



Industrial Technology Validation (ITV) Pilot

A New AMO Pilot to Support Manufacturers in Achieving Sustainability

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October 29, 2020



Alex Fitzsimmons

U.S. Department of Energy
Deputy Assistant Secretary for Energy
Efficiency



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Lawrence Berkeley National Lab
Senior Program Advisor



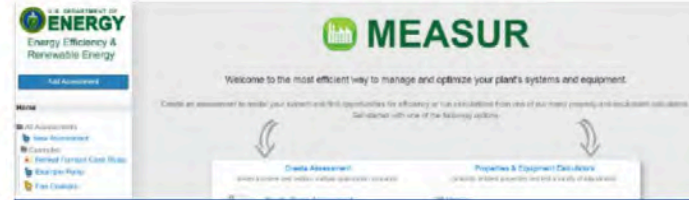
Eli Levine

U.S. Department of Energy
Program Lead

Tools and Resources for Better Plants Partners



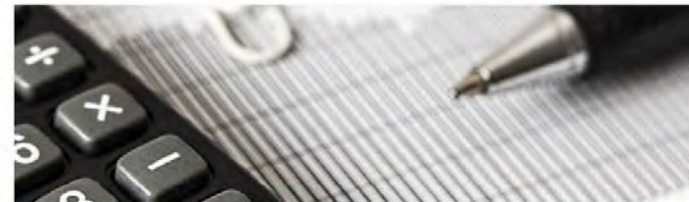
In-Plant Trainings



Software Tools



Diagnostic Equipment Program



Financing Navigator



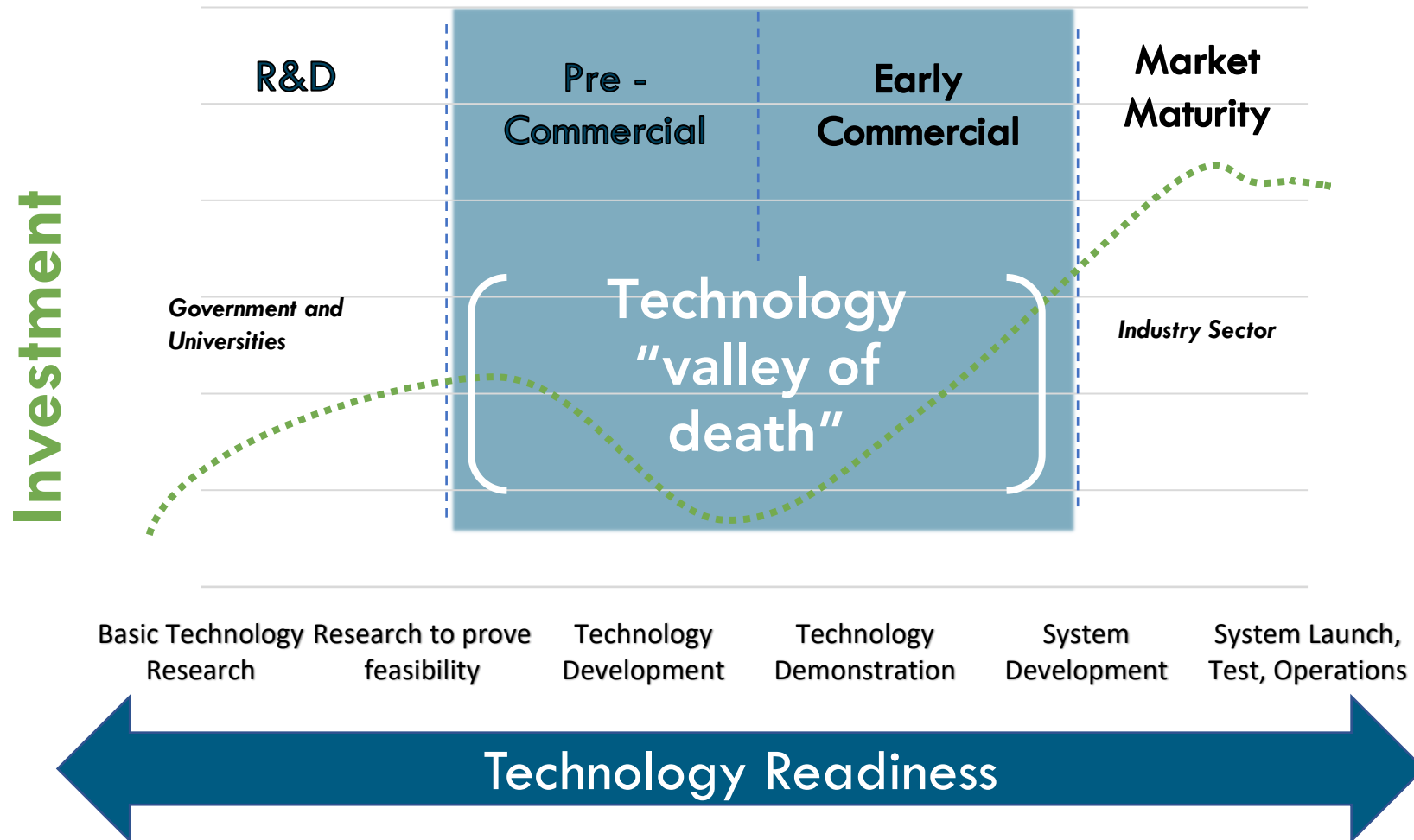
Complementary Programs



Online Learning Series

Why Field Validation?

Field validation provides research and data to prove out technology claims and help bring innovative technologies out of R&D and into the market.



Field validation of the performance of next-generation technologies in a real-world operational setting compared to a bench-scale setting:

- ✓ Supports significant steps towards innovation, optimization and resiliency
- ✓ Helps reduce the risk associated with testing new technologies
- ✓ Enables the broader integration of new technology into the industrial and manufacturing space
