Smart Labs Accelerator Roadmap Template

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# About this Template

This is a planning template to help you and your team develop a roadmap and plan in your first steps toward the creation of a Smart Labs program. This template is adapted from roadmaps developed by Exposure Control Technologies, Inc. [[1]](#footnote-1) the University of California Irvine and Smart Labs Accelerator Partners.

This template can be one of the first step in creating more energy efficient and safer laboratories. Feel free to adjust or change this template to suit your site’s needs and processes or use it as a resource to develop your own customized roadmap. Instructions are given throughout the template and *written* *in italics*. Feel free to erase these instructions for your final version, they are meant only as a prompt for each section. If a standalone plan doesn’t work for your organization, you may want to simply incorporate some of these sections into other organizational planning processes and documents.

Smart Labs programs ensure your laboratories are on the cutting edge of technological advances, safety improvements, and energy efficiency. For more information on developing a Smart Labs program visit the Better Building Smart Labs Toolkit website: <https://betterbuildingsinitiative.energy.gov/accelerators/smart-labs>.

# Smart Labs Program Roadmap

## Smart Labs Team Formation

*Fill in information about your Smart Labs team members for each key area. Add as many team members as you feel appropriate. You may be multiple team members from a specific area (like EH&S), add as many as appropriate for your site.*

|  |  |  |
| --- | --- | --- |
| **Smart Labs Team** | **Name** | **Email** |
| Smart Labs Coordinator |  |  |
| Management |  |  |
| Facilities/Engineering |  |  |
| Environmental, Health and Safety |  |  |
| Facility Maintenance |  |  |
| Sustainability |  |  |
| Lab occupants/Researchers |  |  |

*If you have additional team members you can fill them in below. Feel free to add as many team members or other categories as appropriate.*

|  |  |  |
| --- | --- | --- |
| **Additional Smart Labs Team Support** | **Name** | **Email** |
| Key vendors/contractors |  |  |
| Lab safety |  |  |
| Lab ventilation |  |  |
| HVAC & Controls |  |  |
| Commissioning |  |  |
| Other |  |  |

## Laboratory Building Inventory

* 1. *Describe the process to gather and categorize relevant building information. Include information such as:*
     1. *Where is building information stored?*
     2. *Where is energy and water consumption for the building stored?*
     3. *What information is needed on each building? What information is missing?*
     4. *Do you have any internal ranking systems for buildings? What are they based on?*
  2. *Next, create a summary of all your building information once you’ve been able to gather everything you need and answered the questions above.* 
     1. *Use the table below as a possible template for gathering information.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Building Name** | *Lab #1* | *Lab #2* | *Lab #3* |
| **Year Built** |  |  |  |
| **Building Area (ft2)** |  |  |  |
| **Total Lab Area (ft2)** |  |  |  |
| **# of Labs** |  |  |  |
| **Lab Type(s)** |  |  |  |
| **# of Occupants** |  |  |  |
| **Occupancy Hours** |  |  |  |
| **HVAC System Type(s)** |  |  |  |
| **Lighting System Type(s)** |  |  |  |
| **Fuel Type(s)** |  |  |  |
| **Analytic(s)** |  |  |  |
| **Other** |  |  |  |

## Lab Condition Status Assessment

* 1. *Describe how you plan to assess current lab conditions. Will you do a walk-through audit? Will you do a full energy and water audit? What is the projected timeline of these assessments?*

*Example:*

*Lab #1*

*Assessment: Walk-through energy audit scheduled for January FY 2019*

* *Assessment will focus on HVAC and plug load equipment. Several new researchers have moved into the building and the walk-through will help assess current plug load increases.*
* *Note, major renovation completed in FY 2017*

*Lab #2*

*Assessment: Retrocommissioning completed in April FY 2018*

* *Lab #2 completed a retrocommissioning project in FY 2018. Use findings to determine energy and water requirements for the building*
* *Use our Lab Ventilation Risk Assessment to determine required ventilation after the retrocommissioning project is complete*

*Labs #3, 5, and 6*

*Assessment: Energy and water audits scheduled for June 2019, ASHRAE 110 testing in July 2019*

* *Labs are part of a larger campus-wide project to audit laboratory energy and water consumption*
* *All fume hoods have annual testing with the ASHRAE 110 test in July, use results to help determine laboratory condition*
* *Lab Ventilation Risk Assessment has detailed information on program and ventilation safety requirements in each of these labs. See documentation on SharePoint Site //mylabs.Sharepoint.SummaryofVentilationRiskAssessment*

## Key Performance Indicators

* 1. *Develop a list of key performance indicators (KPIs) to better understand the success of your Smart Labs program. Listing your KPIs upfront will help you determine clear goals and start you in your baseline efforts for the laboratory.*
     1. *Below is a list of possible KPIs to use in your facilities.*

