



*Using less. Doing more.*

# Systems Efficiency Initiative

Laura Van Wie McGrory

2017 NASEO

Energy Policy Outlook Conference

February 9, 2017

# Systems Efficiency Initiative (SEI)

- Launched in February 2015 to:
  - Deepen understanding and raise awareness
  - Document energy, cost, GHG savings and other benefits
  - Develop market-oriented strategies for more efficient building systems

# Broad Stakeholder Involvement

100+ Manufacturers, designers, builders, utilities, efficiency advocates, federal agencies/labs, state energy offices

- **Steering Committee**
- **4 Technical Committees**
- **5 Working Groups**

# SEI Year 1 Report



- May 2016
- [www.ase.org/sei](http://www.ase.org/sei)

# Definitions

- **Building System:** *A combination of equipment, operations, controls, accessories, and means of interconnection that use energy to perform a specific function.*
- **Systems-Efficient Building:** *A building in which Multiple building systems are designed, installed, and operated to optimize performance collectively to provide a high level of service for a given level of energy use.*



# Why Systems Efficiency?

- *Some types of building equipment are approaching technical and economic limitations* for further efficiency improvements.
- *Highly efficient components do not necessarily result in an efficient building.*
- Emerging opportunities for attaining significant efficiency gains are *optimally applied at the system level.*
- *New systems-level strategies and tools could support the improved performance of building systems over the long term.*

# Scope of Year 1 Work

- High-Priority Building Systems:
  - Mechanical systems (HVAC)
  - Lighting
  - Building-level DC distribution
  - Miscellaneous electric loads
  - Buildings-to-grid integration (B2G)
  - Multi-Systems Integration
  - Market and Policy Barriers

Initial focus on new/renovated commercial buildings

# Strategies for System Efficiency

- ***Break down silos*** - collaboration among industry stakeholders and between industry and policymakers
- ***Effective integration*** within and among systems
- ***Optimize technology*** – smart design and smart control
- ***Incorporate systems strategies through all phases of the building life cycle*** – from design through construction, commissioning, and O&M
- ***Think outside the building*** – campus or community scale systems; buildings-to-grid integration



# Technical Recommendations

- **System-level metrics and modeling procedures** that reflect real-world operating conditions and allow hybrid technologies
- **Maximize daylighting** by integrating with other systems and providing dynamic control
- **Integrate MEL device controls** with building management systems
- **Expand power and communication standards** to support DC system designs
- **Develop common communication protocols**

# Policy Recommendations

- Promote *Integrated Project Delivery*
- Incorporate system approach in energy codes
- Workforce training & certification
- Expand use of periodic/continuous commissioning of building systems

# SEI Year 2 and Beyond

## Systems Efficiency Roadmap development:

### – Five Working Groups:

- Key building systems and their integration
- Grid-edge building interactions
- DC power distribution
- Life cycle of buildings
- Implementation strategies

### – Developing specific policy recommendations for the Roadmap

# Systems Efficiency Roadmap

- 84 Recommendations
- *Audiences include:*
  - U.S. Congress
  - DOE/other federal agencies
  - State/municipal governments
  - Utilities and regulators
  - Building professionals
  - Manufacturers and associations
- Roadmap launch: May 9, 2017

# SEI Roadmap: Selected Recommendations

## For US Department of Energy

1. Expand Better Buildings Workforce Guidelines to include systems-level training and knowledge.
2. Develop and validate simplified tools for building designers and utilities to evaluate systems-level energy-saving approaches in small buildings.
3. Develop improved end-use data and energy models to more reliably predict system-level energy savings potential from misc. electric loads (MELs).
4. Review and update energy test methods to allow DC input power
5. Undertake RD&D on ways smaller commercial and multi-family buildings can participate fully in buildings-to-grid (B2G) transactions.



# SEI Roadmap: Selected Recommendations

## For U.S. Congress

1. Support expansion of GSA pilots on integrated procurement to ensure that public building construction and renovations incorporate system efficiency.
2. Direct federal agencies to consider use of DC power distribution at the building or microgrid scale, for all existing or proposed projects involving on-site solar photovoltaics.
3. Amend current law to eliminate fossil-fuel phase-out as a potential barrier to CHP installations in federal facilities with significant thermal and electrical loads.

# SEI Roadmap: Selected Recommendations

## For State and Municipal Governments

1. Encourage or require commercial building owners to benchmark and disclose building energy performance; and adopt sub-metering requirements in building codes to support systems-level benchmarking.
2. Provide training and tools to support EE design, installation, commissioning & post-occupancy measurement of building lighting systems.
3. Encourage use of integrated design and delivery when providing design assistance to local governments and school districts.
4. Authorize tax incentives, matching grants, and other financing mechanisms to support early adopters of packaged CHP systems in buildings.
5. Adopt policies committing major public facilities to help “anchor” new or expanded DES systems.

# SEI Roadmap: Selected Recommendations

## For Utilities

1. Allow alternatives to full-building modeling when designing EE programs and when evaluating energy reductions of installed system-level measures.
2. Approve simplified tools to validate actual building system energy performance compared with initial savings estimates.
3. Promote integrated project design and delivery through design-assistance and rebate programs.

# SEI Roadmap: Selected Recommendations

## For Appliance & Equipment Manufacturers and Associations

1. Develop metrics to measure the performance of various building systems and subsystems, to support systems approaches to reducing building energy consumption.
2. Provide designers and installers with training on the role of their components within the building system and the ideal configuration to realize optimized system efficiency.
3. Work to enhance open-system protocols to facilitate the integration of MEL local controls with Building Management Systems.

***THANK YOU!***

For more information:

Laura Van Wie McGrory

[Lvanwie@ase.org](mailto:Lvanwie@ase.org)