Building Technologies Office

FY 2016 National Laboratory Call for Proposals and Merit Review (BTOLMR1600000)

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Informational Webinar
February 6, 2015

Expected Schedule

Activity	Date
Lab Call Released	Feb 2, 2015
Informational Webinar	Feb 6, 2015, 2 – 4 PM ET
Letters of Intent Due (submitted to EERE Exchange)	Feb 17, 2015, 5 PM ET
Proposals Due (submitted to EERE Exchange)	Mar 13, 2015, 5 PM ET
Reviewers' Initial Comments Due	Apr 1, 2015, 5 PM ET
Presentations Due (submitted to BTOLabCallFY16-18@EE.DOE.Gov)	Apr 8, 2015, 5 PM ET
Lab Call Merit Review Meeting (Washington, DC)	Apr 16 – 17, 2015
Reviewers' Final Comments Due	Apr 24, 2015, 5 PM ET
Notification of Decisions for FY16 – 18 Lab AOP Projects	May 8, 2015

Questions: Please address all questions about this Lab Call to BTOLabCallFY16-18@EE.DOE.Gov, and include 'ET,' 'CBI,' or 'RBI' in the subject heading, as appropriate. Answers will be posted on EERE Exchange under this Lab Call's Frequently Asked Questions (FAQS) section. No questions should be addressed to BTO staff.

Building Technologies Office's Goals

BTO's overarching goal is to develop and demonstrate technologies and solutions enabling 50 percent reduction in building primary energy use. To achieve this, BTO's R&D goal is to enable the development of cost-effective technologies that will be capable of reducing a building's energy use by 25 percent relative to 2010 technologies, and 35 percent by 2030.

BTO's Buildings Integration goals are:

- Demonstrate at scale by 2020 market adoption strategies for *new* commercial buildings offering savings of 50 percent or more; and by 2025 for new homes.
- Demonstrate at scale by 2020 market adoption strategies offering savings of 20 percent or more for *existing* commercial and residential buildings; by 2025, 25 percent or more for existing homes; by 2030, 40 percent or more for homes and 50 percent for commercial buildings.

FY 2016 Lab Call

- The Department of Energy's Building Technologies Office (BTO) is seeking multi-year (2 or 3 years) project proposals from national laboratories ('Labs') for activities to incorporate into the FY 2016, FY 2017, and FY 2018 Annual Operating Plans (AOPs). **Only proposals for which a DOE national laboratory is the prime recipient will be considered for funding; all other proposals will be returned without review.** This Lab Merit Review will fund the vast majority of the Emerging Technologies (ET) direct lab work starting in FY 2016, and portions of the Commercial Buildings Integration (CBI) and Residential Buildings Integration (RBI) direct lab work. This Lab Call & Merit Review is meant to solicit and select two- to three-year projects that will be assessed with quarterly milestones, including annual Go/No-Go decision points. BTO may subsequently issue supplemental Lab Calls should other topics or needs arise.
- For the ET Program, almost all direct lab work starting in FY 2016 needs to be proposed in response to this Lab Call, including both work in progress and new work. This includes all previously designated "core" and "enabling" capabilities. The topics solicited for the RBI Program are extensions of ongoing work, while CBI is soliciting only new work under this Lab Call.

FY 2016 Lab Call - Eligibility

- Only DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) and DOE Government-Operated Government-Owned laboratories (GOGOs) are eligible to apply for funding as a prime recipient. These laboratories include all the "Labs and Technology Centers" listed on http://energy.gov/offices. Prime recipients are encouraged to include other entities as sub-recipients, and to form teams with other Labs, as appropriate.

Process and Criteria

A four-step application process will be followed:

1. The first step is the submission of a letter of intent that will not be reviewed, but rather serves to assist BTO in organizing reviewers and the review sessions.
2. The second step is the submission of a written proposal, with page lengths for the Technical Volume that vary depending on the program (ET, RBI, or CBI).
3. The third step is the submission of a PowerPoint slide deck prior to the Merit Review. Note that applicants will have the benefit of seeing the reviewers' initial comments prior to submitting this slide deck.
4. The fourth step is the delivery of an oral presentation to an external review panel in a closed (private) setting, using the slide deck submitted earlier. The length of the presentation depends on the program (ET, RBI, or CBI). The presentation period will include time for questions from the external review panel.

