A conversation with PHIL WIRDZEK, president and executive director of PSL

THINKING OUTSIDE THE ICEBOX ON LAB SUSTAINABILITY

Ultra-low temperature freezers (ULT, -80°C) are one of the most energy-intensive pieces of equipment found in labs. They could be operated more efficiently by implementing simple cold-storage management best practices, yet few researchers invest the time to do so. To reduce the environmental impact of ULTs and other cold storage units, two non-profits — the International Institute for Sustainable Laboratories (I2SL®) and My Green Lab — joined forces to launch the first Laboratory Freezer Challenge in 2017. PSL president and executive director, Phil Wirdzek, along with My Green Lab executive director, Allison Paradise, describes how the challenge continued to spur hundreds of new and international labs into action in 2018.

What was the inspiration for the challenge? The challenge was created to educate scientists on the environmental impacts of ULTs and other cold storage units. The challenge was also created to better develop energy-saving models.

What were the goals of the challenge? The goal of the challenge is to offer the International Laboratory Freezer Challenge in 2018. The organizations have made several goals to help reduce energy consumption. The goals of the challenge are to educate scientists on what they can do to mitigate those effects. An additional benefit is the reduction of overhead costs. The more can we do to reduce overhead costs for labs, the more resources can be redirected to research.

Are there prizes? Yes, there are prizes. The competition is open to anyone involved in the lab. The winners are determined based on the amount of energy saved and the number of points scored by taking simple actions such as properly maintaining freezers, adjusting storage temperatures, and retiring and replacing inefficient units.

Where is the Freezer Challenge headed in the future? Both organizations, in conjunction with our sponsors, are hoping to offer the challenge in the future. Keep in touch with us at freezerchallenge.org.

People often don't think about energy consumption in labs. Is it a big deal? Absolutely. Typical research university lab buildings consume 40-60% of all energy on campus. Of that, 25% is due to lab equipment. An average ULT freezer uses as much energy as a single-family home (~20 kWh/day), and collectively, cold storage units (e.g. U/LTs, refrigerators, cold rooms) contribute substantially to a lab's energy use. But there's a lot that can be done to reduce the environmental impact of cold storage, including defrosting (~10% energy savings); changing the set point on ULTs to -70°C (~40% savings); purchasing energy-efficient models to replace older units (up to 70% savings); and throwing away superfluous samples to make space in existing units. Stirling Ultracold, our sponsor, brought to this industry a unique technology that significantly reduces the energy consumed by freezers in laboratories. That laid the groundwork for others to develop energy-saving models.

What was the inspiration behind the International Laboratory Freezer Challenge? The sustainable laboratory community has been keen to address energy consumption of cold storage, and a competition seemed like a great way to do that. When PSL and My Green Lab launched the first North American Laboratory Freezer Challenge in 2017, that competition caused a significant level of interest from others outside North America. Thus, the organizations coordinated with sponsors to offer the International Laboratory Freezer Challenge in 2018.

What were the results of the International Laboratory Freezer Challenge? More than 170 labs from around the world participated this year, collectively saving an estimated 1.6 million kilowatt hours. This is the equivalent of ~1,200 metric tons of CO2, or ~1,400 acres of forest. The competitors collectively saved an estimated 1.6 million kilowatt hours.

Who were the winners? We awarded both organizations and individual labs for their work. The individual lab winners were the Janssen Immunology Biology Lab at La Jolla, California, Immunology Therapeutic Area, Janssen Research & Development LLC, the Inorganic and Radiation Analytical Toxicology Branch from the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia; the Brain Inflammation Group, Luckman Lab, and the SFB Group Labs managed by Elena Redondo at the University of Manchester in Ohio. The organizational winners were the University of Illinois Urbana-Champaign, CDC, and the La Jolla, California campus of the Janssen Pharmaceutical Companies of Johnson & Johnson.

Winners were determined based on the amount of energy saved and the number of points scored by taking simple actions such as properly maintaining freezers, adjusting storage temperatures, and retiring and replacing inefficient units. Are there prizes? Yes, and this is one of them! People are very excited to have their pictures in Nature. Winners were recognized October 16, 2018, at the PSL Annual Conference awards in Raleigh, North Carolina. The competition and prizes were made possible due to the generosity of our sponsors: Stirling Ultracold, Eppendorf, and Thermo Fisher Scientific.

What do you see as the larger goals of the challenge? There are two main goals of the Freezer Challenges. The first is simply to raise awareness about the environmental impact of cold-storage. As former scientists, neither Allison nor myself ever once thought about our lab refrigerators or -80°C freezers, aside from making sure they were still functional and that samples remained where they were left. And the second goal, given the environmental impacts is to educate scientists on what they can do to mitigate those effects. An additional benefit is the reduction of overhead costs. To be honest, scientists are wasting a lot of money. The money spent on creating, using, and operating labs inefficiently, including cold storage, is not sustainable. The more we can do to reduce overhead costs for labs, the more resources can be redirected to research.

The competitors collectively saved an estimated 1.6 million kilowatt hours.

The University of Illinois, Urbana-Champaign

Centers for Disease Control and Prevention

The La Jolla, California, campus of the Janssen Pharmaceutical Companies of Johnson & Johnson

And the 2018 Winners Are...

The Brain Inflammation Group, Luckman Lab, and the SFB Group Labs managed by Elena Redondo at the University of Manchester

The Eye and Vision Research Biorepository at the University of Pennsylvania

The University of Illinois, Urbana-Champaign

The La Jolla, California, campus of the Janssen Pharmaceutical Companies of Johnson & Johnson

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