

Autoclave Study Paper

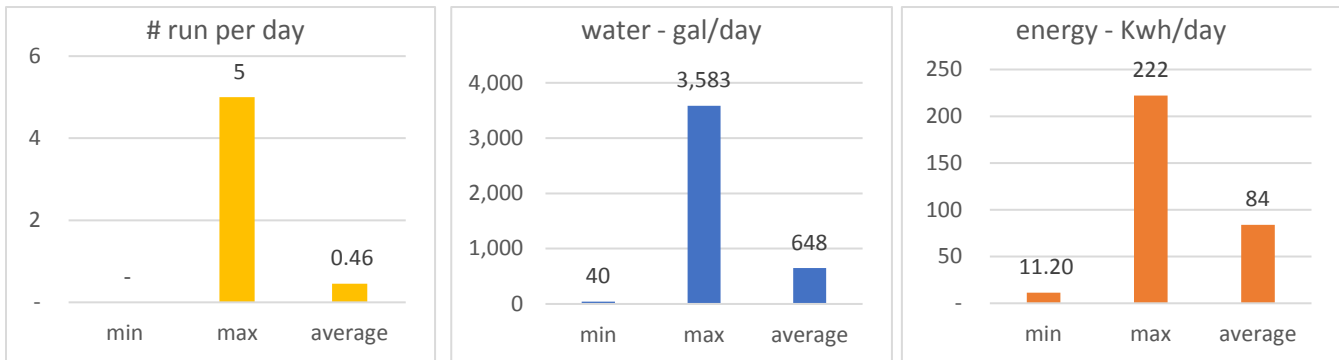
An autoclave is a pressure chamber used to sterilize lab equipment and deactivate bio hazardous waste; exposing them to high pressure saturated steam. At UCR, autoclaves usually belong to Departments and are shared between labs.

The office of sustainability conducted an Autoclave Study during one year, studying two autoclaves on campus:

- 1 in Entomology Building (one Steris autoclave for the full building)
 - Stand-alone steam supply ; 24*36*36 ; 2001
 - Live energy monitoring: boiler + autoclave
 - Has a water meter
- 1 in Genomic Building (8 Steris autoclaves in the building, 2 per floor)
 - Connected to steam plant ; 36" ; 2008
 - Live water monitoring only

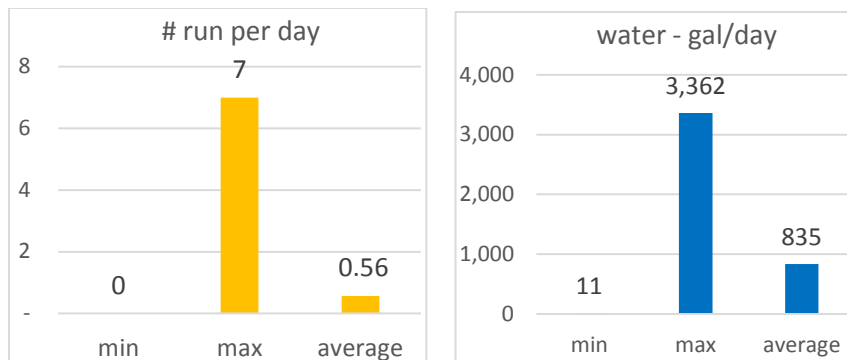
We collected data on energy and water use, as well as number of cycles per day (from users log sheets). The results are presented below:

Entomology Building:



On average, the unit uses 84kWh/day and **30,000 kWh for 1 year**; it can use up to 222kWh in one day. The unit uses from 40 gal/week to 3583 gal/day, and **236,500 gal/year**.

Genomic Building:

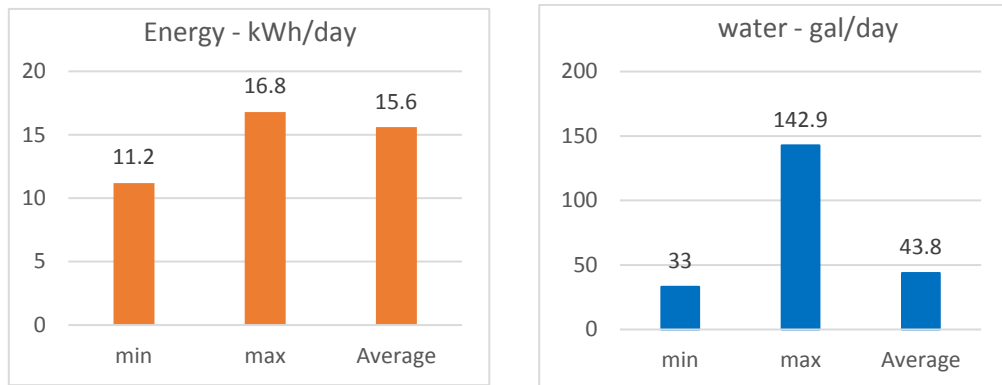


This unit uses an average of 835 gal/day or 304,800 gal/year, for less than 1 cycle per day on average.