Program	Merit Review Technical Volume Length	Oral Presentation Duration (Including Questions)
Emerging Technologies (ET)	15	60 min
Residential Buildings Integration (RBI)	7	30 min
Commercial Buildings Integration (CBI)	7	30 min

Submittal of 1-page Letter of Intent

Applicants are required to submit a 1-page letter of intent (LOI) by the submission deadline specified on the first page. The LOI must be submitted via EERE Exchange at https://eere-exchange.energy.gov/. The LOI should include the following information:

- Program area (ET, RBI, or CBI)
- Sub-program area or "open" topic, if applicable
- Project title
- Lead laboratory & project director
- Partner institutions (if any), including labs, companies, universities, non-profits, etc.
- 1-paragraph description of the proposed project

Submittal of Written Proposal

- **Only applicants who submitted a timely Letter of Intent are eligible to submit a written proposal.**
- The proposals must be submitted via EERE Exchange at https://eere-exchange.energy.gov/.
- Page limits for the written Technical Volumes vary depending on the program (ET, RBI, and CBI).
- The proposals will be reviewed by external reviewers, who will provide an initial evaluation of the proposals, and use the review form provided in.
  - The evaluators' comments, in turn, will be made available to the applicants by the date specified on the first page so that the applicants can take those comments into account as they prepare their PowerPoint slide deck for the oral presentation.

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Written Proposal Content and Form

Technical volume

1. Project Title
2. Project Goal/Objective (High Level)
3. Technical Merit, Innovation, and Impact (50%)
    A. Project Description
4. Project Approach (30%)
    A. Work Plan
    B. Market Transformation
5. Team and Resources (20%)
    A. Total Budget
    B. Qualifications
    C. Project Performers
    D. Inter-Lab Collaboration (as appropriate)
    E. Facilities
    F. Teaming and Industrial/Market Partners

Budget information

1. A completed EERE 159 Detailed Budget Justification is required as a part of the full proposal package. Applicants must use the EERE 159 form available on EERE Exchange. There are no page limits for this form.

Written Proposal Content and Form (cont…)

2-page CVs

1. CV's are required for the Lead PI and all key personnel. CV's may not exceed 2 pages per person, and should include at least the following:
   A. Academic/professional qualifications
   B. Bibliography of relevant publications and intellectual property
   C. There are no page limits for this section, except the 2-page limit for each CV.

Letters of support/commitment

1. Applicants may attach letters of support and/or commitment (i.e., cost share) from collaborators, as needed. There are no page limits for this section.

Submittal of a PowerPoint Slide Deck

- **Only applicants who submitted a timely written proposal are eligible to submit a PowerPoint slide deck.**
- All applicants to this Lab Call are required to make an in-person oral presentation to an external review committee, and the PowerPoint slide deck used for the presentation must be delivered to BTO by the deadline specified on the first page so that it can be made available to the review committee prior to the presentation.
- The slide deck must be submitted via email to BTOLabCallFY16-18@EE.DOE.Gov, and cannot be modified once it has been submitted.
- Applicants are free to choose the format and content of their presentation; **no template will be provided by BTO**.
- **Applicants should prepare their presentation to conform to the time limits, keeping in mind that the total time allotted includes time for questions and answers.** Reviewers will be able to comment on both the written proposals and on the PowerPoint slide decks.

