

Realizing Better Buildings

Maria T. Vargas
US Department of
Energy

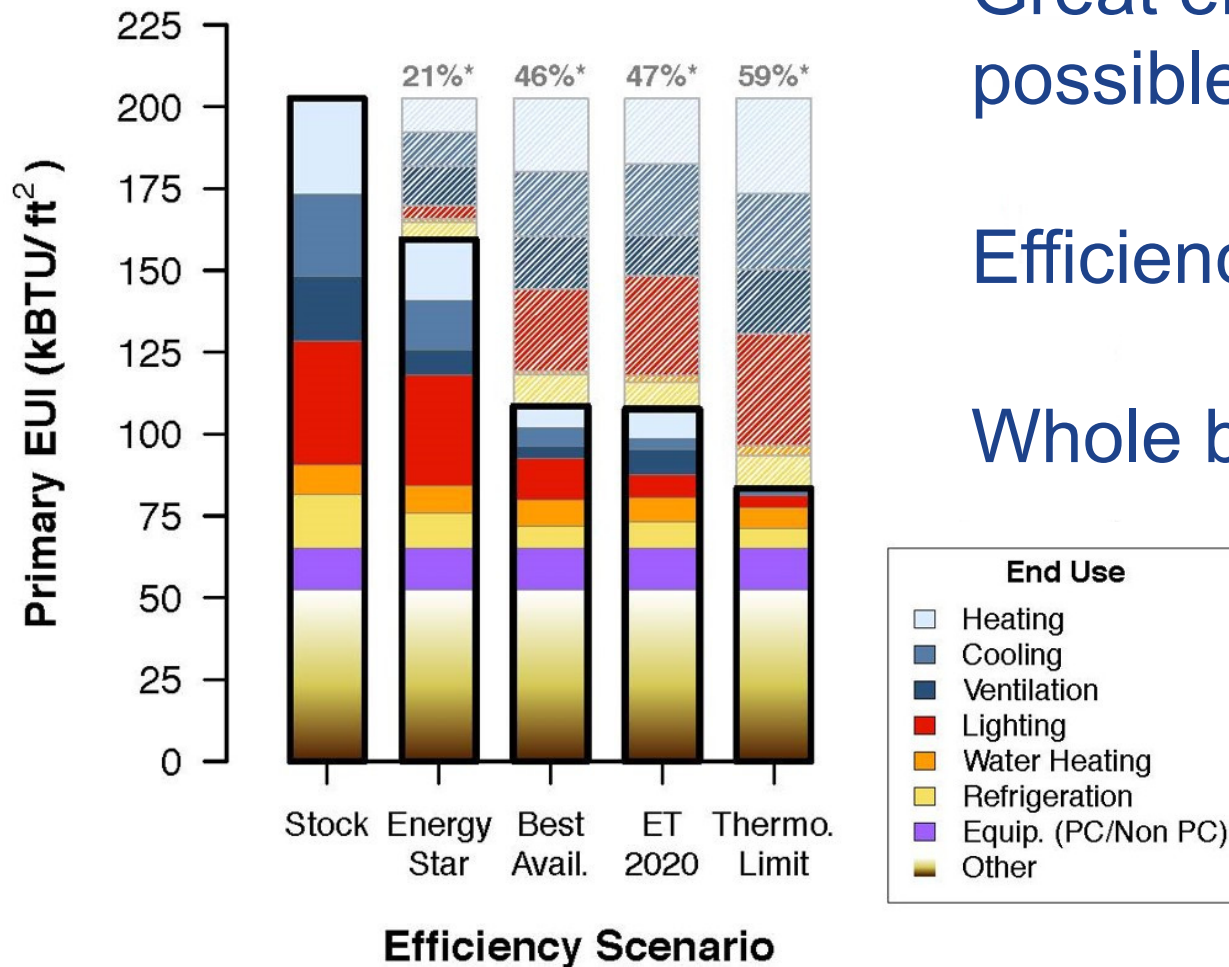
Today

- Why care about buildings
- Opportunities and emerging trends
- Challenges
- Who is doing it right... and what are they doing?
- Making it fun
- What is next?
- You

Buildings – why do we care?