- ✓ Informs research and development and drives commercial markets



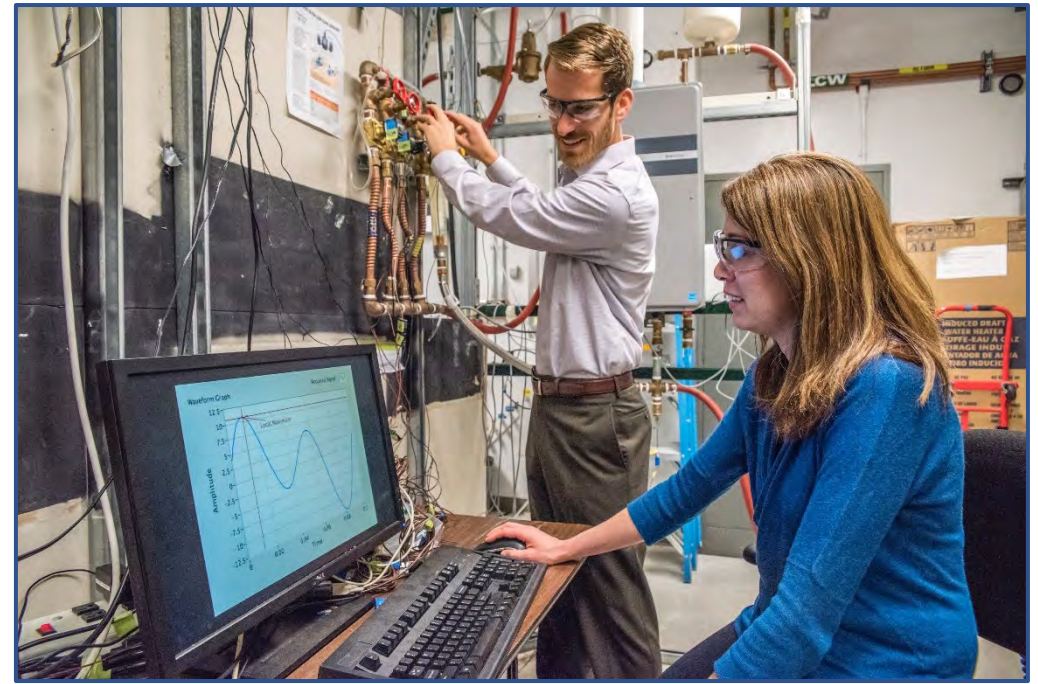
The image shows a 'Better Plants Partnership Agreement Form' from the U.S. Department of Energy. The form is titled 'Partnership Agreement Form' and includes the 'Better Plants' logo. It contains an introductory paragraph about the Better Buildings Better Plants Program, followed by sections for 'Better Plants Partners agree to:' and 'DOE agrees to provide:'. The 'Partners agree to' section lists several bullet points: 'Adopt energy efficiency measures...', 'Report energy intensity, energy portfolio, and additional metrics...', 'Additionally, within 12 months partners agree to:', 'Develop an energy management plan...', and 'Conduct an energy audit or energy walk-through...'. The 'DOE agrees to provide:' section lists: 'Provide energy efficiency resources...', 'Technical support (based on program requirements) and...', and 'Additional resources...'. At the bottom, there is an 'Agreement:' section with a statement of commitment and a signature block with fields for 'Senior Executive Officer (signature)', 'Date', 'Printed Name', 'Title', 'Company', and 'Address'. A URL and the 'ENERGY' logo are at the very bottom.

