



*An Energy-Efficiency Workshop
and Exposition*

Orlando, Florida

**Distributed Generation/
Combined Heat and Power (DG/CHP)
Resources for Federal Facilities**

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FEMP – “ADD CHP”

- Accelerated Development and Deployment of Combined Heat and Power (ADD CHP)
- Goal: Make proven DG/CHP technology more easily accessible to federal agency sites who want to “lead by example” with DG/CHP
 - Enhance energy security & reliability
 - Reduce costs
 - Reduce GHG emissions



Energy Security

Mandates:

- Executive Order on Critical Infrastructure Protection (10/2001)
- E.O. 12656 Emergency Preparedness Responsibilities (11/1988)

Bottom Line:

- *Installations* must ensure energy is available for all critical mission operations



DG/CHP Is Key to Security Solutions

- DG can provide dependable, on-site power when and where needed - independent of external influences
- Doing DG efficiently means doing CHP
- More reliable if base-loaded or peak-shaving daily

**“You know it’s ready for an emergency
if it operates every day.”**



Why ADD CHP?

- ✓ **1600 MW w/avg. simple payback <8 years**
- ✓ **50 trillion Btu/yr of source energy savings**
- ✓ **\$170 million/year in energy cost savings**
- ✓ **4 million metric tons/yr of avoided CO₂ emissions**
- ✓ **Increased reliability/security for 13% of federal power purchased (buildings, FY2000)**
- ✓ **Diversified fuels reduce vulnerability to price volatility in a single market**

CHP offers *significant* potential benefits



FEMP's Strategy

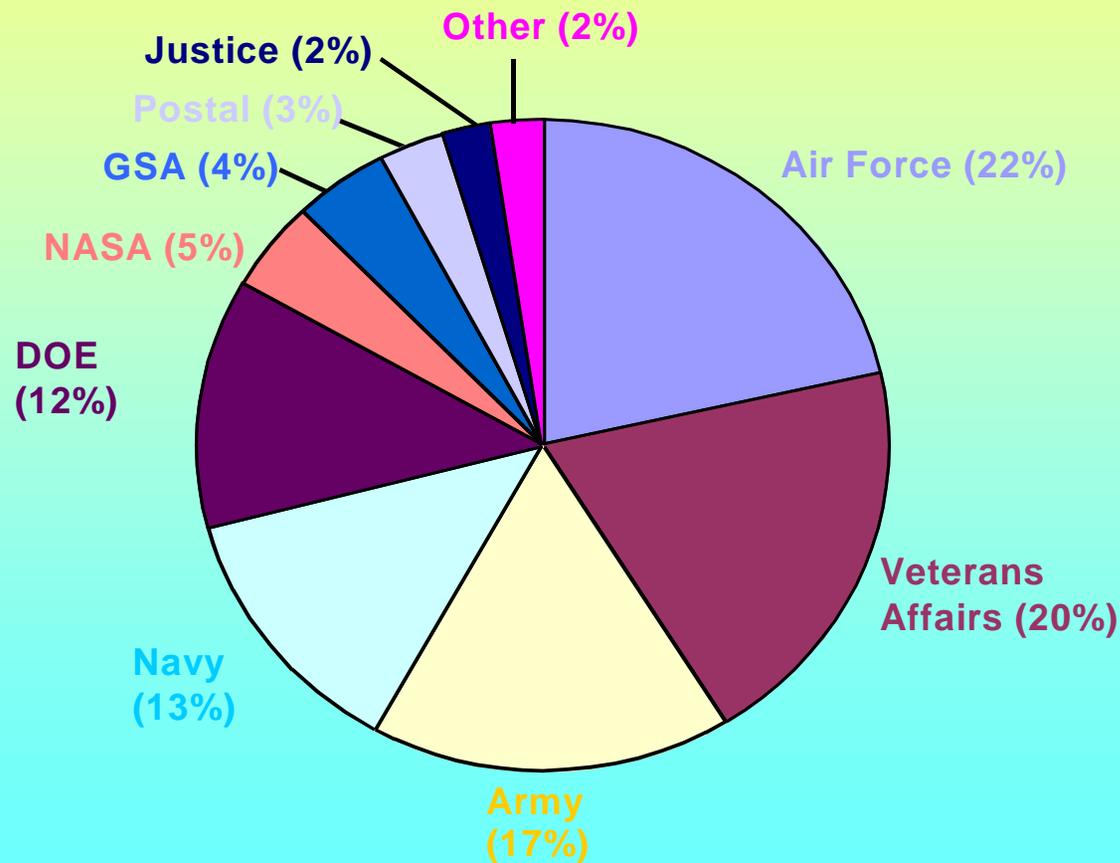
- Focus on key markets
 - Veterans Affairs
 - Army
 - Navy
 - Air Force
- Target assistance to address hurdles
 - Technical
 - Financial
- Help sites make informed decisions





