



FACT SHEET: CHILL UP YOUR ULTRA-LOW TEMPERATURE FREEZER



SUSTAINABILITY OPPORTUNITY

If you work in a lab that uses cold storage (e.g. refrigerators or freezers) you are undoubtedly already keenly aware that these types of equipment consume a significant amount of energy. However, did you know that a standard -80 freezer can consume nearly as much energy as a single-family home?

One easy way to reduce the energy consumption of your ultra-low temperature (ULT) freezer is to change the set point from -80 degrees Celsius to -70 degrees Celsius. Chilling up your freezer will save over 1000 kWh and over \$100 in energy costs every year. It also prolongs your freezer's lifespan.

FREQUENTLY ASKED QUESTIONS

Is it safe to store samples at -70?

Most samples—such as proteins, bacteria and viruses—are generally safe at -70°C. In fact, 15 years ago all ultra-low freezers were set to -65 or -70. The drive to continually lower freezer temperatures has more to do with marketing and selling freezers than it has to do with science.

Several papers have been published demonstrating that storing various types of samples at -70 or lower does not affect the integrity of the samples. These papers can be accessed here: <https://www.freezerchallenge.org/resources.html>.

What about Nucleic Acids?

Most of the time, nucleic acids can safely be stored in a regular freezer at -20°C. They can also be stored at room temperature using a technology that mimics extremophile biology of dehydration. This technology eliminates the need for cooling during shipping and storage, cutting down on energy costs and reducing the risk of having valuable research disrupted from a power outage. More information on room temperature storage and how to obtain the full rebate can be found here: <https://sustainable.stanford.edu/cardinal-green/cardinal-green-labs/energy-programs>.

When is chilling up a freezer to -70 not a good idea?

Freezers that are only partially full may not be the best candidates for chilling up because a lower thermal mass causes higher temperature swings when the freezer is opened.

Watch the temperature of your freezer closely if you choose to chill it up when not full. If your freezer is not full, offer to share the space with another laboratory.

Has anyone else tried it?

Labs at the following universities are chilling up their ULT freezers to -70:

- CU Boulder
- Dartmouth
- Harvard
- UC Davis
- UC Santa Barbara
- University of Pennsylvania

The following link provides a list of labs across the country that store their samples at -70 or warmer: bit.ly/1RCXdWz

What else can I do?

The Cardinal Green Labs program offers many resources for reducing energy and increasing sustainability in lab operations, including rebates for energy- and water-saving equipment, free equipment timer installations, alternatives to hazardous chemicals, a chemical and equipment reuse program, and much more. Learn about the Cardinal Green Labs program and all available resources here: sustainable.stanford.edu/cardinal-green/cardinal-green-labs.

MORE INFORMATION

CARDINAL GREEN LABS PROGRAM

sustainable.stanford.edu/cardinal-green-labs

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For more resources and to take action, sign in to [My Cardinal Green](#)

