

The International Fume Hood Challenge



I2SL International
**Fume Hood
Challenge**

The 2024 Pilot

- Emphasis on behavior change, scientist engagement & resource efficiency
- Limited to academic institutions in the United States
- Pooled resources from multiple institutions, but still limited
- Energy calculations not validated, assumed perfectly operating buildings
- Data submission through Google Form

Improvements to be made

- Be clearer about the actions we are incentivizing
- Best practice guides for achieving said actions
- Updated energy calculations & systems testing requirement (data validation)
- International participation
- Create a user submission portal/automatic data analyzer

Created Working Groups

- Best Practice Guides
- Competition Restructuring
- System Testing
- Fundraising



Best Practice Guide Working Group

- Created a list of guides that would be useful to participants
- Created a workflow for authoring, editing, “peer-reviewing” best practice guides
- 20 BPGs currently being drafted, across 5 themes (behavior, technical, policy, education, collaboration)

Competition Restructuring Working Group

- Created objectives that the challenge would promote
- Created a list of actions/elements participants could do in order to reach these objectives
- I2SL Labs2Zero Benchmarking Tool for submissions
- Use AIM Report to calculate energy savings

Fundraising Working Group

- Estimated budget to make this challenge a reality
- Market research to see what would interest and be of benefit to potential sponsors
- Created a prospectus for potential sponsors

Systems Testing Working Group

- Rationale: before expending effort on changing behavior, make sure your building is responsive and will produce energy savings.
- Worked on preliminary SOP's for testing and documentation of HVAC performance

2026: Challenge Program Development



- **Challenge moving out of foundational work into development phase**
- **New program structure created:**
 - **Challenge Leadership Council (CLC)**
 - **Technical Advisory Groups (TAGs)**
 - **Goal: Involve multiple stakeholders across community for cross functional input**
- **Much work needs to be done across multiple areas to meet our goals**



Planned Start of Challenge: January 2027



What are the Goals of the Challenge?



Improve lab safety & energy efficiency through a collaborative team effort involving all relevant stakeholders

This will be achieved through a broad scope:

- ✓ Evaluate opportunities for best hood energy savings
- ✓ Encourage system testing to ensure safety & savings
- ✓ Promote education & behavior change on fume hood use
- ✓ Promote lab energy efficiency and safety upgrades
- ✓ Optimize fume hood utilization and hibernation



Why is this Challenge different than a Shut the Sash Contest?



- **A more comprehensive approach to insure impact**
 - Stronger focus on lab & fume hood safety
 - Focus on selecting “best” lab buildings for savings
 - Includes HVAC system and fume hood testing
- **Involves not only researchers and green lab staff,**
 - But also, safety and facilities staff
 - And manufacturers & service providers for support
- **Encourages evaluating other actions to save energy**
 - Also includes lab air systems & other energy measures



Fume hoods are a primary but not the only focus



What 10 Elements Combine to Make an Impact



1. Engage Team Members:

- a. Form team with researchers, green labs staff, facilities, EH&S, & senior management to implement the challenge



2. Select Lab Buildings to Participate:

- a. Enter potential lab buildings into LBT
- b. Use free AIM demo to select labs w/ largest potential energy savings impact



3. Perform System Checks:

- a. Check operation of supply and exhaust systems, & room airflow controls



4. Perform Fume Hood Checks:

- a. Conduct fume hood perf. tests to ensure safe containment



The 10 Elements of the Challenge



5. Perform Maintenance Actions:

- a. Diagnose & take maintenance actions to ensure systems support safe, & energy-efficient lab & fume hood operation



6. Set up Sash Monitoring:

- a. Monitor researchers' fume hood sash heights/airflows before, during, and after the “shut the sash” contest



7. Engage and Educate Researchers:

- a. Educate researchers on safe & efficient hood operation
- b. Publicize researchers' involvement



8. Run a “Shut-the-Sash” Competition:

- a. Run a contest among identified participants,
- b. Track behavior change, recognize winners, & report results



The 10 Elements of the Challenge



9. Evaluate and Optimize Hood & Lab Utilization:

- a. Look for underutilized fume hoods
- b. Look for underutilized lab rooms & reallocate or shutdown
- c. Decommission, hibernate, reallocate, or share hoods



