



Energy Efficient County Buildings

Realizing Money and Energy-Saving Opportunities



About IBTS

IBTS is a 501(c)(3) non-profit organization that helps governments provide high-quality, cost-effective services, manage risk, and meet new challenges through public/non-profit partnerships. Established to provide unbiased professional services, IBTS is committed to promoting enduring solutions to strengthen communities, enhancing trust and confidence in governance, and empowering people to serve communities -- all with the goal of lessening the burdens of government. IBTS services include inspections, plan reviews, building department services, education and training, staff augmentation, policy and procedure development, cost evaluation, energy ratings, and auditing.

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About NACo

The National Association of Counties (NACo) is the only national organization that represents county governments in the United States. Founded in 1935, NACo provides essential services to the nation's 3,068 counties. NACo advances issues with a unified voice before the federal government, improves the public's understanding of county government, assists counties in finding and sharing innovative solutions through education and research, and provides value-added services to save counties and taxpayers money. For more information about NACo, visit www.naco.org.

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Introduction

Counties across the country are taking advantage of the many low- or no-cost energy saving initiatives available, and NACo has begun to recognize and assist counties that prioritize managing their buildings more efficiently.

In May of 2012, the National Association of Counties and the Institute for Building Technology and Safety (IBTS) launched a study to learn more about how counties use energy in their buildings. Our goal is to help counties identify strategies to increase their energy efficiency by tracking energy use in their facilities and creating a plan for energy saving improvements.

Counties cannot properly manage their energy consumption without first measuring their energy use. While many counties have already taken the initiative to track energy in their buildings, many lack a centralized resource to compare their facilities to each other, to similar building types across the country, and to the same facility over time.

NACo and IBTS have taken the first steps to create this resource, interviewing and gathering data from NACo members about how they manage and decrease energy use in their buildings. The newly developed National County Building Database will allow counties to benchmark their facilities and identify opportunities to improve their energy efficiency.

Executive Summary

This report provides a summary of the data counties have provided to NACo through Portfolio Manager, EPA's tool for monitoring utility costs and benchmarking facilities against their counterparts across the country. This Portfolio Manager analysis is a preview of our findings to come, and spans 21 states and totals more than 62 million square feet. The non-Portfolio Manager data will strengthen and deepen the database so that we may provide empirical conclusions and action strategies for producing significant cost savings. Key findings:

- * 33% of county facilities have an annual source energy use intensity (EUI), a measure that reflects energy performance relative to a building's size, below the EPA's national median
- * 48% of county facilities have an annual source EUI at least twice the EPA's national median, and
- * The most popular building types in the database are offices (405 facilities), fire/police stations (101 facilities), courthouses (74 facilities), jails (45 facilities), and libraries (36 facilities).

The research team has found that many counties are poised to make 10% - 20% energy savings gains in their buildings by implementing low- to no-cost



The Ada County (ID) Courthouse/Administration Building was the first ENERGY STAR labeled building to receive recognition through NACo's ENERGY STAR Courthouse Campaign in 2004. In 2005, the Courthouse became the first "green" building in Idaho to meet standards for the U.S. Green Building Council's Leadership in Energy and Environmental Design for Existing Buildings (LEED-EB).

Photo courtesy of Ada County Operations Team

improvements and cost-neutral improvements that can be financed by a third party and paid over time through the resulting energy and operational cost savings. Some of these improvements include: upgrading mechanical and electrical systems; replacing lighting controls; adding energy management and information systems; upgrading heating, ventilation, and air conditioning systems (HVAC); replacing motors and pumps; and adding insulation.

Building the Database

From June to October 2012, NACo's research team contacted and interviewed county staff and elected officials from nearly 400 counties to build the foundation for the County Building Database. The team sought energy information from at least 90 counties of all sizes and climates to create a representative sample of counties nationwide. Through these individual interviews, NACo compiled data on:

- * The number of buildings each county owns
- * Building types in each county (jail, courthouse, office building, etc.)
- * Who the county's utility providers are
- * How the county receives and processes utility bills (paper vs. electronic)
- * If the county is tracking energy use and how ("homemade" spreadsheets, ENERGY STAR®'s Portfolio Manager Tool, a third party software system, etc.), and
- * What kinds of energy upgrades the county has performed (lighting upgrades, equipment replacements, Energy Performance Contracts, etc.)

