U.S. DEPARTMENT OF ENERGY

Cloud and Infrastructure Community of Practice: Sustainable Practices for Performance Contracts

Jefferey B. Murrell, PE, MBA

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FEMP
Federal Energy Management Program

Objectives of discussion

- What is performance contracting and how does it differ from traditional federal appropriations?
- What types of projects can the federal IT community accomplish?
- How to get started

FEMP Focuses on Federal Agency Support

FEMP works with key stakeholders to support all stages of energy management in federal agencies' critical areas

Key Stakeholders

- White House
- Industry
- Agencies
- National Labs
- Congress
- MUSH Markets

Technical Areas

- Facilities
- Fleets
- Grid

Federal Agency Energy and Sustainability Goals and Requirements

Agency energy projects will enable progress toward several administration and congressional priorities focused on energy and water efficiency, decarbonization, investment, jobs and American manufacturing.

Energy Act of 2020

- Agencies to use performance contracting to address at least 50% of ECMs identified in EISA evaluations
- Agencies to implement all cost-effective ECMs identified within two years
- FEMP to establish a Federal Smart Building Program

Executive Order 14057

- Government-wide targets for long-term and mid-term GHG reductions
- Net-zero buildings by 2045, reduce emissions by 50% from buildings by 2032 from 2008 levels
- Deep Energy Retrofits in 30% of owned covered facilities by FY2030

Federal Building Performance Standard

- Support achievement of net-zero emission for federal building portfolio
- Zero scope 1 emissions from on-site fossil fuel use in 30% of agency's federal buildings (by GSF) by FY 2030
- Applies to federally-owned, EISA-covered facilities in U.S. and U.S territories

Climate Smart Building Initiative (CSBI)

- Government-wide emission reductions using performance contracting
- Agencies establish emissions reductions targets
- Increase on-site clean electricity generation
- Support plan to reduce emissions from Federal buildings by 50% by 2032

Note: Descriptions are illustrative and not comprehensive.

Performance contracting supports all these goals and requirements

Government Performance Contracting Impact

Over $16.0 billion in project investments awarded
(DOE ESPC IDIQ, Army MATOC, VA ESPC IDIQ, ESPC ENABLE, UESC)

ENERGY

Estimated over
63.8 trillion BTU
reduced annually

ECONOMIC

Estimated over
128,200
job-years
(direct jobs)

ENVIRONMENTAL

Estimated over
3.6 million
metric tons CO_2e*
reduced annually

*Using eGrid 2019 values, inclusive of awarded projects through FY2023

FEMP Performance Contracting Impacts

DOE ESPC IDIQ Program · FY 1998 – FY 2023

Project Investment: $8 Billion

Guaranteed Cost Savings
(over contract term):

$18 Billion

Awarded Contract Value
(over contract term):

$17.6 Billion

Energy Savings
(MMBtu/yr):

33,173,514

Water Savings (gallons/yr):

5 Billion Gallons

Economic (job-years created):

63,000 Job-Years

Projects in all 50 states,
plus U.S. territories and international:

