

**Bill Bradbury**  
Chair  
Oregon

**Henry Lorenzen**  
Oregon

**W. Bill Booth**  
Idaho

**James A. Yost**  
Idaho



**Jennifer Anders**  
Vice Chair  
Montana

**Pat Smith**  
Montana

**Tom Karier**  
Washington

**Phil Rockefeller**  
Washington

October 29, 2013

## MEMORANDUM

**TO:** Council Members

**FROM:** Shirley Lindstrom

**SUBJECT:** Briefing on the University of Idaho - Integrated Design Lab

Kevin Van Den Wymelenberg is an Associate Professor at the University of Idaho, Director of the University of Idaho - Integrated Design Lab (UI-IDL) in Boise, and part of the leadership of the CAES Energy Efficiency Research Institute (CEERI). He earned his PhD in the Built Environment at the University of Washington. Kevin will present on the history of the UI-IDL, the Lab Network with shared funding from NEEA, how the UI-IDL works within the local community stakeholders and at a national scale. Kevin will also discuss current developments with BSU and INL via CEERI, as well as other UI-IDL initiatives.

There will be a tour of the IDL immediately after the Council adjourns. The IDL is located @ 306 S. 6<sup>th</sup> St., which is approximately 2 blocks from the Hampton Inn.



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## Welcome

The University of Idaho Integrated Design Lab in Boise [IDL] is dedicated to the development of high performance energy efficient buildings in the Intermountain West. This is approached through research, education and outreach efforts with students, owners, and professional design and construction teams to transform practice and keep pace with the milestones of the 2030 Challenge. Those who utilize the resources available through the IDL will design and construct buildings that are more comfortable for people, require less energy to maintain and operate, and enhance the health and productivity of inhabitants.

[What's new?](#)    [Discussion](#)

## 2013 Fall Lecture Series

Join us for the next lecture on October 24th with Z Smith presenting on lessons learned from a number of low-energy and net-zero projects! [Click here for more information.](#)

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Operated by the *University of Idaho College of Art & Architecture* - Department of Architecture and Interior Design

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You are here: [Home](#) > [Clients & Collaborators](#)

## Clients & Collaborators

The following clients and collaborators are organizations that we have worked for since 2004.

### Center for Advanced Energy Studies

CAES is a partnership between INL and the state through its three public research colleges – Boise State University, Idaho State University and University of Idaho. The center is committed to conducting research to address the country's and Idaho's energy challenges, with emphasis on nuclear. It also is charged with addressing the looming nuclear energy work-force shortage.

### Energy Studies in Buildings Laboratory

The Energy Studies in Buildings Laboratory's (ESBL) research projects are focused on understanding how buildings and related transportation determine energy and resource use. The lab's goals are to develop strategies for maximum energy efficiency in new materials, components, assemblies, and whole buildings. Architects, designers, builders, developers, and governmental agencies use ESBL to improve buildings and communities.

### Idaho Office of Energy Resources

The Office of Energy Resources has the responsibility for energy planning, policy and coordination in the State of Idaho. Our goal is to communicate Idaho's energy policies to our stakeholders and provide the public with the information they need to help us meet our state's future energy needs.

### Idaho Power Company

At Idaho Power, we work hard every day to bring energy to your door. We do it safely and proudly. You can rest easier knowing we are always there. Planning for the future, caring for the environment, partnering with you. Big and small. Day and night. Today and tomorrow. We are your neighbors, your friends and your family, and you can always count on us for reliable, responsible, fair-priced service.

### Integrated Design Lab Puget Sound

The Integrated Design Lab (IDL) is a self-supporting University of Washington Service to the building industry. The IDL includes interdisciplinary UW research, faculty, staff, and students that support the development of high-performance commercial and institutional building design including lighting, daylighting and energy infrastructure. The IDL has established design and construction market relationships in the Pacific Northwest through the provision of technical assistance, design guidance, and building energy efficiency research.

### Northwest Energy Efficiency Alliance

The Northwest Energy Efficiency Alliance (NEEA) is a non-profit organization working to maximize energy efficiency to meet our future energy needs. NEEA is supported by, and works in collaboration with, the Bonneville Power Administration, Energy Trust of Oregon and more than 100 Northwest utilities on behalf of more than 12 million energy consumers.

### Northwest Power and Conservation Council

The Northwest Power and Conservation Council was created by Congress to give the citizens of Idaho, Montana, Oregon and Washington a stronger voice in determining the future of key resources common to all four states — namely, the electricity generated at and fish and wildlife affected by the Columbia River Basin hydropower dams.

[Ada County](#)

[Association of Idaho Cities](#)

[Boise State University](#)

[CSHQA Architects and Engineers](#)

[CTA Architects & Engineers](#)

[Engineering Incorporated](#)

# UI - Integrated Design Lab, Boise

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2013 UI-IDL Presentation to NWPCC

2013.11.06

Kevin Van Den Wymelenberg, PhD – Lab Director

## **KEY MESSAGES:**

1. Our expectation is to be a premier energy efficiency R&D facility for the D&C&O industry in the Intermountain West.
2. We are unique nationwide in our ability to connect research with practice and teaching.
3. Our technical assistance outreach projects deliver kWh less expensively than any other energy resource.
4. We are expanding our partnerships inside and outside the state and the region.





# Mission Statement



The University of Idaho Integrated Design Lab in Boise [IDL] is dedicated to the development of high performance energy efficient buildings in the Intermountain West. Through research, education and outreach efforts with students, owners and professional design teams we seek to transform design and construction practice and keep pace with the milestones of the 2030 Challenge. We strive to enable our clients to design and construct buildings that are more comfortable for people, require less energy to maintain and operate, and enhance the health and productivity of inhabitants.

# University of Idaho

**Hoversten**  
*CAA Dean*

**Kumar**  
*Strategic  
Initiatives*

**Armpriest**  
*Architecture  
Chair*

**Osbourne**  
*Budget  
Specialist*



Kevin Van Den Wymelenberg,  
PhD  
[Associate Professor]  
[IDL, Director]

**LaBolle**  
*Fiscal Ops.  
Manager*



Ery Djunaedy, PhD  
[Simulation Specialist]



Brad Acker, PE  
[Senior Engineer]



Katie Lechlitter  
[Field Engineer]



Gunnar Gladics  
[Arch Energy Specialist]



Jake Dunn  
[Arch Simulation Specialist]



Alen Mahic  
[AIT]



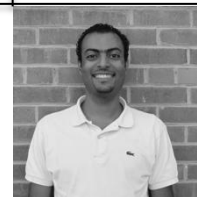
Carlos Duarte  
[ME Grad Student]



Lauren Hemley  
[AIT]



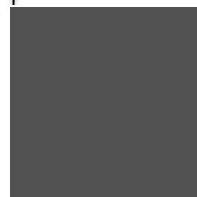
Damon Woods  
[ME Doctoral Student]



Shrief Elsayed Shrief  
[ME Grad Student]



Lee Keeling  
[ME Student]



Amir Nezamdoost  
[MS.Arch Grad Student]