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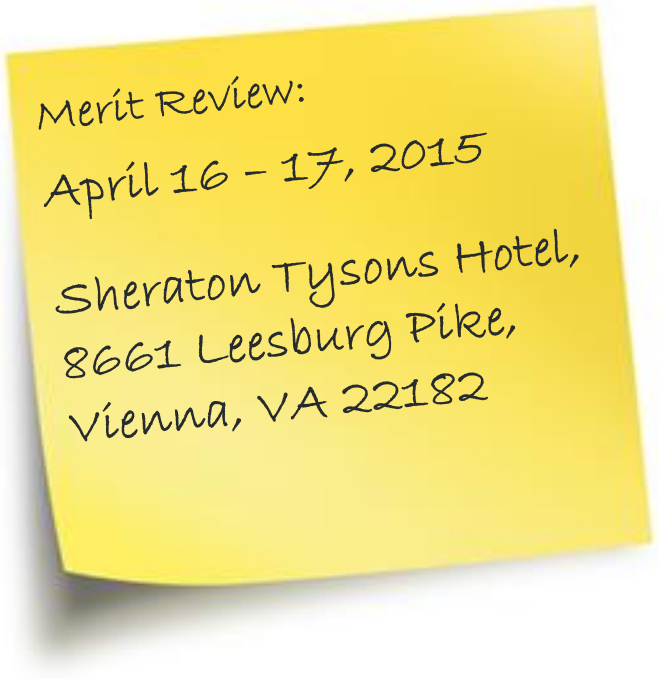
Making an Oral Presentation to External Review Panel

- During the merit review each applicant will make an oral presentation, using the slide deck provided earlier, to a review committee consisting largely of non-Federal experts.
- Each program area (ET, RBI, and CBI) will assemble its own review committee. The oral presentations will take place one-by-one in a closed-door session (not open to the public, nor to other applicants).
- All members of the review committee will be encouraged to ask questions of the applicants, and to provide written comments and scores after the presentation.



Funding* Decisions and Next Steps

- BTO will make funding decisions, by May 8, 2015, that are informed by the written comments and scores provided by the external review committees.
- BTO may choose to fund all, some, or none of the applicants.
- After funding decisions are announced, successful applicants will be asked to develop corresponding multi-year Statements of Work (SOWs) based on their proposals, feedback from the external reviewers, and feedback from BTO.

***All funding is subject to the availability of annual appropriations.**

Topics of Interest

Emerging Technologies

- Solid-State Lighting
- HVAC, Water Heating, & Appliances
- Windows & Building Envelope
- Sensors & Controls
- Building Energy Modeling
- Manufacturing Analysis
- Open Topic

Residential Buildings Integration

- Analysis & Tools for Building America, Zero Energy Ready Homes, and Residential Buildings Integration
- Technical Quality Management Support of Building America Teams
- Advanced Technical Solutions of Zero Energy Ready Homes

Commercial Buildings Integration

- Open Topic (new ideas for projects that will have significant impact aligned with CBI's mission and multiyear plan).

Emerging Technologies

- For ET, the topics of interest are based largely on the BTO Multi-Year Program Plan (MYPP), and an "open" topic is included as well.
- All applicants are strongly encouraged to review the existing ET portfolio http://energy.gov/eere/buildings/emerging-technologies.
- Technology-specific metrics and targets, including current status, are described for each sub-program, with the exception of the sensors & controls sub-program for which appropriate metrics and targets are currently being determined through an ongoing roadmap development process.

BTO, Emerging Technologies Program Goals:

1. As a result of ET-sponsored research, cost effective technologies will be introduced into the marketplace by 2020 that will be capable of reducing a building's energy use by 25% relative to 2010 cost effective technologies, and 35% by 2030.
2. Target primary energy savings relative to the 2030 primary energy consumption projected by the 2010 Annual Energy Outlook:

	Primary Energy Savings Targets	
End Use	**2020**	**2030**
Lighting	30%	65%
HVAC	10%	25%
Water Heating	20%	35%
Appliances	15%	30%
Windows/Envelope	15%	35%
Sensors & Controls	10%	20%

Emerging Technologies - Topics

Proposals for a given sub-program should be comprehensive and include ALL the solicited topics, subject to the anticipated planned budgets provided.