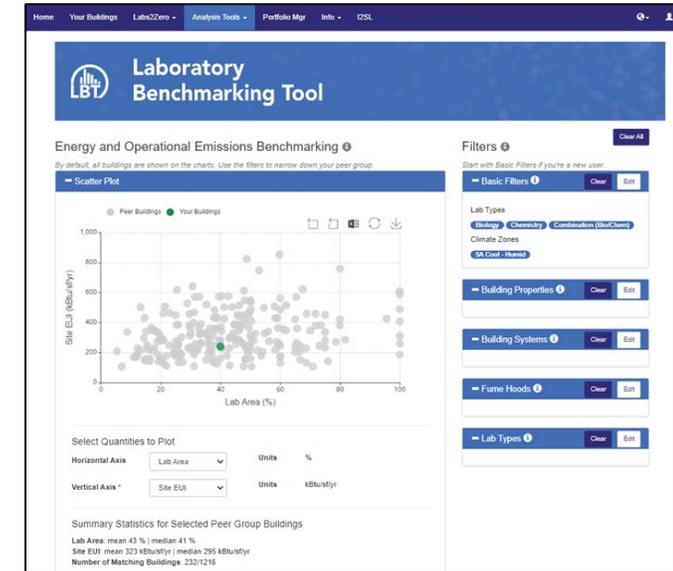
10. Identify Other Energy Savings Opportunities:

- a. Evaluate the feasibility, cost, and savings of potential lab energy conservation measures by:
 - i. Obtaining a full AIM Report with other measures or
 - ii. Developing an internally generated report of measures or
 - iii. Engaging a consultant, or manufacturer to develop a report
- b. Prepare and present the business case for a lab energy savings project to senior management



The Laboratory Benchmarking Tool

- Established industry tool
- Data entry, storage, scoring, interactive analytics, anonymized dataset of lab buildings
- Fully internationalized
- lbt.i2sl.org



Extending LBT for the Challenge

- Add a **data entry pathway** for participants
 - Overlap of most mandatory fields
- Calculate competition **scores**
- Provide **anonymized** competition dataset
- Will also provide building Energy Score



Labs2Zero Tie-Ins: The AIM Report



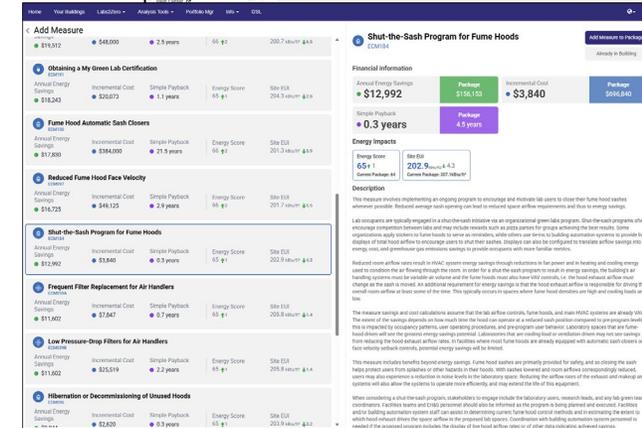
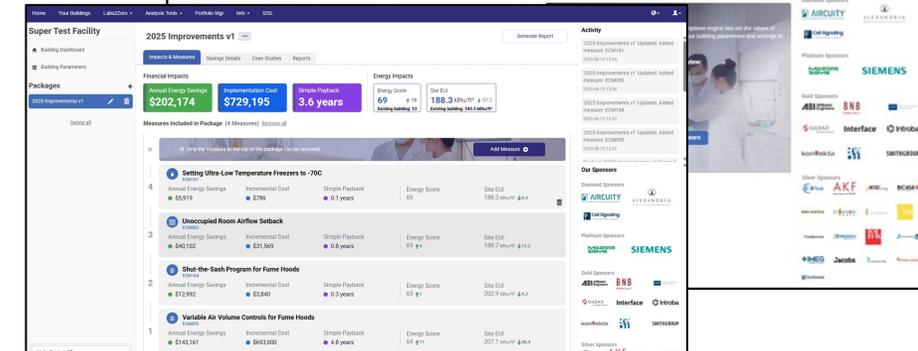
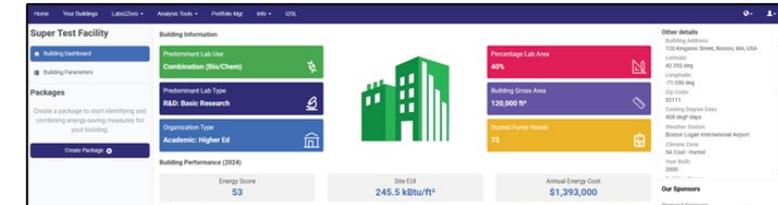
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The AIM Report: I2SL's automated energy audit for lab buildings