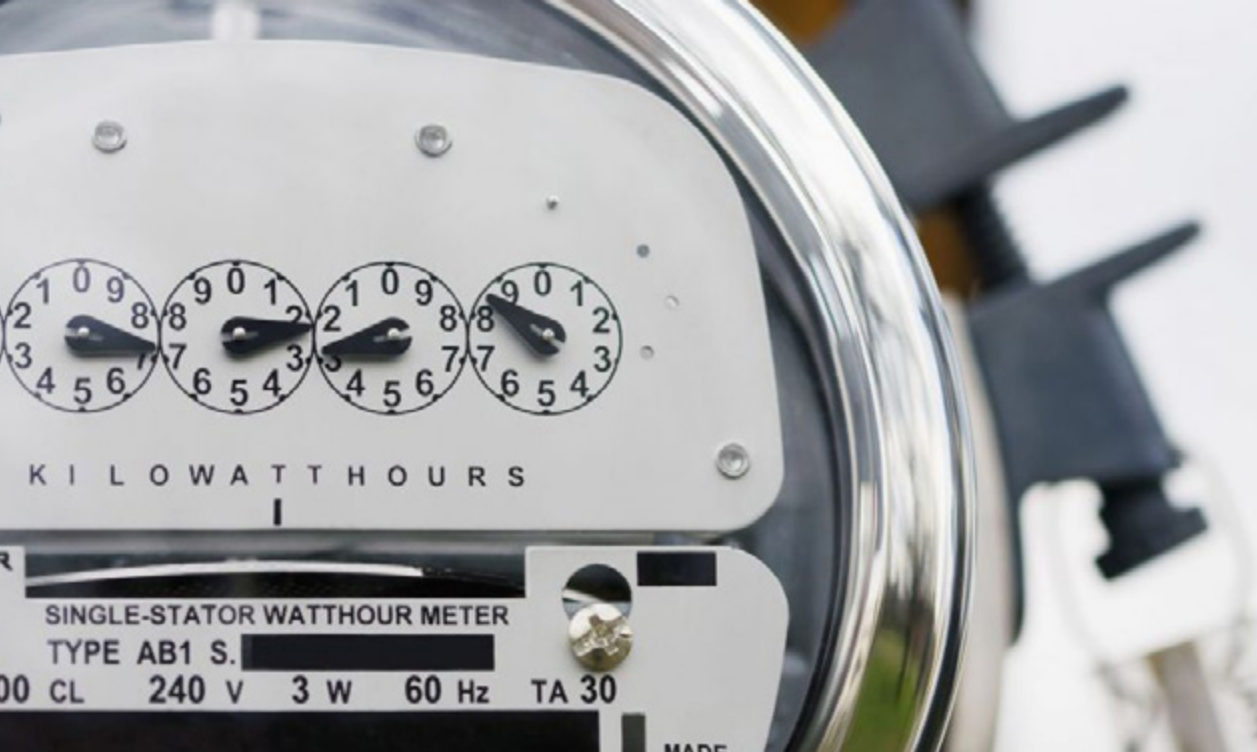
NACo and ENERGY STAR®'s Portfolio Manager Services

- * 93 Counties are ENERGY STAR Partners
- * 110+ Counties are using NACo's Benchmarking Assistance Program through Portfolio Manager
- * There are 1,816 Buildings in NACo's Master Portfolio Manager Account
- * 1,060 County buildings have been added to Portfolio Manager over the life of the program

For more information about NACo's Benchmarking Assistance Program, visit www.naco.org/energystar

Of the nearly 400 counties NACo interviewed, 94 provided monthly energy cost and use data for each of their county owned buildings. Several more counties provided data for some of the buildings in their portfolios. NACo now has sufficient building information to benchmark common county building types, provide individual county assistance, and draw national conclusions about the state of county buildings.

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What is Benchmarking?

The first step to energy efficiency is tracking energy use and developing a baseline on which to improve.

Benchmarking is the process of comparing the energy performance of facilities to similar building types across the country or to the same facility over time. The knowledge generated from tracking enables county leaders to identify inefficiencies in their buildings. Most importantly, benchmarking is essential for determining which energy improvements will be most effective, identifying underperforming buildings and verifying efficiency initiatives.

The more buildings of each type there are in the National County Building Database, the more accurate conclusions we can make about energy use, building efficiency and challenges to managing energy.

