



CRAN SYMPOSIUM 2012
ELEVATING THE ART OF RESIDENTIAL
DESIGN & PRACTICE
SEPTEMBER 6-9 / NEWPORT, RHODE ISLAND

Sustainability and Residential Design: Some Useful Tools

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Sustainability and Residential Design

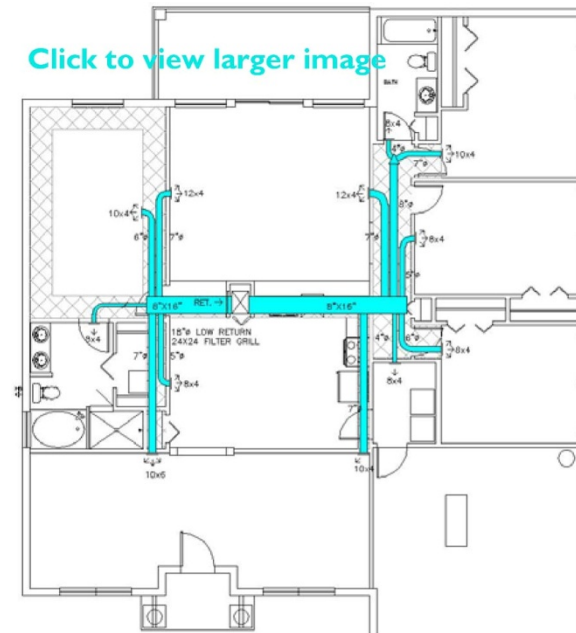
- **Whole-Building Approach**
- **Optimize Energy Performance**
- **Measure and Verify**
- **Operation and Maintenance**
- **Practices, Guidelines and Standards**



Whole-Building Design Approach

- **The Whole-Building Approach**
- **Coordinate Design Elements**
- **Optimize Systems**





Optimize Energy Performance

- **Energy loads/ sources**
- **Building configuration**
- **Price offsets**



Measure and Verify

- **Real-time readouts**
- **Energy scores**
- **Benchmarking**
- **Testing**
- **Certification**



Real-Time Read-Outs



Benchmarking

March 2011
Account number: 42 009 123 09
Visit our website: www.pseg.com

Invoice number: 600201244769

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PSE&G Gas

Usage Meter **2808502**
Actual reading Mar 15 40495
Actual reading Feb 10 36999
Conversion to CCF x 1.0120
CCF total 3537.952
Conversion to therms x 1.02500
Total therms 3626.401

Gas Deliveries
Bill period deliveries 4420.971
Imbalance* 794.570

*See text

Charges	PoD ID: PG000010575389186655	Rate - LVG
Delivery		
Service charge		\$97.29
Distribution charge		
First	1000.000 therms @ \$0.0847300	84.73
Next	2626.401 therms @ \$0.0403899	106.08
Demand	180.207 therms @ \$3.6450270	657.40
Balancing charge	2000.638 therms @ \$ 0.05955840	191.98
Societal Benefits	3626.401 therms @ \$0.06424280	232.97
Total Delivery		\$1,370.45
Total gas charges		\$1,370.45

A history of PSE&G's monthly Basic Gas Supply Service (BGSS) prices are located on our website at www.pseg.com.

*The imbalance of 794.570- will be applied to your Gas Deliveries in the month of May. The amount and month applied may differ if you are switching third party suppliers or your account requires an adjustment.

PSE&G Electric

Usage Meter **778015956**
Reading Mar 15
Actual On-Peak 34670
Actual Off-Peak1 6128
Actual Off-Peak2 19554
Reading Feb 10
Actual On-Peak 34342
Actual Off-Peak1 6068
Actual Off-Peak2 15348
Multiplier 160
On-peak kWh 52480
Off-peak kWh 42560
Total kWh 95040

Distribution Demands
Annual Demand kW 190.40

Measured Demands
On-Peak kW 190.40
Off-Peak1 kW 187.20
Off-Peak2 kW 171.20
Constant 160

Supply Capacity
Generation kW 426.21
Transmission kW 350.65

Charges	PoD ID: PE000010575390986655	Rate - LPLS
Delivery		
Service charge		\$377.71
Distribution charges		
Annual Demand	190.40 kW @ \$3.424002101	651.93
kWh - On-peak	52490 kWh @ \$0.007164063	375.97
kWh - Off-peak	42560 kWh @ \$0.007164004	304.90
Societal Benefits	95040 kWh @ \$0.007599011	722.21
Securitization Transition	95040 kWh @ \$0.009940025	944.70
Sub-Total Delivery		\$3,377.42
Total electric charges		\$3,377.42

*You are currently purchasing your electric supply from another supplier. If you had been purchasing your electric supply from PSE&G, you would have been billed \$11,331.62 for this supply. This is your Price to Compare, which varies each month depending upon your usage pattern.

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Commissioning



Operation and Maintenance

- **Occupant training**
- **O&M manual**
- **Continuous commissioning**



Practices, Guidelines & Standards

- **Best Practices & Guidelines**
 - **Building America**
 - **EEBA**
- **Green Standards**
 - **Energy Standards**
 - **LEED/NGBS**
 - **State & Local Programs**



Building America

Building America: Bringing Building Innovations to Market

The U.S. Department of Energy's (DOE) Building America program has been a source of innovations in residential building energy performance, durability, quality, affordability, and comfort for more than 15 years. This world-class research program partners with industry (including many of the top U.S. home builders) to bring state-of-the-art building innovations and resources to market.