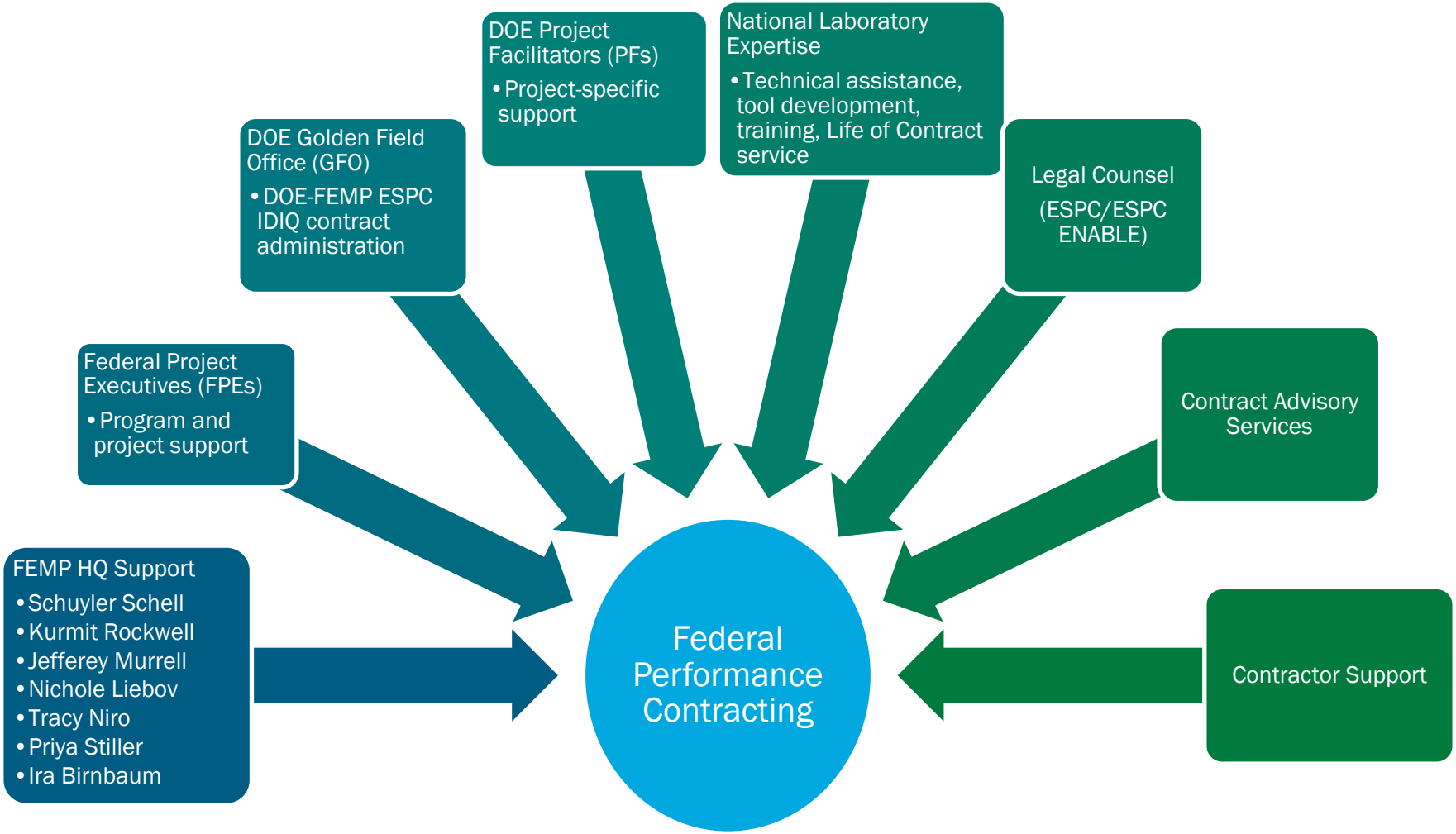
All 50 States +

Metric tons (MT) of CO_2 per year
in emissions reductions

