

Managing Energy Use in Buildings

Ongoing Collection and Utilization of Energy Use Data

From the NEMA High Performance Buildings Council

Energy Efficiency Life Cycle

- Metering at overall and subsystem level
- Alerts as system is altered
- Continuous feedback

- Existing buildings – Energy Audits and Metering
- New Buildings – database of similar buildings

1. Measure

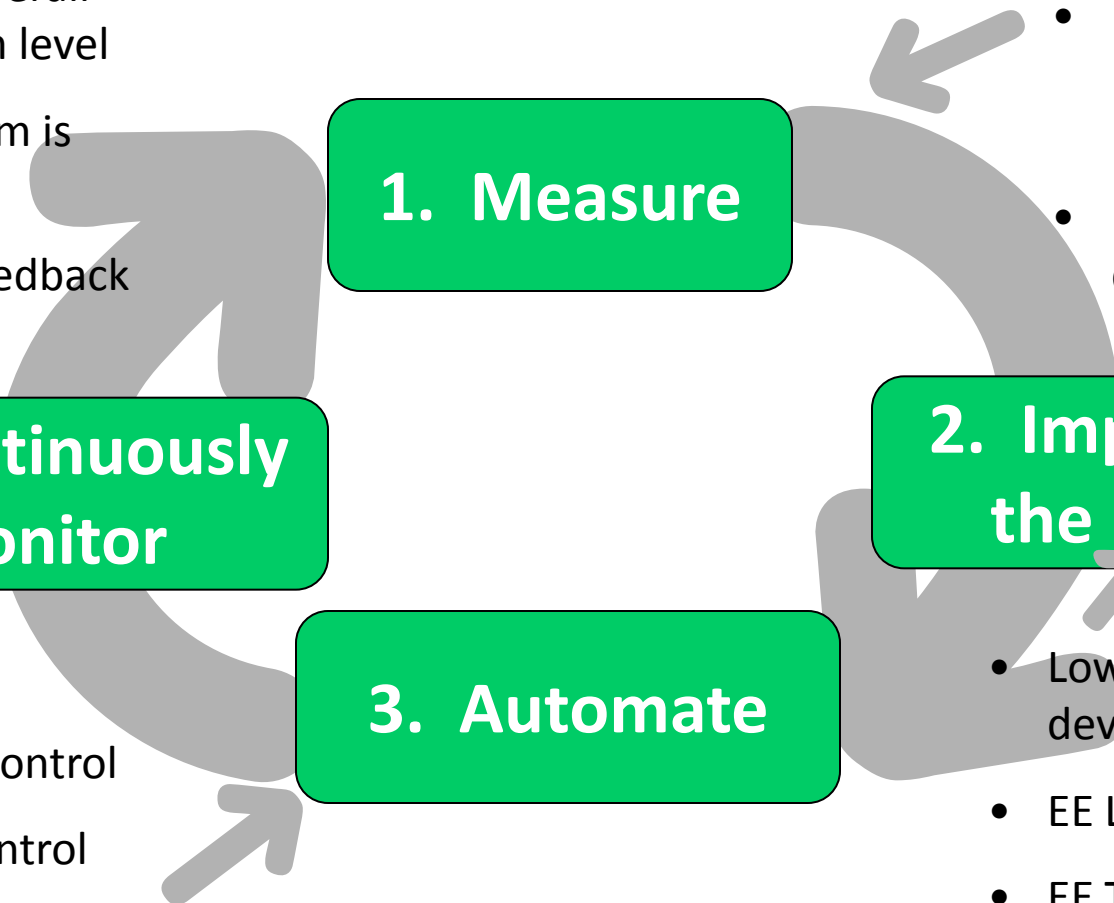
2. Implement the Basics

- Low consumption devices
- EE Lamps and ballasts
- EE Transformers
- EE Motors
- Power quality