ENERGY STAR®'s Portfolio Manager Tool

Since 2004, NACo has been working with the EPA's ENERGY STAR® Program, helping counties monitor their utility costs and benchmark facilities against their counterparts across the country. Portfolio Manager has proven an exceptional tool for NACo members. Some counties, however, have needs outside the scope of Portfolio Manager's services, and use private third-party software to enhance their energy tracking efforts.

NACo has collected energy reports counties generated from these software programs as well as counties' more informal excel spreadsheets to expand the number of counties eligible to contribute to the database and be recognized for their energy tracking efforts. By helping counties manage buildings that the Portfolio Manager system does not provide an ENERGY STAR benchmarking score for (i.e. jails, fire/police stations), the County Building Database will provide county-specific resources for energy saving success.

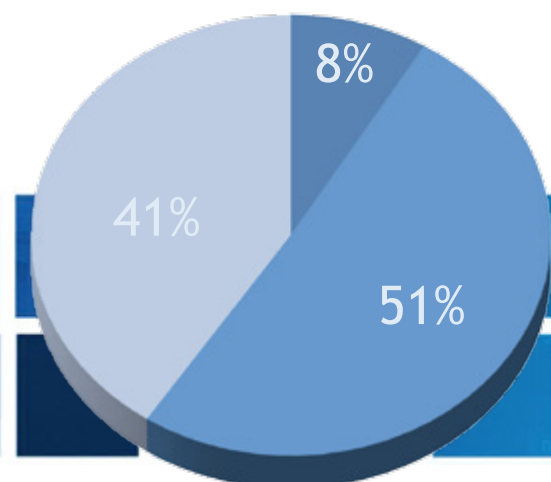
Energy Tracking Methods

Counties that are tracking energy in their buildings have recognized significant value from their efforts. According to county staff and officials, the top reasons for tracking are:

1. Analyzing aggregate energy cost and use information
2. Identifying areas with cost savings potential
3. Measuring savings from retrofit projects, and
4. Identifying anomalies in cost and use data.

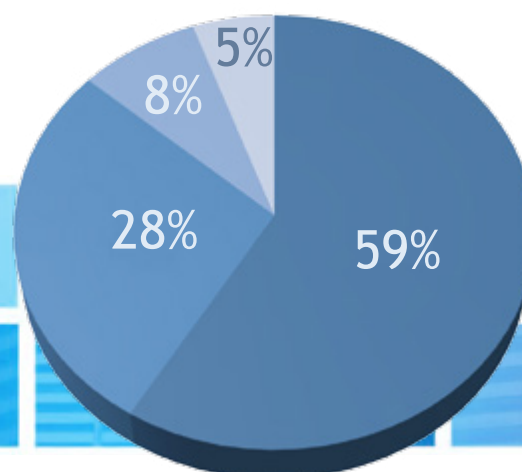
While Portfolio Manager has the capability to help counties accomplish all of these things, third party tracking software programs can identify errors from

HOW COUNTIES USE PORTFOLIO MANAGER



- Full Portfolio in Portfolio Manager Only (No Other Software)
- Partial Portfolio in Portfolio Manager
- Portfolio Manager and Third Party Software

HOW COUNTIES TRACK ENERGY



- Counties with Portfolio Manager account
- Counties with third party software account
- Using spreadsheets only to track
- No tracking at all

manual data entry, track greenhouse gas emissions for state reporting requirements, increase the consistency and uniformity of procedures across county departments, and provide more comprehensive energy reports. A good tracking fit depends on each individual county's energy management goals.

For example, when Iredell County, N.C., began tracking energy with FacilityDude's Utility Trac Pro software, the county's facilities manager found that energy consumption was increasing in vacant buildings. Improperly set controls and failing equipment had been going undetected in these facilities, but simply by changing controls in one building, the county realized \$7,000 in mechanical errors that would otherwise have been lost.

The National County Building Database includes 94 full county portfolios from 30 states in addition to several more partial portfolios. Of these full county portfolios, 48 counties shared their Portfolio Manager data with NACo's master Portfolio Manager Account. The remaining counties shared data in a wide range of formats, from scanned bills to third party tracking software reports. In total, the database includes nearly 4,500 buildings in 176 counties.