ITV's field validation can help you meet your Better Plants energy savings goals!

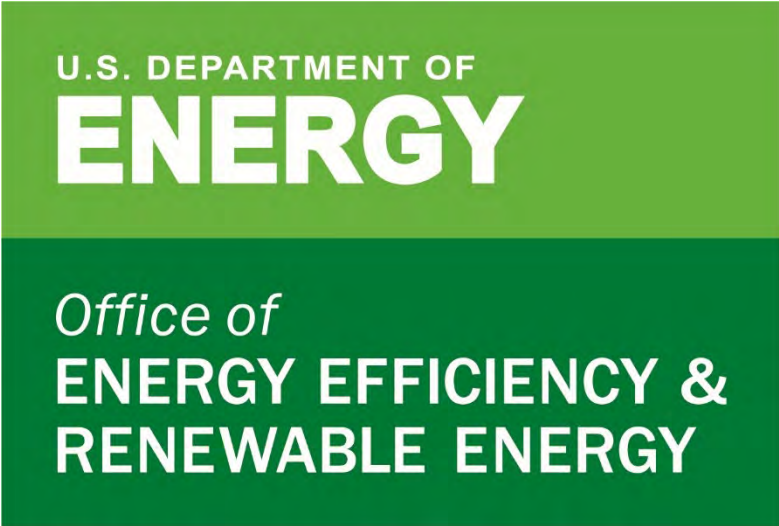
ITV Pilot Objectives

Identify, install, and monitor technology performance in real world installations and communicate the results through case studies

1. Validate the potential of a selected technology
2. Verify performance improvement claims
3. Project cost savings and scalability
4. Produce a publicly available M&V report for each validation



AMO's Industrial Technology Validation (ITV) Pilot



Partner Benefits

- **Engage in a full-scale pilot** with M&V managed by National Lab experts
- **Receive independent insights** regarding technology suitability for industrial processes
- **Inform public- and private-sector investment decisions** through publicly available M&V findings
- **Increase market acceptance** of emerging technologies by validating real-world performance



ITV Pilot Participant Contributions

DOE and National Lab Experts

U.S. Department of Energy:

- Leads ITV pilot initiative's direction
- Engages innovation community
- Provide input to labs on test bed design, project plans, and evaluation reports
- Direct funding will not be provided for the technology tested

Berkeley Lab with ORNL Support:

- Evaluate candidate sites, recruit and select technology/host site
- Develop M&V Scope
- Conduct M&V
- Deliver public report of results

Better Plants Technical Account Managers:

- Technical expertise including input on:
 - Scoring applications
 - M&V plans
 - RFP Support
- Facilitate project planning, implementation and engagement for the duration of the study

ITV Pilot Participant Contributions

Better Plants Partners

- Provides the host site for testing
- Teams up with a technology vendor of their choosing
- Continued engagement for the duration of the study
- Provides input to labs on test bed design, project plans, and evaluation reports

Industrial Technology Validation (ITV) Team

Meet some of our technical experts who will help support partners and vendors throughout this field validation pilot.