2 Million MT

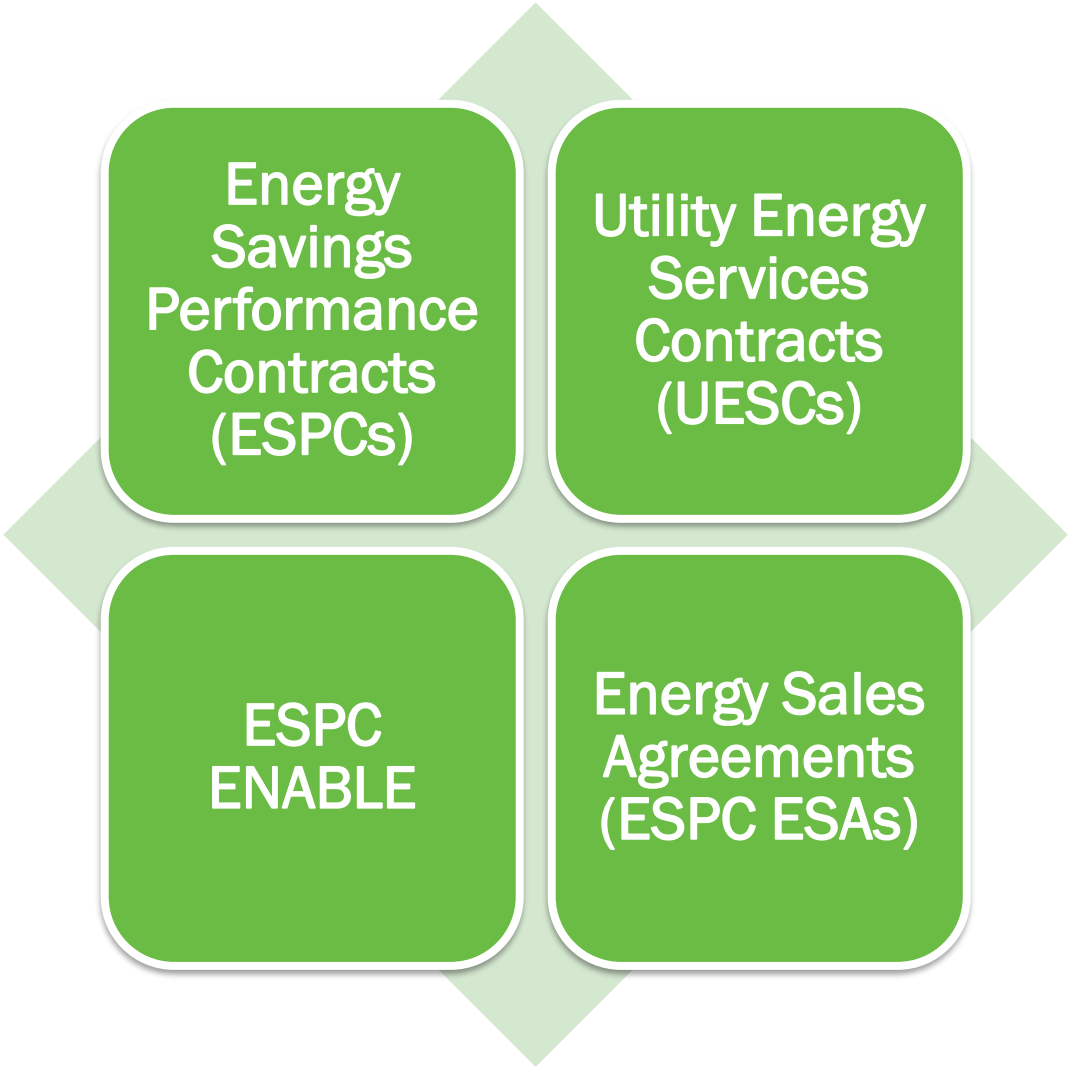
DOE FEMP Performance Contracting Support