Of the nearly 400 counties interviewed by NACo in 2012, the vast majority have created Portfolio Manager Accounts. Most of these counties, how-

ever, only track a few large facilities (i.e courthouses, office buildings, and schools) that Portfolio Manager gives an ENERGY STAR® benchmarking score. Counties rarely input their entire portfolio into Portfolio Manager, and often are not tracking their other facilities at all. The opportunity to manage and reduce energy in these buildings, however, is significant. Depending on an individual county's needs, counties may also track some/all of their buildings with a combination of excel spreadsheets of varying sophistication or with a third party tracking software.

Expanding data collection beyond Portfolio Manager has enabled our team to gather a stronger, more representative sample of county building portfolios. The research team is still working through the organization and analysis of these various portfolios, and is synthesizing the data to make deeper conclusions about county buildings. From interviews and Portfolio Manager Reports, however, we have a significant amount of information available about how counties manage energy and what kinds of projects they have been undertaking.

The data we have collected thus far has not been analyzed to the point of assigning a degree of confidence for a national extrapolation of trends but with more participation we hope to be able to draw meaningful conclusions about such trends and the degree of confidence in subsequent reports.

Portfolio Manager Snapshot

- * Counties – 62
- * Facilities - 1,799
- * States – 21
- * Over 62 million square feet
- * Average facility size – 62,939 sf
- * Average age of buildings - 39 years (1973 construction)

Data Preview: Portfolio Manager Analysis

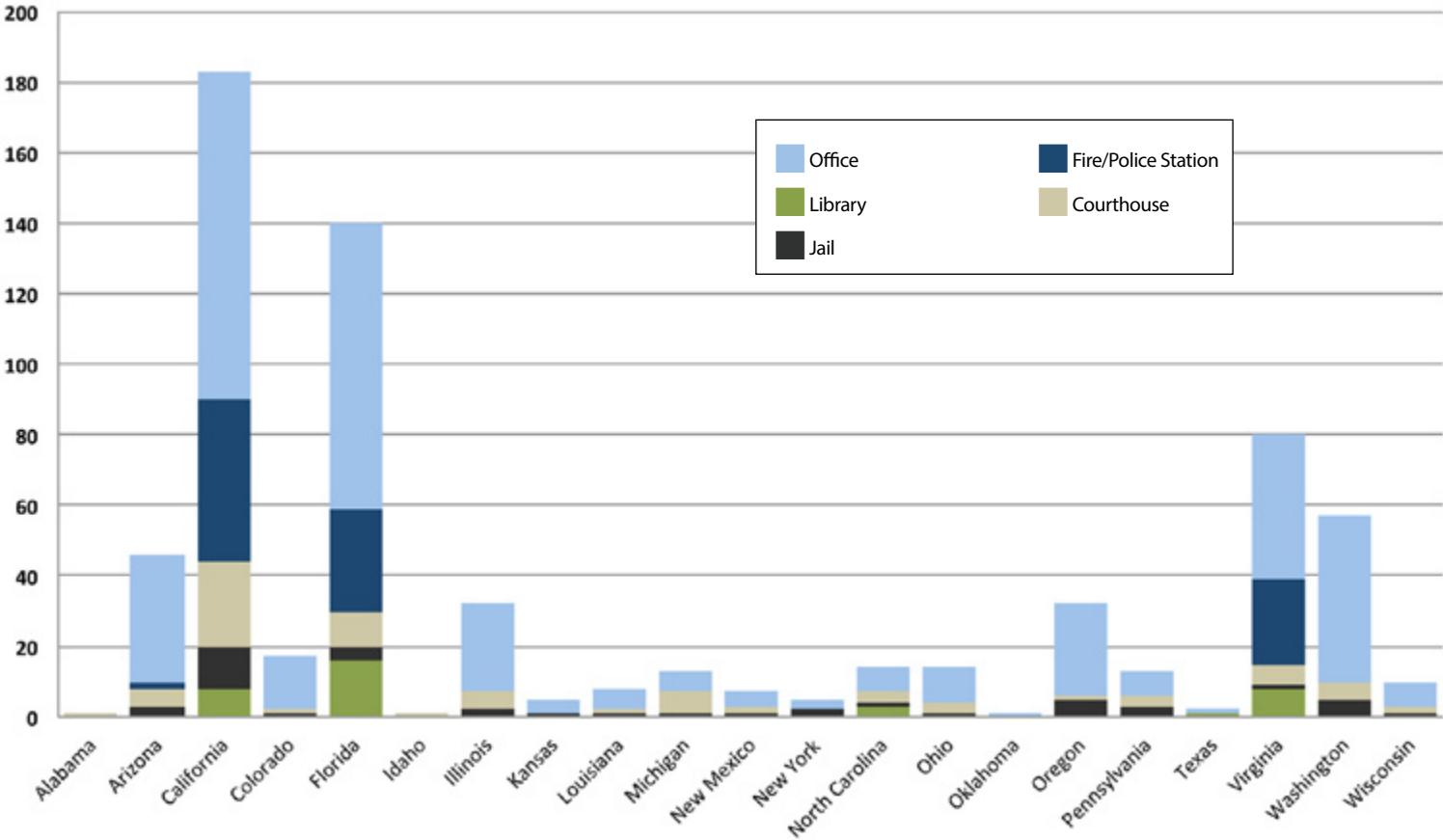
The NACo-IBTS research team is still working to synthesize the entire stock of buildings submitted to the database. This report, however, provides a summary of the data counties have provided to NACo through Portfolio Manager. This Portfolio Manager analysis is a preview of our findings to come. The additional data will strengthen and deepen the database so that we may provide empirical conclusions, action strategies for producing significant cost savings, and biannual reports for information and action.

