Leading By Example:
Improving Energy Management at
Connecticut State Facilities

Office of Energy Demand
Bureau of Energy and Technology Policy
1. Vision for Lead By Example
2. State Government Energy Usage Snapshot
3. LBE Accomplishments and Project Savings Highlights
4. Strategies Moving Forward
5. EnergyCAP Demonstration of Statewide Reports
Vision for Lead By Example
LBE Vision

- Implement sustainable and predictable funding and financing
- Empower all state agencies to analyze accurate and complete energy data
- Set and achieve energy and water efficiency targets at state facilities
- Convert 100% state street lights to LED by 2021
- Update High Performance Building Standards Statutes & Regulations
- Aggregate energy purchasing while meeting or exceeding the RPS
- Assess feasibility of renewables at state facilities
- Improve Electric Vehicle infrastructure at state facilities
- Reconvene LBE Council of Commissioners (COC)
State Government Energy Usage Snapshot
State Building and Energy Overview

Gross Square Feet of Floor Space by Agency

- UCONN, 18%
- CSCU, 22%
- DAS, 10%
- DOC, 8%
- DOT, 10%
- DDS, 2%
- DEEP, 2%
- DMHAS, 4%
- OPM, 1%
- MIL, 3%
- JUD, 4%
- OLM, 1%
- DVA, 1%

FY18 State Est. Energy Cost & Use

- Executive Branch: $1,622,988
- Higher Education: $2,740,518
- Judicial Branch: $4,222,837
- Legislative: $5,489,912
- Quasi-Publics: $2,328,844

*Snapshot of the information currently available, the data is not 100% complete*
State Energy Use and Cost by Commodity

Use Percentage

- Electric: 33.8%
- Natural Gas: 44.8%
- Other: 6.6%
- Sewer: 0.0%
- Steam: 14.8%
- Water: 0.0%
- Total: 100.0%

Cost Percentage

- Electric: 73.1%
- Natural Gas: 15.4%
- Other: 4.3%
- Sewer: 1.7%
- Steam: 2.1%
- Water: 3.5%
- Total: 100.0%

*Snapshot of the information currently available, the data is not 100% complete*
State Energy Accounts by Commodity

*Snapshot of the information currently available, the data is not 100% complete*
LBE Accomplishments and Project Savings Highlights
Why Lead By Example?

Connecticut’s state buildings are an important energy savings opportunity.

State buildings account for 15%-20% of electricity and natural gas consumption across the state, costing about $100 million in energy costs for SFY18.

Energy efficiency measures can reduce energy costs up to 30%.
Since 2012, energy efficiency investments have resulted in

208+ energy saving projects

$6.2M annual state savings
LBE Accomplishments

Achieved key progress in energy analytics
Established electronic data flow from some utilities to state platform for analyzing energy

Progress installing upgrades at CT Valley Hospital campus
Bond funding for major efficiency upgrades fully expended by end of 2016; additional funds in 2018
Multiple agencies successfully completed minor efficiency upgrades

Established master agreements with Connecticut’s utilities to unlock the ability of state agencies to use utility administered programs to complete small-scale energy efficiency investments in facilities

Purchased competitive electricity supply for all agencies at pricing below standard offer
8.423 cents per kWh compared to 10.14-11.23 cents/kWh
Utility Turnkey Projects Savings 2014-2018

Estimated Annual Cost Savings by Agency

- Connecticut State Library: $144,828.73
- Department of Administrative Services: $4,714.87
- Department of Children & Families: $272,647.86
- Division of Criminal Justice: $271,067.61
- Department of Developmental Services: $47,777.64
- Department of Energy and Environmental Protection: $43,241.18
- Department of Emergency Services & Public Protection: $171,195.90
- Department of Mental Health & Addiction Services: $171,195.90
- Department of Correction: $85,563.55
- Department of Labor: $7,633.34
- Department of Transportation: $21,401.64
- Judicial: $55,184.91
- State Department of Education: $52,221.48
These graphs are from the 46 completed projects with a year’s worth of data.