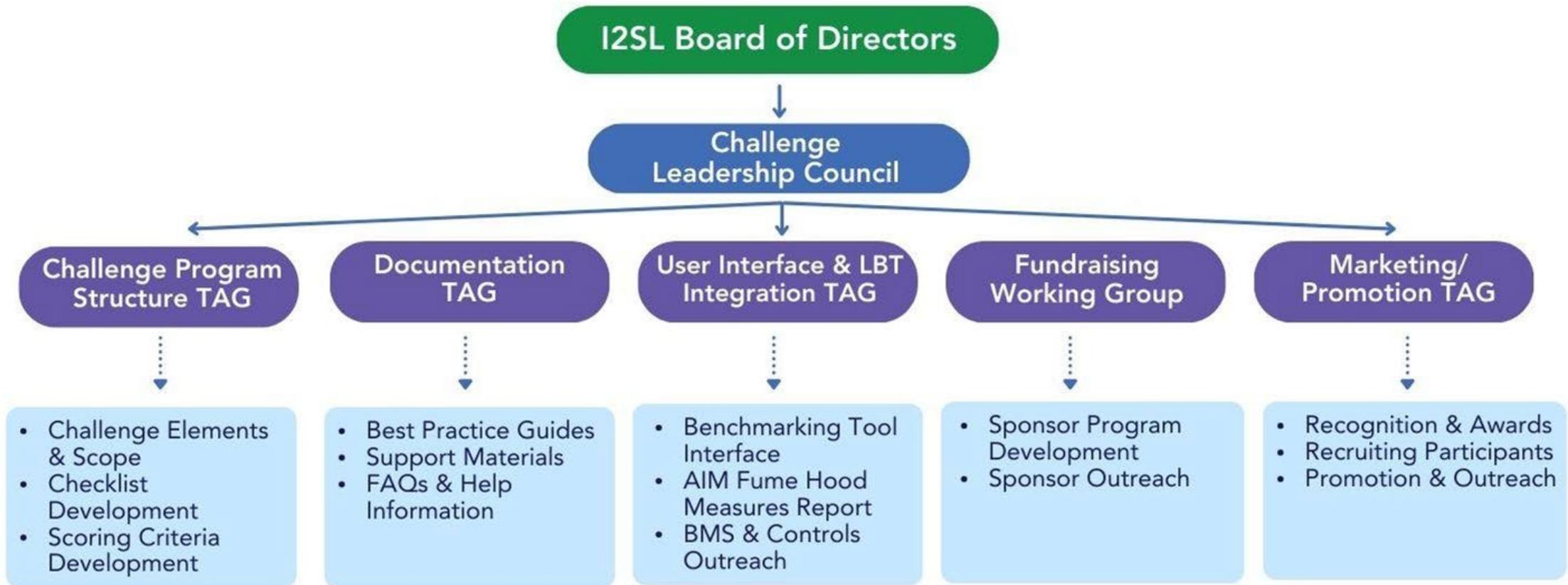
- Accessed via LBT
- Calculates estimated savings and costs for a range of lab-focused measures
- 9 of the 26 measures relate to fume hoods
- Free demo version includes shut-the-sash measure

Challenge will use the AIM Report to:

- **Prioritize** between buildings (participants)
- **Estimate** program savings (I2SL/participants)
- **Generate** a business case for energy retrofits



I2SL Fume Hood Challenge Program Organization



Challenge Program Structure TAG Responsibilities



- **Refine the 10 actionable elements for an impactful Challenge**
- **Identify implementation methods for each element**
 - *Define different levels of implementation (Good, Better, Best)*
 - *Includes technologies, procedures, best practices, or behavioral strategies*
- **Develop assessment questions to gauge success**
- **Assign weightings & points to responses to score participants**

Laboratory Benchmarking Tool

Edit Building: West Coast R&DLab 4

Basic Info Building Info Lab Area Building Systems **Policies** Utility & Emissions

Building Energy Manager Y N

Building Energy Efficiency Policy/Targets Y N

Automatic Fault Detection and Diagnostics Y N

Three Biggest Barriers to Efficiency Nothing selected



Documentation TAG Responsibilities



- **Provide editorial oversight for all Challenge support materials**
 - *Best Practice Guides, Instructions, Technical Resources, FAQs, etc.*
- **Define content structure and organization**
 - *Recruit subject matter experts*
 - *Oversee document development timeline*
 - *Conduct peer reviews of technical content*
- **Drafts FAQs in response to participant questions**



Frequently Asked Questions about the AIM Report

Assorted questions and answers about using the AIM Report.