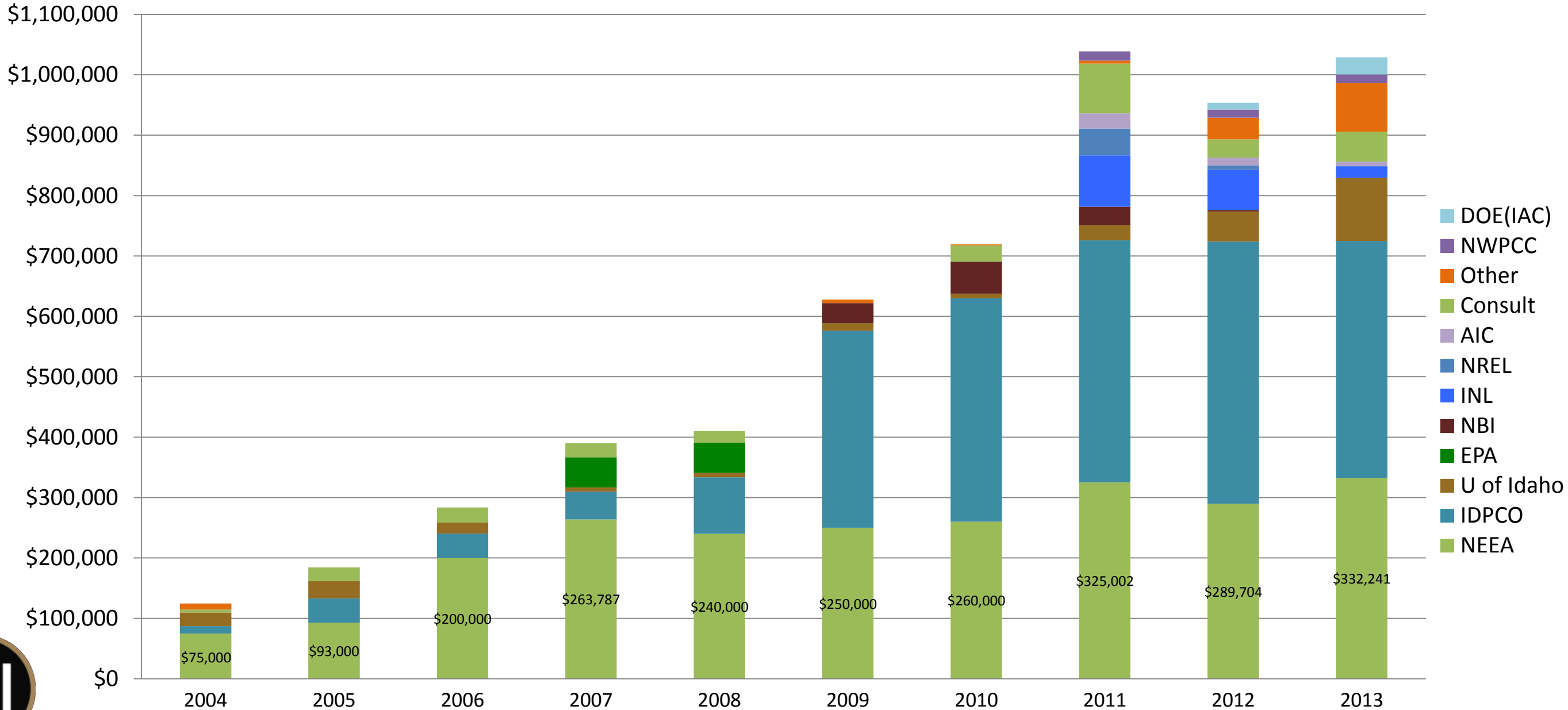


Ciera Shaver  
[M.Arch Grad Student]



Eric Fredback  
[Budget Specialist]

