heads are designed for. By one estimate, they can save as much as 9% of the water in an average Austin home. Though required by the Austin building code for irrigation systems in new homes with high water pressure, most older systems do not have them.

Efficient Sprinkler Heads – Conventional sprinkler heads often have uneven “Distribution Uniformity” when they are broadcasting water to the zone they serve, leading to excess irrigation. “Multi-stream, Multi-Trajectory Rotating” (MSMTR) heads compensate for this. Studies have shown about a 10% savings compared to conventional equipment.

Drip “Capillary” Irrigation – Drip irrigation for turf applies water directly to the root zone below the soil, and is virtually immune to direct water losses from evaporation and wind spray.

E. Amount and Frequency of Water – Grass does not need as much water as many homeowners use. In Austin, mandatory watering days are spaced 3 or 4 days apart. Apply about 1 inch (as measured in a container near the irrigation system) at a time. In shallow clay soils, it is best to water small amounts several times to allow water to percolate. Otherwise, water can be lost as runoff.

Austin's ordinary (non-drought) schedule for Residential watering (4 units per building or less) is easy to follow. Watering cannot take place between 10 AM and 7 PM.

City of Austin Residential Watering Schedule	
Wednesday	automatic irrigation or hose-end sprinklers for street address ending in an odd number
Thursday	automatic irrigation or hose-end sprinklers for street address ending in an even number
Saturday Automatic irrigation prohibited	hose-end sprinklers for street address ending in an odd number
Sunday Automatic irrigation prohibited	hose-end sprinklers for street address ending in an even number

- Exemptions (any time of day):
- Drip irrigation, hand-held hose, or refillable container, vegetable gardens with a soaker hose or soaker tape.
 - Trees using a bladder bag, soaker hose, soaker tape, or automatic tree bubbler in the drip-line of the canopy.
 - Watering with rain water, gray water, or other auxiliary water

Customers violating this schedule repeatedly may face civil fines.

3. Efficient Toilets and Fixtures

Depending on the age and tank size, toilets can use anywhere from 10 to 40% of the indoor water use in an average Austin home. While the typical toilet of the 1960s used 5 to 7 gallons per flush, today, the best conventional “single-flush models use between 0.80 and 1.06 gallons. The advent of dual flush toilets, that allow less water to be used to remove liquid waste, has shown even lower consumption when averaged over time.

Maximum Performance (MaP) Testing is run by a non-profit organization that rates performance of most major toilet manufacturers to certify that their units save water and still remove large volumes of solid waste. The minimum standard is 350 grams per flush, which is adequate for the vast majority of uses. Paying more for units above this base performance level is generally not necessary, though there are several hundred units on the market that greatly exceed this.

There are other qualities to look for in a new unit. One of them is sound. Consumers are advised to be cautious of pressure-assisted models that use a combination of water and compressed air to propel water. These are extremely loud and disturbing. Another consideration is how clean the bowl stays after washdown. *Consumer Reports* magazine is a good source to compare quality of competing models.

Showers consume about 17% of domestic indoor water use. In the early 1990s, showerheads could use as much as 5.5 gallons per minute. National standards in 2012 mandate units that consume no more than 2.5 gallons per minute. The WaterSense rating program recommends water-conserving fixtures using no more than 1.5 gallons/minute.

Indoor faucets consume about 15% of domestic indoor water use. National standards for bathroom sink faucets in 2012 limit consumption to no more than 2.2 gallons per minute. WaterSense rated fixtures reduce use to 1.0-1.5 gallons per minute, a savings of 32 to 55%. Inexpensive aerators can reduce flow to as little as 0.5 gallons per minute.

For more information and listed products for MaP-and WaterSense-rated toilets, showerheads, and faucets, see the Web sites: map-testing.com and epa.gov/watersense.

4. Efficient Clothes Washers

In 2009, about 82% of U.S. homes used automatic clothes washers. The average unit cleans almost 400 loads of laundry a year. An older, inefficient home clothes washer can use about 12.2 thousand gallons a year, equivalent to 16% of an average Austin home’s water use in 2016.

Top-loading High Efficiency (HE) washers achieve back-and-forth motion with wobbling plates, wheels, or disks. Front loading HE washers repeatedly tumble clothes through water at the bottom of the drum. Though front-

loading clothes washers generally save more energy and water, efficient top-loading units do exist.

Water in these appliances is rated by an Integrated Water Factor (IWF): the number of gallons used per load divided by the cubic feet of capacity of the washer. The first federal standard was only imposed in 2011. However clothes washers today can reduce water use by as much as 73% compared to this standard.

HISTORICAL CLOTHES WASHER WATER EFFICIENCY INCREASE		
	Integrated Modified Water Factor	Reduction Over 2011
Federal Standard 2011	9.5	
2015 Federal Standard	4.7	51%
Highest Voluntary Standard 2017	3.2	66%
Best On Market 2017	2.6	73%

Energy use is rated as an Integrated Modified Energy Factor (IMEF), which adds all energy used in the washing cycle, including the electricity for machine use, water heating, and drying, as well as “stand-by” losses from electronic controls that never turn off. Energy uses in the washing cycle interact. Cutting back on water use cuts back on water heating. Increased spinning to remove more moisture from clothes cuts down on heat needed for clothes drying.