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Best Practices Guide
Building a Team to Run the Challenge

2026

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Introduction

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Energy Systems Integration Facility (ESIF) at NREL South Table Mountain campus in Golden, Colorado.
Photo by Joshua Bauer; NREL 59215.

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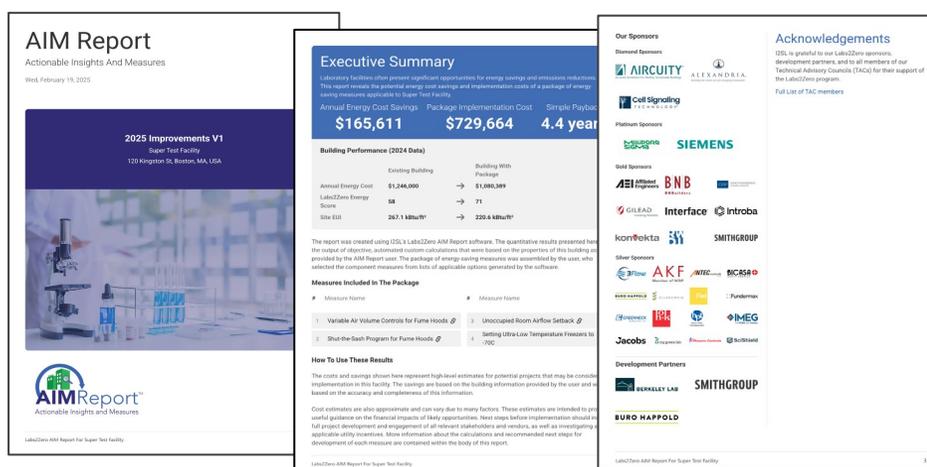
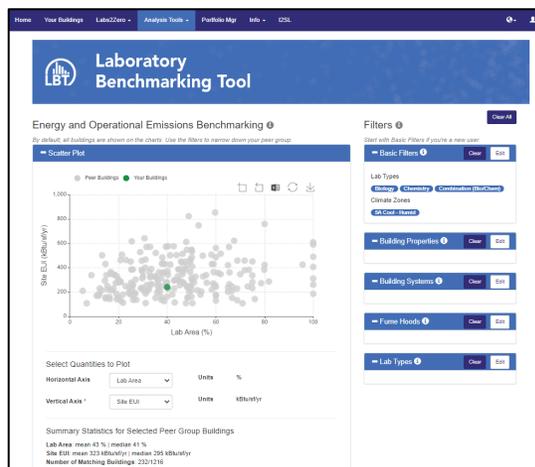
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User Interface and LBT Integration TAG Responsibilities



- **Help translate Challenge program into software requirements**
 - *Assemble “user stories” to guide software design and testing*
 - *Help develop data input structure and performance metrics*
- **Review & pilot software designs and layouts**
 - *Test & review Challenge software’s user experience (UX) and functionality*
- **Outreach to lab controls companies on FH sash data requirements**



Fundraising Working Group Responsibilities



- **Provide suggestions, contacts, and input on potential funders**
- **Assist I2SL in developing sponsorship materials and benefits**
 - *Become familiar with sponsor benefits to effectively communicate them*
- **Contact potential sponsors from known contacts & organizations**