Eli Levine
DOE
Program Lead



Paul Sheaffer
LBNL
Sr. Program
Advisor



Amy Pevzner
LBNL
Program
Manager



Shankar Earni
LBNL
Sr. M&V Lead



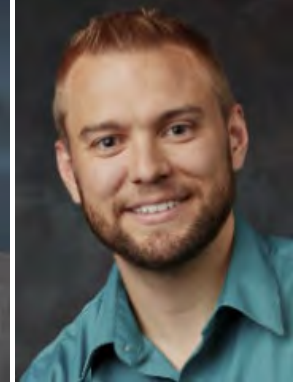
Prakash Rao
LBNL
Sr. Technical
Program Advisor



Peter Therkelsen
LBNL
Sr. Technical
Program Advisor



Sachin Nimbalkar
ORNL
Program
Advisor



Thomas Wenning
ORNL
Program
Advisor



BERKELEY LAB



Process and Onboarding

1. Interested sites to fill out and submit a response to the Request for Proposals
2. Technical Committee reviews technology submissions
3. Rolling deadline for submission of applications through March 2021

Project Lifecycle approximately 12-24 months*:

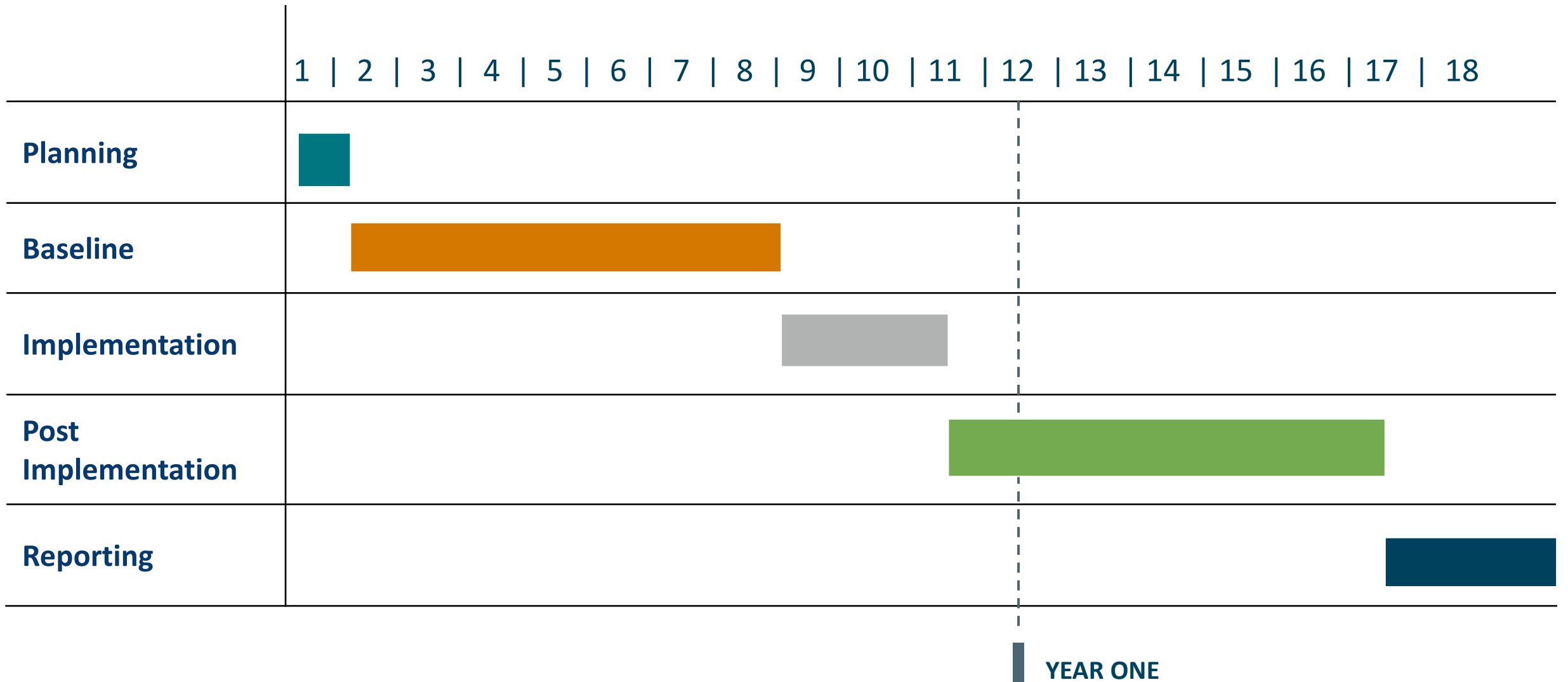
- Planning (1-2 months)
- Baseline (3-8 months) [*time depends on technology*]
- Implementation (1-2 months) [*time depends on technology*]
- Post Implementation (4-12 months) [*time depends on technology*]
- Reporting (3-4 months)