Data Highlights

NACo’s master Portfolio Manager Account spans 21 states and totals more than 62 million square feet. The five states with the most facilities in NACo’s master Portfolio Manager Account are: California (226 facilities), Florida (226 facilities), Virginia (151 facilities), Washington (116 facilities), and Arizona (61 facilities).

There are more than 30 unique building types in NACo’s master Portfolio Manager Account. The most popular building types in the database are offices (405 facilities), fire/police stations (101 facilities), courthouses (74 facilities), jails (45 facilities), and libraries (36 facilities). Of these facilities, office buildings and courthouses are the only building types that can receive an ENERGY STAR benchmarking score in Portfolio Manager. Jails—a notoriously high energy user in counties—are not

TYPES OF COUNTY BUILDINGS STUDIED





This remodeled Washington County, Minn. library has been designed to be as energy efficient and sustainable as possible through the use of natural ventilation, day lighting, selection of materials, energy efficient lighting and mechanical units, and controls to monitor and adjust for use and time.

Photo courtesy of Washington County Facilities

a recognized space type in Portfolio Manager; the research team pulled these jails from the “other” space type designation. There are not enough jails, libraries, or fire/police stations in the Portfolio Manager database to benchmark these facilities. With the addition of the non-Portfolio Manager data, NACo and IBTS hope to have a sufficient number of these buildings to benchmark and make national county comparisons.

While approximately 33% of county facilities in the dataset use energy at rates below the national median, nearly half of the facilities in the Portfolio Manager dataset use at least twice the energy of the national median building. In fact, most county buildings in the dataset use energy at rates well above the national median, pointing to opportunities for significant cost savings.

Just by implementing some life-cycle cost-effective improvements, many of which can be financed upfront by a third party and paid for out of the energy cost savings that result, counties are poised to make 10%–20% energy cost savings gains in their buildings.

- * Upgrading mechanical and electrical systems
- * Replacing lighting controls
- * Adding energy management and information systems
- * Upgrading heating, ventilation, and cooling air conditioning (HVAC)
- * Incorporating low-flow water fixtures
- * Developing renewable energy capacity
- * Replacing windows, and
- * Adding insulation.

COUNTY HIGHLIGHT

Hamilton County, Ind.

By concentrating first on “easy fixes”, Hamilton County saves \$300,000 each year in utilities and \$200,000 in maintenance. The county replaced over 1,000 lights in the historic courthouse, jail, and corrections center while buying upgrade supplies in bulk. Additionally, the facilities management department upgraded boilers and controls in several buildings.

Hamilton County has also prioritized getting building tenants and other county staff involved in energy efficiency. The county’s recycling program has reduced total trash in facilities by 60%, and has reduced the county’s trash fees significantly.

By implementing these diverse low-cost initiatives, Hamilton County has seen short payback periods on energy projects and huge cost savings. These improvements have been realized and verified by Hamilton County’s energy tracking, where further upgrades can be easily targeted and acted upon.