Key Federal CHP Markets

Large, energy-intensive facilities dominate



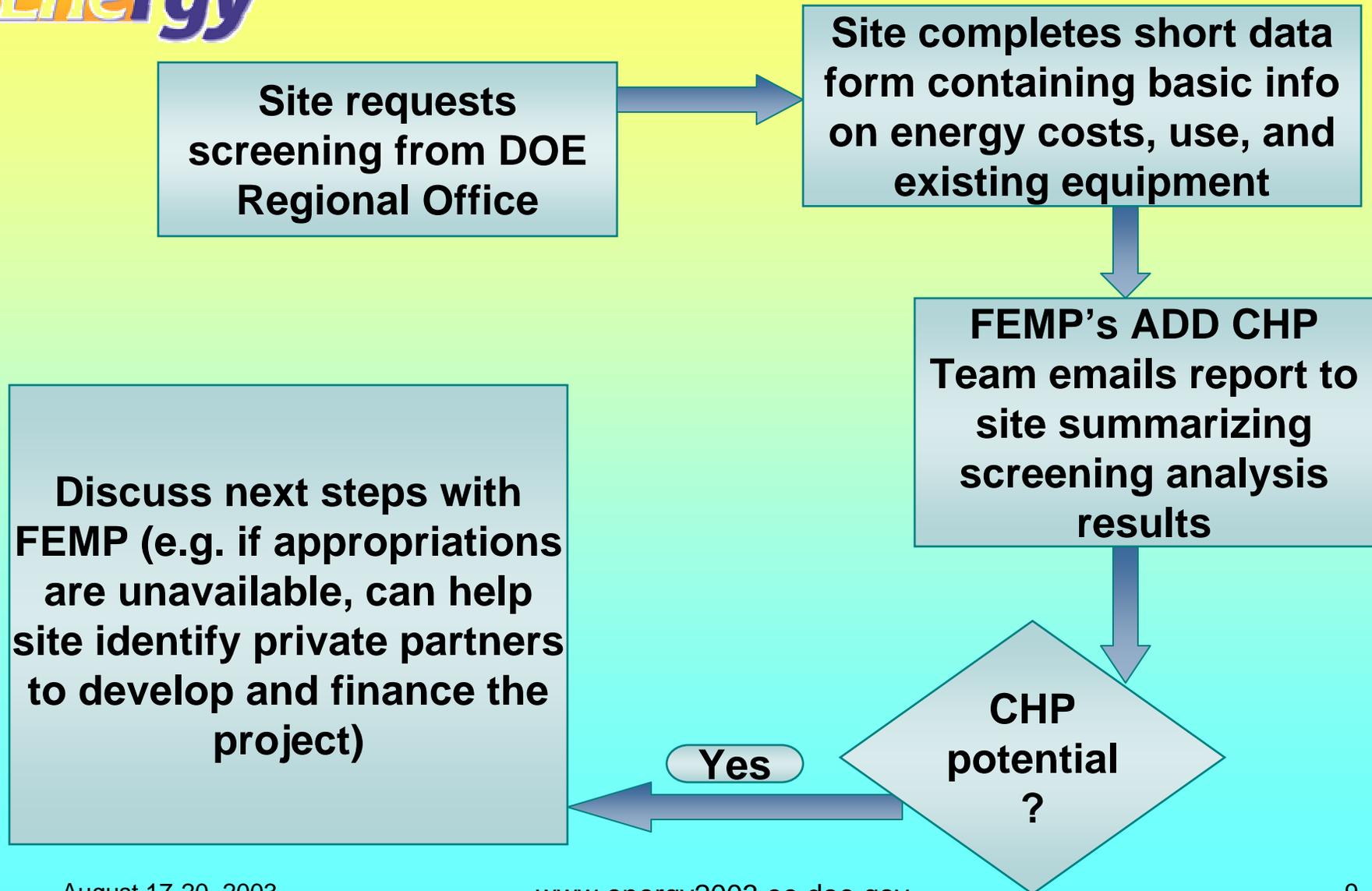


Technical Assistance

- CHP screenings (over 125 sites to date)
- CHP “next step” TA (customized to need)
 - Performance/cost estimation for various prime movers, components, configurations, base load or peak shaving, thermal storage;
 - “Head wind” indicators: incentives?; requirements for permitting, interconnection, standby/backup, exit fees, etc.
- CHP “light touches” once project developers engage
 - Reviews of survey reports, feasibility studies, designs, technical proposals, price proposals, baselines, savings calculations, M&V