# Budget History



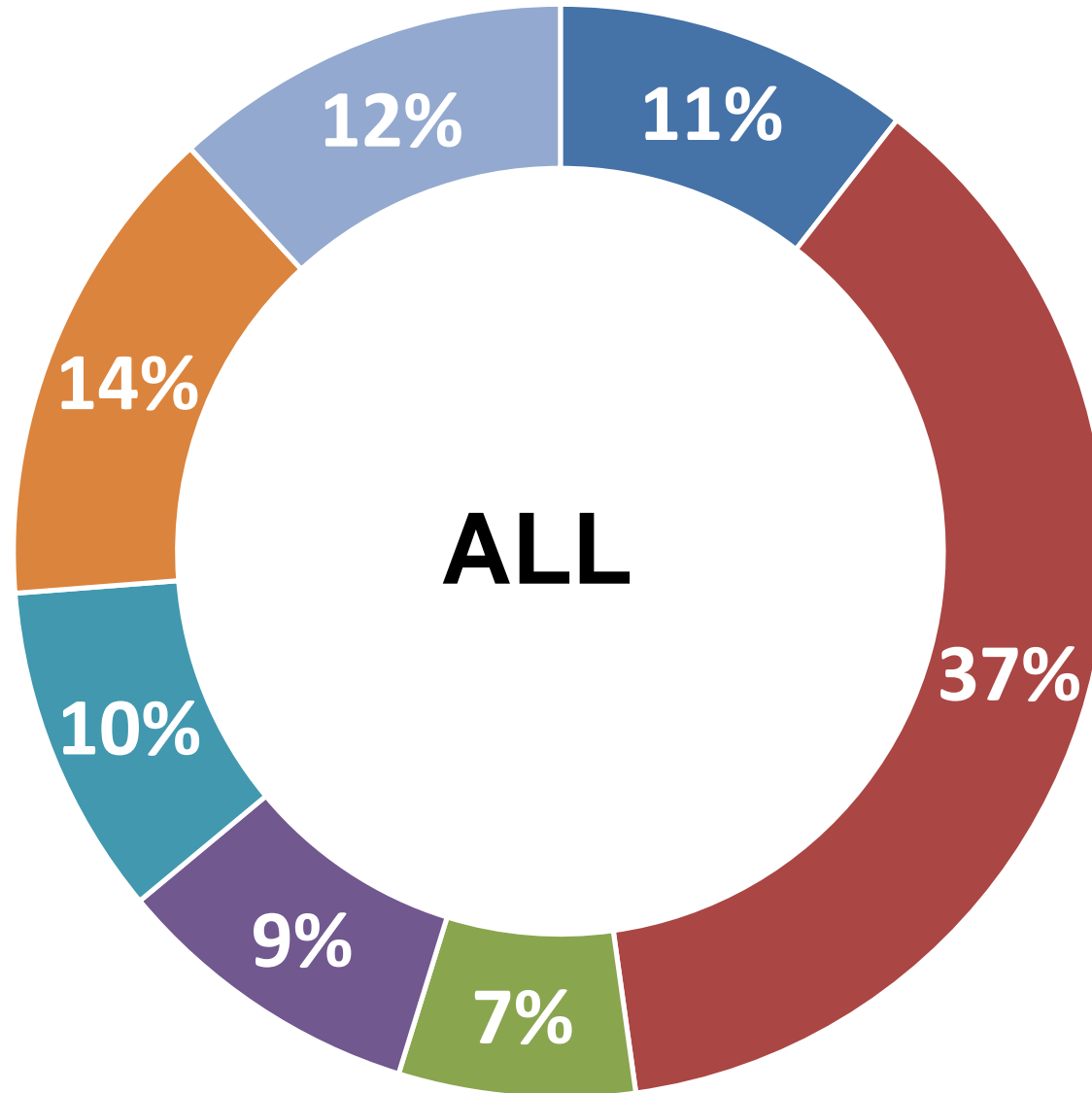
>\$5M to date





# 2013 Activity Detail

*Funding by Type of Activity*

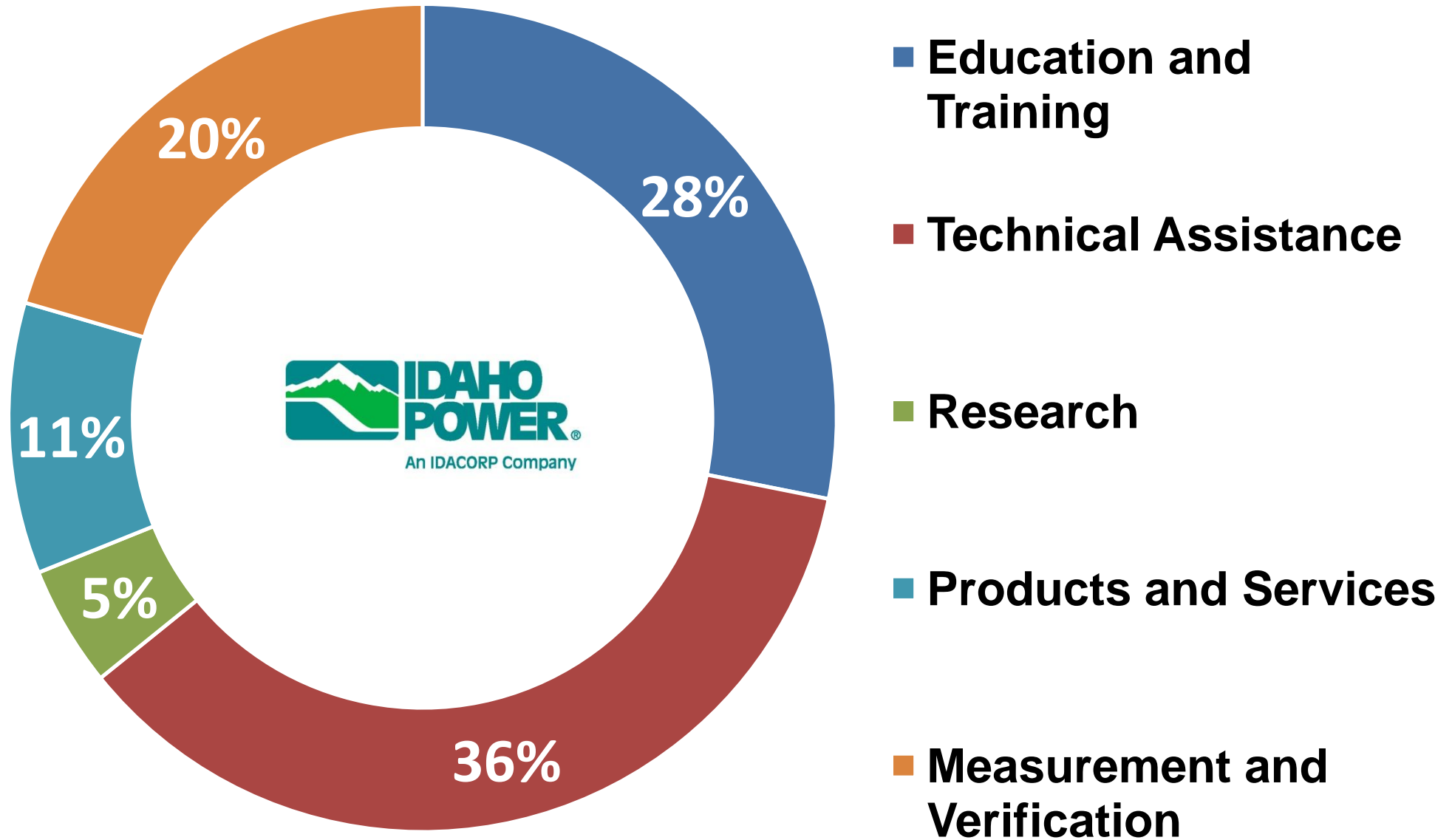


- Education and Training
- Technical Assistance
- Research
- Academic
- Products and Services
- Measurement and Verification
- Foundational Support



