

# **Metrics and Tools for Sustainable Buildings Publications**

## **(Last Updated 04/27/2018)**

### **ASHRAE Standard-based Commercial Buildings Database:**

#### **Documentation**

Building Industry Reporting and Design for Sustainability (BIRDS) Commercial Database Technical Manual: Update

**OCTOBER 19, 2017 (NOTED AUGUST 2018)**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, Shannon A. Grubb, Sangwon Suh, Anne L. Greig**

Building Industry Reporting and Design for Sustainability (BIRDS) Technical Manual and User Guide  
**SEPTEMBER 30, 2013**

**Author(s): Barbara C. Lippiatt, Joshua D. Kneifel, Priya D. Lavappa, Sangwon Suh, Anne L. Greig**

Prototype Commercial Buildings for Energy and Sustainability Assessment: Design Specification, Life-Cycle Costing and Carbon Assessment

**JANUARY 10, 2012**

**Author(s): Joshua D. Kneifel**

Prototype Commercial Buildings for Energy and Sustainability Assessment: Whole Building Energy Simulation Design

**NOVEMBER 22, 2011**

**Author(s): Joshua D. Kneifel**

#### **Analysis**

Impact of More Precise Electricity Price Data on Estimated Energy Costs from Energy Standard Adoption for Buildings

**DECEMBER 19, 2014**

**Author(s): Joshua D. Kneifel, David T. Butry**

Impact of More Precise Construction Data on Estimated Savings from Energy Standard Adoption for Commercial Buildings

**DECEMBER 19, 2014**

**Author(s): Joshua D. Kneifel, David T. Butry**

Life-cycle Cost Implications of More Stringent State Energy Codes

**OCTOBER 05, 2014**

**Author(s): Joshua D. Kneifel**

Environmental Performance of Green Building Code and Certification Systems

**JANUARY 31, 2014**

**Author(s): Joshua D. Kneifel, Sangwon Suh, Shivira Tomar, Matthew Leighton**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: State-by-State Summaries

**SEPTEMBER 30, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: National Summary

**JUNE 10, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: Midwest Census Region

**MARCH 05, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: South Census Region

**MARCH 05, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: West Census Region

**MARCH 05, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings: Northeast Census Region

**MARCH 05, 2013**

**Author(s): Joshua D. Kneifel**

Benefits and Costs of Energy Standard Adoption in New Commercial Buildings

**FEBRUARY 06, 2013**

**Author(s): Joshua D. Kneifel**

Beyond the Code: Energy, Carbon, and Cost Savings using Conventional Technologies

**MARCH 01, 2011**

**Author(s): Joshua D. Kneifel**

Cost-effectiveness of Energy Efficiency Measures Exceeding Current Standards in New Commercial Buildings

**MAY 17, 2010**

**Author(s): Joshua D. Kneifel**

Life-Cycle Carbon and Cost Analysis of Energy Efficiency Measures in New Commercial Buildings  
**MARCH 01, 2010**

**Author(s): Joshua D. Kneifel**

Cost-effectiveness, Carbon Emissions, and Carbon Tax Implications of Energy Efficiency Measures in  
New Commercial Buildings.

**NOVEMBER 01, 2009**

**Author(s): Joshua D. Kneifel, Barbara C. Lippiatt**

## **IECC-Based Residential Buildings Database:**

### **Documentation**

Building Industry Reporting and Design for Sustainability (BIRDS) New Residential Database Technical Manual: Update

**JULY 2018**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, Priya D. Lavappa, Anne L. Greig, Sangwon Suh**

Building Industry Reporting and Design for Sustainability (BIRDS) New Residential Database Technical Manual

**JUNE 03, 2015**

**Author(s): Joshua D. Kneifel, Priya D. Lavappa, Anne L. Greig, Sangwon Suh**

Building Industry Reporting and Design for Sustainability (BIRDS) Tutorial for New Residential Database

**JUNE 03, 2015**

**Author(s): Joshua D. Kneifel, Priya D. Lavappa**

Prototype Residential Building Designs for Energy and Sustainability Assessment

**OCTOBER 16, 2012**

**Author(s): Joshua D. Kneifel**

### **Analysis**

Benefits and Costs of Energy Standard Adoption in New Residential Buildings: National Summary