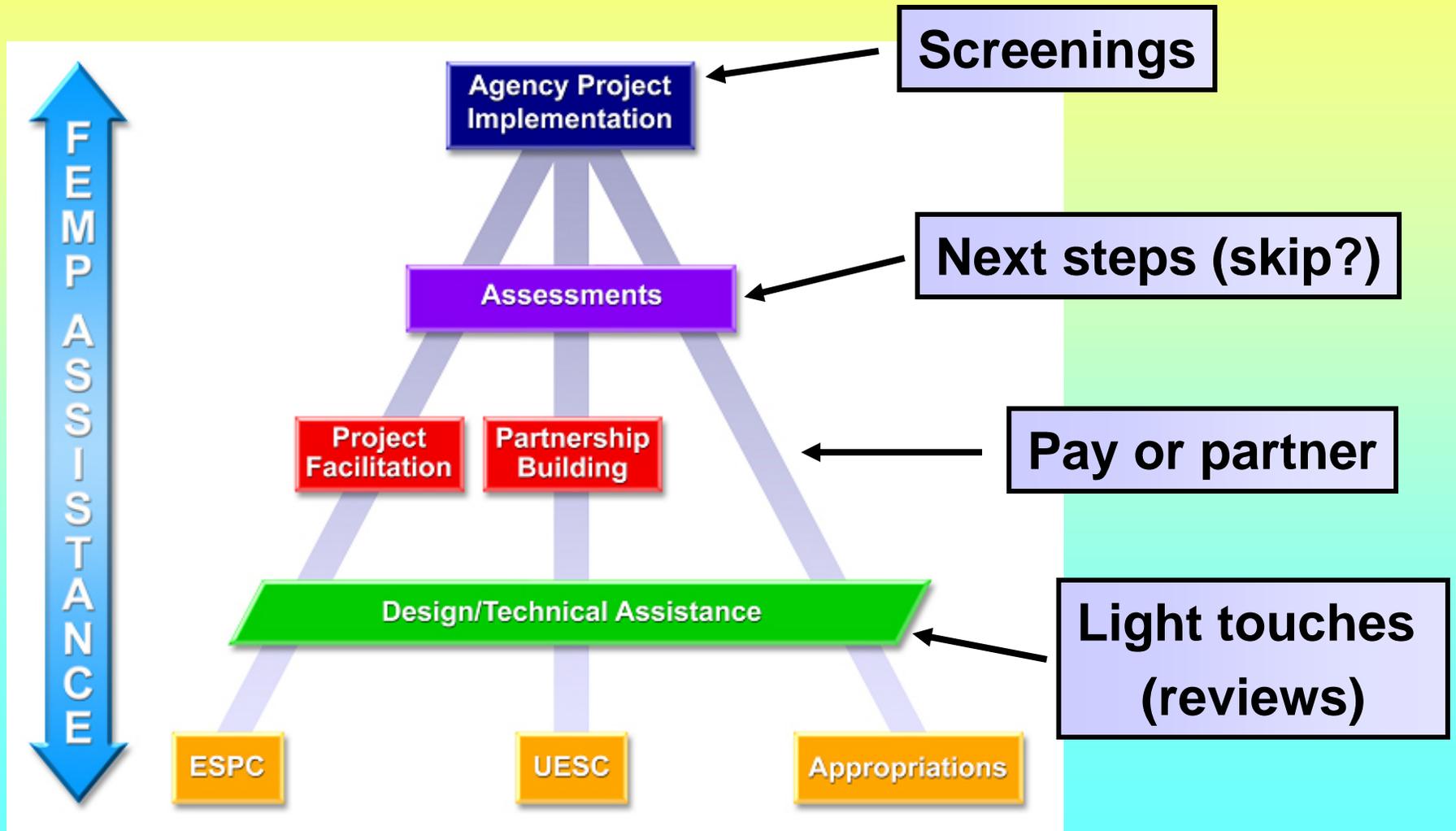


CHP Screenings





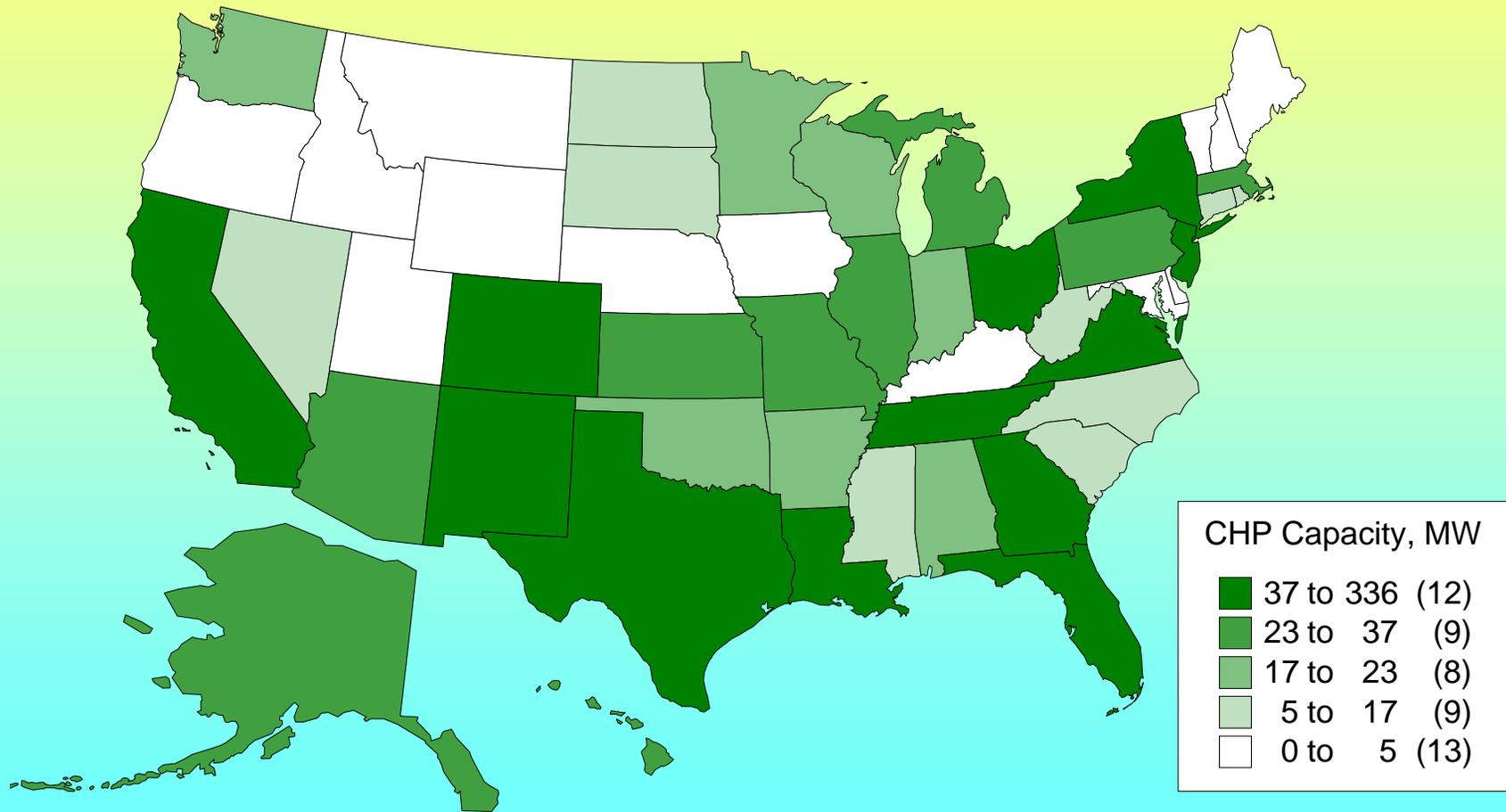
TA Focused Where “Financing Paths” To Implementation Exist





1.6 GW Federal CHP Potential

(Investing Where “Head Wind” Is Least)





Who Does What?

- ***Private partners*** promote, market, develop project, finance it ... implement
 - **ESCOs and Utilities**
 - **CHP industry & associations (USCHPA, IDEA, etc.)**
- ***Federal agency/site*** leads
- ***FEMP*** supports
 - **By providing agencies unbiased expertise**
 - **Access through the DOE Regional Offices**





CHP Examples: Twentynine Palms Marine Corps Air Ground Combat Center, CA

- **7.2-MW, dual-fuel cogen system**
- **Annual cost savings: \$5.8M**
- **Savings subsidized >1 MW of PV**
- **75% efficiency (design target)—
twice U.S. grid average**
- **Exhaust heat for district
hot water and 200-ton chiller**
- **FEMP provided independent and unbiased review of
design, contributed to more efficient design; Case
Study in 2004**





CHP Examples: Fort Jackson, SC



Chronology of FEMP support

- ✓ **Screenings performed/revised per site requests (4/02)**
- ✓ **Site champion attended DG/CHP workshop (5/02)**
- ✓ **Site requested/awarded FEMP tech-assistance (9/02)**
- ✓ **Analysis performed for 13 CHP configurations to gain ESCO buy-in (12/02) (continuous, peak shaving, and extended peak shaving modes of operation; different sizes, types of prime movers)**
- ✓ **ESCO submits initial proposal (4/03)**



CHP Examples:

EPA Steam Turbine, Boston, MA

- At EPA request, evaluated routing purchased steam to produce electricity prior to its use for building heat
- **Technology configuration**
 - 150-kW backpressure steam turbine
 - Modest 5% increase in steam flow required