- We spend 90% of our time indoors
- Green office environments linked with higher cognitive function scores
- Emerging technologies will continue to drive greater efficiency, comfort, affordability and protect the environment; can also make buildings more resilient
- Buildings could be key part of integrated grid of the future; critical component of grid stability
- Advanced buildings require a skilled labor force

Commercial Energy Use



Great energy savings possible; deep retrofits

Efficiency first is key

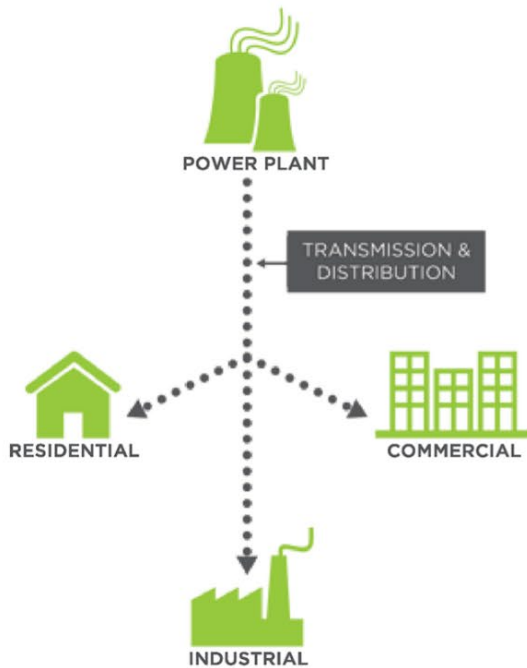
Whole building approach

Sources: <http://energy.gov/qtr>

Moving Towards the Grid of the Future

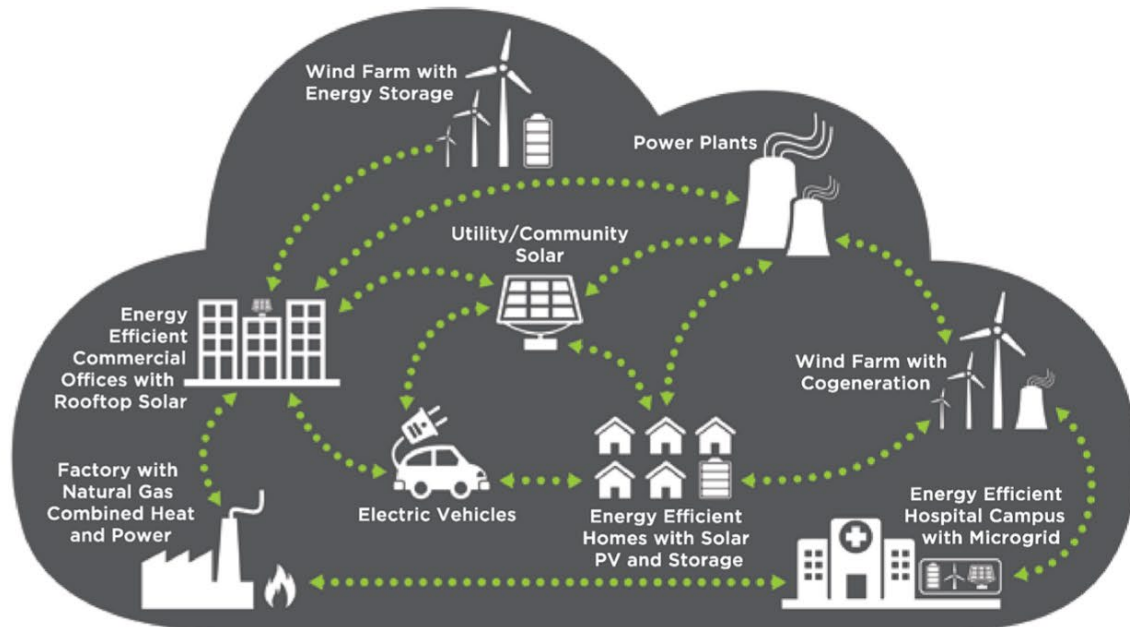
TODAY: ONE-WAY POWER SYSTEM

Central, One-Way Power Systems



EMERGING: THE ENERGY CLOUD

Distributed, Two-Way Power Flows



Opportunities and Challenges

U.S. spends \$600 billion each year to power homes, plants, & buildings

- Great opportunities in residential, commercial & industrial sectors
- 20%+ savings average; cost effective
- Other benefits: Jobs, Environment, Competitiveness

BUT persistent barriers exist...