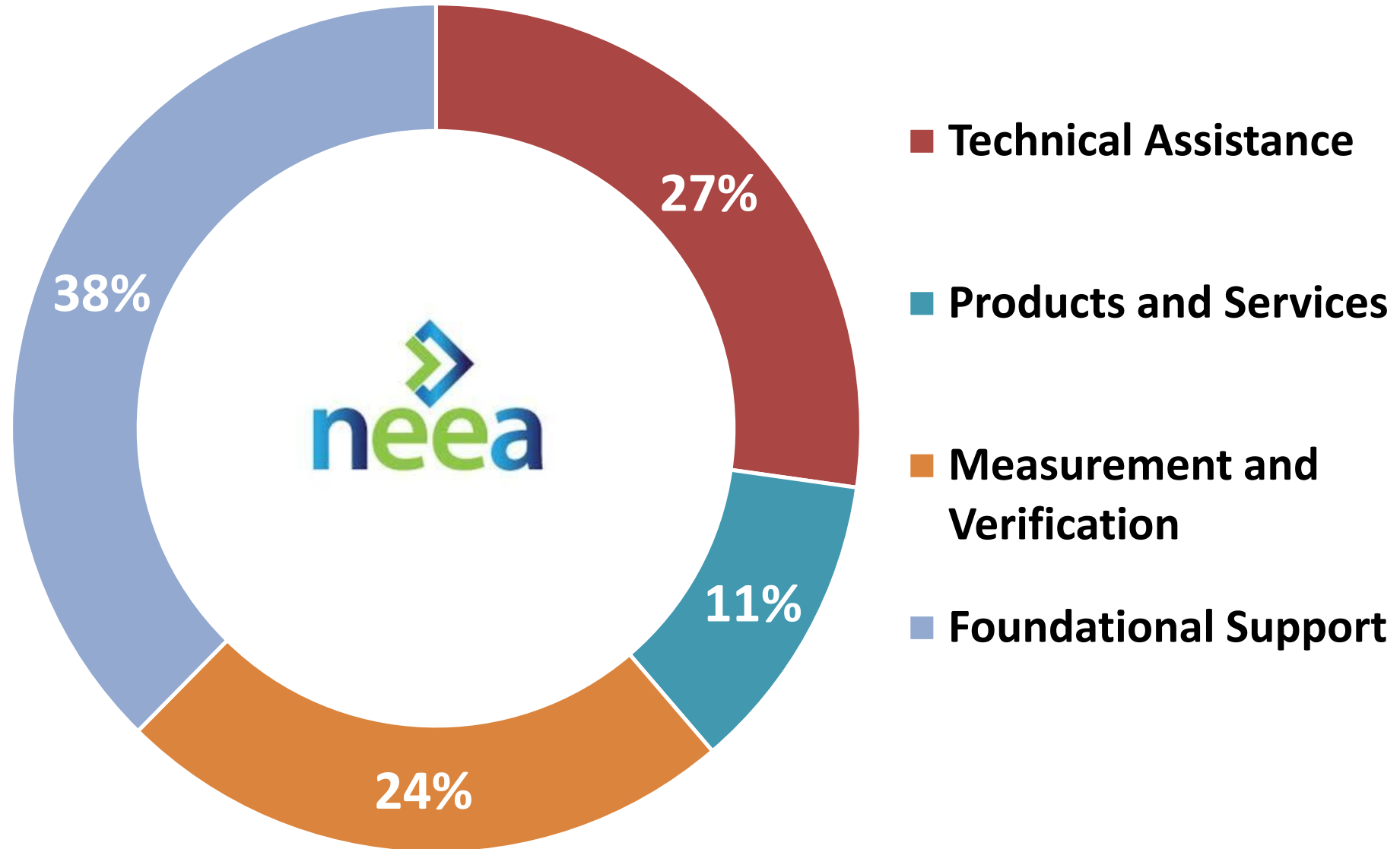
# 2013 Activity Detail

*IPC Funding by Type of Activity*



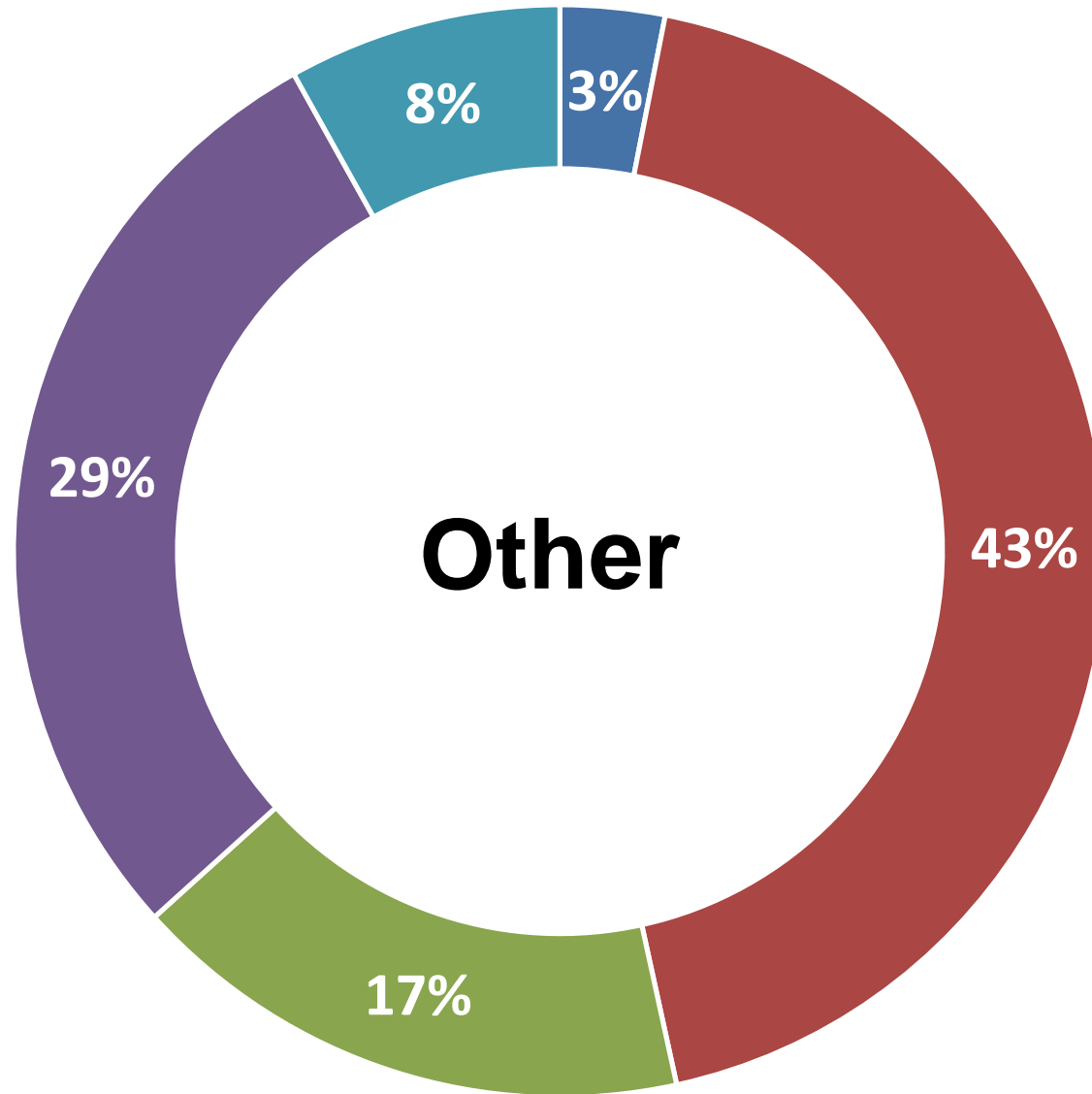
# 2013 Activity Detail

*NEEA Funding by Type of Activity*



# 2013 Activity Detail

*Other Funding by Type of Activity*



- Education and Training
- Technical Assistance
- Research
- Academic
- Products and Services



# Outreach

Professional

Lectures

Project-based Edu.

Tool-loan Library

Website



# Professional Lectures

## •2010

- 2400 Professional Contact Hours

## •2011

- 4600 Professional Contact Hours
  - Several energy and daylighting multi-day workshops
  - International daylighting patterns webinar

## •2012

- 2123 Professional Contact Hours
- 70+ Events

## •2013 (to date)

- 1300 Professional Contact Hours
- 45 Events
  - primarily IPC funded in 2013
  - Fall series upcoming



# Outreach

Professional

Lectures

Project-based Edu.

Tool-loan Library

Website



# Project-Based Education / Tech. Assist.

	Project-based Education (ID, MT, OR, & WA only)			
	IDL Staff (community contact hours)	Design & Construction Community (IDL contact hours)	Building Projects (count)	Building Projects (square feet)
2004	30	91	14	483,200
2005	37	112	43	3,088,507
2006	81	242	24	2,157,570
2007	106	319	51	4,211,513
2008	132	605	25	1,154,712
2009	167	831	28	1,262,000
2010	125	567	7	627,950
2011	523	1702	20	1,434,640
<b>Total</b>	<b>1,201</b>	<b>4,469</b>	<b>212</b>	<b>14,420,092</b>

# Outreach

Professional

Lectures

Project-based Edu.

Tool-loan Library

Website



## Tool Loan Library

- **Since Sept 2011 (about 2 years)**
  - 66% increase in 2013 loans over 2011-12
  - 36 Individual Tool Loans 2011-2012
  - 18 Loans in 2013 to date
  - 983 pieces of equipment (\$140K library)
- **Most Popular Tools**
  - Power logging
  - HOBO – Temp, RH
  - State Logging
  - Illuminance meters



# Outreach

Professional

Lectures

Project-based Edu.

Tool-loan Library

Website



University of Idaho  
College of Art and Architecture

# Website – Hits, Downloads, Views

- **~3500 hits per month (+40% from 2012)**

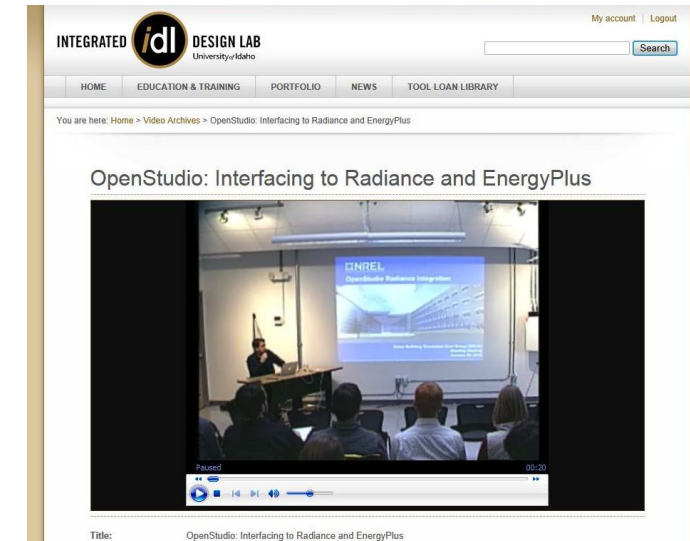
- Research Papers – 320 /mo
- Video Archives – 500 /mo

- **~1800 Registered Users**

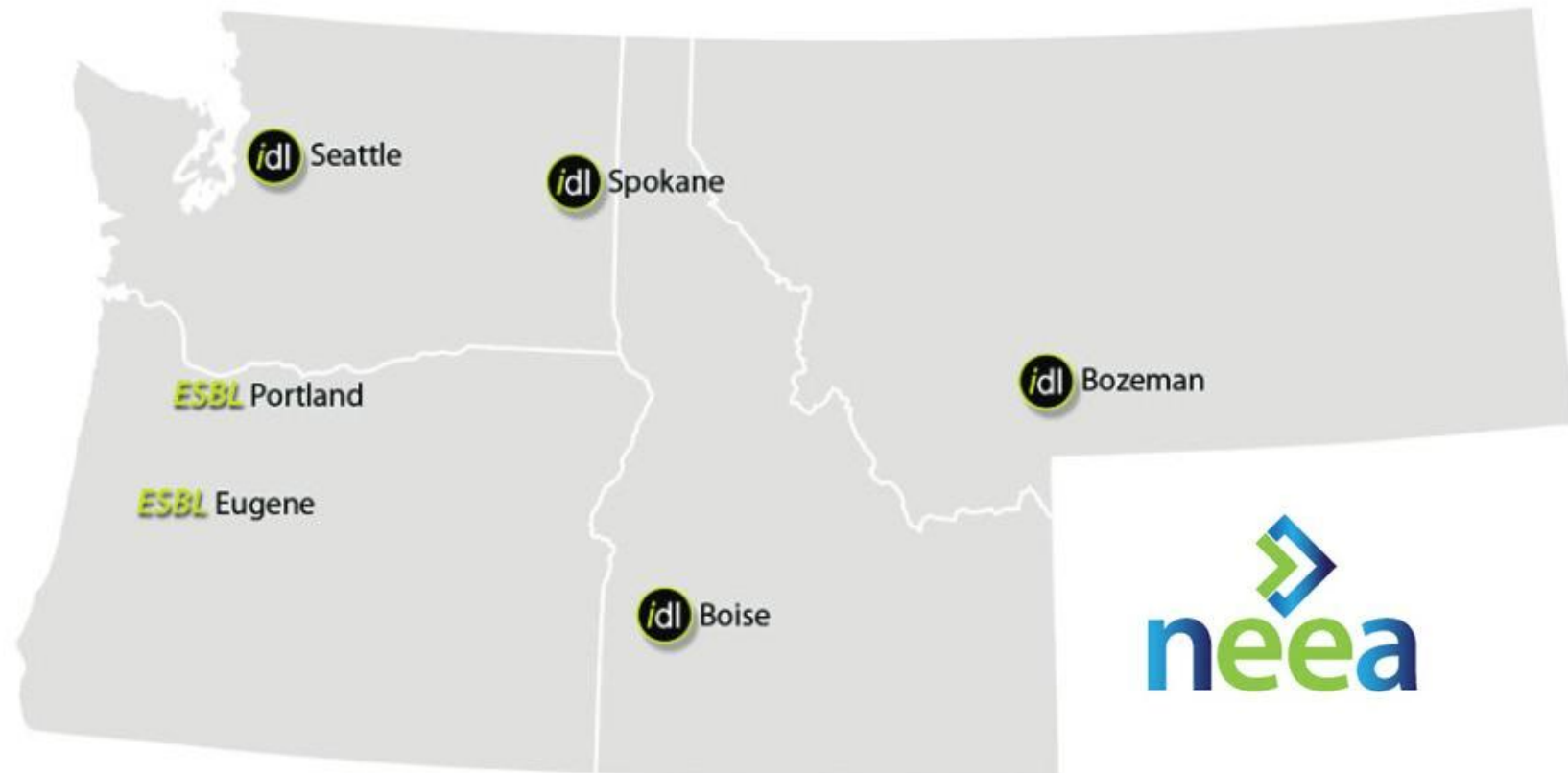
- 897 (+18.7%) opted in on Monthly Newsletters
- 379 (+38.3%) opted in on BSUG 2.0