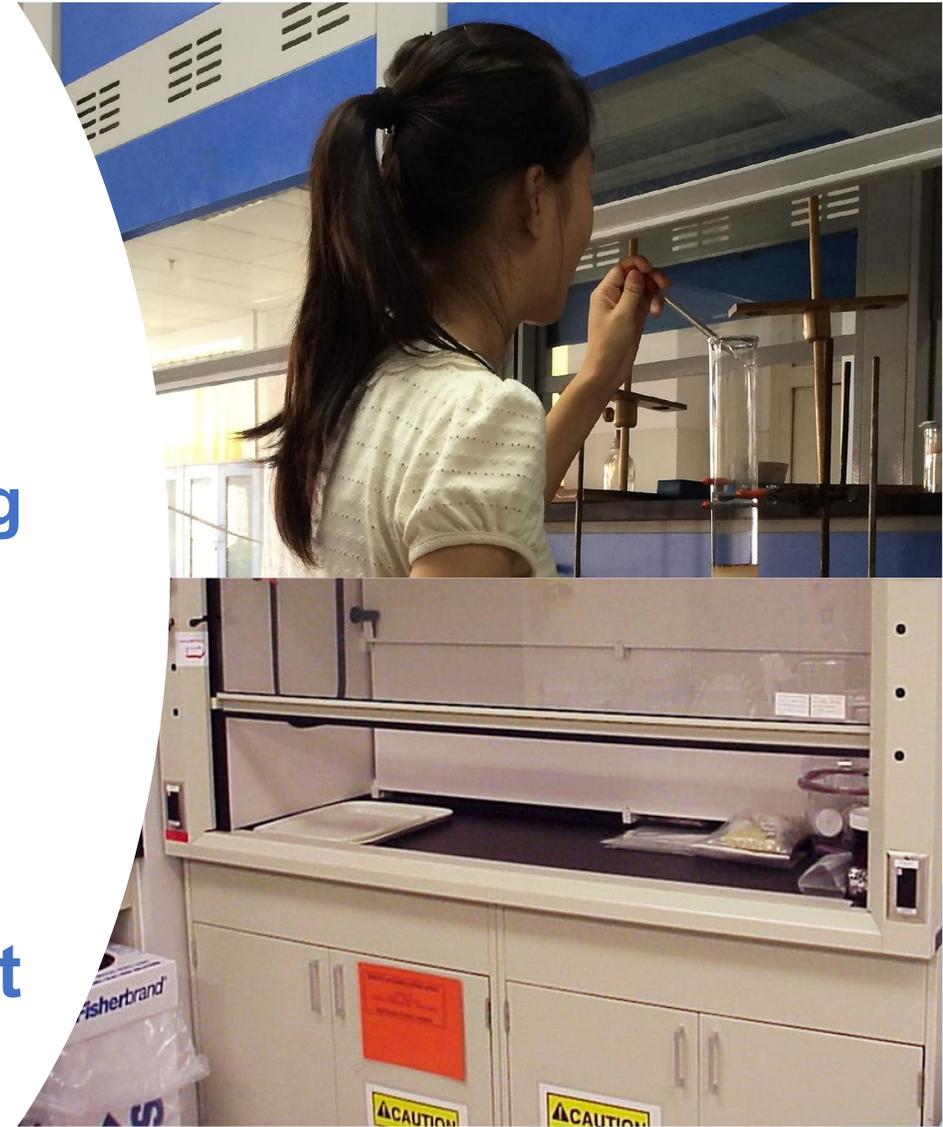
- **Advise on applicant evaluation & award categories**
 - *Provide input on recognition methods and materials for Challenge winners*
- **Support awareness-building within participants' networks**
- **Recommend strategies for launch and ongoing promotion**
- **Contribute to content distribution via web & social media**
 - *Author and share articles, blogs, emails, or LinkedIn posts promoting the Challenge*



Draft Fume Hood Challenge Timeline



- **November 2025: TAG Announcement/Forum**
- **Throughout 2026: TAG Group Meetings**
- **Throughout 2026: Challenge Development:**
- **Mid 2026: Challenge Tools & Element Testing**
- **Fall 2026: Challenge Announcement:**
- **Q1 2027: 2027 Challenge Launched!**
- **Q3 2027: 2027 Challenge ends, results out**