- Efficiency not integrated into business planning & corporate decision making
- Perceived risk
- Confused by options; lack of unbiased information
- Financing? High hurdle rates, not willing to take on debt/sign long term contracts
- Split incentives /tenant-employee behaviors at odds with efficiency goals
- Not enough/qualified workforce



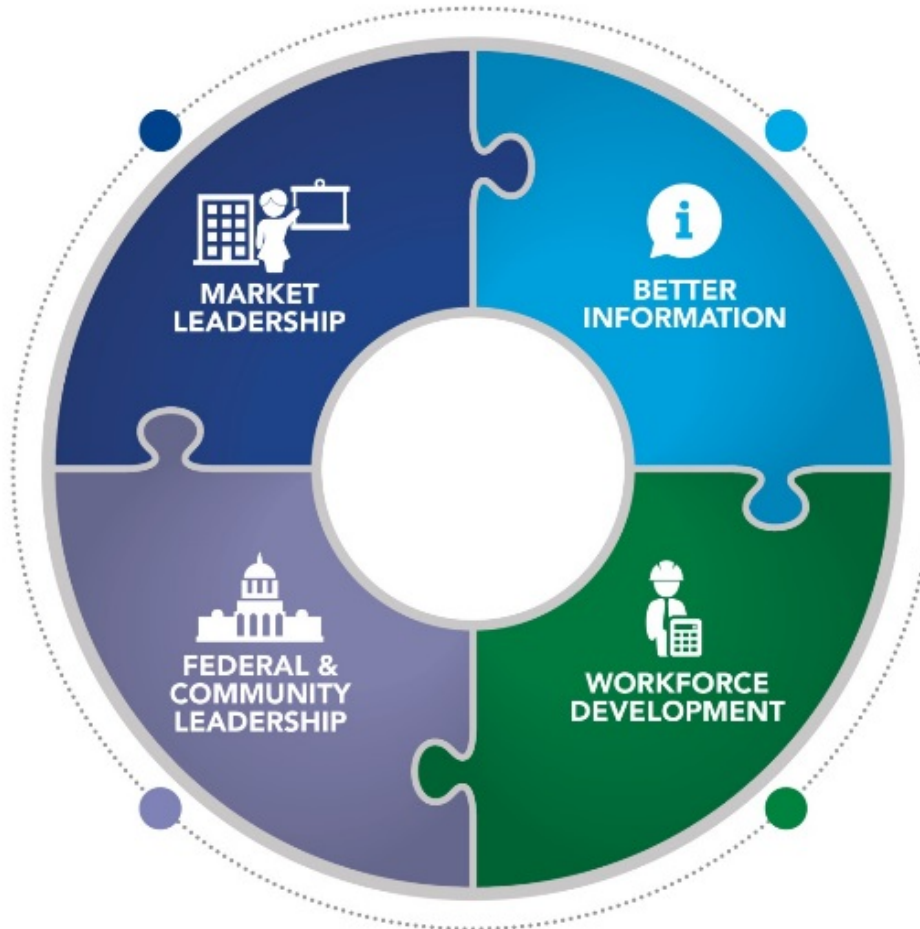
Developing Innovative,
Replicable Solutions
with Market Leaders

- ▶ Better Buildings Challenge
- ▶ Better Buildings Alliance
- ▶ Better Buildings, Better Plants
- ▶ Better Buildings Accelerators
- ▶ Better Buildings Residential
- ▶ Superior Energy Performance



State, Local, and
Federal Governments
Leading by Example

- ▶ Better Communities Alliance
- ▶ Performance Contracting



Making Energy
Efficiency Investment
Easier

- ▶ Better Buildings Solution Center
- ▶ Financing Navigator
- ▶ Improved Data Consistency and Access
- ▶ Tools to Assess the Efficiency of Buildings/Homes
- ▶ Tools for Energy Management



Expanding
the Workforce

- ▶ Better Buildings Workforce Guidelines
- ▶ Industrial Energy Management Workforce