The IMEF has also changed dramatically, with reductions of as much as 74% compared to requirements in 2004.

HISTORICAL CLOTHES WASHER ENERGY EFFICIENCY INCREASE		
	Integrated Modified Energy Factor	Reduction Over 2004
Federal Standard 2004	0.8	
Federal Standard 2007	1	25%
Federal Standard 2015	1.84	57%
Top Voluntary Standard 2015	2.92	73%
Best on Market 2017	3.1	74%

Other Considerations

- Cold-water detergents and clothes lines eliminate almost all energy use in the wash cycle. With an inefficient machine, roughly 80% of the energy use comes from water heating and fabric drying when natural gas is used for fuel. When electricity is used for drying, it is about 90%.
- Buy the right kind of detergent for HE machines. Conventional detergents create more suds. In HE machines, the excess suds may prevent water from properly rinsing clothes and may impede tumbling.
- HE detergents have a logo on the bottle designating they are for HE washers. Some detergents state they are “HE Compatible,” which is not always the same thing. Experiment with such products first to make sure they do not cause a problem.
- Front-loading washers have been shown to reduce detergent use up to 25%, in addition to running quieter and being gentler on fabrics (which lengthens their useful life).

To view lists of efficient clothes washers, see the Web sites for the Consortium for Energy Efficiency (cee1.org), and ENERGY STAR (energystar.gov).

5. Rainwater Harvesting

In Central Texas, if you have a roof area of 2,500 square feet and a yearly average rainfall of 32 inches, you can collect almost 45,000 gallons of rainwater in a typical year. This can meet most or all of the annual indoor needs of a water-conserving household of 3 to 4 people for a year.

Among the many benefits of rainwater use are: water supplies without treatment chemicals (chlorine, fluoride) or pollutants; elimination of scale in pipes and appliances (lengthening life and maintaining energy efficiency); and self-sufficiency, including availability in emergencies curtail normal water service. Unfortunately, in almost all residential installations, rainwater cannot compete economically against municipal water systems. They can, however, compete with private wells.

Numerous hardware and specialty stores sell rainwater barrels, tanks, pressurization pumps, and other accessories. Professionals that deal with issues of pressurization, water filtration and purity, and proper connection to plumbing systems are harder to come by. A list of these installers is provided here, though consumers should get competitive bids and seek references.

Other Rainwater Resources

Texas Manual on Rainwater Harvesting, Third Edition, July 2005. Online at www.twdb.texas.gov/publications/brochures/conservation/doc/RainwaterHarvestingManual3rdedition.pdf

City of Austin rainwater rebate program: austintexas.gov/department/water-conservation