Sub-Program	Brief Description	Planned Annual Budget ($M/yr)
Solid-State Lighting	R&D and commercial application activities for light-emitting diodes (LEDs) and organic light-emitting diodes (OLEDs)	$6.75
HVAC, Water Heating, & Appliances	R&D for vapor-compression, non-vapor-compression, electric-driven and natural-gas-fired HVAC systems, water heaters, and major energy-consuming appliances	$5.25
Windows & Building Envelope	R&D and software development for energy-efficient windows, highly insulating materials and systems for the opaque building envelope and roofs, air-sealing technologies, dynamic windows & window films, and visible light redirection technologies (daylighting). This work does not include the scope of work in support of the Attachments Energy Ratings Council (AERC) FOA project (http://energy.gov/eere/buildings/downloads/attachments-energy-ratings-council) awarded to the Windows Covering Manufacturers Association.	$2.00
Sensors & Controls	R&D for self-configuring, self-commissioning, self-optimizing controls, and low-cost self-powered wireless sensors	$2.00

Emerging Technologies – Topics (cont…)

Sub-Program	Brief Description	Planned Annual Budget ($M/yr)
Building Energy Modeling	R&D and software development for the EnergyPlus building energy simulation package, including testing and validation	$1.75
Manufacturing Analysis	Analysis to understand the competitive advantage along the value chain, U.S.-specific competitive advantages and potential market impacts of building energy efficiency technologies	$0.20
Open	Any R&D topic not described elsewhere in this document that can contribute substantially to realizing the ET goals.	$1.00

Emerging Technologies – Progress Metrics

Metric	Description
Commercialized Products at Market-Acceptable Costs*	Number of products that are commercialized, with corresponding primary energy savings impacts
Primary Energy Savings*	Projected Quads of primary energy (technical potential) saved through commercialized products
Industry Interactions	Number of private and public organizations which are supplying funds or in-kind support for research projects
Cost Share	Amount of funds or in-kind support supplied by private and public organizations (non-BTO)
Intellectual Property (IP)	Number of invention disclosures, patent applications, awarded patents, and licensing agreements
Communications	Number of peer-reviewed journal articles

* Most important metrics, and required for ALL projects except the Manufacturing Analysis.

Emerging Technologies – Comprehensive Proposals!

- Proposals for a given sub-program (HVAC/WH/Appliances, Windows & Building Envelope, etc.) must be **COMPREHENSIVE**
  - Include **ALL** solicited topics for that sub-program, subject to the budgets described in Table A1
- Example: Lab A and Lab B should team up to address all the topics for the sensors & controls sub-program, and submit a SINGLE combined proposal
- We will not accept proposals that do not address all the topics for a given sub-program
  - Exception for where planned budget does not allow for all solicited topics to be addressed
- Proposals may not exceed the budgets described in Table A1
- For the "open" ET topic, each Lab can submit only **1 proposal** as the Lead Institution

Residential Buildings Integration

- The RBI program has a goal of demonstrating at scale market-relevant strategies (technology to market) offering a reduction in U.S. building-related energy use in existing homes by 20 percent by 2020, 25 percent by 2025 and 40 percent by 2030.
- For new homes, the RBI subprogram's goal is demonstrating at scale market-relevant strategies offering 50 percent energy savings above the 2009 International Energy Conservation Code (IECC) in homes by 2025 and zero energy ready homes by 2030.
- The overarching strategy for RBI is to identify, demonstrate, and promote adoption of technology areas and technical solutions that offer the potential for large energy savings in new and existing homes.
  - Through its Building America, Zero Energy Ready Homes, and Better Buildings programs, RBI demonstrates the viability of these technologies, and offers solutions to the challenges inherent in integrating these technologies into residential buildings.