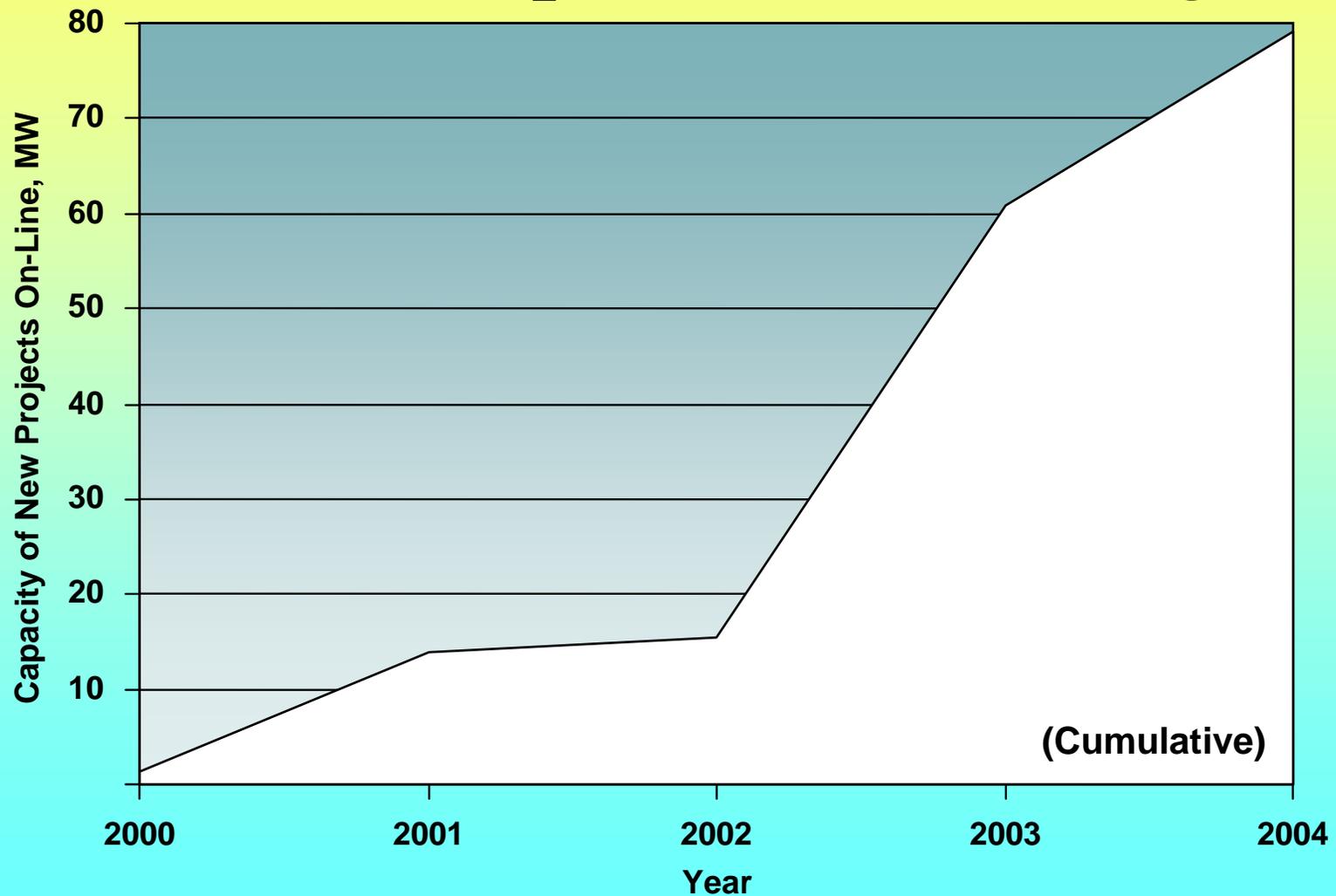


- **Benefits**

- 2 yr simple payback
- ~\$75k implementation cost
- Cost savings: >\$40k/yr
- Energy savings: 2,400 MMBtu/yr