FEMP's Team
Dedicated to Helping Agencies Succeed with ESPC

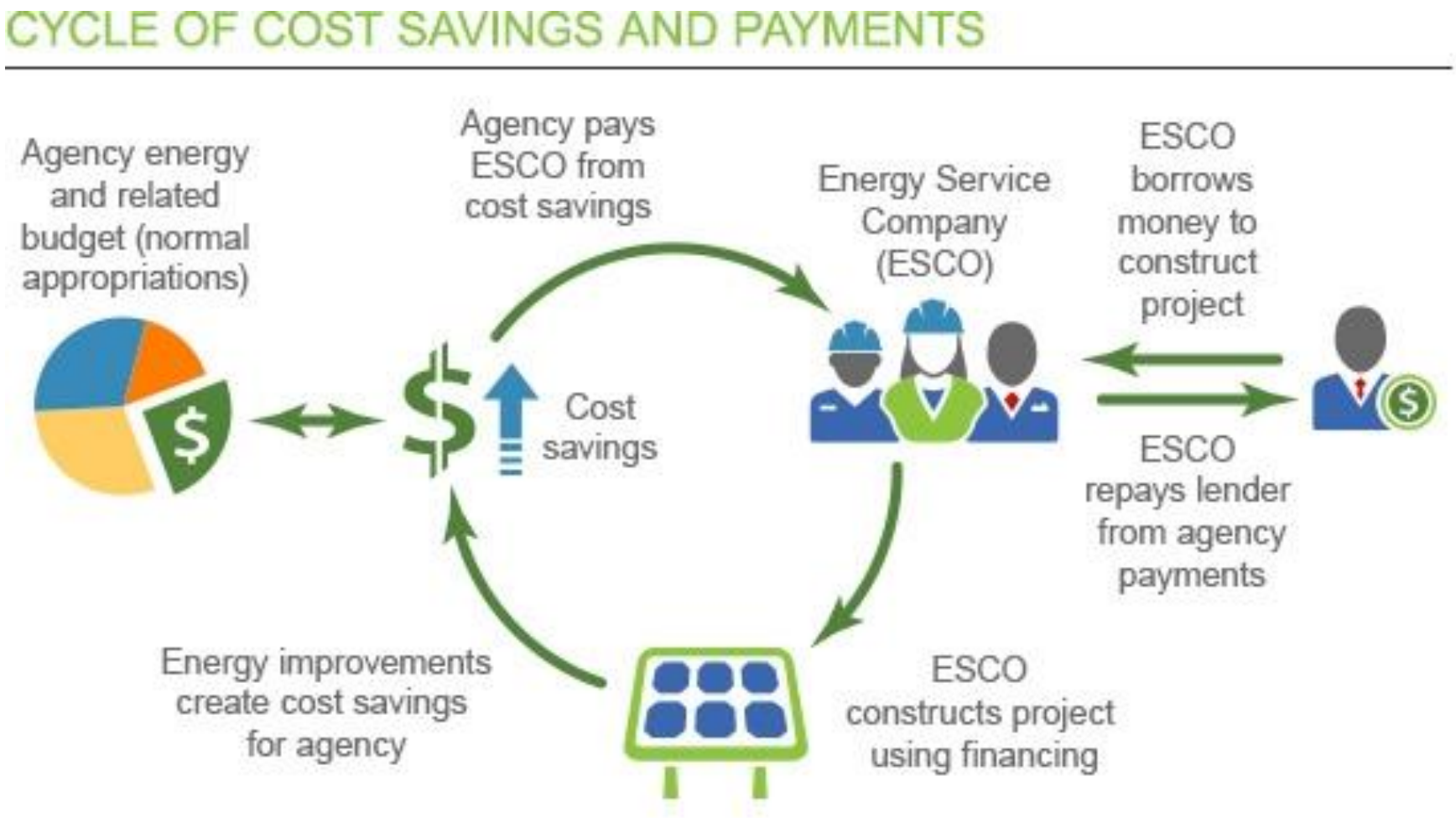


Financing Vehicles for Federal Energy Projects

- ***These vehicles can finance energy improvements without up-front capital costs or special appropriations.***



Where the Money Comes from and Where it Goes



Key Features of ESPCs

➲ Legislated purpose: Achieve energy savings and ancillary benefits

- Savings guarantees are mandatory
- Savings must exceed payments for each year
- Measurement and verification (M&V) is mandatory
- Maximum contract term is 25 years (starting with task order award)
- May combine financing and appropriations

DOE ESPC IDIQ Technology Categories

Scope includes energy- and water-conservation measures (ECMs)

- Boiler and chiller plants
- Energy management control systems
- Building envelope
- HVAC
- Chilled/hot water and steam distribution
- Lighting
- Electric motors/drives
- Refrigeration
- Distributed generation
- Renewable energy
- Energy/utility distribution
- Water and wastewater
- Electrical peak shaving/load shifting
- Rate adjustments
- Energy-related process improvements
- Commissioning
- Advanced metering
- Appliance/plug load reductions
- **Data center/Information Technology**
- Other

ESPCs Support Mission-Critical Infrastructure

Agency requirements addressed by ESPCs:

- Repair or modernization of infrastructure
- Reduce maintenance headaches
- Increase reliability, capacity, functionality, resilience
- Improve occupant comfort
- Provide critical facility data
- Reduce utility bills
- Reduce O&M responsibility and expense; avoid deferred maintenance problems
- Leverage agency funds

ECMs for Data Centers: Specific Measures

Infrastructure (Cooling, Power)