These projects have saved $2.9 million and 54,605 MMBtus in their first year.

$841,775 in incentives for these projects was diverted from DEEP’s LBE fund account to the General Fund in CY17 (this is in addition to the C&LM Plan funding diversion).
DEEP ENERGY EFFICIENCY PROJECT WITH DAS

IMPACT:

Following this project, DAS reduced annual energy use by over 3,450 MMBtus resulting in estimated energy cost savings of $253,000 per year.

by completing a mechanical renovation in 2015 at 55 Farmington in Hartford. 
**The project cost was $609,550 with a payback period of 2.41 years.**
DEEP ENERGY EFFICIENCY PROJECT WITH DOC

IMPACT:

Following this project, DOC reduced annual energy use by over 3,000 MMBtus resulting in estimated energy cost savings of $143,000 per year.

by replacing inefficient, outdated rooftop HVAC units in 2016 at their Robinson Correctional Center.

The project cost was $275,381 with a payback period of 1.93 years.
Projects and Strategies Moving Forward
Strategic Plan for Better State Buildings

**Inventory Facilities Universe**
State building and account data collection, and correlation of meters to buildings

**Benchmarking and Procurement**
Compare energy use to prioritize; update documents, contracts, and processes; identify financing mechanisms

**Screening for potential opportunities**; conduct feasibility analyses for renewables generation; consider consistency with state and local plans

**Energy Assessments**
Various audit levels, depending on purpose and funding source

**Measure Progress**
Efficiency measures and renewable energy generation financed, installed, and savings analyzed
Geo-Targeting Renewables for State Facilities

Strategically install renewable energy sources to integrate with existing energy infrastructure and address energy waste and efficiency first

- Ensure good siting decisions
- Maximize limited financial resources
- Ensure coordination with utilities on interconnection constraints and opportunities
Connecticut Department of ENERGY & ENVIRONMENTAL PROTECTION

Current and Future Energy Management Upgrade Projects

**DEEP**
Quinebaug Fish Hatchery: energy conservation measures

**DMV**
Wethersfield Headquarters lighting and HVAC upgrades

**DOT**
Lighting upgrades at various maintenance facilities and DOT-owned streetlights, bridge/tunnel lighting

**DMV**
Lighting upgrades at various maintenance facilities and DOT-owned streetlights, bridge/tunnel lighting

**DOC**
District 1 facilities: Osborn, Northern & McDougal/Walker

**DVA**
Rocky Hill Campus: Home Energy Audits, electrical upgrades, sub-metering installation, potentially co-gen and retrofits

**JUD**
Developing plans for future energy management upgrades

**DAS**
Lighting and controls upgrades across multiple agencies with standardized approach
Projects in the Pipeline

1. Department of Transportation will upgrade their highway lights with LEDs saving over $50K annually

2. Multiple projects to be completed at DOC, DVA, DAS, and other agencies following release of previously authorized $20M bond funding

3. DOC, DOT, and DEEP are pursuing renewable energy projects with solar site feasibility assessments scheduled for 2019
This year, DEEP is rolling out Energy Performance Profiles for state agencies

– Personalized, periodic profiles for each state agency outlining their benchmarking progress and key energy data in a customizable dashboard

Profiles will enable DEEP and agencies to:

– Encourage and incentivize state agencies to partner with DEEP
– Measure and monitor progress in state building benchmarking
– Improve the accuracy and granularity of state building and facility data
– Improve transparency about energy use for program managers and administrators
EnergyCAP Demo of Statewide Reports
EnergyCAP at a Glance

Well suited for the state’s comprehensive energy structure
   – allows agencies to manage their state accounts, buildings, meters, and even sub-meters at a granular level

Can populate into Portfolio Manager, allowing agencies to view Energy Star Scores

Provides customizable live energy dashboards and powerful tools for energy use and cost analyses
Ranking DAS Buildings by Energy Use and Costs