For example, Building America climate-specific guides and case studies document proven performance in building advances, and provide ready resources for those in the building industry looking to gain a competitive advantage by delivering high performance homes. Building America also holds regular meetings where researchers, building professionals, and manufacturers can engage in generating new ideas for improving energy efficiency of residential buildings. Building America research teams and DOE national laboratories are a valuable national resource, offering the building industry specialized expertise and new insights from the latest research projects.

Learn about how this world-class research program can help the U.S. building industry promote and construct homes that are better for business, homeowners, and the nation.

EEBA

EEBA
The Energy & Environmental Building Alliance

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Energy Efficiency

Energy Auditor Field Guide
Energy Auditor Field Guide Describes the best practices used in assessing the performance of existing homes. Includes step-by-step procedures that identify the most effective energy-saving measures for a variety of housing types and climates.
\$39.00
1
Add to Cart

SATURN ENERGY AUDITOR FIELD GUIDE

ENERGY FREE Homes for a Small Planet

Energy Free Homes for a Small Planet
Individuals and institutions have been working towards Net Zero Energy homes for over a decade. ENERGY FREE distills those collective efforts, compiling invaluable lessons learned and resource information.
\$25.00
1
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Energy Standards



Certified New Homes

ENERGY STAR certified new homes must meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency. These homes are independently verified to be at least 15% more energy efficient than homes built to the 2009 International Energy Conservation Code (IECC), and feature additional measures that deliver a total energy efficiency improvement of up to 30 percent compared to typical new homes and even more compared to most resale homes.

LEED for Homes

LEED: Custom Homes  <p>Harvard 659 Steven Winter, FAIA</p>	LEED: Production Homes  <p>Harvard 659 Steven Winter, FAIA</p>	LEED: Attached Housing  <p>Harvard 659 Steven Winter, FAIA</p>	LEED: Gut Rehab  <p>Harvard 659 Steven Winter, FAIA</p>
LEED: Low-Rise  <p>BYU - Idaho Steven Winter</p>	LEED: Mid-Rise  <p>BYU - Idaho Steven Winter</p>	LEED: Mixed Use  <p>BYU - Idaho Steven Winter</p>	 <p>BYU - Idaho Steven Winter</p>

National Green Building Program

National Green Building Program

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NAHBGreen: Builder Education & Advocacy

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NAHB Research Center: Green Certification

[Green Scoring Tool](#) | [Certification](#) | [Resources](#)

Certification for: [Single-family](#) | [Multifamily](#) | [Land Development](#)

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The Rating System: National Green Building Standard

The National Green Building Standard (ICC 700 or "the NGBS")^{*} is the only residential green building rating system approved by ANSI, the American National Standards Institute, as an American National Standard. The NGBS provides practices for the design, construction, and [certification](#) of green residential buildings, renovations, and land developments. It also sets requirements and environmental performance levels for green buildings and developments.

Under the NGBS, green building practices are assigned point values. A home can attain one of four performance levels — Bronze, Silver, Gold, or Emerald — depending on how many green practices are included in the single-family home or the multifamily building. For a building to attain any certification level, all of the applicable mandatory provisions must be correctly implemented. In addition to the mandatory provisions, the NGBS requires the home to include sufficient green practices in each of the six categories of green building practices to meet the category minimums for each green level. As an ANSI-approved green building rating system, the NGBS provides builders with a credible definition of green home. Since it provides a flexible, expansive point-based system for certification, it also offers builders a process to build affordable green homes that meets their goals, appropriate for the climate, and meets the needs of the market and homebuyers.

The National Green Building Standard is currently being updated, as required by ANSI. Follow the update process on the [NAHB Research Center's website](#).

^{*} The NAHB Model Green Home Building Guidelines were created in 2006 and served as the starting point for the Consensus Committee that created the ICC 700-2008 National Green Building Standard. The NAHB Research Center began certifying single-family new homes to the Guidelines in January 2008. Once the NGBS was approved by ANSI in January 2009, the Research Center offered both rating systems as options for certification, with only the NGBS providing options for multifamily, remodeled, and development projects in addition to single-family new construction. The Guidelines were officially phased out as an option for National Green Building Certification in September 2010, and most references to the Guidelines were removed from this website to minimize confusion. However, some builders' projects were grandfathered into continued certification to the Guidelines through the end of 2011. All certificates issued by the NAHB Research Center clearly state if a home was certified to the Guidelines or the NGBS — homebuyers should check with their builder as to which rating system will be used for certification of their new home. If you are interested in receiving a copy of the NAHB Model Green Home Building Guidelines, please [contact us](#).



Gold Certified Home
Single-Family New Construction
[RJ Walter Homes](#)

The National Green Building Standard establishes design & construction practices for new single-family homes — including detached single-family homes, townhomes, duplexes, tri-plexes, and quad-plexes.

[See the green certified gallery](#)
[Learn more about certification](#)

Green Builders Are Saying...

There will be many ways of getting to Green, not just two or three, and the opportunity for individual creativity will be unlimited. Now is the time for all of us to come together and show the world what we are capable of.

John Wesley Miller, John Wesley Miller Companies, Tucson, AZ

CRAN Symposium

Steven Winter, FAIA

State & Local Green Building Programs



AUSTIN ENERGY GREEN BUILDING

Living Building Challenge



Thank You