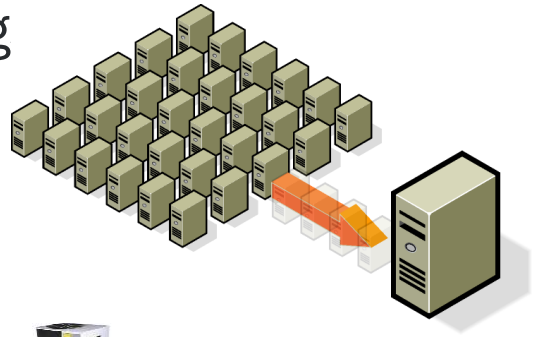
- Install metering and implement data center infrastructure management (DCIM) controls and power monitoring
- Improve air management / Install Cold or Hot Aisle Containment
- Increase temperature setpoints toward the high end of the range set by ASHRAE
- Turn off active humidity control
- Install Variable-Speed Drives on cooling system fans
- Install rack and/or row-level cooling
- Implement dedicated room cooling (vs. using central building cooling)
- Use air- and water-side economizers
- Retro-commission system and plant controls
- Use high-efficiency UPSes in eco-mode
- Use high-efficiency lighting
- Install liquid cooling and adopt warm water cooling

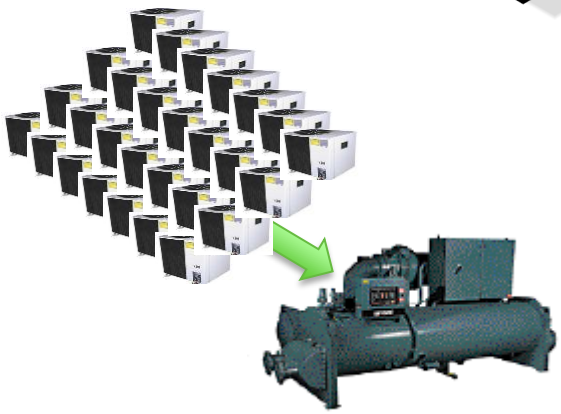
Information Technology (IT)

- Turn off unused servers
- Improve server power management
- Minimize requirements for Uninterruptible Power Supplies (UPS)
- Refresh the oldest IT equipment with new high-efficiency equipment
- Virtualize applications
- Consolidate applications, servers, closets, and data centers
- Move applications and/or hardware to higher-efficiency internal or external data center or to the cloud
- Implement network storage optimization
- Joint training for IT and Facility staff
- Upgrade IT equipment to more energy efficient models and that are rated to higher ASHRAE thresholds
- Implement VoIP, network printers, thin-client,

Consolidation/Virtualization Example

- **Savings/avoided cost attributed to:**
  - Energy savings for server reductions and cooling
  - Energy related savings
    - Operation and Maintenance (O&M) saving
    - IT refresh avoided cost/savings
    - Software/licensing
    - Labor (IT staffing, subcontracts)
    - Frees up floor space
  - Other facility ECMs
    - Energy and water
    - Deferred maintenance
    - Resilience & energy security





Project Example – Naval Base Coronado

- Critical Goals: reliability, sustainability, resiliency, and efficiency
- 95% of the ESPC is in a mission critical data center with comprehensive ECMs
- Task Order awarded February 2016 with a value of $114 Million.
- Performance guarantee is structured around ESCO guaranteeing temperatures on the server floor, uptime of critical equipment, and full O&M, in addition to energy savings.
- **Guaranteed savings are $4.4 million/year.**

Project Example – NASA Jet Propulsion Laboratory

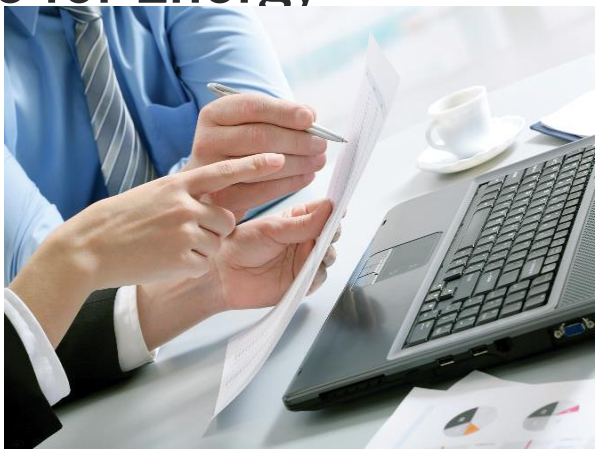
- **Overview**
  - Expand on-Laboratory high efficiency data center capacity
  - Build out a high efficiency data center in an existing facility
  - Install a scalable Modular Data Center (MDC) to allow for geographic separation of IT assets
  - Allow for existing lower efficiency data center to be retired
- **Benefits to NASA**
  - Help facilitate NASA JPL's data center consolidation efforts
  - Reduce NASA JPL's data center-related energy costs, including utility and IT costs
  - Provide lower PUE data centers with more efficient cooling infrastructure
  - Allow NASA JPL to consolidate and virtualize IT assets
- **Projected Annual Savings: $2.6 Million**