- **Downloads/Views by Registered Users**

- 48 (+60% ~YouTube) archived video views per month
  - “Building A Passive House” – Blake Bilyeu & Alison Kwok (2012)
  - “Weidt Group” – Chris Baker (2013)
  - “OpenStudio: Interfacing to Radiance and EnergyPlus” – Rob Guglielmetti (2012)
- 20 (+33%) research paper downloads per month
  - “Evaluating Human Visual Preference and Performance in an Office Environment Using Luminance-based Metrics” – VDW @ UW 2012
  - “Office Building Plug Load Profiles” – Acker & VDW @ ACEEE 2012
  - “Simulation-Based Daylighting Design Education and Technical Support” (Daylight Pattern Guide) VDW & Meek @ IBPSA 2012



Who?  
Where?  
Future?





# Idaho NZEB #1

Can we design a market-rate, Class A, near zero energy office building in Idaho?

A team lead by the Christensen Development Corporation has done just that.

Working with the University of Idaho, Integrated Design Lab, Steed Construction, Colvin Engineering, and CTY Architects, Christensen Development has created a plan for affordable near zero office space, today.

Near zero and net zero buildings are no longer science fiction, they are science fact. Numerous examples have taken root around the country, providing dramatic reductions for their impact on the environment, while creating healthier more efficient places to work. This plan illustrates the financial value that near zero energy buildings have in Idaho.



**ZERO ENERGY CAPABLE DESIGN**





	Baseline	Efficient	Net Zero
Hard Costs	\$7,015,324	\$6,862,760	\$6,862,760
Soft Costs	\$1,882,546	\$2,006,601	\$2,006,601
Net Cost of PV		\$60,000	\$563,374
IPCO Incentives		\$(100,000)	\$(151,337)
Land	<u>\$834,918</u>	<u>\$834,918</u>	<u>\$834,918</u>
Total Project Cost	\$9,732,788	\$9,664,279	\$10,116,316
Total Project Value	\$10,113,361	\$10,679,704	\$10,968,717

# ZERO ENERGY CAPABLE DESIGN

THE BUILDING  
PERFORMANCE  
PARTNERSHIP

# K I L O W A T T C R A C K D O W N

EBR

Near Zero

DOE IAC

BSUG

Climate Design/HP Calc

Energy Leasing Sheets

Tool Loan

Evap RTU

Targeted EMS

Bullitt

- **Program Summary**

- Commercial office building energy competition
- January 2013 – Spring 2014
- Cost: Free!



## Boise

Buildings Registered

# 46



# M&V = R&D Evaporative Cooling “Sidecar”

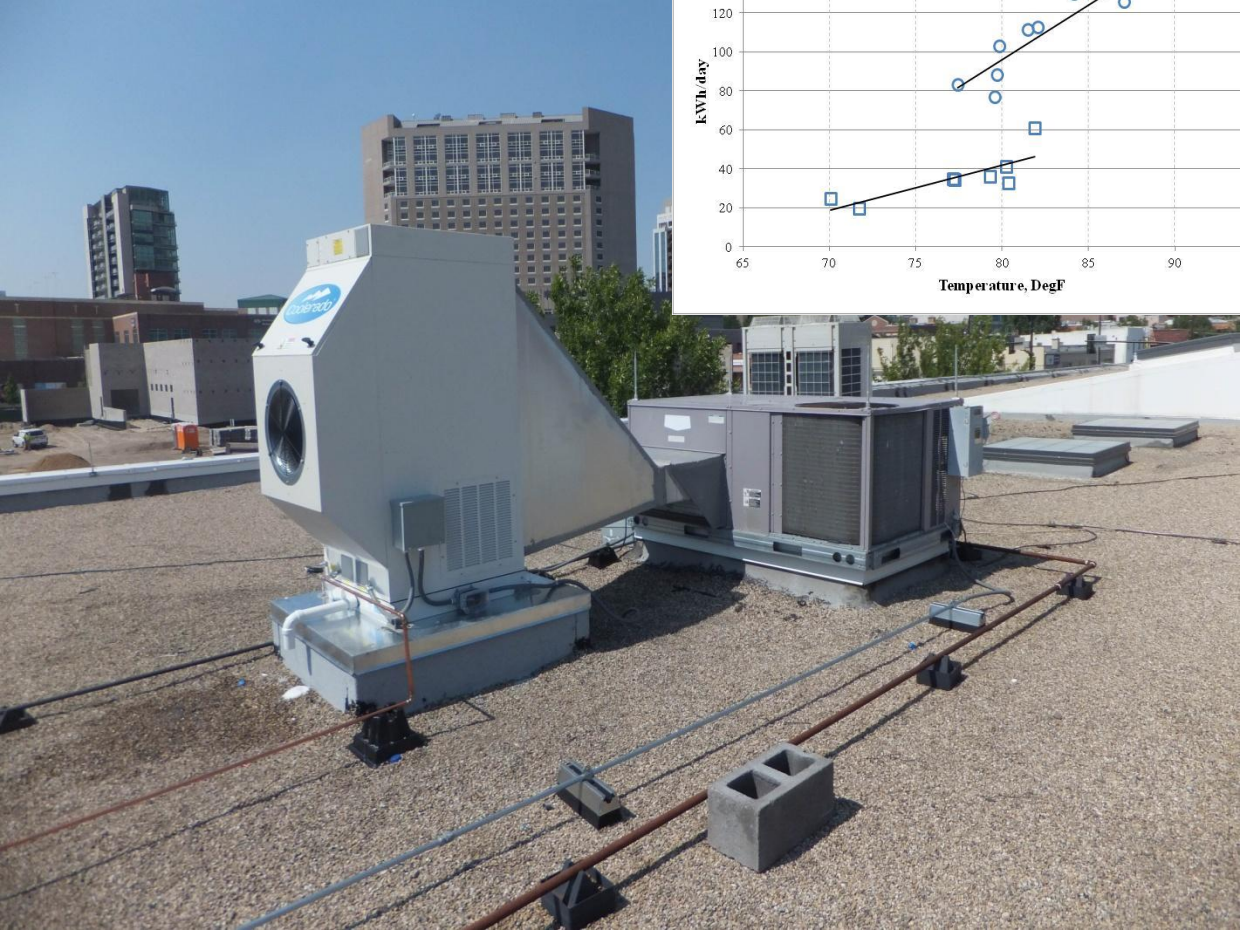
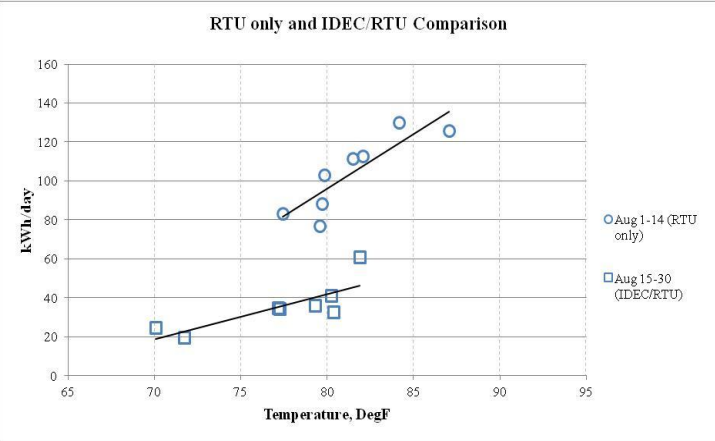
Funded by NEEA with collaborative work between the New Buildings Institute (NBI) and the IDL.