**JULY 07, 2015**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Determining the Optimal Spatial Location of Shade Trees for Energy Savings: A Case Study Approach

**NOVEMBER 22, 2011**

**Author(s): Joshua D. Kneifel, David T. Butry**

The effect of shade trees on summertime electricity use in Sacramento, California

**SEPTEMBER 01, 2010**

**Author(s): Geoffrey Donovan, David T. Butry, Joshua D. Kneifel**

## **Incremental Energy Efficiency Measure-based Residential Building Database:**

### **Documentation**

Building Industry Reporting and Design for Sustainability (BIRDS) Low-Energy Residential Incremental Energy Efficiency Improvements Database Technical Manual: Update

**JULY 23, 2018**

**Author(s): Joshua D. Kneifel, Priya D. Lavappa, Eric G. O'Rear, Anne L. Greig, Sangwon Suh**

BIRDS v3.1 Tutorial for Low Energy Residential Database

**MARCH 09, 2017**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, Priya D. Lavappa**

BIRDS v3.1 Low-Energy Residential Database Technical Manual

**MARCH 06, 2017**

**Author(s): Joshua D. Kneifel, Priya D. Lavappa, Eric G. O'Rear, Anne L. Greig, Sangwon Suh**

Building Industry Reporting and Design for Sustainability (BIRDS) Tutorial for New Low-Energy Residential Database

**MAY 23, 2016**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, Priya D. Lavappa**

Building Industry Reporting and Design for Sustainability (BIRDS) Low-Energy Residential Database Technical Manual

**MAY 06, 2016**

**Author(s): Joshua D. Kneifel, Priya D. Lavappa, Eric G. O'Rear, Anne L. Greig, Sangwon Suh**

Simulated versus Measured Energy Performance of the NIST Net Zero Energy Residential Test Facility Design

**MARCH 30, 2015**

**Author(s): Joshua D. Kneifel, William V. Payne, Tania Ullah, Lisa C. Ng**

Annual Whole Building Energy Simulation of the NIST Net Zero Energy Residential Test Facility Design

**OCTOBER 16, 2012**

**Author(s): Joshua D. Kneifel**

### **Analysis**

Gas vs Electric: Space and Domestic Hot Water Heating System Fuel Source Implications on Low-Energy Single-Family Dwelling Sustainability Performance

**UNDER REVIEW AT ENERGY AND BUILDINGS**

**Author(s): David H. Webb, Eric G. O'Rear, Joshua D. Kneifel, Cheyney M. O'Fallon**

Progress and Challenges in Quantifying and Evaluating Building Sustainability  
**IN PRESS AT TECHNOLOGY | ARCHITECTURE + DESIGN (TAD) IN “MEASURED” ISSUE**  
**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

An Exploration of the Relationship between Increases in Energy Efficiency and Life-Cycle Environmental Energy and Carbon Emissions using the BIRDS Low-Energy Residential Database  
**FEBRUARY 01, 2018**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, David H. Webb, Cheyney M. O'Fallon**

Economics of the Net-Zero Energy Residential Test Facility

**JANUARY 01, 2018**

**Author(s): William M. Healy, Joshua D. Kneifel, Eric G. O'Rear**

Small Changes Yield Large Results at NIST's Net-Zero Energy Residential Test Facility

**SEPTEMBER 28, 2017**

**Author(s): Arthur H. Fanney, William V. Payne, Joshua D. Kneifel, Lisa C. Ng, Brian P. Dougherty, Tania Ullah, William M. Healy, Farhad Omar**

Reducing the Impacts of Weather Variability on Building Energy Performance Uncertainty by way of Adopting Energy-Efficient Measures and Systems: A Case Study

**NOVEMBER 22, 2016**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Net-Zero Energy Residential Building Component Cost Estimates and Comparisons

**OCTOBER 04, 2016**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Evaluating the Sustainability Performance of Alternative Residential Building Designs using the BIRDS Low-Energy Residential Database

**AUGUST 10, 2016**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, David H. Webb**

Predicting Energy Performance of a Net Zero Energy Building: A Statistical Approach