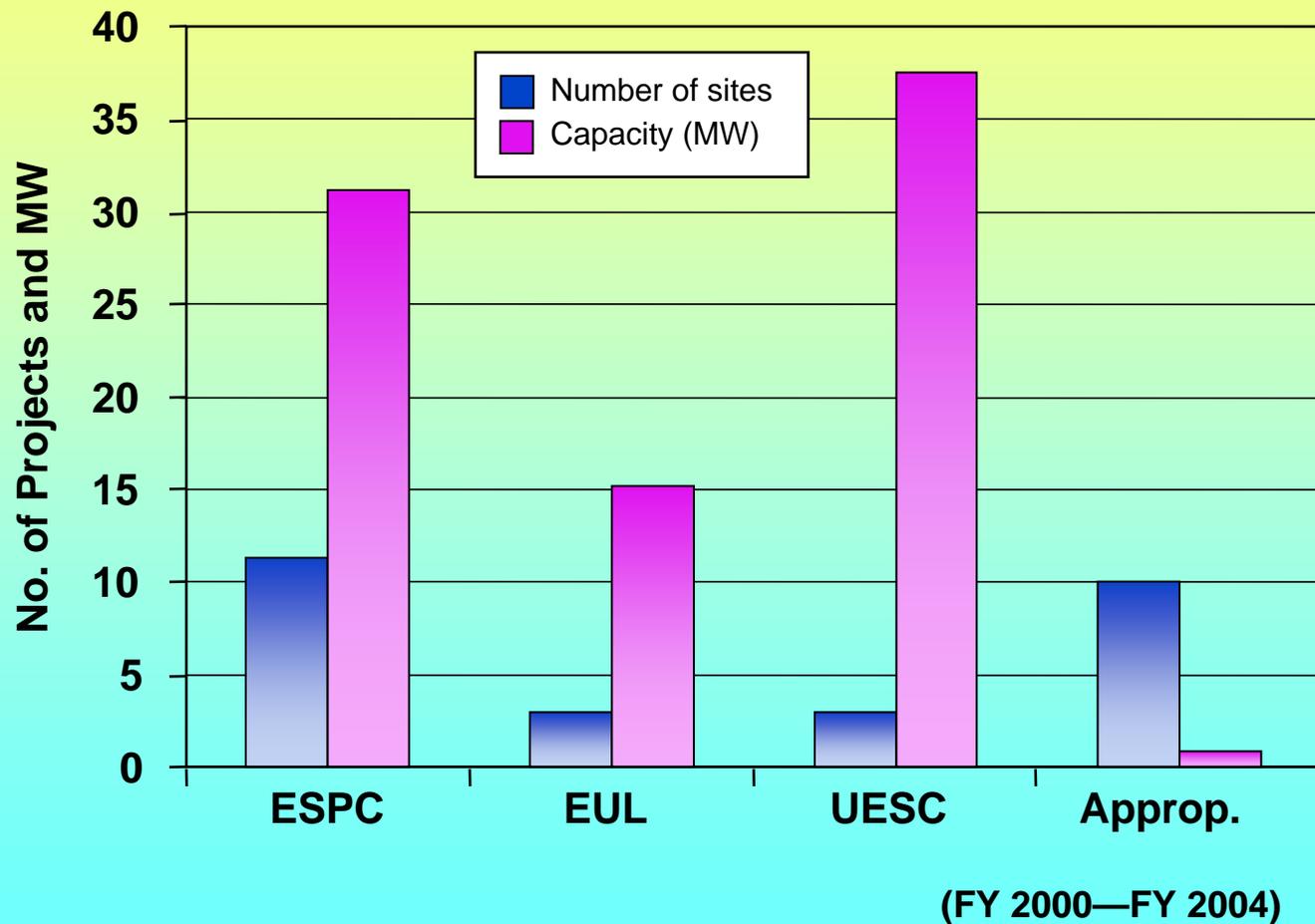


Federal CHP Projects & Experience Growing





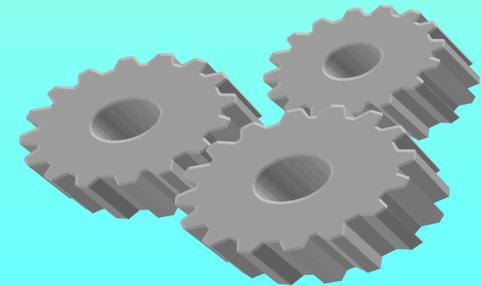
Funding Mechanisms for CHP Being Installed





Is CHP for You?

- High electric rates?
- Energy security upgrades planned?
- Gas/alternate fuel available?
- Thermal demand on site? --follows electric load?
- Compatible infrastructure (central heat and cooling systems)?
- Large, steady energy loads?





What Have We Learned?

- Strongest market drivers for CHP are energy security, costs, equipment upgrades
- Potential savings are significant
- Dual fuels and/or intelligent operating controls reduce susceptibility to changing fuel costs
- Savings from CHP can “subsidize” renewables
- Site champions are critical for success

More lessons and case studies from federal colleagues in sessions 5, 6, & 7 – don't miss them!

Technical Issues

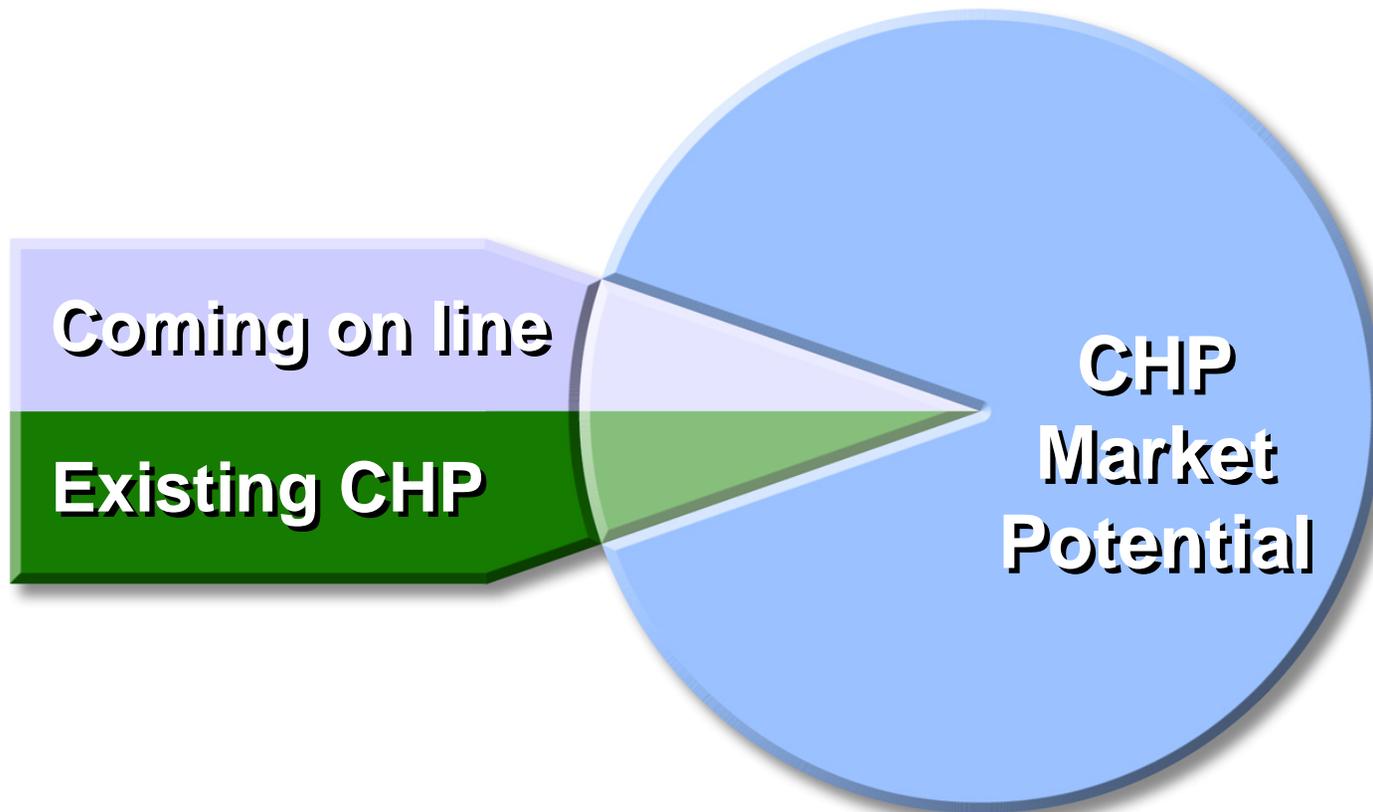
- IC engines, large gas turbines, HRSGs, steam turbines — tried and true
- Gas compressors and peripherals for microturbines—varied results
- Fuel cells— appealing but costly