- Energy savings aspects
- Direct vs. indirect evap
- Install configurations
- Water use
- Control logic

56% reduction in energy (kWh)  
60% reduction in power (kW)



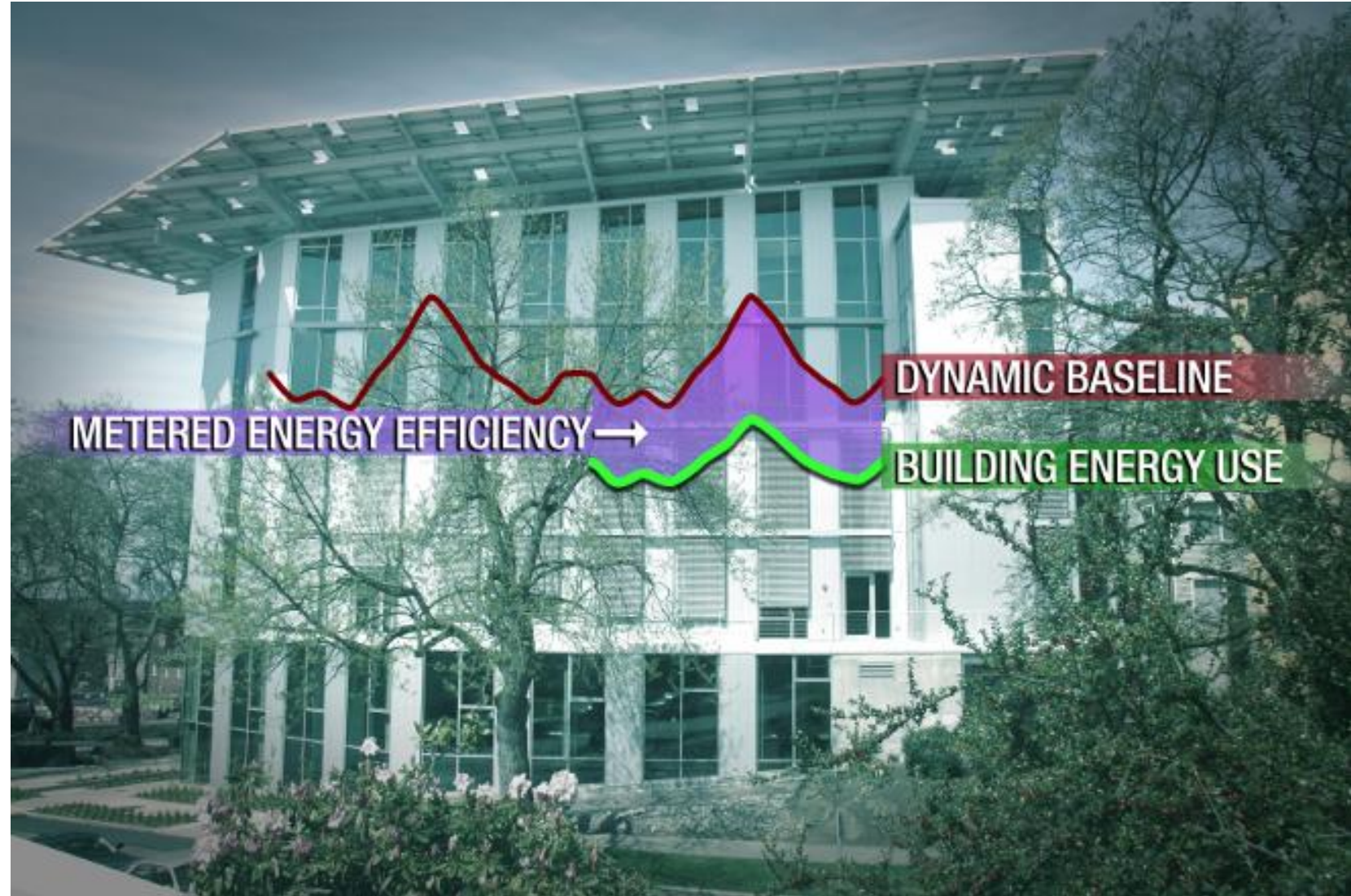
EBR  
Near Zero  
DOE IAC  
Kilowatt Crackdown  
BSUG  
Climate Design/HP Calc  
Energy Leasing Sheets  
Tool Loan  
Targeted EMS  
Bullitt





# Bullitt

Pay-for-Performance



Or Click on the IAC Center LOGO

- EBR
- Near Zero
- Kilowatt Crackdown
- BSUG
- Climate Design/HP Calc
- Energy Leasing Sheets
- Tool Loan
- Evap RTU
- Targeted EMS
- Bullitt

### Industrial Assessment Centers 2012-2016

U.S. DEPARTMENT OF ENERGY  
**ENERGY**  
Energy Efficiency & Renewable Energy

<http://iac.rutgers.edu>  
<http://cerri.boisestate.edu/iac>



# Targeted Energy Management System Toolset (TEMST)



University of Idaho



Dr. Craig Reiger - INL, ICIS

Dr. Ray Grosshans – INL, CAES

Dr. John Garnder – Boise State University, ME

Dr. Milos Manic – University of Idaho, EE

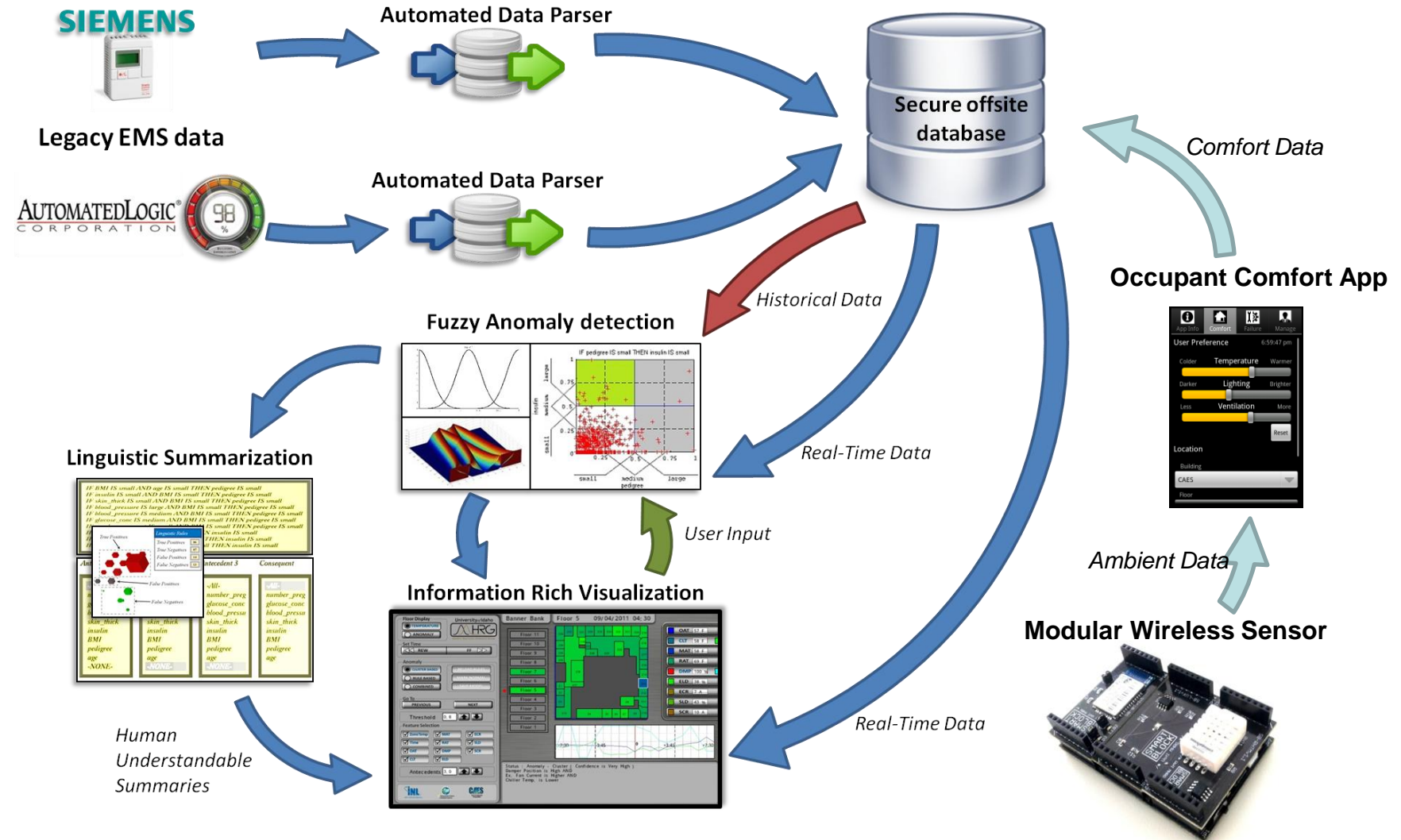
Dr. Kevin Van Den Wymelenberg – University of Idaho, Architecture