**JUNE 28, 2016**

**Author(s): Joshua D. Kneifel, David H. Webb**

Energy and Economic Implications of Solar Photovoltaic Performance Degradation

**FEBRUARY 05, 2016**

**Author(s): Joshua D. Kneifel, David H. Webb, Eric G. O'Rear**

An Assessment of Typical Weather Year Data Impacts vs. Multi-year Weather Data on Net-Zero Energy Building Simulations

**JANUARY 08, 2016**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Comparing the Energy and Economic Performance of the NIST NZERTF Design across the Mixed-Humid Climate Zone

**DECEMBER 31, 2015**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Net-Zero and Beyond! Design and Performance of NIST's Net-Zero Energy Residential Test Facility

**MAY 15, 2015**

**Author(s): Arthur H. Fanney, William V. Payne, Tania Ullah, Lisa C. Ng, Matthew T. Boyd, Farhad Omar, Mark W. Davis, Harrison M. Skye, Brian P. Dougherty, Brian J. Polidoro, William M. Healy, Joshua D. Kneifel, Betsy Pettit**

Sustainability Performance of the NIST Net Zero Energy Residential Test Facility Relative to a Maryland Code Compliant Design

**MARCH 30, 2015**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear**

Energy Performance Sensitivity of a Net-Zero Energy Home to Design and Use Specifications

**FEBRUARY 02, 2015**

**Author(s): Joshua D. Kneifel, William M. Healy, James J. Filliben, Matthew T. Boyd**

Life-Cycle Cost Comparison of the NIST Net Zero Energy Residential Test Facility to a Maryland Code-Compliant Design

**JUNE 11, 2014**

**Author(s): Joshua D. Kneifel**

Energy Performance of the NIST Net Zero Energy Residential Test Facility relative to a Maryland Code-Compliant Design

**SEPTEMBER 30, 2013**

**Author(s): Joshua D. Kneifel**

## **BIRDS NEST:**

### **Documentation**

Building Industry Reporting and Design for Sustainability (BIRDS) Neutral Environment Software Tool  
(NEST) Technical Manual

**OCTOBER 10, 2017**

**Author(s): Joshua D. Kneifel, Eric G. O'Rear, Shannon A. Grubb, Priya D. Lavappa, Anne L. Greig**

### **Analysis**

N/A

## **Other:**

Measurement Science for Sustainable Construction and Manufacturing: A NIST Perspective

**FEBRUARY 21, 2015**

**Author(s): Robert E. Chapman, Joannie W. Chin, Sudarsan Rachuri, Joshua D. Kneifel, Andrew K. Persily, Anthony P. Hamins**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2018 Annual Supplement to NIST Handbook 135

**APRIL 06, 2018**

**Author(s): Priya D. Lavappa, Joshua D. Kneifel**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2017

**MAY 02, 2017**

**Author(s): Priya D. Lavappa, Joshua D. Kneifel, Eric G. O'Rear**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2016 Annual Supplement to NIST Handbook 135

**SEPTEMBER 07, 2016**

**Author(s): Priya D. Lavappa, Joshua D. Kneifel**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2015 Annual Supplement to NIST Handbook 135

**JUNE 03, 2015**

**Author(s): Priya D. Lavappa, Joshua D. Kneifel**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2014 Annual Supplement to NIST Handbook 135

**OCTOBER 31, 2014**

**Author(s): Amy S. Rushing, Joshua D. Kneifel, Priya D. Lavappa**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2013

**JULY 15, 2013**

**Author(s): Amy S. Rushing, Joshua D. Kneifel, Barbara C. Lippiatt**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2012

**NOVEMBER 26, 2012**

**Author(s): Amy S. Rushing, Joshua D. Kneifel, Barbara C. Lippiatt**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2011

**SEPTEMBER 08, 2011**

**Author(s): Amy S. Rushing, Joshua D. Kneifel, Barbara C. Lippiatt**

Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis - April 2010: Annual  
Supplement to NIST Handbook 135 and NBS Special Publication 709

**MAY 15, 2010**

**Author(s): Amy S. Rushing, Joshua D. Kneifel, Barbara C. Lippiatt**