<table>
<thead>
<tr>
<th>DAS Top 10 Building Use Per Area: FY18</th>
<th>DAS Top 10 Building Cost Per Area: FY18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept of Insurance</td>
<td>Dept of Insurance</td>
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<tr>
<td>0.298 MMBtu/SqFt</td>
<td>$10.93/SqFt</td>
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<tr>
<td>DEEP Windsor Lab</td>
<td>Office of Chief Medical Examiner</td>
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<tr>
<td>0.177 MMBtu/SqFt</td>
<td>$4.42/SqFt</td>
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<tr>
<td>38 Wolcott Hill Road</td>
<td>DEEP Windsor Lab</td>
</tr>
<tr>
<td>0.157 MMBtu/SqFt</td>
<td>$4.14/SqFt</td>
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<tr>
<td>Office of Chief Medical Examiner</td>
<td>DCC HQ - 24 Wolcott Hill Rd</td>
</tr>
<tr>
<td>0.119 MMBtu/SqFt</td>
<td>$2.95/SqFt</td>
</tr>
<tr>
<td>Highland House</td>
<td>395 West Main Street</td>
</tr>
<tr>
<td>0.085 MMBtu/SqFt</td>
<td>$2.53/SqFt</td>
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<tr>
<td>Gov.Res.Annex/Guest House</td>
<td>505 Hudson St</td>
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<tr>
<td>0.084 MMBtu/SqFt</td>
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<td>DCC HQ - 24 Wolcott Hill Rd</td>
<td>286 Sheldon St</td>
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<td>0.071 MMBtu/SqFt</td>
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<tr>
<td>286 Sheldon St</td>
<td>Southeastern Mental Health</td>
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<tr>
<td>0.066 MMBtu/SqFt</td>
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<tr>
<td>Garage #2 (14)</td>
<td>Gov.Res.Annex/Guest House</td>
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<tr>
<td>0.063 MMBtu/SqFt</td>
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<td>Southeastern Mental Health</td>
<td>Rowland State Government Center</td>
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<td>0.062 MMBtu/SqFt</td>
<td>$1.80/SqFt</td>
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*Our EnergyCAP database-wide average EUI ranged between .108 and .114 MMBtu/SqFt in CY 2018

*Snapshot of the information currently available, the data is not 100% complete
## Top Energy and Water Use by State Agency

### Top Energy Cost Per Area by Agency: FY18

<table>
<thead>
<tr>
<th>Agency</th>
<th>Cost Per SqFt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Services, Dept. of</td>
<td>$736.91</td>
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<td>Emerg. Svc. &amp; Public Protection, Dept. of</td>
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<td>Energy &amp; Env. Protection, Dept. of</td>
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<td>Military Dept.</td>
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<td>Developmental Services, Dept. of</td>
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<td>Mental Health &amp; Addiction Svcs, Dept. of</td>
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<td>Correction, Dept. of</td>
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<td>Motor Vehicles, Dept. of</td>
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<td>Labor, Dept. of</td>
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<td>Children &amp; Families, Dept. of</td>
<td>$22.01</td>
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### Top Water Cost Per Area by Agency: FY18

<table>
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<tr>
<th>Agency</th>
<th>Cost Per SqFt</th>
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<td>Administrative Services, Dept. of</td>
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<td>Transportation, Dept. of</td>
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<td>Military Dept.</td>
<td>$1.10</td>
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<tr>
<td>Motor Vehicles, Dept. of</td>
<td>$1.10</td>
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<tr>
<td>Mental Health &amp; Addiction Svcs, Dept. of</td>
<td>$0.65</td>
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<tr>
<td>Emerg. Svc. &amp; Public Protection, Dept. of</td>
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<td>Correction, Dept. of</td>
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<td>Labor, Dept. of</td>
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<td>Education, State Dept. of</td>
<td>$0.06</td>
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<tr>
<td>Econ. &amp; Comm. Develop., Dept. of</td>
<td>$0.00</td>
</tr>
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</table>

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LEAD BY EXAMPLE

FOR STATE GOVERNMENT

Connecticut Department of Energy and Environmental Protection