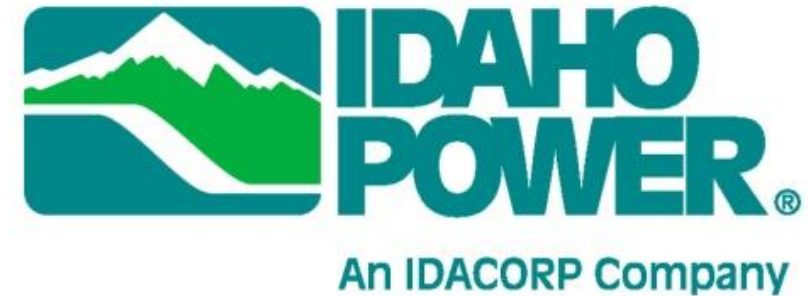
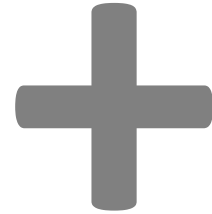
Brad Acker – UI Research Scientist

Carlos Duarte – UI ME graduate



## Big Picture





- 2013.11.06
- Kevin Van Den Wymelenberg, PhD – Lab Director
- Sheree Willhite, IPC EE Program Manager

<http://www.idahopower.com/EnergyEfficiency/Business/Program>

**easy upgrades**

Shelley Martin

**building  
efficiency**

Sheree Willhite

**custom  
efficiency**

Chellie Jensen  
Chris Follow  
Randy Thorn

**IPC**

**2013 Activity Detail**

Energy Use Index Labeling Program

Lunch & Learn

Fall Educational Series

Building Simulation Users Group

Foundational Services

BEP & PC Incentive Verification

Tool Lending Library

Simulation QA, Baselines, EM&V

Multi-family Cost-effectiveness

Heat Pump Calculator

Daylight Demonstration



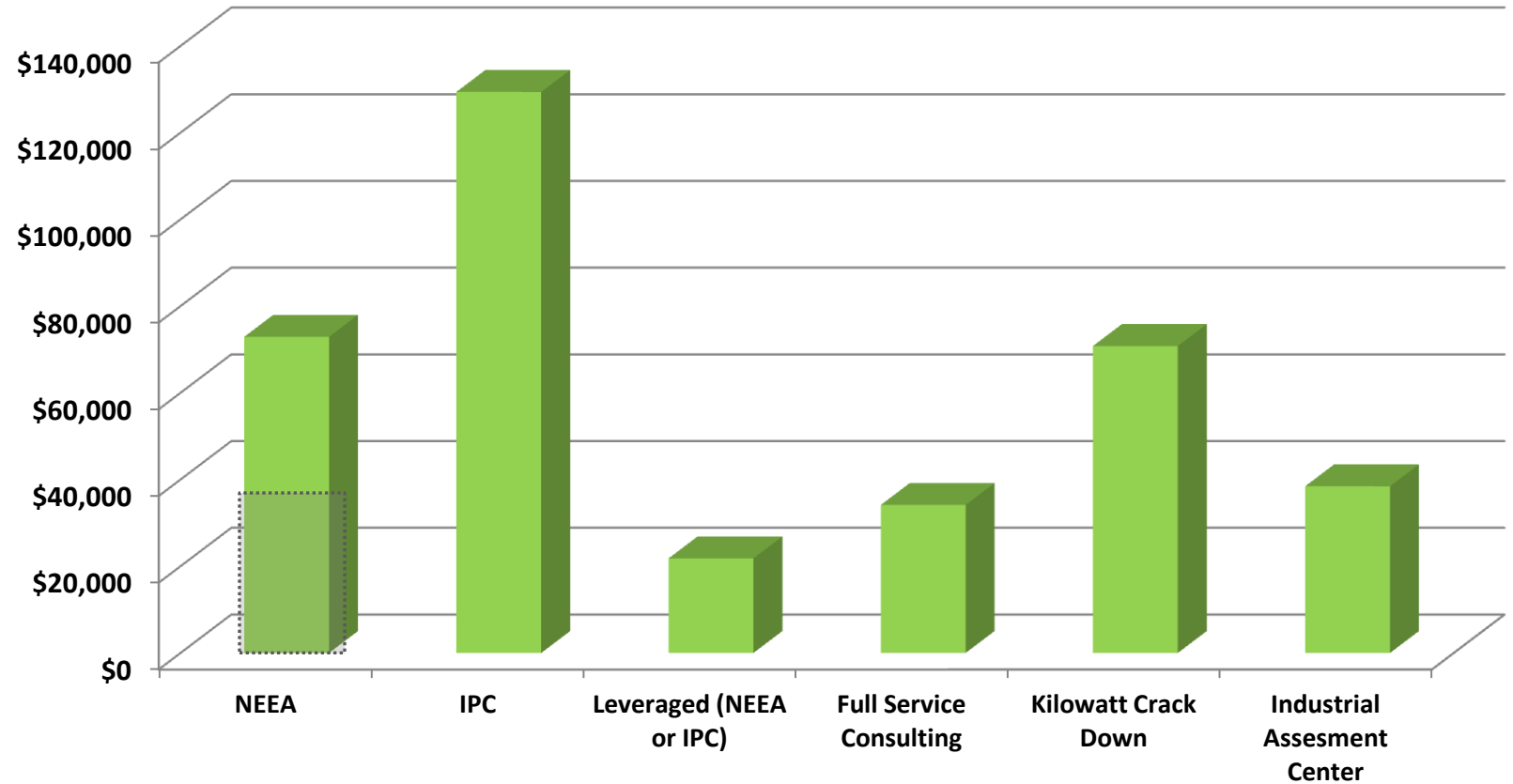


# Technical Assistance

## All Technical Assistance Projects

<b>Idaho Power</b>	<b>42</b>
New Construction	16
Existing Building	19
Combination/Other	6
<b>NEEA</b>	<b>4</b>
New Construction	1
Existing Building	3
<b>Cost Sharing</b>	<b>5</b>
<b>Full Service</b>	<b>3</b>
<b>Crackdown</b>	<b>33</b>
<b>IAC</b>	<b>3</b>
<b>Total</b>	<b>85</b>

## Technical Assistance Funding



# Technical Assistance

## Idaho Power Technical Assistance Projects

2013 Total to Date 8/27/13 - 42

Phase III - 3 (one is pending)