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RAINWATER HARVESTING PROVIDERS IN CENTRAL TEXAS

Company Name	Address	City, TX	Phone	Website	Services
All Things Rainwater	P.O. Box 2224	Wimberley, 78676	(512) 826-0653	allthingsrainwater.com	All sizes & types
Blue Gold Engineering	3005 S. Lamar, D109, #144	Austin, TX 78704	(512) 944-0677	bluegoldaustin.com	Design/build rain/graywater; home & business
Bowerbird Construction	P.O. Box 1141	Dripping Springs, 78620	(512) 858-5395	bowerbirdconstruction.com	20,000-100,000; ferrocement
Bright Leaf	P.O. Box 300012	Austin, 78703	(512) 371-7220	gobrightleaf.com	500 gallons and up; all materials
Dick Peterson	3451 Mayfield Ranch, #306	Round Rock, 78681	(512) 922-3326	dickpeterson.com	System design, consultation & instruction
Flores-Shepard LLC	3904 Manchaca Rd.	Austin, 78704	(512) 775-6060		100 up to 5,000 gallons; plastic; drip irrigation
Harvest Rain	2770 Hwy. 290 W.	Dripping Springs, 78620	(512) 689-4906	harvestrain.com	All materials; 2,500-60,000 gal.
Harvested Rain Solutions	11183 Circle Dr., Suite D	Austin, 78736	(877) 693-2166	HarvestedRainSolutions.com	5-130,000 gal. irrigation systems; all materials
Hydro Catch	825 Johns Road, #822	Boerne, TX 78006	(512) 784-2513	hydrocatch.com	Designs 500-20,000 gallon systems; all types
Innovative Water Solutions	501 W. Powell, Suite 206	Austin, 78753	(512) 490-0932	watercache.com	All types of materials
Lakota Water Company	10006 Longhorn Skwy.	Dripping Springs, 78620	(877) 652-5682	lakotawatercompany.com	Up to & above 100,000 gallons; all materials
Longhorn Water Treatment	P.O. Box 726	Leander, 78646	(512) 260-5900	longhornh2o.com	55-25,000 gallon; all types
Mark Wieland, Master Plumber	P.O. Box 2743	Austin, 78768	(512) 626-2547		up to 20,000 gallons; fiberglass
Native Constuction	201 Cole Street	Austin, 78737	(855) 253-6284	buildnative.com	20,000-30,000; metal
Pinnacle Water Tanks	1704 Colt Circle	Marble Falls, TX 78654	(512) 755-4553	pinnaclewatertanks.com	1,500-65,000 gallons; metal
Rain Man Waterworks	2263 Red Corral Ranch Rd.	Wimberley 78676	(512) 351-5150	rainharvester.com	Turnkey rainwater for home and landscape
Rain Harvest Resources	1019 C.R. 323	Liberty Hill, 78642	(512) 864-4226	rainharvestresources.com	Up to 65,000 gallons; all materials
Rainwater Works	P.O. Box 1429	Burnet, 78611	(512) 277 0096	rainwaterworks.com	5-65,000 gal.; residential, commercial, ranch
Southern Exposure	1483 CR 311	McDade, 78650	(512) 663-9538	southernexposureaustin.com	3,000-15,000 gallons; all materials
Steady Rain Irrigation	12420 Turtleback Ln.	Austin, 78727	(512) 589-0833	steadyrainirrigation.com	3,000 gallons or larger; plastic tanks;
Sustainable Homesteads	8607 Swanson Lane	Austin, 78748	(512) 282-6629		Up to 40,000 gallons; all materials;
Tall Drink Rainwater Harvesting	20310 Haystack Cove	Spicewood, 78669	(512) 769-1254	talldrinkrh.com	6,000 gallons and up; metal and plastic;
Texas Native Rainwater	3600 Elder Hill Rd.	Driftwood, 78619	(512) 466-2898	texasnativereinwater.com	Res. irrigation up to 20,000 gal.; graywater

The Leading Edge

A New Kind of Clothes Washer



Courtesy Xeros

The Xeros commercial clothes washer uses over a million tiny beads that provide agitation, greatly saving on water, heat, and detergent

Throughout recorded history, clothes washing has relied on 3 tried and tested strategies to remove dirt and stains: wash water as solvent (preferably hot water); chemical agents mixed with the water (detergents, soaps, and bleaches); and agitation (scrubbing, hand-beating, or mechanical motion). Today's standard clothes washers can integrate all 3 options in a convenient box.

A British company, Xeros, has developed a new spin (no pun intended) on clothes washing that mixes tiny plastic

beads with a small amount of water to enhance agitation to clean clothes. The beads remove dirt, stains, stray dyes from fabric, and chemicals and smoke particles (important in cleaning protective gear for fire fighters). Xeros states that its washers can reduce water use 70 to 80%, energy used to heat water by 50 to 100%, and detergent use by 50%.

Each full laundry load will use 1.3 million beads injected with water, which are constantly hitting the fabrics as the machine's drum tumbles. With careful drum cycling and vacuum removal, almost all of the beads are removed at the end of the washing period for reuse. The few beads that are left (as few as 20) are usually removed through other laundry processes such as drying and folding. The beads can last 500 to 1,000 cycles before they are recycled.

Xeros uses a proprietary detergent that is hypoallergenic and fragrance free. Since the process uses less agitation and detergent, fabrics generally last longer.

The company estimates its machines carry a premium of \$7,000 (which includes monthly maintenance). Considering average U.S. utility and detergent costs, they can pay back this premium in 2 years. To date, the machines are only sold for commercial use (professional laundries, hotels, hospitals), though a residential machine is in development.

Xeros U.S. Office..... 1 (844) 207-1099
250 Commercial St #4002a, Manchester, NH 03101
xeroscleaning.com



Save Our Springs is a nonprofit alliance of activists, scientists, lawyers, and educators working to protect Barton Springs and the Edwards Aquifer. By preventing pollution, limiting pumping, and steering development downstream of the Edwards recharge zone, we can keep our streams and springs clean and flowing through droughts and a changing climate.



ADVOCACY

We advocate for policies and investments that protect the Hill Country. We partner with neighborhoods, landowners, local governments, and other conservation groups to oppose the worst threats to our local waters and to support sustainable alternatives.

PERMANENT PROTECTION

We work to expand and connect public parks and preserves and private conservation lands across the Hill Country region with public funding, landowner stewardship, and innovative private conservation investments.

EDUCATION AND ACTION

Austin's rapid growth challenges us to educate newcomers on the importance of and threats to Barton Springs and the Edwards Aquifer. We do this through:

- Our SOS email news and action alerts – sign up at SOSAlliance.org
- Barton Springs University educational events, including an annual day of outdoor learning at Barton Springs for students and the general public
- Our free Barton Creek Greenbelt app
- Education and outreach tabling at Barton Springs Pool and local events



SOSAlliance.org