



The Solutions Network

---

Rochester, New York

# Technology Deployment

Brad Gustafson

Federal Energy Management Program

[brad.gustafson@ee.doe.gov](mailto:brad.gustafson@ee.doe.gov)

# Presentation Topics



- Technology Deployment Overview
- Success Stories/Deployment Examples
- Promising Technologies
- What You Can Do
- Managing Risks



# Technology Deployment Mission

---



- To identify promising emerging technologies and Federal sites for application of those technologies in order to . . . .
  - Meet the Federal Energy Goals

# Actions

---



- Identify and prioritize emerging technologies
- Analyze high priority technologies
  - What is potential energy impact?
  - What are market barriers
  - What can FEMP do to promote technologies
- Implement technology deployment strategies across all FEMP activities

# Screening Process Overview



	Criteria	Resulting Technology
Initial Technology List	Technologies were pre-screened to remove transportation and industrial technologies	303
Screening One: Applicable to Federal Sector	Technologies were categorized as probable, possible, secondary, or not applicable. Probable technologies move to the next stage.	92
Screening Two. Near term timeline.	Technologies classified as commercially available or less than two years from market. Technologies with undetermined timelines were also included.	69
Screening Three. Not already in the FEMP system.	Technologies that had not already been evaluated through the FEMP Technology Demonstration program	44
Screening Four. Energy and cost evaluation by technical team.	Technologies were evaluated subjectively on extent of applicability in the federal sector, potential energy savings, and relative cost compared to standard technology	11

# Technology Assessments



- Serves as a verification step
- Will include information on the technology's:
  - Federal Market Potential
  - Contribution to Energy Goals
  - Barriers to Federal Market Penetration
- Will provide recommendations for market penetration next steps (deployment measures)



# FEMP's Tool Kit for Market Penetration



- Direct Project Assistance
  - Demonstrations
  - Design and Technical Assistance
  - Site Screenings
  - Technical Tools such as the GHP construction and maintenance cost database
- Information, Training and Outreach
  - Web-based Catalog of Emerging Technologies
  - New Technology Demonstration Program publications
  - Other publications like the EE Product Buying Guide and the FEMP web site
  - Training/Meetings
  - Exhibits
- Alternative Financing Support



# Moving Advanced EERE Technology to the Marketplace



GHP retrofit of 4000 homes at Fort Polk, LA, 1996. Reduce kWh use 33%, eliminate natural gas use altogether. FEMP roles included:

- 1) Validate field performance and savings (ORNL);
- 2) Promulgate results - Federal Energy Showcase Award 1997.

Issue GHP Construction guide specifications 1999

**Geothermal Heat Pump**

**Outcome:** More than \$100M investment in GHPs in Fed facilities 2001-2002, > than total investment in previous 10 years

Initial Information: Federal Tech Alert 1995

**Alternative Financing.** FEMP issues Technology-Specific Super ESPC in 1998 for GHP. 5 contractors selected.

## EERE Emerging Technologies

Whole Building Diag., Fume Hood, Residential Heat Pump Water Heater

Electrochromic Windows

Solid State Lighting

1990

2000

2010

# Advanced Turbine Deployment at San Diego VA Med Center using Super ESPC



- 4.4 MW prototype Solar Mercury 50 Turbine beta unit test
- Goal: develop a 21st century turbine which is more efficient, cleaner and less expensive to operate.
- Product development is collaboration between DOE, Solar Turbines and numerous other partners



# Advanced Turbine Deployment at San Diego VA Med Center using Super ESPC



- VA partnering with SEMPRRA on the Super ESPC
- The beta test unit will be replaced with a commercial production unit after about a year of operation.
- If the turbine does not meet the performance, availability and emission requirements in the contract, Sempra will replace the turbine with conventional natural gas fired reciprocating engines that will meet contracted requirements.
- Replacing an old existing cogen system resulting in significant reduction (40 tons) NOx emissions. Emissions credits key to closing deal



# LED Runway Lights Deployment Example at Naval Air Station – North Island using UESC



- First such implementation at a Navy site
- Replaced 951 45-watt incandescent taxiway lights and 118 incandescent obstruction lights with FFA-approved, 16 watt LED light fixtures
- 263,000 kWh savings annually
- New lights are more visible and will last longer (up to 100,000 hours)

