





Deploying Emerging Technologies with ESPC

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For More Information

- Would you like to know more about this session?
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Deploying Emerging Technologies



- Goals/Objective
- Define emerging technologies
- Examples of emerging technologies in ESPC projects - lessons learned
- Describe actions taken to incorporate ET in ESPCs
- Results to date
- Feedback, suggestions

Emerging Technologies in ESPCs



Goal/Objective:

- Tool to help reach Executive Order 13423, EPACT 2005 and EISA energy use reduction goals
- Means to acquire energy savings otherwise not attainable, and build larger ESPC/UESC projects & projects that would not be otherwise feasible



“Emerging Technologies”?

Definition:

New and emerging technologies will be defined as applicable to existing buildings, developed beyond bench-test status, ready for beta-testing at a minimum, commercially available through a private-sector partner, or already in the commercial market but with minimal market penetration in the federal building sector.



Examples of ET in ESPCs

2006 case studies

- San Diego VA- Ultra Low NOx Turbine Cogen System
- Ft. Stewart- Super T-8 Lighting Technology
- Luke AFB- Integrated Cool/ PV Roofing System
- Ft. Irwin –HID to T-5 Hi- bay Lighting
- BOP Victorville- Wind Turbine and PV
- NAS Oceana- Waste water reuse/energy recovery
- EPA Ann Arbor- Fuel Cell

San Diego VA- Ultra Low NOx Turbine Cogen System



Ft. Irwin –HID to T-5 Hi- bay Lighting: Pre-Retrofit



Ft. Irwin – HID to T-5 Hi- bay Lighting: Post-Retrofit





ET in ESPC- Lessons Learned

- **Projects require a mix of motivation and tolerance amongst project partners: partners are either motivated to incorporate the technology into the project or tolerant to have it as part of the project.**
- **Technologies can be the idea of the federal agency, ESCO and /or third party.**
- **Perceived risks need to identified managed and/ or mitigated**



ET in ESPC- Lessons Learned

- Utilize technology experts from the National Labs and private sector to educate stakeholders, emphasizing value/benefits
- Positive relationships and trust among all parties is critical
- Need to be flexible and provide a customized approach to meet customer needs
- Applicable financial incentives can help offset first costs

ET Deployment Action Plan to date

Steps/Tasks

- **Identified, cataloged, and prioritized technologies into FEMP Emerging Technology Matrix**
 - Alliance to Save Energy (ASE), FEMP, LBNL, other DOE Labs
 - Input from CA Emerging Technologies Council, Navy Techval program, others
- **Preliminary market assessment**
- **Developed/identified 1-2 page technology fact sheets**
- **Identified technology expert(s) and availability of technical assistance**



ET Deployment → Action Plan

- **Disseminate new technology information to field (Educate PFs, Agencies, ESCOs)**
 - ESCO project development engineers critical
 - If application matches are found, coordinate technical assistance.
 - If necessary, small demo (if scalable) during the DES phase to confirm feasibility/acceptability
 - Implement technology on larger scale via ESPC
- **Identify any applicable financial incentives, prototypes, cost sharing opportunities, other funding sources.**

Emerging Technology (ET) Matrix



- The Emerging Technology (ET) Matrix is an Excel spreadsheet tool to assist agencies and ESCOs:
 - Identify emerging technologies for Federal ESPC/UESC projects.
 - Provide references for additional information, points of contact, and resources.
 - Save research time and provide better direction in making Energy Conservation Measure (ECM) decisions.
- ECM Categories
 - Building Envelope
 - HVAC
 - HighTech Buildings
 - Lighting
 - Power Generation
 - Water/Wastewater
 - Water Heating
 - Other



FEMP ET Matrix Websites

FEMP Emerging Technology Matrix

- http://www1.eere.energy.gov/femp/docs/emerging_tech_matrix.xls

Alliance to Save Energy Emerging Technology Report

- http://www1.eere.energy.gov/femp/pdfs/emerging_technologies_ase_report.pdf

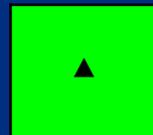
ESCO/Agency Review and Support



- Prior to the Initial Proposal (IP) KickOff (KO) meeting agency customers will be provided an Emerging Technologies (ET) Matrix
- Agencies are requested to review the ET Matrix for potential saving opportunities
- At the IP KO meeting FFS/PF will provide an overview of the ET Matrix to the project team
- Prior to the IP development FFS/PF will schedule a meeting with the ESCO/Agency to go over the ET Matrix in more detail and identify potential ET ECMs