Funding and Agreements:

- Project details and costs will be negotiated between vendor and host site partner
- DOE will not provide direct funding to participate in the evaluation

*Technology requirements, schedules and material lead times will influence project timelines.

Typical Project Timeline –18 months*



*Schedule based on a 6 month baseline and 6 month implementation cycle, but can vary depending on M&V requirements

Request for Proposals

RFP to be filled out jointly by Better Plants Partner host site and Technology Vendor

* While applications will be reviewed on a rolling basis, funding is limited. It is recommended to submit applications as early as possible, even if not ready to begin the project.



Request for Proposals – A Closer Look

First section:

- Terms
- Priorities
- Technologies Accepted
- Scoring Criteria

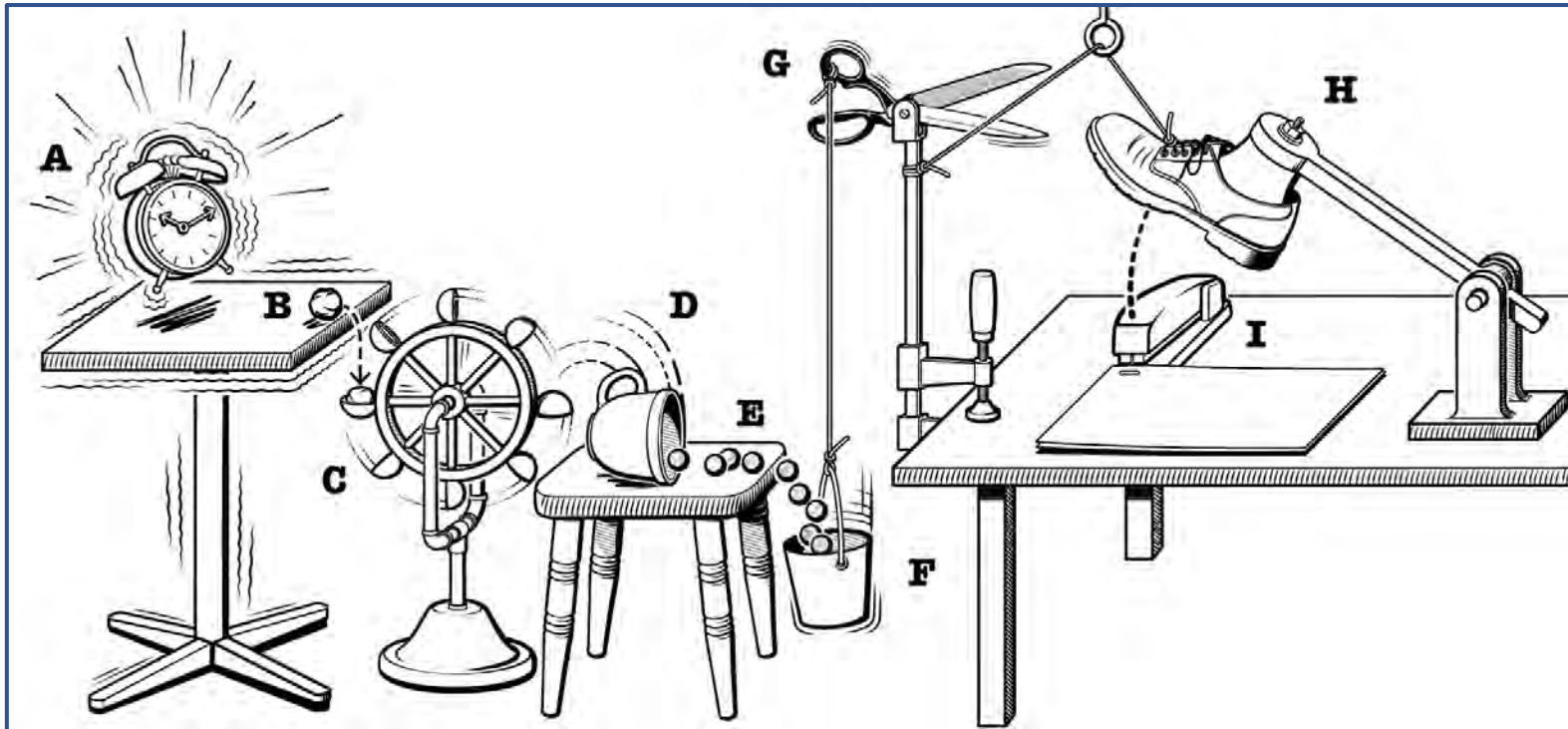
Second section:

- Q&A for host site/tech vendor to submit jointly



How does the RFP define “technology”?

Refers broadly to the application of equipment, hardware, software, systems, innovations, etc. in manufacturing and wastewater treatment plants.



How does the RFP define “**performance improvement**”?

Refers to measured improvements as a result of the application of the **technology**.

The following performance improvement categories will be considered:

- ✓ **Energy**
- ✓ **Water efficiency/performance**
- ✓ **Waste reduction**



How does the RFP define “**vendor**”?

Refers to the manufacturers, distributors, innovators, inventors, incubators, labs, etc. that are providing the **technology**.



Technology Development Stages Considered

- **Pre-commercial technology** - Not yet fully available on the open market and has a value proposition or price that is still being defined
- **Early commercial technology** - Whose value and risks are understood by specialists for some applications, but the supply chain and/or full-scale production have not yet been fully established
- **New applications** – Projects where technologies are being demonstrated in a different sector or use case than conventionally deployed

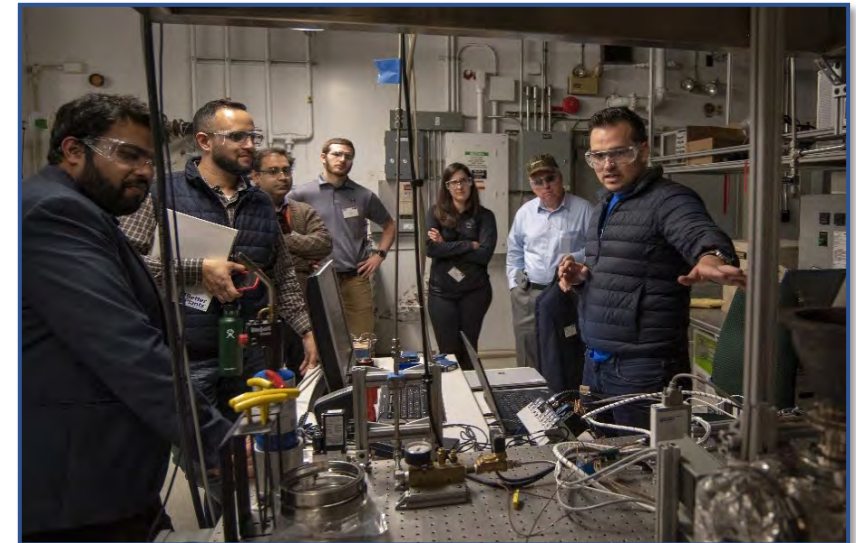
Technology Evaluations Process

DOE will prioritize technologies:

With potential for widespread performance impact in the manufacturing and wastewater sectors

Additional factors considered:

- ✓ Innovation
- ✓ Performance
- ✓ Cost savings
- ✓ Deployment potential
- ✓ Technical risk
- ✓ Measurement and verification requirements and feasibility



RFP Evaluation Criteria and Considerations

DOE is seeking technologies that meet the following criteria:

- ✓ Improves energy efficiency and/or performance
- ✓ Reduces water use, wastewater effluent, or waste creation
- ✓ Qualifies as “emerging/innovative” as defined in RFP
- ✓ Potential to lead to demonstrable performance improvement due to wide-scale replicability

Scoring Criteria for Applications

Criteria	Description	Metric	Scoring	Weight
Is the technology based on sound engineering principles?	Review technology and how it is proposed to save energy. Make sure it is not violating engineering principles or basic laws of physics	Soundness	Yes, No	Must have
Does this meet the definition of type of emerging technology?	Meets RFA description of "technology" Does it fall in the one of three categories listed in the RFA?	Technology type	Pre- or early commercial, or new applications of technology	Must have
Are there adequate energy, water, and/or water reduction savings?	Vendor calculation of savings versus conventional technology	Savings	Savings versus conventional solution	At least 15 percent improvement
Potential scope of the technology and replicability?	The technologies themselves range from highly specific technologies that can be applied in a single industry to the more broadly cross-cutting technologies, which can be used in many industrial sectors. Scale of replicability in US.	Magnitude of replicability in terms of energy, water, or waste savings	1-10	20%
Can the technology be evaluated using sound M&V strategies?	Can the proposed technology be evaluated with existing M&V strategies using commonly available data loggers or meters or sensors?	Ease of M&V	1-10	20%
Conditions under which the technology will be evaluated	Is the technology being evaluated under typical conditions?	State of conditions	1-10	15%
Technical risk associated with technology	Are there any risks associated with adopting the technology?	Level of risk	1-10	15%
Publications, reports, demonstrations, evaluations	Are there publications or reports to support the manufacturer's claims? Were the technologies demonstrated or evaluated elsewhere? If so, what were the results?	State of existing data	1-10	10%
Are there any NEBs?	Substantiated non-energy benefits related to productivity improvements- increased throughput, reduce waste, reduce O&M costs, improved health or safety	Number and magnitude of NEB savings	1-10	10%
Are the savings calculations sound and the baseline assumption reasonable?	Do the savings calculations follow engineering principles?	Engineering practices of calculation, magnitude of savings	1-10	10%

M&V Process

Phase 1: Planning

- Develop M&V approach and monitoring plans

Phase 2: Baseline

- Data collection, analysis, and baseline report

Phase 3: Implementation

- Conduct post-installation M&V

Phase 4: Post-implementation

- Post-installation data collection and analysis

Phase 5: Reporting

- Technical M&V Report
- Communication material summarizing high level results will be produced and made available to help inform technology innovation.



M&V Reports will:

- Objectively evaluate performance, viability, and functionality of a technology
- Present an analysis of potential savings across broader relevant industrial sectors
- Summarize baseline and post installation test site conditions
- Detail commissioning and M&V activities including:
 - Changes between proposed installation and as-installed and their impact on proposed savings
 - Post-installation verification activities with test performance data collected, evaluation of environmental factors and site feedback
- Address lessons learned

M&V Reports will include:

- Full-scale M&V report
- Four page high level summary
- Single page graphic overview

Reports will be modeled after the GSA's Proving Ground to help maximize communication of results to multiple stakeholders.



APRIL 2015

021 WIRELESS SOIL-MOISTURE SENSORS FOR IRRIGATION CONTROL

OPPORTUNITY

What is the Agency's mandated water reduction goal?

36% REDUCTION IN POTABLE WATER USE by 2025, compared to 2007 baseline*

37% OF UNITED STATES is experiencing drought conditions! **20-40% WATER SAVINGS** with smart irrigation!

TECHNOLOGY

How do Wireless Moisture Sensors work?