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County Building Efficiency: Energy Use Intensity

This study uses source energy use intensity (EUI) to analyze the buildings in the database. EUI measures a building's energy use and reflects the energy consumed by a building relative to its size.¹

What is Energy Use Intensity?

A building's EUI is calculated by taking the total energy consumed in one year (measured in kBtu) and dividing it by the total floor space of the building. For example, if a 50,000-square-foot school consumed 7,500,000 kBtu of energy last year, its EUI would be 150. A similarly sized school that consumed 9,000,000 kBtu of energy last year would have a higher EUI (180) to reflect its higher energy use. Generally, a low EUI signifies good energy performance.²

County Building EUIs

- * 33% of county facilities have an annual source EUI below the EPA's national median
- * 48% of county facilities have an annual source EUI at least twice the EPA's national median

Facility Type	Number of Facilities	Average Source Use Energy Intensity (kBtu/Sf)	Buildings with Source EUI Above National Median	Buildings with Source EUI Above 2x National Median
Office	420	245.67	315	224
Fire/Police Station	101	152.33	67	28
Courthouse	79	242.67	50	30
Jail	45	256.61	32	27
Library	36	208.38	30	23

¹ United States Department of Energy, Energy Information Administration. Commercial Building Energy Consumption Survey (CBECS), 2003. <http://www.eia.doe.gov/emeu/cbecs/contents.html>, quoted in United States Environmental Protection Agency. Energy Star. What is EUI? <http://www.energystar.gov/index.cfm?fuseaction=buildingcontest.eui>.

² Ibid.



The Gathering Center at Spring Lake Park generates nearly all of its annual electricity needs – often sending excess power back to the grid – using a nearby wind turbine. Indoor temperature is controlled through super insulation techniques and automated shading devices. The building captures rainwater to flush toilets, and then treats the water on-site. Photo courtesy of Dakota County.

Photo courtesy of Dakota County

Certain building types use more energy than others. For example, a county office building uses relatively little energy compared to a county hospital. Similarly, a small office building that supports 80 workers will use less energy than a skyscraper that supports thousands of workers. While many buildings in county portfolios have low EUIs, the county building portfolios in the database contain more buildings with higher EUIs than their national counterparts. The appendix summarizes EUI figures for building types in the NACo portfolio manager.

10 BEST PERFORMING COUNTY COURTHOUSES

(AVERAGE COUNTY COURTHOUSE EUI: 242.67 KBTU/SF)

County	State	Portfolio Manager Rating (1-100)	Source Energy Use Intensity (kBtu/Sq. Ft.)
Mohave	Arizona	81	117.6
Mohave	Arizona	81	117.6
Mendocino	California	89	125.1
Mendocino	California	89	125.1
Mohave	Arizona	81	126
Manistee	Michigan	94	135.8
Bernalillo	New Mexico	89	138.3
Los Angeles	California	86	146.6
Monterey	California	78	151.9
Whatcom	Washington	77	160.7
Summit	Ohio	84	165.3
New Hanover	North Carolina	54	166

10 BEST PERFORMING COUNTY OFFICE BUILDINGS

(AVERAGE COUNTY OFFICE EUI: 245.67 KBTU/SF)

County	State	Portfolio Manager Rating (1-100)	Source Energy Use Intensity (Kbtu/Sq. Ft.)
Mendocino	California	95	67.8
Douglas	Kansas	94	74.6
Snohomish	Washington	25	91.3
Whatcom	Washington	77	92.3
Orange	Florida	78	93.4
Mendocino	California	81	93.5
Snohomish	Washington	85	96.2
Mohave	Arizona	95	96.5
Pierce	Washington	61	96.8
Allegheny	Pennsylvania	79	106.6

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The David L. Lawrence Convention Center, located in downtown Pittsburgh, was the first “green” convention center in the world and was awarded the Gold (new building) and Platinum (existing building) LEED® certifications by the US Green Building Council. The 1.5 million sq. ft. building features natural air circulation, energy efficient lighting, grey water reclamation, and a green roof.

Photo courtesy of Allegheny County, Penn.

Challenges and Opportunities

Most of the energy projects that emerge from energy tracking pay for themselves, representing a truly untapped resource for reducing county operating costs and saving taxpayer dollars.

Many counties— such as Allegheny, Pa.; Mendocino, Calif.; Volusia, Fla.; and Mohave, Ariz. — have high-efficiency building portfolios. The majority of buildings in the Portfolio Manager database, however, are ripe for significant economic savings.