Residential Buildings Integration - Topics

Analysis & Tools for Building America, Zero Energy Ready Homes, & RBI

1. Key analysis activities for this multi-year project include assessment of the efficiency impacts achieved by the Building America program and the future efficiency potential of the American housing stock. These require continued maintenance and improvement of the BAFDR* database and Building America house simulation protocols as well as modeling support to Building America teams and program partners/stakeholders.
2. In addition to analysis support, RBI requires the maintenance and development of modeling software and tools needed by Building America participants and industry to achieve zero energy ready new and existing homes. This includes completing and implementing incorporation of HERS index algorithms into Building America modelling tools (e.g., BeOpt), the maintenance of the Field Test Best Practices Web-site, completing multifamily and multi-zone modeling capabilities, and additional modeling capabilities that may be necessary to support Building America program objectives and cost-effective zero energy ready homes.
3. Lastly, these efforts shall work in tandem with Emerging Technologies (ET) efforts to integrate residential models into EnergyPlus, as well as Commercial Buildings Integration (CBI) funding the incorporation of building geometry capabilities in OpenStudio that will be used as the basis for BEopt's geometry component. In addition, there are several co-sponsored tasks within this effort. The California Public Utilities Commission (CPUC) is funding the integration of multifamily capabilities and technologies into BEopt while the Bonneville Power Administration (BPA) has provided an official notice to award a regional-scale efficiency assessment for the Pacific Northwest, leveraging the national/regional-scale analysis tool.

*Building America Field Data Repository

Residential Buildings Integration – Topics (cont…)

Technical Quality Management Support of Building America Teams

1. This multi-year project includes the following direct lab support activities: FOA support, technical support to DOE during Building America project planning, test plan review and support, advanced field test support, project tracking, project/team technical support, deliverable review and multi-year plan coordination for the Building America Program such as stakeholder engagement and meeting support. Tasks will also include peer review administrative management and technical editing of Building America reports, as well as coordination of technical communications.
2. RBI also requires technical and facilitation support in the development of BASC content, outreach supporting innovation deployment, and deployment initiative support such as the Race to Zero Student Design Competition.

Residential Buildings Integration – Topics (cont…)

Advanced Technical Solutions of Zero Energy Ready Homes

1. The goal of this project is to develop and demonstrate optimized zero energy home solutions to builders and homeowners. This project would result in viable, effective renewable integration methods for Zero Energy Ready Homes that would further advance the Building America Market Transformation Strategy. It will also result in reduced risk and cost to production builders pursuing zero energy home objectives.
2. This multi-year project focuses on identifying, developing and demonstrating technology packages that overcome market barriers and provide a path forward to substantially higher penetrations of zero energy homes. The project will focus on developing technology packages for Zero Energy Ready Homes that provide cost-effective, optimized thermal comfort and, eventually will rely on renewable energy systems, such as photovoltaics (PV).
3. For the next three years, renewable integration project activities will include:
    - Meeting and working with stakeholders (including homebuilders, PV and SWH manufacturers, roofing contractors, plumbing contractors, electricians, and Building America teams) to develop a renewable integration work plan to achieve project objectives.
    - Working with stakeholders to assess the technical potential and cost savings of various renewable integration approaches that lower the cost by 50 percent or more and simplify the installation of the following systems: Rooftop Photovoltaic so Building-Integrated Photovoltaics (BIPV); Solar Water Heating (SWH); Combined PV/Thermal (PV/T) Systems
    - Working with PV and SWH manufacturers and homebuilders to develop prototype system integration approaches that can either be tested directly in the field or first in a laboratory facility before they are fully deployed in the field.
    - Collection of detailed performance and operational data from the laboratory or field tests for evaluating integration effectiveness and net zero energy performance.
    - Working with stakeholders to develop installation guidance and best practices for Zero Energy Ready Home builders and Building America teams on effective renewable systems integration for varying climates.

Commercial Buildings Integration

- The Commercial Buildings Integration (CBI) program focuses on voluntary uptake of high-impact building technologies, systems and practices by commercial building decision makers, serving as a bridge between the research and development mission of BTO's Emerging Technologies program and the regulatory activities of the Codes and Standards programs. Program activities are developed with understanding of the constraints and opportunities in the commercial buildings market - such as building type, use and ownership structure - in order to maximize impact throughout the commercial building lifecycle, from design through construction, occupancy and renovation.

Existing Buildings	**Mid-term (2020)**	Demonstrate that it is cost-effective to reduce energy use of typical commercial buildings by 20%.
	Long-term (2030)	Demonstrate that it is cost-effective to reduce energy use of typical commercial buildings by 50%.
New Buildings	**Mid-Term (2020)**	Demonstrate that it is cost effective to construct commercial buildings that use 50% less primary energy than ASHRAE 90.1, 2004.
	Long-Term (2030)	Demonstrate that it is cost effective to construct commercial buildings that are net zero energy ready.