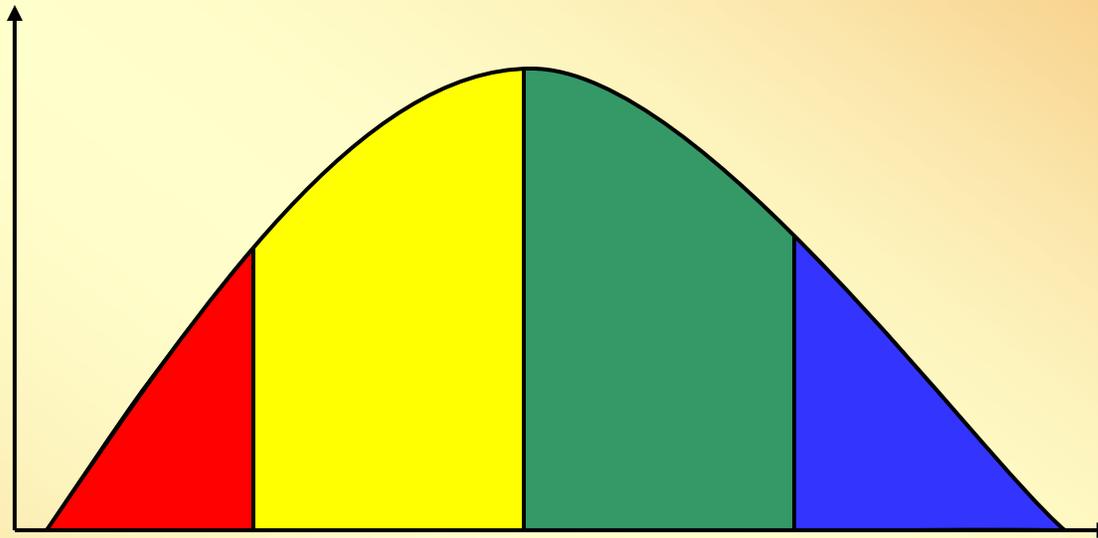
# LED Runway Lights Deployment Example at Naval Air Station – North Island using UESC



- Partnership with SW Div of NAVFAC, Sempra Utilities and AMTECH Lighting
- Challenge: high burn-out rate. Corrected in cooperation with the manufacturer
- Project satisfactorily completed in March 2004



# FEMP Technology Investment Curve



- ◆ radar screen: investigating, market assessment
- ◆ ready to deploy: demonstrating, providing technical support
- ◆ it's out there: publishing results, getting the word out,
- ◆ implementation through alt financing vehicles
- ◆ wrap up: case studies, technical assistance
- ◆

# Technologies Recommended for Future Promotion to Federal Facilities



## Lighting

- Scotopic Lighting
- Compact Fluorescent Lamp (CFL) Adaptor for Recessed Downlights
- Temperature-Tolerant Reflector Compact Fluorescent Lamps
- Hybrid Solar Lighting
- Compact Fluorescent Lamp (CFL) Plug-in Ballast in a Socket