Federal CHP

*Currently Only a Fraction of Total
Federal Potential*





FEMP DG/CHP Information

- **DER “How-To” Guide**
- **Case Studies, Fact Sheets**
- **CHP Market Analysis**
- **Environmental permitting guide**
- **New interconnection guide**

See FEMP booth for these and other publications and visit the web site:

<http://www.eere.energy.gov/femp.html>



CHP Training in 2004

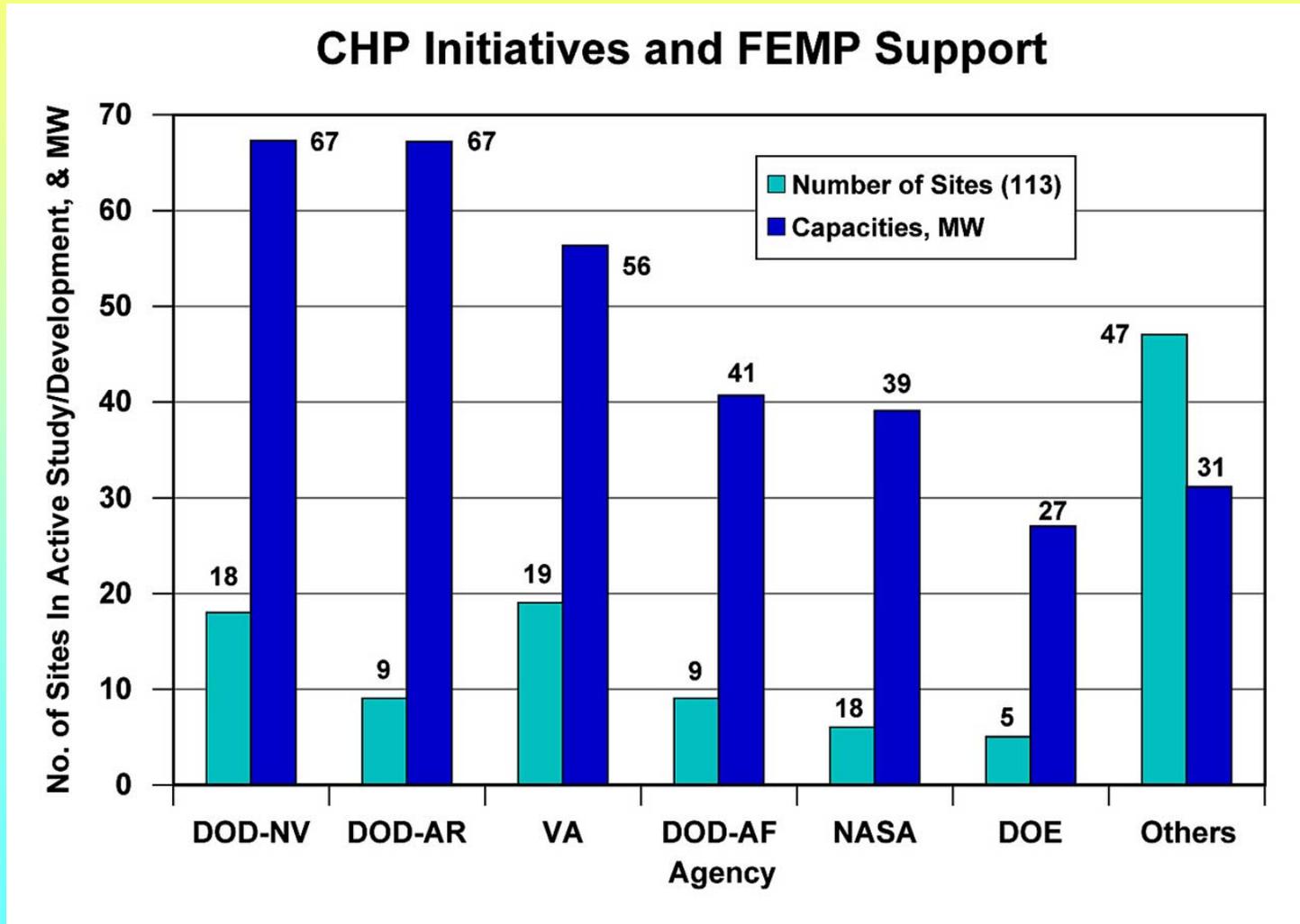
- DER hands-on training for federal managers, Albuquerque, NM: April 28-29, Sept 15-16
- Two web-based workshops (spring/summer)
- Energy 2004—August—Rochester NY
- DG/CHP for Federal Facilities Regional Workshops—see presentations from past events and see what's coming in '04 on web