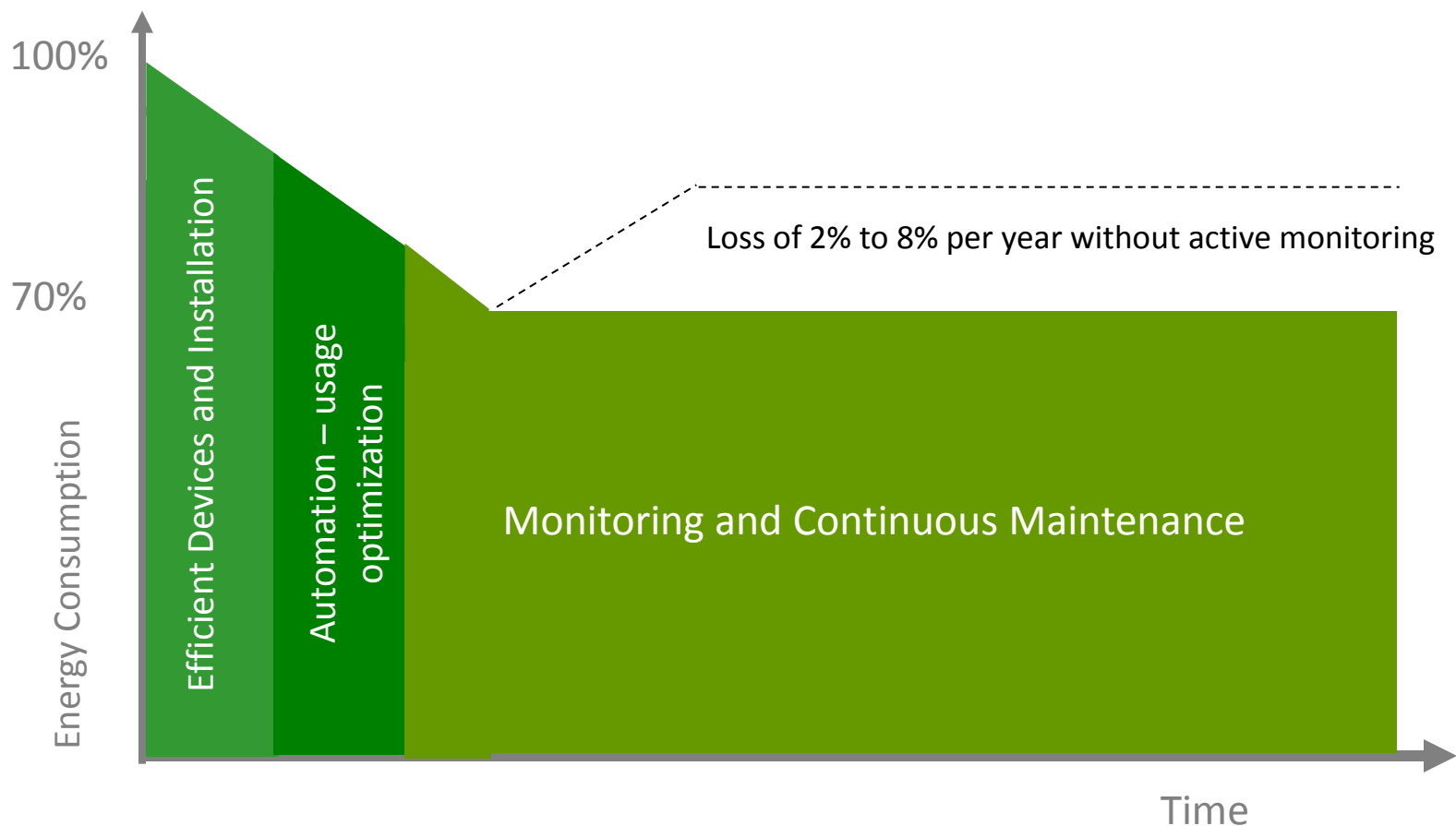
3. Automate

- Lighting control
- Motor control
- Building management
- Power management

4. Continuously Monitor



Gaining Efficiency At Each Level



Where to Monitor?

- 💡 Overall Energy Usage
- 💡 Major Subsystems
 - Lighting
 - Motor driven systems
 - Water Heating
- 💡 Nonelectrical systems
 - Water usage
 - Natural Gas



Case Studies #1 – Texas

- 💡 2 Buildings owned by the State
- 💡 Actual Savings over 3.5 Years
 - 5,043,585 kWh
 - 4,556 MCF natural gas
 - ~\$367K
- 💡 Environmental Impact
 - 3,785 tons of CO2 reduced = to taking 757 Cars off the road
 - High-efficiency transformers
 - Mechanical system upgrades
 - New vestibule
 - Energy management system upgrade
 - Lighting retrofit
 - Water conservation measures
 - Window film
- 💡 Continuous monitoring allows for the savings to be continued into the future

Case Studies #2 – Kansas

- 💡 42 Buildings owned by major city
- 💡 Actual Savings over 7 Years
 - 16,667,032 kWh
 - 63,692 MCF natural gas
 - ~\$2.3M
- 💡 Environmental Impact
 - 16,322 tons of CO2 reduced = to taking 3,264 Cars off the road
- 💡 What was done
 - Retrofitting 10,000 luminaires
 - Adding building control systems to 36 of the buildings
 - Cooling retrofit
 - Added variable speed drives
 - Monitoring of 1,200 control points
- 💡 Central point monitoring allows facilities engineering to track all buildings from a central location and to take action if systems require adjustment or maintenance

What is Needed?

- 💡 Heightened awareness of the importance of monitoring and continued maintenance
- 💡 Database comparison capability
 - We need a database of energy usage of various building types
 - Should capture energy savings by “passive” and “active” types
- 💡 Building performance labeling

Action by Congress

Lead by example

- Require metering/monitoring of federal buildings
- Require the resulting data to be input into a national database that can be accessed for comparison with other buildings

Require that adopted energy codes include metering/monitoring of major systems and compatibility of those systems with Smart Grid