Results to date

\$3.1 Billion saved

\$12 Billion in financing extended

380 Trillion BTUs energy saved

6.3 Billion gallons in water saved

900+ Better Buildings Partners

30 of the Fortune 100 companies

12 of the top 25 US employers

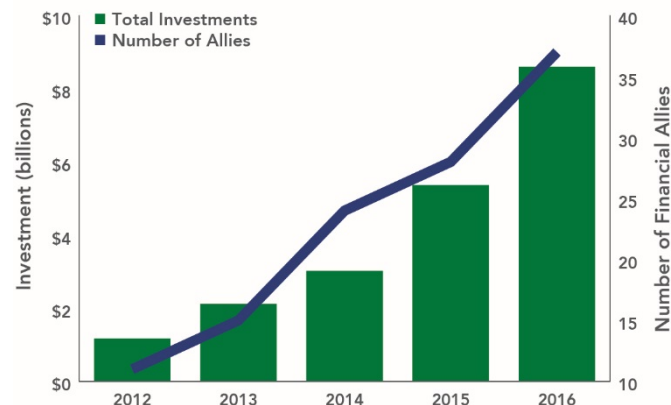
12% of US mfg energy footprint

13% of commercial building space

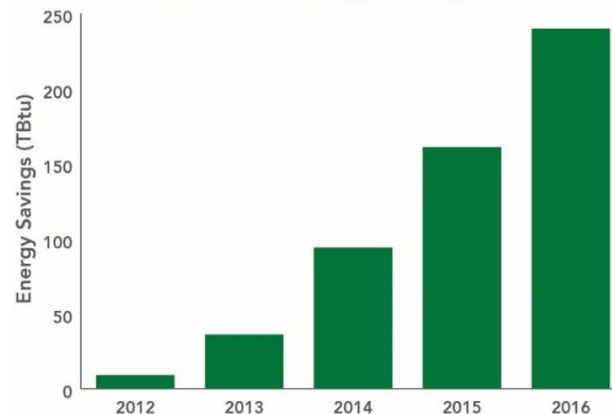
17 fed agencies; **28** states, **93** local governments

1500+ solutions published

Total Investment and Ally Growth by Year



Cumulative Energy Savings



Better Building Challenge Partners & Allies



Habits of successful organizations

1 Set a goal.

2 Data matters.

3 Look beyond technology.

4 It takes an champion and a team.

5 Learn, teach and evolve.

Examples of partner innovation

KOHL'S

Reorganized to take advantage of EE opportunities



Linked improved EE to compensation

3M

Established internal capital set aside fund



Used energy success to improve water management



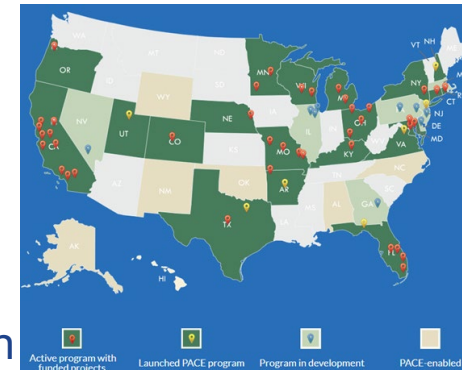
King County

Net zero facility; focus on efficiency first

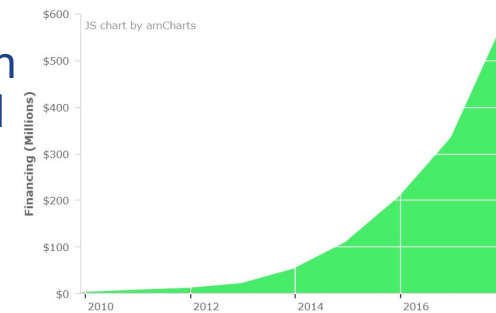
Innovations in Energy Financing

- ESPCs, loans, and leases continue to dominate the market but other financing options are growing
 - Efficiency-as-a-Service (i.e. energy services agreement (ESA), lumens-as-a-service): pay-for-performance, off-balance sheet financing solution
 - Green Banks (available in CA, CT, HI, MI, NY, RI, and Montgomery County): Public/non-profit finance institutions dedicated to increasing and accelerating investment in clean energy
 - On-Bill Financing: Utility/private lender pays for upgrade; customer repays on utility bill
 - Property-assessed clean energy (PACE) is now available in 36 states (and D.C.) with active programs in 20 states (and D.C.)
- Market standardization efforts (CPACE networks, Investor Confidence Project)
- [Better Buildings Financing Navigator](#) available to help users learn more and connect to financing providers

CPACE Policy Map



Cumulative CPACE Funding



\$588M end of 2017;
75% increase
compared to 2016

Better Buildings Solution Center

More than 1,500 solutions

Showcase Projects:

- Large and small buildings
- All sectors
- Specific building types such as schools, hospitals, hotels, grocery stores, universities, civic centers, libraries, offices and labs

Implementation Models (Playbooks):

- Overcome barriers: finance, data, energy management, staff training, community and customer outreach, partnering with utilities, and more
- Multi-faceted and applicable across sectors

Other Resources, Toolkits, Case Studies



Partner Playbooks

✓ FINANCE

- Power Purchase Agreement for the District of Columbia
- CPACE Financing for Resiliency and Energy Performance
- Facilities Infrastructure Pool
- Update Internal Purchasing Systems To Facilitate A Portfolio-Wide Energy Upgrade With Maintenance Funds
- Energy Finance Strategy
- Building Upgrade Value Calculator
- On-Balance Sheet, Off-Debt Capacity Performance Contracting
- Internal Green Revolving Fund
- Capital Set Aside Fund
- Green Initiatives Trust Fund
- Utility Savings Initiative
- ESA in BAE Facilities Nationwide
- Commercial PACE Financing at Pier 1
- On-Bill Financing