Commercial Buildings Integration - Topic

CBI expects to fund one or more proposals that:

- Align with CBI's mission and multiyear plan, suggesting work that fits into defined CBI activity areas to address specific market barriers, with a clear exit strategy, on a timeline that complements other projects.
- Is for an integrated set of activities addressing one or more of the barriers outlined in CBI's plan that will have significant impact toward the program goals.
- Include a defined target market, problem statement and impacts that can be measured during and after the project completion.
- Describe a clear deployment path targeting specific use cases for specific end users with the help of industry / market partners if necessary. Proposals should also include example go/no-go milestones beginning within the first quarter that could ensure that the project is addressing pressing market needs and will result in measurable impact.
- Include little to no deployment activity by laboratory staff. CBI expects to see laboratories working directly with market partners on deployment activities, with the laboratory playing a technical role and the market partner playing a market-facing role.

CBI is not interested in proposals that:

- Are small or one-off.
- Are focused on large-scale, real-building demonstration or deploying commercialized technologies– CBI is addressing this elsewhere;
- Are in areas not covered in the CBI mission and strategic plan
- Develop one-off software tools outside of CBI's core platforms (Open Studio, Asset Score, SEED, BPD)

Merit Review Criteria

Criterion 1: Technical Merit, Innovation, and Impact (Weight: 50%)

- 1(a) Degree to which the project addresses program barriers, contributes to achieving Office targets/goals, and has potential to advance state-of-the-art or achieve substantial market impact
- 1(b) Extent to which the proposed project addresses EERE core questions – addresses a high impact problem, provides additionality, has the potential for enduring economic impact/provides high value to the government, and is appropriate for Federal funding
- 1(c) Sufficiency of technical detail to assess whether the proposed work is scientifically meritorious and make sense for the market
- 1(d) For deployment activities, the extent to which the proposal describes a clear target market, market barriers, target use case, problem statement, and deployment path

Merit Review Criteria (cont…)

Criterion 2: Project Approach (Weight: 30%)

- 2(a) Relevance and appropriateness of the approach and critical path and description of key tasks, metrics (including baseline), and SMART milestones
- 2(b) Degree of likelihood that the work plan will succeed in meeting project goals
- 2(c) Identification of key technical risks and the quality of management and mitigation strategies to address them
- 2(d) Level and appropriateness of partnerships (e.g., “openness”), and the clarity in the description of roles and responsibilities
- 2(e) Degree to which the project identifies and addresses the current and/or potential opportunities to move EERE technologies towards eventual transition to the market (i.e., Market Transformation), including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, U.S. manufacturing plan, and product distribution.

Merit Review Criteria (cont…)

Criterion 3: Team and Resources (Weight: 20%)

