# Additional Resources from Chat: Global Kickoff for the 2024 Freezer Challenge Digital Pass

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## Categories:

1. **Registration and Participation**
2. **Safe Storage Temperature: -80°C to -70°C**
3. **Systems & Equipment**
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5. **Replacement and Incentives**

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## 1. Registration and Participation

- **Would you register as individual labs or as a whole research institute? i.e. what is the team size? What is the best way to register - per department (or lab) or per organization/site?**
    - **Response:** You can register the entire department or institute for the annual Freezer Challenge. You will be asked within the registration as to how many labs are represented with your scoresheet so you can capture more than one lab per scoresheet.
    - **Follow-up:** Some of our depts. are very small, so we were wondering if it makes sense to register per dept if you have a team of 5, for example, it sounds to me like per dept would be a good idea.
    - **Response:** It also depends a bit on your organizational structure. I.e. do you have a singular person (maybe an HSE rep or a Green team lead) who would like to act as a site coordinator for a larger group? Or do you have lab leads who would rather sign up as individuals?

- **How do we handle shared units between labs if scores should be calculated per lab?**
    - **Response:** If freezers are shared, register the whole group as a lab/org unless you can determine specific lab contributions.

- **Do you need a site coordinator for the organization competition, or can labs from the same organization participate together?**
    - **Response:** You don't necessarily need a site coordinator, but having one ensures responsibility. You can participate as a lab or capture multiple labs on one scoresheet.

- **Do you get results and energy saved if you are not a site coordinator?**
    - **Response:** Yes, results are provided for all labs participating. The lab registered gets its own info, while the coordinator has access to all.

- **Aside from freezers, do other measures affect points? We have solar panels and an EV fleet.**
    - **Response:** Unfortunately, for this challenge, only freezer-related actions are considered. However, it's an evolving program, and your input could influence future considerations.

- **What reports/updates can site coordinators see? Can we do monthly rewards for the leading lab?**
    - **Response:** Site coordinators can download reports with actions taken and estimated energy savings. Monthly rewards for the leading lab are possible.
- **If no site coordinator, would I get results as the person named for the lab itself?**
    - **Response:** Yes, if you register and start a scoresheet, you will receive results and reports upon submission.
- **Is there a way to continue conversations with other sites after this call?**
    - **Response:** Join the My Green Lab Ambassador Program for networking, questions, and collaboration. Here's the link.

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## 2. Safe Storage Temperature: -80°C to -70°C

- **Have any GMP labs made the switch to -70 C? If so, is there any guidance?**
    - **Response:** You can find information on GMP labs that have made the switch to -70 on this link. Additionally, for a list of institutions and data, you can refer to this spreadsheet.
    - **From attendees:** Consider implementing a cooling circuit with water instead of air. Also, filling your freezer from the bottom up can be helpful. We top fill with ice packs where the temperature is less stable at opening.

- **We recently purchased a new -80 freezer with an energy-saving -70 function. The warning mentioned potential ice build-up at -70. Is this a common problem?**
    - **Response:** It might be unrelated to temperature; factors like increased door opening or longer open durations could contribute. Consider checking with your freezer manufacturer for advice.

- **How much energy is saved with -70 vs -80?**
    - **Response:** Approximately 30% depending on the unit's fullness and age. The data was measured to validate this claim.
    - **From attendees:** For brand comparisons, we tested Dometic vs Stirling, and Stirling's UTL freezers were more energy-efficient at -70°C.

- **Are there any labs working with cells that are stored in -70°C ULT freezers?**
    - **Response:** You can find information on labs working with cells stored in -70°C ULT freezers on this spreadsheet.
    - **From attendees:** We routinely store cells, such as CHO cells, at -150°C in a freezer. They remain stable for years, showing comparable or even better stability than liquid nitrogen storage.

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## 3. Systems & Equipment

- **What monitoring equipment do people use to compare energy savings before and after -70 degrees?**
    - **Response:** Some use Thermo Insight Motes to monitor temp, energy, door opening, etc. And Klatu provides the analytics and alarm notifications.
- **What system do people use to track sample storage? We have a QR sticker system, but it is not great. Stickers get lost even though they are meant to be used with ULT.**
    - **Response:** Some use a real-time system for temp and power monitoring, but specifics may not be suitable for this group.

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## 4. Freezer Maintenance

- **Is a full freezer more stable and energy-efficient than a half or quarter-full freezer chamber?**
    - **Response:** We did a blog post about this in 2020, and there's a Lab Manager resource that provides a bit more detail here. Yes, fuller freezers are more thermally stable than ones with lots of empty space. If you don't have enough samples yet to fill your freezer, consider filling empty space with extra ice packs, jugs of frozen water, or even empty Styrofoam shipping containers with their lids on that fit into your freezer shelves. Or consolidate your units together so you can power an empty one off for a while until you have enough samples it is needed again.

- **How do we employ a maintenance program when funding and maintenance are at the scientist's cost?**
    - **Response:** If freezer maintenance is the responsibility of scientists at an institution rather than provided by your university or company, never fear! Routine preventative maintenance for cold storage units is straightforward and doesn't require expensive tools. Pages 6 and 7 of this guide talk about some of the tools you might want on hand. At a minimum, gloves to protect your hands, some sort of scraper, and a soft-bristled brush. Access to a vacuum or shop vac might help clean dust and debris from the filters and coils of your units. If you are doing a full defrost of a freezer, you'll want to remove all samples and turn the unit off, propping the door so all ice melts. Absorbent pads in front of the freezer door, or even spare broken-down cardboard boxes, can help catch the melting water. If you live in a dry enough climate, you can then let the cardboard dry and put it back in the recycling bin. As your building manager or proctor (whoever helps run your lab building) if they have access to a shop vacuum, mop, or even brushes, and scrapers, that your lab could borrow. If your building has none of these materials but has several cold storage units, consider asking your department or university to invest in these materials to have on hand for all labs to use when doing preventative maintenance.

- **Is there an instruction video on how to vacuum freezer filters?**
    - **Response:** It varies by manufacturer, but it's usually simple. Remove the sponge-like filter, vacuum, and replace it. For PHCBI, here's a link. NIH has a video on ULT Freezer User Level PM on YouTube.

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## 5. Replacement and Incentives

- **Is there an incentive program to replace units over 10 years old?**
    - **Response:** There are various incentives, including rebate programs. Some institutions and companies collaborate with facility members or utility companies. Here are some examples:
        - Colorado State University Freezer Incentive Program
        - University of British Columbia ULT Freezer Rebate Program
        - University of Pennsylvania Freezer Replacement Rebate Program
        - UNC-Chapel Hill Efficient Freezer Rebate Program
- **When is a freezer considered "old"?**
    - **Response:** Usually between 10-15 years.
- **Any resources on the life cycle analysis of the environmental cost of disposing of 'older' ULT freezers and buying new ones?**
    - **Response**: Older fridges/freezers tend to use harmful refrigerants that affect the ozone layer. Here is a resource on refrigerants. This link can provide additional insights into considerations when evaluating ULT freezers.
    - **From attendees:**
        - Legacy ULTs (over 7 years old) use 26.4 kWh/day.
        - PHCBI VIP Eco Smart currently leads in energy efficiency at 5.4 kWh/day.
        - The "Voltcraft 6000" costs only €30 (in the Netherlands).
- **Is there a recommended replacement age for ULTs, -20 freezers, and standard refrigerators?**
    - **Response:** The ACT database can help with informed purchasing decisions: ACT Database. NIEHS targets 10 years for ULTs, considering compressor warranty expiration. 10-15 years seems to be the average age for replacement.