## Building Envelope

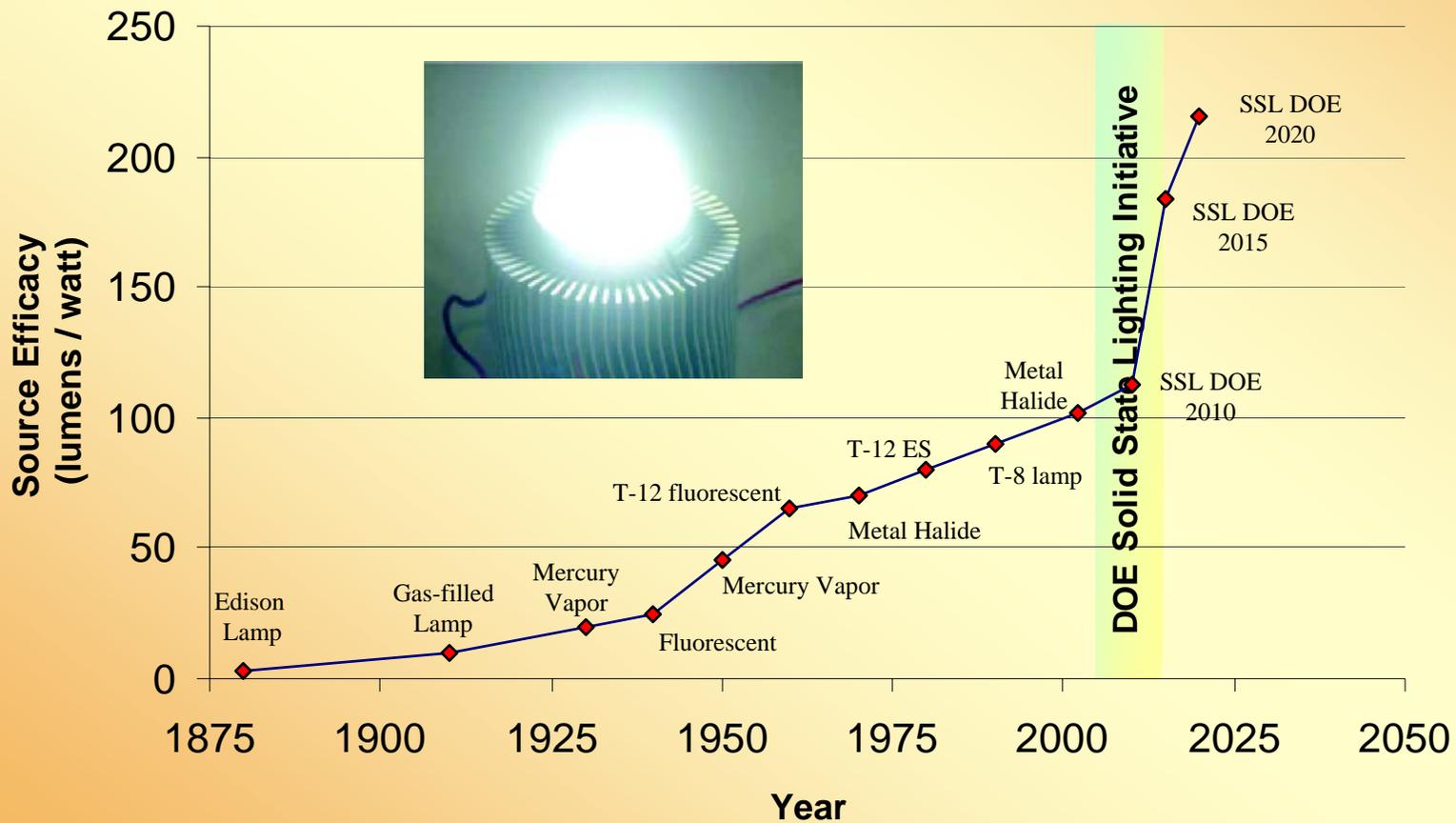
- Improved Poured Concrete Wall Forming System
- Photovoltaic Roofing System

## Building Equipment

- High Performance Rooftop Air Conditioning
- Liquid-Desiccant Heating/Cooling System Powered by Solar Energy
- Solarwall Air Preheating System
- Commercial Laundry Waster Water Reduction

[REPORT available here – on the handouts table](#)

# Electric Lamp White Light Efficacy Improvement



# What you can do to increase adoption of emerging technologies in your projects

---



- Consult with your ESCO or Utility on emerging technologies you might consider
- Get on the distribution list for free New Technology Demonstration Program publications  
(<http://www.eere.energy.gov/femp/technologies>)
- Also watch that web site for our list of technologies
- Check out U.S. Navy “Techval” web site for more options  
(<http://techval-energy.nfesc.navy.mil>)
- Take advantage of FEMP Services

# Managing Risks with Alternatively Financed Emerging Technology Projects

---



- Shared risk/responsibility
- Work with good partners
- Build replacement for prototypes into the agreement
- Project bundling
- Other Peoples' Money
- Use FEMP Services

# Contract Risk Management

---



- Place risk of system operation on vendor
- Take small bites
- Learn from mistakes and success
- You don't have to be the first to try something new!

# I'd like to hear from you

---



- Your examples of alternatively financed projects employing emerging technologies
- Your ideas about emerging technologies we should consider.
- Do you want to participate in FEMP's Technology Deployment Working Group?

Thank you  
Brad.Gustafson@EE.DOE.GOV