



BBA Equipment Performance Specifications

Better Buildings Alliance

William Goetzler

Navigant Consulting

william.goetzler@navigant.com

(781) 270 8351

April 4, 2013

The BBA Performance Specifications project provides information and tools to help BBA members and other commercial building owners/operators specify and purchase high efficiency equipment.

Identify commercial building technologies with high energy savings potential

- Limits scope to products that can have largest market impact and stakeholder buy-in.

Develop performance specifications

- Helps manufacturers understand customer requirements
- Enables end users to specify the equipment they want (can include directly in purchase orders)
- Fills equipment gaps in the current voluntary programs.

Conduct field demonstrations

- Demonstrates that high-efficiency equipment achieves the desired energy savings while operating reliably and otherwise meeting end-user requirements

Collaborating with stakeholders

- Ensures targeted technologies are of interest to end users and manufacturers
- Helps audience have full access to performance specifications and field-evaluation results

Problem Statement:

- End users are unaware of high efficiency equipment, or how to specify it
- End users perceive risks (complexity, reliability, etc.) with high efficiency equipment
- Manufacturers may not understand end-user requirements for high efficiency equipment
- Manufacturers do not perceive sufficient market potential for high efficiency equipment



Impact of Project:

- Provides BBA members and other commercial building owners/operators with knowledge and information needed to identify, evaluate and purchase high efficiency equipment
- Defines end-user requirements for high efficiency equipment
- Helps aggregate market demand for high efficiency equipment

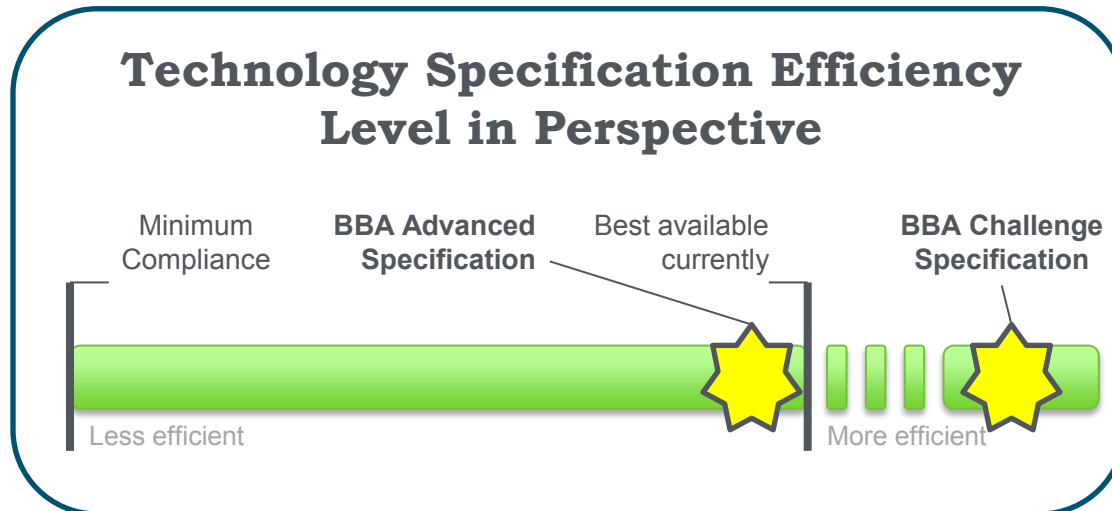


Project Focus:

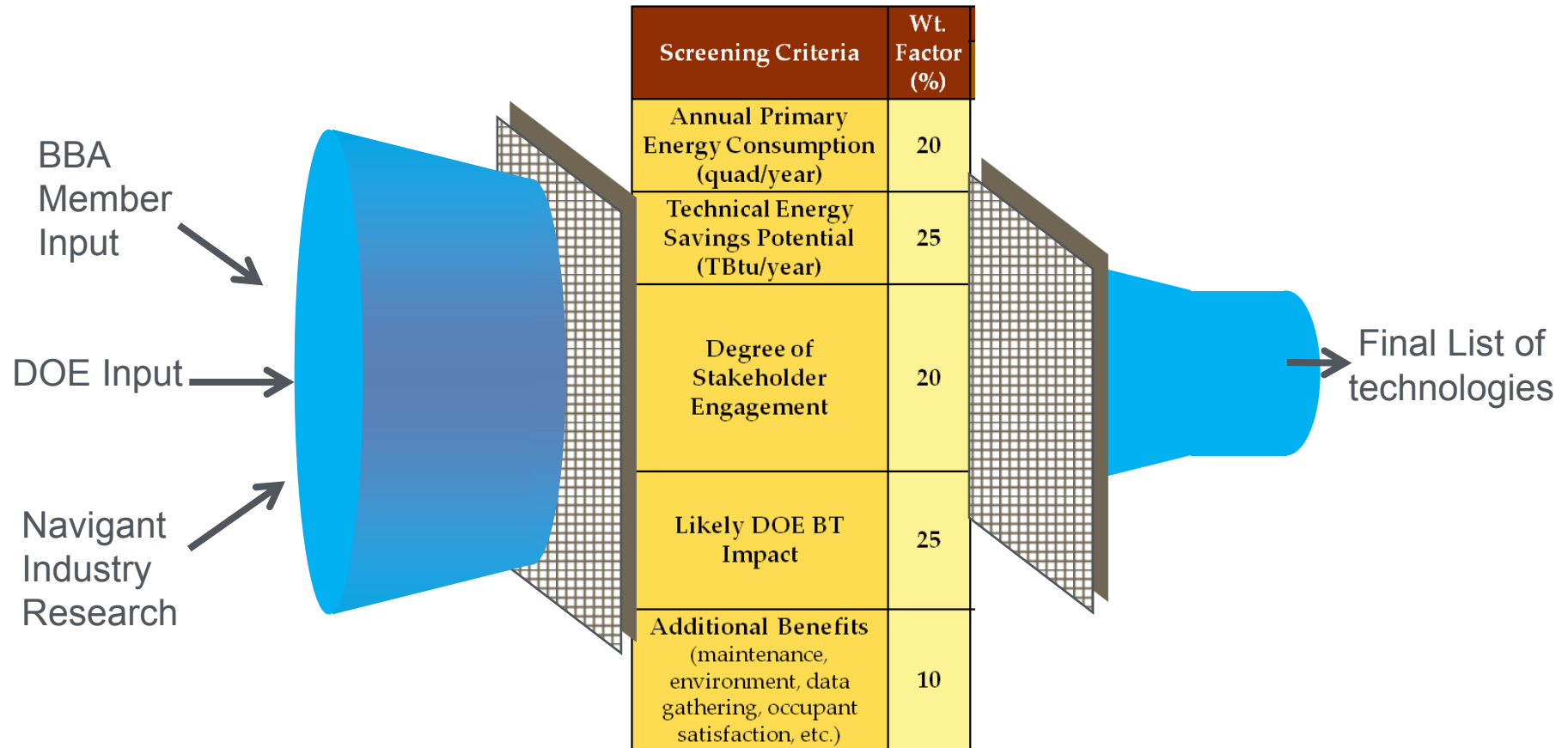
- High efficiency commercial building equipment that existing specification programs (i.e., ENERGY STAR, CEE Tiers) do not cover

We developed two types of performance specifications, depending on the technology, to best advance energy savings.

- Advanced Specification – Promotes purchase of existing products that have not yet achieved significant market penetration (targeted ~20% improvement over typical efficiencies)
- Challenge Specification – Sets efficiency level beyond what is currently available and challenges manufacturers to meet them



We narrowed an initial list of high potential commercial building technologies based on five impact criteria.



The final technologies list includes commercial building technologies that are utilized by BBA members.



Low-Voltage Distribution Transformer

- LVDTs are used in the final voltage transformation step for commercial buildings.
- All electricity used by the building runs through LVDTs, meaning small efficiency gains can have significant impact



Gas Heater

- Gas unit heaters are self-contained space-heating systems designed to be installed within large open facilities with high ceilings, often exposed to outdoor conditions.



Commercial Water Heater

- Heat pump water heaters offer substantial energy savings over traditional electric water heaters.
- Common applications are food service and other buildings with large hot water loads.



Ultra-Low Temperature Freezer

- These are freezers used in laboratories to store medical or scientific samples .
- Storage requirements down to -80° C result in very high energy consumption



Laboratory Fume Hood

- Another laboratory product, fume hoods ventilate noxious gases, fumes, and small particles generated from stored substances.
- They are among the highest energy consumers in laboratory environments, sometimes consuming more than a typical residence.

We developed the initial specifications with the input and support of leading manufacturers and industry organizations.

Low-voltage Distribution Transformer	Gas Heater	Commercial Water Heater	Ultra-low Temperature Freezer	Laboratory Fume Hood ¹
				
				
				
				
				
				
				

¹ Navigant developed the specification, while deployment is being performed in collaboration with LBNL, who is managing the fume-hood field evaluations.