Getting Counties Tracking

County officials can access high-level advice from NACo and IBTS to capture environmental and cost savings for their communities. Based on the information immediately available, the research team believes that over 20% gains in energy efficiency are possible in many facilities with very limited or no upfront investment.

Counties can utilize available off balance sheet financing options like tax-exempt municipal leases and other third-party options. In addition, county leaders can start saving energy costs today by simple employee workplace behavior changes, assigning energy management responsibilities, adjusting control systems and operational hours, reducing plug loads when systems are not in use (i.e. anything

plugged into an outlet), and/or simply by tracking and monitoring energy use in their facilities. With proper measurement, counties can take charge of their energy use and develop concrete steps to make significant savings.

For NACo and IBTS, this new County Building Database will serve as the foundation of our energy efficiency strategies for county governments. Through education, outreach, and technical assistance, NACo and IBTS can teach counties about the cost savings options available and represent counties in the energy project purchasing process.

Counties will be able to learn more about how their energy use compares to their peers nationwide, and recognize opportunities for improvements in county building performance. Throughout 2013, workshops and webinars will show key research findings and recognize the counties that have taken the initiative to track and manage energy in their buildings.

COUNTIES THAT CONTRIBUTED FULL PORTFOLIOS TO THE DATABASE



34 LARGE COUNTIES

(population greater than 500,000)

- Maricopa County, Ariz.
- Alameda County, Calif.
- Kern County, Calif.
- Los Angeles County, Calif.
- Riverside County, Calif.
- San Diego County, Calif.
- Ventura County, Calif.
- Denver County, Colo.
- Brevard County, Fla.
- Broward County, Fla.
- Hillsborough County, Fla.
- Orange County, Fla.
- Cook County, Ill.
- Kane County, Ill.
- Will County, Ill.
- Johnson County, Kan.
- Macomb County, Mich.
- Bernalillo County, N.M.
- Clark County, Nev.
- Cuyahoga County, Ohio
- Franklin, Ohio
- Montgomery County, Ohio
- Summit County, Ohio

Washington County, Ore.

- Allegheny County, Pa.
- Bexar County, Texas
- Tarrant County, Texas
- Salt Lake County, Utah
- Fairfax, Va.
- San Mateo County, Va.
- King County, Wash.
- Pierce County, Wash.
- Snohomish County, Wash.

42 MEDIUM COUNTIES

(population between 50,000 and 500,000)

- Coconino County, Ariz.
- Mohave County, Ariz.
- Monterey County, Calif.
- Santa Barbara County, Calif.
- Boulder County, Colo.
- Kent County, Del.
- Charlotte County, Fla.
- Leon County, Fla.
- Pasco County, Fla.
- Sarasota County, Fla.
- Seminole County, Fla.
- Volusia County, Fla.

- Ada County, Idaho
- McHenry County, Ill.
- Hamilton County, Ind.
- Butler County, Kan.
- Douglas County, Kan.
- Fayette County, Ky.
- Calif.ddo County, La.
- KalamAriz.oo County, Mich.
- Anoka County, Minn.
- Blue Earth County, Minn.
- Christian County, Mo.
- Calif.barrus County, N.C.
- Calif.tawba County, N.C.
- New Hanover County, N.C.
- Madison County, N.Y.
- Clackamas County, Ore.
- Umatilla County, Ore.
- Nueces County, Texas
- Arlington County, Va.
- Henrico County, Va.
- Loudoun County, Va.
- Spotsylvania County, Va.
- York County, Va.
- Clark County, Wash.
- Island County, Wash.
- Kitsap County, Wash.

- Skagit County, Wash.
- Whatcom County, Wash.
- Yakima County, Wash.

19 SMALL COUNTIES

(population less than 50,000)

- Kodiak County, Alaska
- Inyo County, Calif.
- San Miguel County, Colo.
- Lemhi County, Idaho
- Ellis County, Kan.
- Manistee County, Mich.
- Oceana County, Mich.
- Carbon County, Mo.nt.
- Alexander County, N.C.
- Elk County, Pa.
- Hood County, Texas
- Duchesne County, Utah
- San Juan County, Wash.
- Skamania County, Wash.
- Whitman County, Wash.
- Dunn County, Wis.
- Marinette County, Wis.
- Price County, Wis.
- Sheridan, Wyo.

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