Table 1. Standard Set of Laboratory Energy Use and Efficiency Metrics[[2]](#footnote-2)

|  |  |  |
| --- | --- | --- |
| **System** | **Energy Use Metrics** | **System/load efficiency metrics** |
| Whole Building | kWh/sf-yr (electric)  BTU/sf-yr (site)  BTU/sf-yr (source)  Utility $/sf-yr | Peak W/sf |
| Ventilation | kWh/sf-yr | Peak W/sf  Peak cfm/sf (lab)  Avg cfm/sf (lab)  Avg cfm/peak cfm |
| Cooling | kWh/sf-yr | Peak W/sf  Peak ton/sf |
| Heating | BTU/sf-yr |  |
| Lighting | kWh/sf-yr | Peak W/sf |
| Process Equipment | kWh/sf-yr | Peak W/sf |

## Prioritization

|  |  |  |
| --- | --- | --- |
| **Priority** | **Building** | **Key Performance Indicators** |
| High (next 1-2 years) |  |  |
| Medium (next 2-5 years) |  |  |
| Low (5+ years out) |  |  |

* 1. *Prioritizing your efforts ensures you create realistic goals for your program and leaves you time to slowly retrofit and build out your laboratory facilities.* 
     1. *If your site has started this process and has already completed your lab condition status assessments, use the following template to prioritize your laboratory facilities:*

*Describe the reasoning for prioritized rankings and why the high priority buildings provide the best opportunity and value. Record keeping of these decisions will help inform future decisions.*

* + 1. *If your site has not completed the lab condition assessment phase simply describe the process that will be used to determine a prioritized ranking of laboratory buildings to determine the best opportunities and value.*

## Timeline and Plan for Building Assessments

* 1. *Outline the steps you will take to thoroughly assess each facility as you make your way through your prioritization list.*
     1. *Will every building have an energy and water audit? When are those audits scheduled for?*
     2. *How will you evaluate ventilation effectiveness? What is the timeline for that process?*
  2. *Each building should establish a baseline. Using your identified KPIs what will be your process for establishing a baseline? Where will this information be stored?*
  3. *Do you plan to incorporate a cost analysis into upcoming Smart Labs projects? Will you do life-cycle cost analysis or use some other methodology?*
  4. *Develop a plan for future upgrades*
     1. *Will you work with an outside contractor to develop this scope of work?*
     2. *Is there ongoing dedicated funding for the Smart Labs program or will it be combined with other funding streams and projects?*

## Performance Management Plan

* 1. *Defining stakeholder responsibilities at the beginning of the program can help ensure good communication and ongoing management once the program gets started.* 
     1. *You may use the same list of positions from section 1, or this could be organizational responsibilities. Here is a possible template for determining ongoing stakeholder responsibilities:*

|  |  |
| --- | --- |
| **Stakeholder** | **Responsibilities** |
| Smart Labs Coordinator | *Ex: Coordinate the Smart Labs team and report on KPIs annually for all Smart Labs laboratories.* |
| Management | *Ex: Determine funding annually for the Smart Labs program* |
| Facilities/Engineering | *Ex: Implement Smart Labs projects and incorporate Smart Labs requirements into design guidelines.* |
| Environmental, Health and Safety | *Ex: Develop a Laboratory Ventilation Risk Assessment and perform all ASHRAE 110 tests annually for all fume hoods.* |
| Facility Maintenance |  |
| Sustainability |  |
| Lab occupants/Researchers |  |

* 1. *Ensure an ongoing management plan will be a part of your Smart Labs program.*
     1. *How will you ensure ongoing communication between operations, safety and researchers?*
     2. *Will you create a process for change management? Do you already have a process you can use?*
     3. *How will you share successes?*

## Planning for an Information Layer

* 1. *Information and analytics are essential in better performing and safer laboratories*
     1. *Use the following template to document current and planned information networks:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab Building** | **Current BAS** | **Planned BAS** | **Current Fault Detection Diagnostics (FDD)** | **Planned FDD** |
| *Lab #1* | *Yes, X program* | *N/A* | *No* | *Yes, Z program* |
| *Lab #2* | *Some, Y program controls on AHUs* | *Yes, Y program in remainder of the building* | *Yes, Z system* | *N/A* |
| *Lab #3* | *No, all pneumatic controls* | *Yes, X program* | *No* | *No, need to install BAS system first* |

* 1. *Do you have other plans for analytics? Control rooms? Dashboards? Integration with other systems? Explain any other plans to integrated analytics into your Smart Labs program.*

## Resilience

* 1. *Resilience is an important benefit of any Smart Labs program. How does the Smart Labs program fit into any other resilience efforts your site may have?* 
     1. *Are there climatic changes that should be incorporated into ongoing design decisions?*
     2. *Are there specific vulnerabilities at your site that should be address in tandem with Smart Labs projects?*

1. *Roadmap to High Performance Laboratories and Critical Control Environments*. ECT, Inc. January 29, 2018 – V1.02. [↑](#footnote-ref-1)
2. Adapted from *Rating energy efficiency and sustainability in laboratories: results and lessons from the Labs21 program*. Mathew P, Sartor D, Van Geet O, Reilly S. 2003. Proceedings of the ACEEE 2003 Summer Study on Energy Efficiency in Buildings, vol. 4, 321–329. [↑](#footnote-ref-2)