Achieving Laboratory Energy Efficiency and Sustainable Procurement through Eco-labels

Lab Refrigeration and Energy Star

Allen Doyle,
UC Davis Sustainability Manager,
MS Chemical Oceanography
What’s So Cool about “Procurement”?

- Sounds like a dental fixative...ewww...
What’s So Cool about “Procurement”?  

– **BUT!!!**

• UC spent BILLIONS on Goods and Services last year  
• Let’s Add GREEN in a professional way  
• Third Party Certifications make it easy
Buy GREEN: Background

• Why lab spending matters
• How Lab Stuff gets Bought
• What Labs Buy

Bringing Energy Star to Lab Freezers—11 Years, and Counting
$8.8 B Goods and Services
University of California,
Fiscal Year 2016
$4.4 B  Spend on Goods
University of California, FY 2016

- Building Construction
- Life Sciences
- MRO
- IT and Telecom
- Unclassified
- Subawards
- Travel
- Food
- Utilities
- Out of Scope
- Published Products
- OEE
- Print and Marketing
$4.4 B  Spend on Goods
University of California, FY 2016

- Building Construction
- Life Sciences $701 M
- MRO
- IT and Telecom
- Unclassified
- Subawards
- Travel
- Food
- Utilities
- Out of Scope
- Published Products
- OEE
$4.4 B Spend on Goods
University of California, FY 2016

- Building Construction
- Life Sciences: $701 M
- MRO
- IT and Telecom
- Unclassified: $428 M
- Subawards
- Travel
- Food
- Utilities
- Out of Scope
- Published Products
- OEE

"Tail Spend"
How Office Stuff gets Bought

1. Departmental Purchasing Office
2. Transactional Procurement Team
3. Strategic Sourcing Team
   • Negotiate Contracts, Compliance
How Lab Stuff Gets Bought

1. PI’s (1,000 at UC Davis)
   • Staff x 2
   • Post Docs + Grad Students x 5

2. Departmental Purchasing Office

3. Transactional Procurement Team

4. Strategic Sourcing Team
   • Negotiate Contracts, Compliance
Who’s watching for Sustainability?

1. PI’s (1,000 at UC Davis)
   - Staff x 2
   - Post Docs + Grad Students x 5

2. Departmental Purchasing Office

3. Transactional Procurement Team

4. Strategic Sourcing Team
   - Negotiate Contracts, Compliance
Who’s watching for Sustainability?

1. PI’s (1,000 at UC Davis)
   - Staff x 2
   - Post Docs + Grad Students x 5

2. Departmental Purchasing Office
3.Transactional Procurement Team
4. Strategic Sourcing Team
   - Negotiate Contracts, Compliance

“I really believe this UC can make a difference.”

Julie Alvarez
- UC Procurement Officer
$4.4 B  Spend on Goods
University of California, FY 2016

Buying for sustainability raises strategic awareness and may help stay "on-contract".
What do Labs Buy?

– Equipment... > $5,000
  • Analytic “makes data”
  • Process “provides service”

– Supplies .... < $5,000

– Chemicals
What is Important Equipment?

“Typical” Life Science Laboratory

PLUG LOAD MONITORING 2016-17

- Bio Hood: 18%
- Refrigeration: 66%
- Service Equip: 7%
- Analytical: 0%
OK... Freezers & Energy Star

It all started, way back when ...

- informal 2006 conference calls
- DOE/EPA / Labs21 (I2SL.org)
  - Paul Mathew THANKS!
- 6-8 Manufacturers
  - All Equipment “Efficiency”
- 1 lab manager

Participation matters!
EPA requests preliminary data

• 2009

• After Energy Star x GAO “sting”

• Self-Testing will likely need repeating
  – $2-5,000 per item

• Method not Defined
EPA requests preliminary data
EPA re-starts method development

- 2012
- Refrigerators
- Freezers
- Not Ultra-Low Temperature Freezers
- Industry
- Users - Higher Education
- ASHRAE 72 supplement

B) Acronyms:
1) AHAM: Association of Home Appliance Manufacturers
2) ANSI: American National Standards Institute
3) LGF: Laboratory Grade Freezer
4) LGR: Laboratory Grade Refrigerator
5) NIST: National Institute of Standards and Technology
6) TMD: Temperature Measurement Device
7) ULT: Ultra-Low Temperature
Energy Star vs Industry Goals

• Good Performance
• Best 25% Efficiency
• Reliable
• Warm-Up Time

VS

Hyped performance
  e.g. -80 vs -70 C
  Minute uniformity when empty
  Pull Down Time
Continued method development

- 2013—Hyped Performance
- Empty -- consistent, unrealistic
- Units: Total Energy
- 15 sensors, bare – too sensitive
- Ultra-Low Temperature Freezers YES!
Continued method development

- **2014—Realistic Performance**
- Empty – convection assumed OK
- Door Openings
- Units: Energy/Volume = kWh/CF
- 9 sensors, shielded
  - Like a sample
DATA! We Need Some Stinkin’ Data!

- Third Party
- Due March, 2015
- Who’s gonna provide it???
My Green Lab to the Rescue!

1. Empty
2. and Loaded with Racks
3. and Door Openings...
   Oh My!!

Partner with FSTC
Thank You!
Allison!