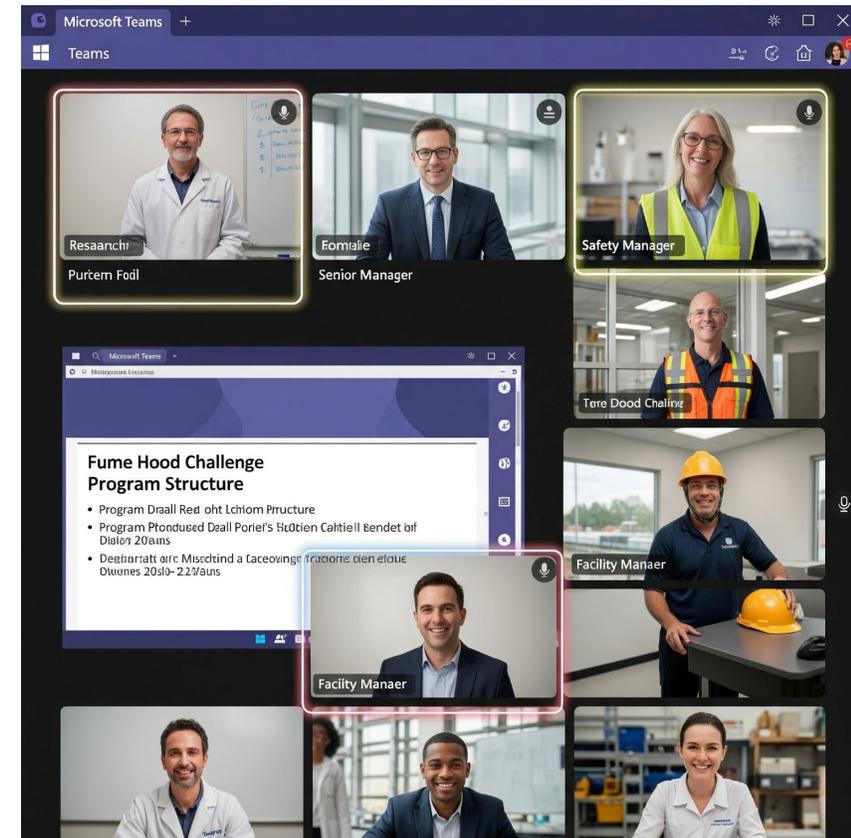


How You Can Get Involved!



- **Volunteer to join a Technical Advisory Group (TAG)**
 - **Volunteer to join one of these TAGs**
 - *Challenge Program Structure*
 - *Documentation*
 - *User Interface and LBT Integration*
 - *Fundraising*
 - *Marketing & Promotion*
 - **Please sign up on sheets passed around**
 - *Signup sheet also at registration desk*
 - *Scan QR code to get to volunteer form*

Help shape and contribute to this important initiative!



How You Can Get Involved!



- **Become a 2026 Pilot Participant!**
- **Help beta test Challenge elements**
 - **Advance help with lab safety & savings**
 - **Assist in the Challenge's success**
 - **Gain early knowledge on the Challenge**
- **Please sign up on sheets passed around**
 - Signup sheet also at registration desk



How You Can Get Involved!



- **Contribute & Become a Sponsor!**
- **Major Sponsor Benefits**
 - Widespread market exposure & recognition
 - Market, savings, & brand Analysis reports
 - Help organizations to upgrade their labs
 - Opt-In information on participants
 - Help on TAGs to develop the Challenge
 - Awards ceremony involvement
- **Benefits will extend to Fall of 2027**
- **Contact Gordon: President@I2SL.org**

Promotional Benefits	Diamond	Platinum	Gold	Silver
Logo on Challenge results dashboard in the LBT	X	X	X	X
Logo on I2SL Annual Conference Challenge banner	X	X	X	X
Mention in Challenge public relations	X	X	X	X
Name in some emails to Challenge participants	X	X	X	X
Listing in relevant Challenge best practice guides	X	X	X	X
Sponsor logo on one Challenge questionnaire web page	X	X	X	
Case study included in AIM Report	X	X	X	
Product or service information on Challenge website	X	X		
Logo on all Challenge web pages	X			
Topical webinar of your choice with I2SL audience	X			
Participant Information				
Emails and organization/building information for participants who opt in*	X	X	X	
Participating organizations' building identifier and location information	X	X		
Awards Related Role & Recognition				
Help distributing awards during recognition ceremony	X	X		
Identification on Challenge certificates	X	X		
Speaking role in virtual recognition ceremony	X			
Challenge Data Analysis Reporting				
Inclusion of company/brand name in participant questionnaire about equipment brands	X	X	X	X
Market report on participants' reported equipment brands	X	X	X	X
Aggregated participant data on savings and trends	X	X	X	
Brand-specific data analytics and savings reports	X	X		
Custom reports with brand-specific data analysis	X			
Impact & Involvement in Challenge Development				
Position on any of up to this number of Technical Advisor Groups (TAGs)	4	3	2	1
Seat on the Challenge Leadership Council (CLC) governing body	X			
AIM Report Software				
Discount percentage on Purchase of Monthly or Annual Subscriptions	35%	25%	15%	10%

Questions?

Gordon Sharp: President@I2SL.org

Kevin Tu : kevin@sustainabli.org



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Challenge**