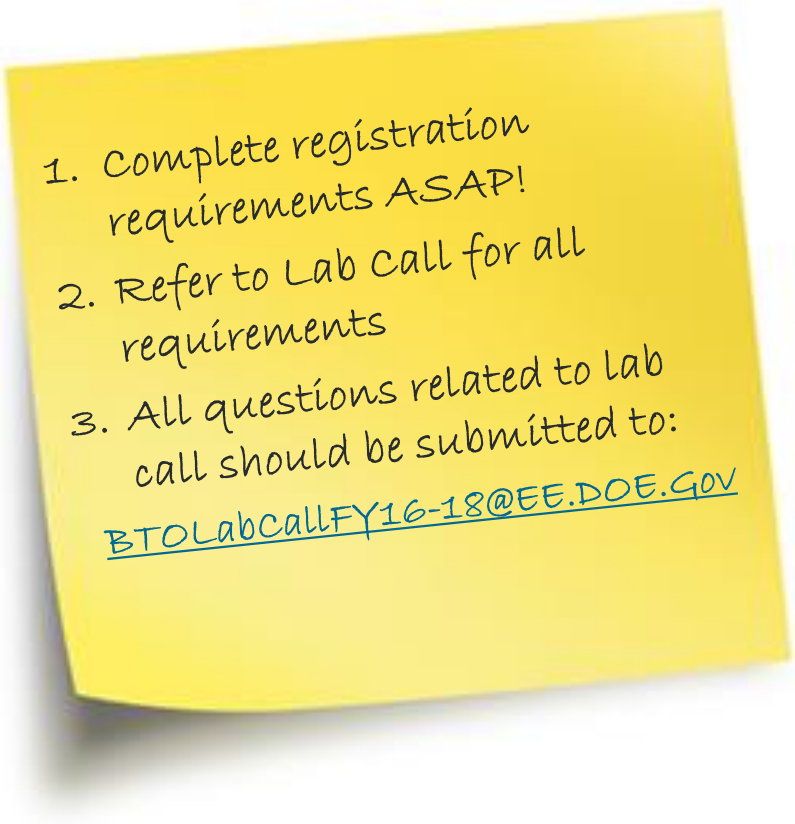
- 3(a) Degree to which the project leverages a core or enabling capability
- 3(b) Capability of the Principal Investigator(s) and team to address all aspects of the work – qualifications, expertise, and time commitment of the team
- 3(c) Sufficiency of the facilities to support the work (if applicable)
- 3(d) Degree to which the team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies (or wider implementation of the proposed deployment activity)
- 3(e) Degree to which inter-lab collaboration is occurring, as appropriate.
- 3(f) Reasonableness of budget and spend plan for proposed project and objectives. Sufficiency of the budget for the innovation proposed.

BTO Lab Core & Enabling Capabilities (Feb, 2015)

BTO - National Lab Capabilities*							
Core Capability is a Black Circle; Enabling is Half & Half		Core =	●			◑	= Enabling
	State	Related Facility	LBNL	NREL	ORNL	PNNL	Cross-Walk to DOE Core Capabilities
Emerging Technologies Development (ET)							19, 22, 23
HVAC, Appliances and Equipment	Existing	BTRIC			●		
Envelope	Existing	BTRIC			●		
Windows - Performance Testing & Simulation	Existing	FlexLab	●				
Windows - Durability Testing	Existing	ESIF		◑			
Lighting	Existing	SSL				●	
Building Energy Modeling R&D	Existing	BTRIC, FLEXLab	◑	◑	◑		
Sensors	Emerging	BTRIC			●		
Transactive and Advanced Controls for Buildings	Emerging					●	
Building Integration and Solutions (RBI, CBI)							19, 22, 23
Whole Building Energy Performance	Existing	FLEXLab	◑	◑	◑	◑	
Building Energy Modeling Deployment	Existing	BTRIC, FLEXLab	◑	◑	◑	◑	
HVAC	Existing	BTRIC, FLEXLab		◑	◑		
Envelope, Windows, Shading	Existing	BTRIC, FLEXLab	◑		◑		
Residential IAQ/Ventilation	Existing		●				
Lighting	Existing					●	
Plug Loads	Existing			◑			
Energy Management and Demand Response	Existing	ESIF	◑			◑	
Integrated Renewables and Grid	Emerging	ESIF		●			
Regulatory (Codes, Appliance and Equipment Standards)							19, 22, 23
Code Development and Analysis	Existing					●	
Code Compliance, Adoption	Existing					◑	
Appliance Standards - Engineering Analysis	Existing		◑				
Standards Economic Analysis - Consumer Products	Existing		●				
Standards Economic Analysis - Commercial Equipment	Existing					◑	
Appliance Standards - Test Procedures	Existing		◑			◑	
Appliance Standards - Product Testing, Research	Existing		◑		◑		

* A core capability is mission-critical, world class, and with unique elements. An enabling capability meets a mission need, and is typically shared by multiple labs, but not necessarily. In general, core and enabling capabilities identify lab AOP areas of stable, multi-year funding, with most proposed AOP work externally merit-reviewed prior to funding, and most AOP projects externally peer reviewed to assess progress and impact.

Thank you



Lab call can be downloaded at EERE eXCHANGE at http://eere-exchange.energy.gov