MEASURE SOIL MOISTURE

TO CALCULATE IRRIGATION NEEDS, AND TRANSMIT DATA TO CENTRAL IRRIGATION CONTROLLER

M&V

Where did Measurement and Verification occur?

PACIFIC NORTHWEST NATIONAL LABORATORY assessed a pre-commercial implementation of wireless soil-moisture sensors for irrigation control provided by UglyMo at the Young Federal Building in Orlando, Florida.

RESULTS

How did Wireless Moisture Sensors perform in M&V?

INCONCLUSIVE RESULTS

COMMUNICATION AND SENSOR PROBLEMS OF PRE-COMMERCIAL TECHNOLOGY COMPROMISED ANALYSIS! Product development continued after M&V

GREATER GRANULARITY

THAN WEATHER-BASED IRRIGATION CONTROL OFFERS POTENTIAL FOR GREATER SAVINGS!

Economic Assessment for Soil-Moisture Sensor Installation in Orlando

Cost-effective when Savings-to-Investment Ratio (SIR) is greater than 1
Assuming installed system cost of \$4,500, annual costs of \$80 and 773,710 gal/yr water use

DEPLOYMENT

Where does M&V recommend deploying Wireless Moisture Sensors?

FURTHER RESEARCH

DOCUMENTING SENSOR EFFECTIVENESS

Meanwhile, turnkey weather-based controllers are recommended!

*Executive Order 13033, https://www.whitehouse.gov/the-press-office/2015/03/18/interim-order-planning-federal-nationality-wide-decade-4-the-new-york-times-mapping-the-spread-of-drought-across-the-u-s, Accessed 4/8/2015. *Irrigation Controls Based on Wireless Soil Moisture Technology Assessment: George C. Young Federal Building and U.S. Courthouse, Orlando, FL. KL McMordie Stoughton, RS Butner. PNNL, March 2015, p. 1. *Kob, p. 1. *Kob, p. 1. *Subject to evaluation and approval by GSA, if any Security

ITV Pilot Information and Resources

For more information, please visit:

<https://betterbuildingsolutioncenter.energy.gov/better-plants/industrial-technology-validation-pilot>

Work with your TAM to complete an application!



Q & A

Submit Questions
www.slido.com event code #DOE

Better Plants Online Learning Series

ENERGY TREASURE HUNTS WITH EPA

Thr, Aug 20, 2020 | 1:00 - 2:00 PM ET

PUMPS AND FANS

Thr, Aug 27, 2020 | 1:00 - 2:30 PM ET

PROCESS HEATING & WASTE HEAT REDUCTION

Thr, Sep 3, 2020 | 1:00 - 2:30 PM ET

ENERGY MANAGEMENT DURING A PANDEMIC

Thr, Sep 17, 2020 | 1:00 - 2:00 PM ET

MEASUR TOOL SUITE

Thr, Sep 24, 2020 | 1:00 - 2:00 PM ET

PROCESS COOLING

Thr, Oct 1, 2020 | 1:00 - 2:00 PM ET

INDUSTRIAL TECHNOLOGY VALIDATION

Thr, Oct 29, 2020 | 1:00 - 2:00 PM ET



E-Learning Center

BETTER BUILDINGS E-LEARNING CENTER

2020-2021 Better Buildings Webinar Series



BUILDING RESILIENT COMMUNITIES: STATE AND LOCAL PERSPECTIVES

Tue, Sep 15, 2020 | 3:00 - 4:00 PM ET

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PERSPECTIVES ON RESILIENCE: INSURANCE AND CREDIT UNDERWRITING

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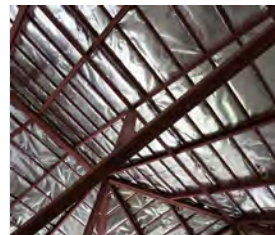
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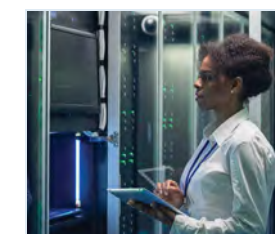
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Additional Questions?

Please Contact Us



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