ET Matrix: Federal Sector Applicability

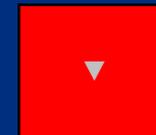
Example – Scotopic Lighting



High



Medium



Low

Technology	Federal (Market) Leverage	Savings Potential		Cost Effectiveness	Retrofit Applicability
		Federal	US economy		
Scotopic Lighting	▲	▲	▶	▲	▲

ET Matrix: ESPC Applicability Example – Scotopic Lighting



A	All or most federal facilities
M	Many federal facilities
S	Special conditions (see measure description)

	ESPC Applicability	Application	Description
	A		

ET Matrix: Information Sources

Example – Scotopic Lighting



Report Type Source Date URL

Report Type	Source	Date	URL	
Scotopic Lighting	Website	DOE	2007	http://www1.eere.energy.gov/femp/new_technology/tech_demo_comp5.html
	2-pager	FEMP	2007	Download
	ACEEE Study (p. 134)	ACEEE	2004	http://www.aceee.org/pubs/a042full.pdf
	Field Evaluation	PNNL	2006	http://www.eere.energy.gov/buildings/info/documents/pdfs/selpies_field_eval_083006.pdf
	Economic Analysis	DOE	2006	http://www.eere.energy.gov/buildings/info/documents/pdfs/selpies_economics_validation_083006.pdf

ET Deployment → Action Plan

- Incorporate into ESPC training, kickoff meetings, Core Team technical assistance
- Promote and highlight quick/early success stories (TEAM initiative)
- Venues include: PF/ESCO, FUPWG, E200X, NAESCO, FEMP webpage, etc
- Conduct Evaluations/Assessments
- Develop case studies
- Gather additional success stories and disseminate information

Results: ESPCs with Scotopic Lighting



- BOP AZ- \$953,574 investment, \$184,870 annual savings. Awarded 03/08.
- DOE Ames Lab- \$ Investment \$306,802, annual savings \$38,127. Beginning DES phase.
- DOE ORNL- \$1,904,567 investment, \$164,912 savings. In DES development.
- DOE Y-12 - \$3,122,293 investment, \$318,058 savings. IP just received.
- GSA Long Beach, Awarded 07/07.
- Malmstrom AFB, \$ 550,096 investment, \$38,461 savings. IP review.
- DOE Hanford- \$906,495 investment \$34,009 savings. In DES development.
- US Army Korea- \$ 6,071,095 investment, \$528,455 annual savings. Beginning the DES phase.
- USDA Forest Products Lab, WI. \$98.180 investment, \$11,640 savings, IP completed.

Results: Other ET Matrix Applications

- Aerosol Duct Sealing – LBNL
- Lab Air Flow/Fume Hoods – DOE: LBNL, BNL, Ames
- Bay Source Heat Pump – FDA Puerto Rico
- Advanced Metering – DOE: ORNL, LLNL, PPPL, SLAC, NETL, LBNL
- Biomass Electric Generation or Boilers – Fort Stewart, ORNL, Savannah River, Forest Service Regions 2 & 4
- High Performance Windows – DOE Ames
- PV – DOE: NTS, PNNL, PPPL, HQ, INL, LANL, LLNL, NETL; US Army Korea, FDA Puerto Rico, AF: Aviano, Malmstrom & Lackland; Forest Service Region 2
- Wind power – NETL, USCG Puerto Rico, Forest Service Regions 2 & 4
- T5 Lighting – Fermi Lab, ORNL, Ft. Stewart, US Army Korea
- Cool/Green Roof – NETL

ET Deployment → Action Plan

- **Other Ideas**

- Develop technology specific technical assistance tools based on user needs
- Demonstration project funding
- FEMP should form partnerships with industry
- Periodic Technology Updates/Training



ET Deployment → Action Plan

Feedback/suggestions?

Applicability to your projects?



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