✓ DATA/ENERGY MANAGEMENT

- Energy Looking Glass Dashboard
- Real-Time Energy Monitoring And Weekly Engagement With Field Staff
- Accessing Tenant Utility Data in Triple-Net Leased Buildings
- Data Update and Certification Scorecard
- Centralized Energy Management And Capital Set-Aside Fund
- Submetering Initiative and Energy Dashboards
- Uniform Methodology To Measure Energy Efficiency Improvement
- Inventory and Tracking Process
- Designing A Comprehensive Energy Plan
- Mass Benchmarking
- Energy Benchmarking Program

✓ EMPLOYEE /CUSTOMER ENGAGEMENT

- Engaging Clinicians To Reduce Resource Use In Operating Rooms
- Chasing Quarters With Energy Set-Points
- Student Fellowships To Kickstart In-House Energy Programs
- Eco-Treasure Hunts at Fulfillment Centers
- Leveraging Green Leases To Reduce Energy And Water Use
- Wyndham Vacation Ownership Green Certification Program
- Leverage Student-Faculty Research
- Linking Energy Efficiency to Performance-based Compensation
- Energy Champion Program
- Operations Management Leadership Program

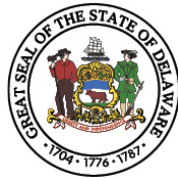
✓ OVERCOMING ORGANIZATIONAL HURDLES

- Enterprise-wide Coordination
- Good, Better...BEST Standards of Sustainability
- Developing an Integrated "Smart Lab" Program
- Integrated Model For Long Term Campus Energy Planning
- Creating a Culture of Energy Efficiency
- Streamlined Tri-resource Efficiency Programs

✓ INTEGRATING EMERGING TECHNOLOGIES

- Gallery Walks
- Lessons Learned from EMIS Pilot & Deployment
- Near-Zero Net Energy Retrofits for Low Income Housing
- Smart Meter Resident Energy Savings Program
- Using Technology to Meet Portfolio-Wide Energy Reduction Goals
- Energy Dashboards
- Project Energy Saver

Better Buildings Goal Achievers



4 things all BBC goal achievers did/do

- 1.** Gained senior management commitment
- 2.** Engaged the entire organization and communicated about results
- 3.** Established strong metrics and a consistent data tracking system
- 4.** Implemented cost effective measures, then look deeper; evaluated best practices & latest technologies; implement them strategically

Make the point... in a fun way

- Profile leadership
- Demonstrate the value of sharing solutions and ideas – ACROSS industries, building types and ownership models
- Make energy efficiency tangible, real and even, entertaining
- Get out of the boiler room and into the C-suite
- Leaders know they can always be better and continue to learn, evolve and act.....

<https://youtu.be/hY7pMaQZaDE>

Better Buildings Challenge SWAP



US NAVAL ACADEMY

US AIR FORCE ACADEMY



Season 1

2016

Season 2

2016

Reaching Media, Making Headlines

Bloomberg

Can a Reality TV Show Help Cut America's Power Bill?
2/17/2016

FAST COMPANY

The Department of Energy's Reality Show Makes Energy Efficiency Fun 4/25/2017

Widespread Outreach



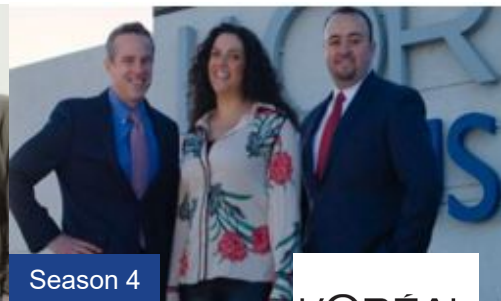
4.7+ Million Views



21 Million Impressions



97 Million Media Impressions



Season 3

2017

Season 4

2018

CITY OF ATLANTA

CITY OF BOSTON

L'ORÉAL USA

GENERAL MOTORS

It is an exciting time for energy professionals! What is next?

- Buildings are a source of opportunity, sustainability, and profit
- Focus on efficiency first. Deep/building wide upgrades.
- People want to work for organizations that care and are doing the right thing
- New technologies, solutions and strategies are emerging all the time
- Learn from leaders. Be a leader!

THANK YOU!

Maria T. Vargas

maria.vargas@ee.doe.gov

VISIT: betterbuildingsolutioncenter.energy.gov