We are now validating the specifications and deploying them to a broader audience. The exact tasks will vary per technology, but most will follow a similar four-step process.

- 1 Validate the energy savings by conducting field demonstrations in real-world applications.
- 2 Update business case resources based on the lessons learned in the field evaluations.
- 3 Conduct webinars and conference presentations with evaluation partners.
- 4 Partner with other teams and organizations to promote the specifications to early adopters.

In FY12, we posted the specification packages to the Better Buildings Alliance site where they can be used by members and the public.

Each specification package includes:

- Product specification
- Energy savings calculator
- List of qualifying products

DOE/CBEA Gas Heater Specification
Company Name:

Advanced Technology Specification:
Gas Heaters

U.S. DEPARTMENT OF ENERGY
Commercial Building
Energy Alliances

1. General

1.1 Scope

A. This specification defines gas heaters with the following characteristics:

- Provide heated air through the combustion of natural gas or propane.
- Input rating between 25,000 Btu/hr and 400,000 Btu/hr.
- Designed for wall or ceiling installation.

B. This specification does not cover space heating equipment using fuels other than natural gas or propane.

1.2 Submittals

A. Manufacturer shall provide product data and drawings stating the following:

- Dimensions of enclosure and all protrusions (in)
- Weight (lb)
- Fuel type(s)
- Maximum/minimum input rating (Btu/hr)
- Maximum/minimum thermal efficiency (%)
- Maximum/minimum thermal output (Btu/hr)
- Fuel consumption rate (cu.ft./hr or gal/hr)
- Full load amps at rated voltage (A)
- Maximum/minimum airflow rate (cfm)

U.S. DEPARTMENT OF ENERGY
Commercial Building
Energy Alliances

Gas heater meeting the requirements of the Commercial Building model.

Units are required. Below, please select and input the:

Value	Value # "Other"	Units
Select Input Rating		kBtu/hr
Select Year Climate		Heating Degree Days
6.58		21,000
# of Similar Units		

Results

	Baseline Efficiency Level Gas Heater	CBEA Advanced Efficiency Level Gas Heater
Annual Energy Consumption (MMBtu/yr):		
Annual Energy Cost (\$/yr):		
Annual Savings over Baseline (MMBtu/yr):	-	-
Annual Savings over Baseline (\$):	-	-

To learn more about how to start saving, please visit the
[CBEA Technology Specification Website](http://www1.eere.energy.gov/buildings/commercial/bba_tech_specs.html)

U.S. DEPARTMENT OF ENERGY
Commercial Building
Energy Alliances

Company Name	Model Name	Model Number	Input Rating Range (kBtu/hr)	Date Model Available for Purchase
Condensing Unit Heaters				
Modine	Effinity93 - PTC	-	55, 65, 85, 110, 135, 155, 180, 215, 260, 310	9/1/2012
Recon	UEAS	-	135, 175, 205, 305	9/1/2012
Direct-Fired Heaters				
Cambridge Engineering	E-Series	5800	400	9/1/2012
Recon	RF	1-20	400	9/1/2012
Robert's Gordon	Combat	DF40	389	9/1/2012
Industrial Heaters				
Cambridge Engineering	TH	-	40, 60, 80, 100, 125, 150, 175, 205, 220	9/1/2012
Space-Ray	FTS/STL	-	40-250	9/1/2012
Resonator Radiant Products	NSM	-	30-120	9/1/2012

http://www1.eere.energy.gov/buildings/commercial/bba_tech_specs.html

Accomplishments and Progress, Cont.

To date in FY13, site hosts have signed 3 final agreement letters for laboratory freezer field evaluations.



Michigan State
University
(Jespersen Lab)

Michigan State University, with BBA assistance, is installing and testing a high-efficiency Panasonic ULF. This model is expected to save 20-30% energy as compared to standard models. Initial data are expected in September.



EPA
(Research
Triangle Park
Campus)

EPA is testing a recently-installed unit of the same model. This model is expected to save 20-25% energy as compared to standard models.



University of
Colorado

UC is in the final stages of selecting which laboratory will participate in the demonstration. Monitoring is expected to begin in the spring.

Accomplishments and Progress, Cont.

Seven other agreements are in various stages of negotiation, and a major utility is assisting in securing additional demonstration sites. Discussions with other sites and utility organizations are also proceeding.