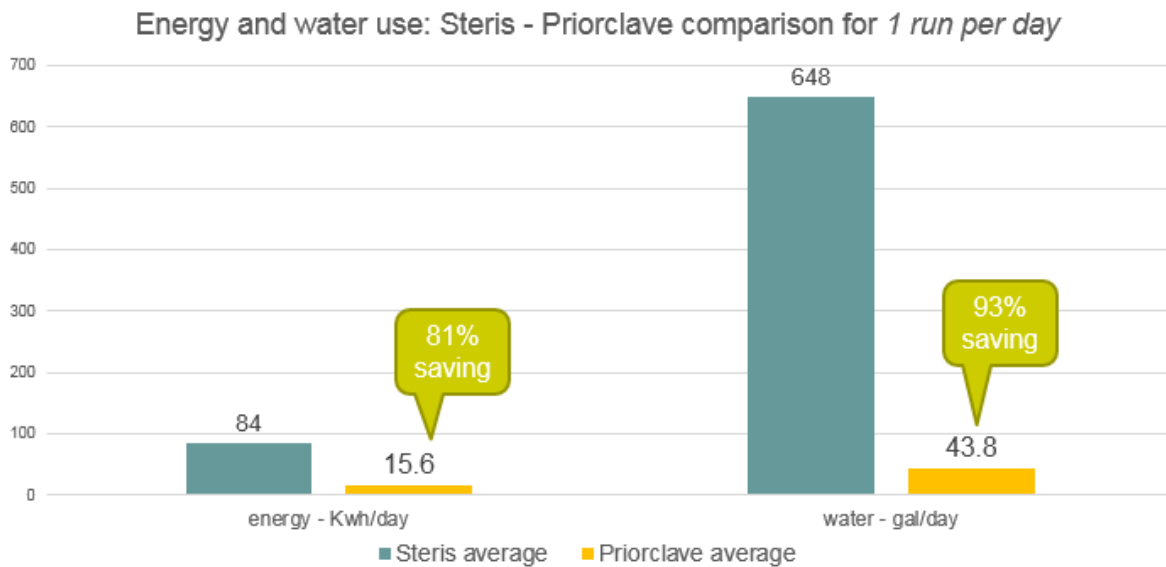
New EHS Building, open in April 2016:

An energy and water efficient autoclave has been installed in the new EHS building instead of a more traditional “Medical Grade” autoclave (e.g. Steris). It is important to note that the design of an efficient autoclave is different, because it operates on-demand only, and not 24/7 as a “Medical Grade” autoclave. Thus, a warm-up time is needed for efficient autoclave, which slightly prolongs the time of a cycle. This is why this type of unit is recommended for light to medium intensity use, or no more than 5 cycles per 8-hour shift. Please consider consulting the section *More Resources* for more details.

The water and energy usage of the Priorclave are live recorded. Since his installation, 22 runs have been measured and the results are presented below:



The comparison between the autoclaves in Entomology and in EHS for **1 run per day** is detailed below:



The Priorclave allows to save annually:

- 25,000 kWh
- minimum of \$2,500/year @ \$0.1/kWh
- 220,000 gal of potable water

Also, the cost of a new unit (w/o freight and taxes) as well as contract maintenance are detailed below:

- Priorclave: \$39,865.00 + maintenance : \$2,500/year
- Steris: \$52,110.00 + maintenance : \$3,000/year

For more resources, please consult the following links:

1. Priorclave papers about autoclave functioning - square versus round chamber, Medical versus Research Grade:
 - <https://priorclavena.com/wp-content/uploads/2016/03/Is-it-Hip-to-be-Square.pdf>
 - <https://priorclavena.com/autoclave-water-consumption/>
2. CHESC (California High Education Sustainability Conference) Presentation:
 - <https://chesc.org/wp-content/uploads/UCR-Autoclave-study-2016-PROCUREMENT-DF.pdf>
3. Priorclave article about their units in the new UCR EHS Building:
 - <https://priorclavena.com/autoclave-need-check-trade/>