ESPC and IT/Data Center

- **IT/Data Center ESPC projects can stand alone or be part of a comprehensive project including any other building systems.**
- **IT projects can save a very high percentage of energy**
- **IT projects should incorporate all applicable agency's cybersecurity requirements**
  - Please include all essential cybersecurity personnel, especially data center energy practitioners (DCEP), in the acquisition planning process
- **Technical solution is in the control of the agency IT departments.**
  - Performance should be enhanced, security increased.

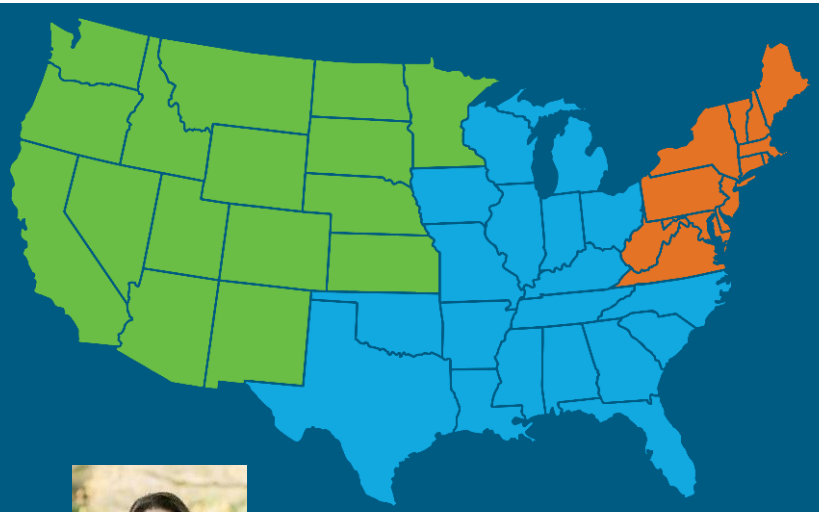
ESPC and IT/Data Center

- **FEMP Federal Project Executives (FPEs)**
  - Your first point of contact
  - Coordinator of all FEMP ESPC assistance for agencies
- **FEMP Project Facilitators (PFs)**
  - Hands-on project support
- **DOE Golden Field Office – FEMP@ee.doe.gov**
  - DOE-FEMP ESPC IDIQ contract administration
- **DCEP**
- **Lawrence Berkeley's Center of Excellence for Energy Efficiency in Data Centers**
- **Legal counsel**
- **Interagency policy and program improvement through Federal ESPC Steering Committee**



First Point of Contact: Your Federal Project Executive (FPE)

- Help with all performance contracting: ESPC, ENABLE, and UESCs
- Connect you with lab, Subject Matter Experts (SME), resources



Western Region
+ East Asia, Pacific; South, and Central Asia

Scott Wolf
360-866-9163
wolfsc@ornl.gov

Southeast Region
+ Europe and Western Hemisphere

Doug Culbreth
919-870-0051
culbrethcd@ornl.gov

Southeast Region
+ Technical Support
+ Back-up for all Regions

Michael Mungal
954-812-7082
mungalmj@ornl.gov

Northeast Region
+ State Department

Bridgette Rodgers
703-951-3308
rodgersbr@ornl.gov

Click here for more information about how FPEs can help you.

Finding Resources on FEMP's Website

FEMP

www.energy.gov/femp/federal-energy-management-program

FEMP ESPC Page

www.energy.gov/femp/energy-savings-performance-contracts-federal-agencies

UESC Resources

Utility Program and Utility Energy Service Contracts for Federal Agencies | Department of Energy

Please all links for ESAs and ENABLE ESPCs

Thank you!

Jefferey.Murrell@hq.doe.gov

202-394-2240

Performance Contracting Training Available:

https://www.energy.gov/eere/femp/federal-energy-savings-performance-contract-training

Data Center:

https://datacenters.lbl.gov/dcep