Cornell University	Fume Hood ¹	Letter of Intent signed. Final agreement expected in April. Cornell and LBNL will test hoods in various campus laboratories
Michigan State University	Fume Hood ¹	Letter of intent signed. Final agreement expected in April. MSU testing will commence in early spring
EPA	Fume Hood ¹	Letter of intent signed. Final agreement expected in April. EPA and LBNL will test hoods that meet the BBA specification
Pacific Gas & Electric	Distribution Transformer	PG&E will provide financial and technical assistance for a demonstration within their service territory—may offer a future incentive program.
Whole Foods	Distribution Transformer, Water Heater	Whole Foods is seeking to demonstrate a LVDT at a Northern California store and is also considering stores for water heater testing.
Starbucks	Water Heater	Starbucks and A.O. Smith are collaborating to develop and evaluate a new product that aligns with the BBA specification
Wawa	Water Heater	Wawa and A.O. Smith are identifying the appropriate demonstration store
Liberty Properties	Gas Heater	Liberty is identifying a candidate warehouse to demonstrate a high efficiency gas heater.

¹Fume Hood field evaluations will be managed by LBNL

Accomplishments and Progress, Cont.

Industry stakeholders are showing strong support for the specifications.

“Participating in this effort with DOE is of great importance to CU Green Labs.” -*Kathryn Ramirez, University of Colorado at Boulder*

“Please make this [spec] happen quickly because it’s very much needed in the industry. Customers are not believing manufacturers’ own specifications...given that results from all the different interest groups are all over the map.” – *Joe LaPorte, Panasonic*



“We see the DOE demonstration as a great compliment to our ongoing ... tests of heat pump water heaters – intended to prove the energy benefits of high efficiency units.”

– *Brad Simcox, Starbucks*

“I talked to several [utility] members about [BBA’s] efforts on transformers, and their response was positive.”

–*Jess Burgess, Industrial Program Manager, CEE*

Project Plan & Schedule

FY12 activities focused on development of specifications. FY13 activities focus on deployment.

Summary					Legend							
WBS Number or Agreement Number							Work completed					
Project Number							Active Task					
Agreement Number							Milestones & Deliverables (Original Plan)					
							Milestones & Deliverables (Actual)					
	FY2012				FY2013				FY2014			
	Q1 (Octt-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Octt-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Octt-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)
Task / Event												
Project Name: BBA Technology Specifications Development and Deployment												
Q1 Milestone: Screen initial technology list. Select technologies												
Q2 Milestone: Convene manufacturer working groups to evaluate technologies												
Q3 Milestone: Determine energy performance level for specification												
Q4 Milestone: Develop initial business case resources. Develop website.												
Q2 Milestone: Obtain agreements for field evaluations												
Q3 Milestone: Kick off field evaluations.												
Q4 Milestone: Update business case data.												
Potential future work plan												
Hold informational session at major industry conference												
Update business case data with field evaluation data												
Develop technical requirements to allow TPE to identify BBA spec'ed products												
Kickoff promotional campaign with major industry partners												

Project Budget: \$150K per technology (FY13)

Variances: None

Cost to Date: ~\$300k (FY13)

Additional Funding: In-kind contributions from utilities, end-users, and manufacturers

Budget History					
FY2010		FY2011		FY2012	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
n/a	n/a	n/a	n/a	\$450k	n/a

Collaboration, Communications, & Next Steps:

- Many organizations are supporting the project
 - *BBA Members*: Input into the specs, providing demonstration sites
 - *Equipment Manufacturers*: Input on specifications, discounted products for demonstrations
 - *CEE & Utilities*: Input on specifications, financial support, coordination of incentive programs
 - *Commercial Building Consortium*: support deployment efforts and provide insight into business case information
 - *Federal Government*: Discussions with GSA to determine if BBA specs can be used for GSA purchasing; coordinating on integration of specifications into Technology Performance Exchange, promoting via intergovernmental working group; reviewed opportunities with FEMP
- We are educating stakeholders about the specifications via several efforts
 - *Webinar*: Conducted information sessions to multiple BBA project teams and public
 - *Conferences*: Presented at Labs21 conference
 - *Website*: Updates to products
 - *Targeted Outreach*: With CBC, CEE, BBA members
- Our next steps focus on promotion
 - Conduct field evaluations
 - Update business case data
 - Promote via conferences
 - Partner with utilities in order to develop incentives
 - Coordinate with Technology Performance Exchange and Sustainable Facilities Tool.