FEMP website for outreach information:

<http://www.eere.energy.gov/femp.html>



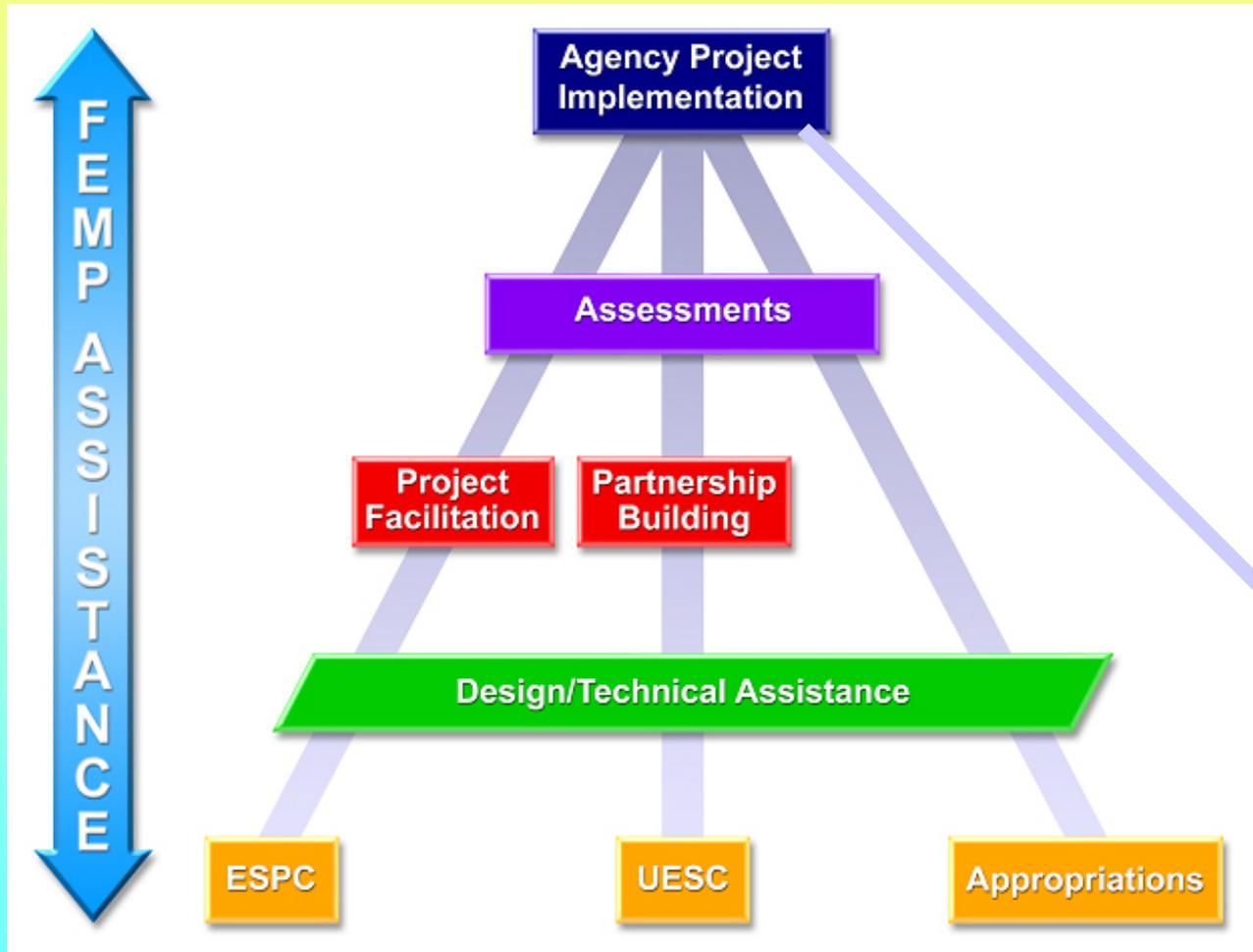
CHP Interest and Initiatives





CHP—Looking Forward

What else should be done to facilitate projects? Ideas are welcome. Meeting here at 4 p.m. on Wed.





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Comments?

Questions?

Thank you!