Phase II - 7

Phase I - 32

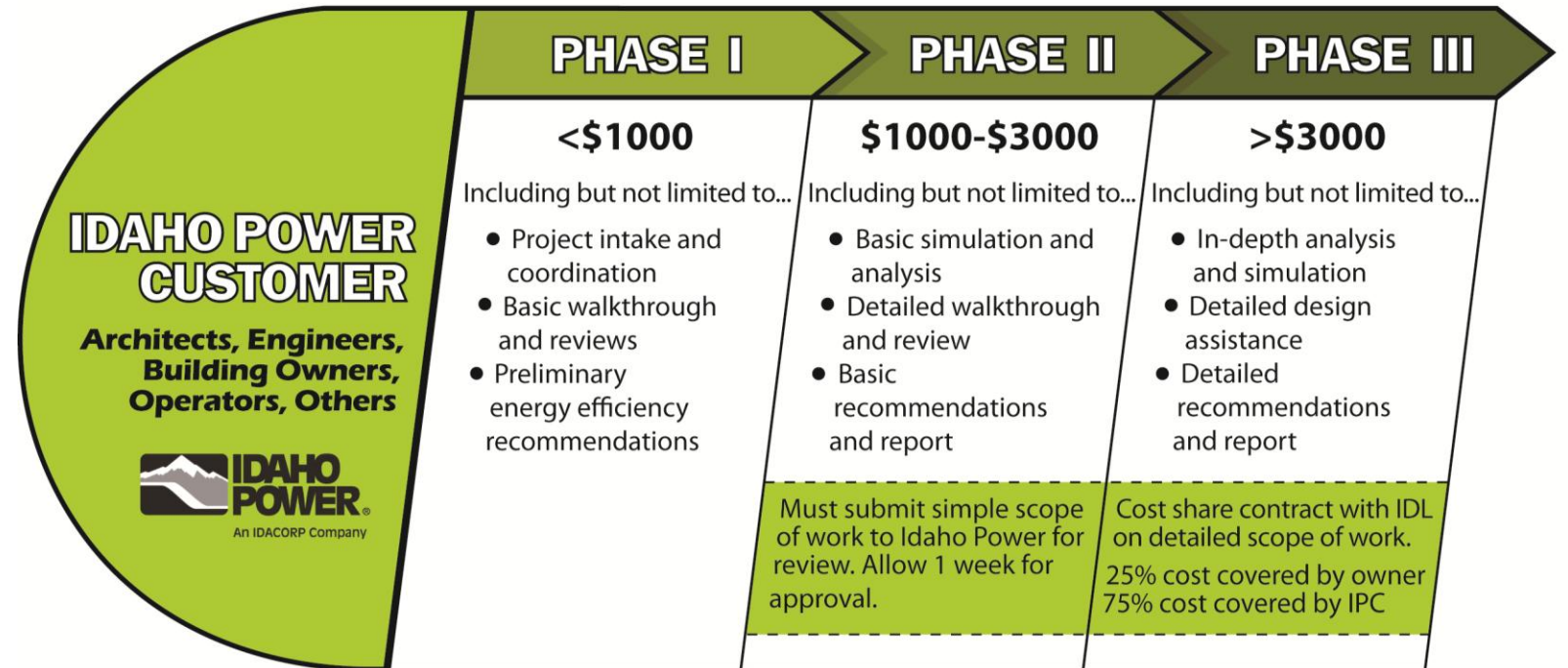
2012 Total - 45

INTEGRATED



DESIGN LAB  
University of Idaho

### IDAHO POWER FOUNDATIONAL SERVICES ENERGY EFFICIENCY ASSISTANCE



For more information or to discuss project details contact any of the following

Kevin Van Den Wymelenberg  
kevinv@uidaho.edu

Gunnar Gladics  
gunnarg@uidaho.edu

Jake Dunn  
jdunn@uidaho.edu

208.429.0220

▼ **Modeling Resources**

- UI-IDL Simulation Protocols  
DRAFT
- Calculation Spreadsheets
- ▼ IDF Objects
  - Equipment IDF Objects
  - window\_objects
- LEED Modeling Resources
- Quality Control / Quality Assurance Forms
- Step-by-Step Modeling Procedures
- External Tools

**Sitemap**

**Recent site activity**

[Home](#)

edited by Jacob Dunn

[BSUG 2.0 August 21st Meeting - "The Role of the Architect in the Energy Modeling Process"](#)

edited by Jacob Dunn

[August 21st BSUG 2.0- The Role of the Architect in the Energy Modeling Process](#)

edited by Andres Vasquez-Aguilera  
attachment from Andres Vasquez-Aguilera

[Upcoming Events](#)

edited by Jacob Dunn

[test](#)

[Video Archive](#) >

## June 2013 BSUG - Low Energy Buildings: Design and Computer Simulation

posted Jul 9, 2013, 1:03 PM by Jacob Dunn [ updated Jul 9, 2013, 1:07 PM ]

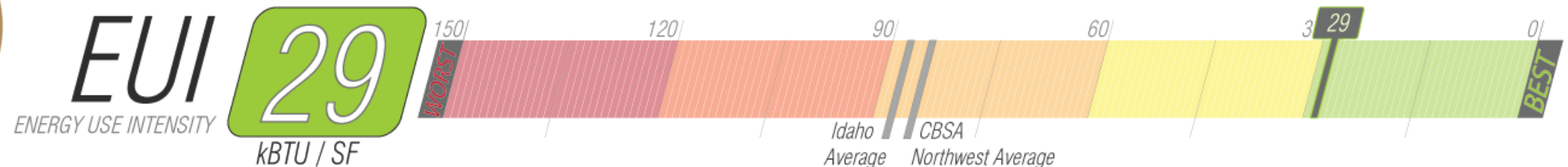
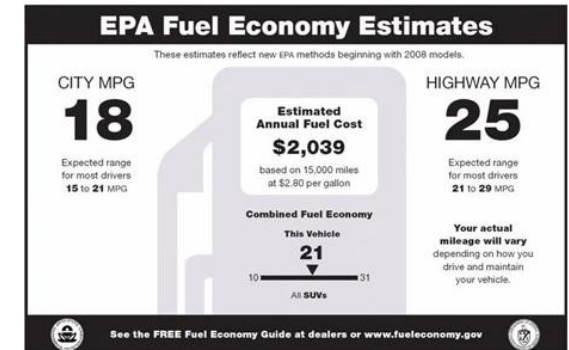
**June 2013 BSUG Presentation**



In June, Malcolm Cook from the University of Loughborough, UK, presented both his research and consultancy activities for our BSUG 2.0 group. This focused on the his work undertaken during his time spent collaborating with architects on low energy building design, with a particular emphasis on natural ventilation and passive cooling strategies, and the role computer simulation can play in this design process--particularly computational fluid dynamics.

# Energy & High Performance Labeling

- **Goal: Labeling energy and environmental metrics**
  - Standardized comparison across all commercial office buildings in the Boise area
  - Comprehensive easy-to-read graphic
  - Includes 4 metrics:
    - Energy Use Intensity (EUI)
    - Energy Star Score
    - Walkability Score
    - Daylight availability
- **Who benefits?**
  - Building owners & property managers
  - Current & potential tenants





# Tool Lending Library

Free resource to Idaho Power Company service territory

Target market is building operators, home owners and A&E firms to support:

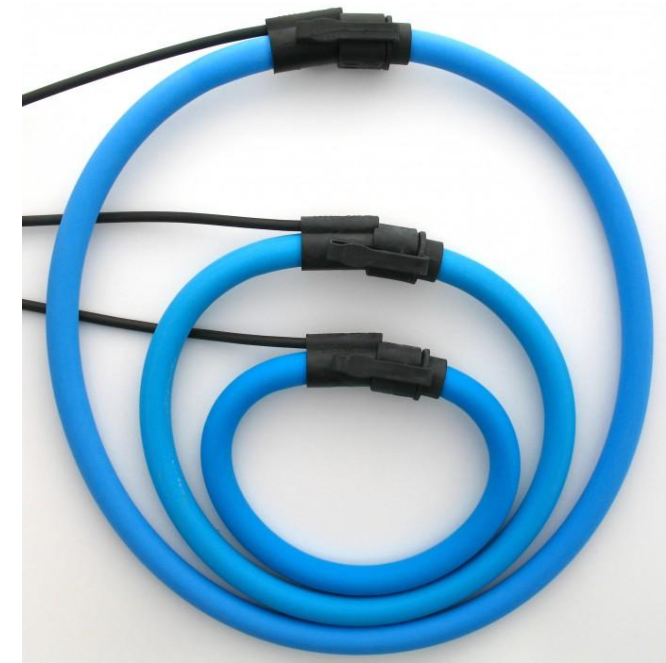
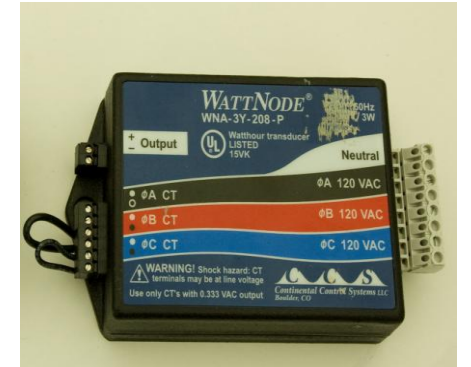
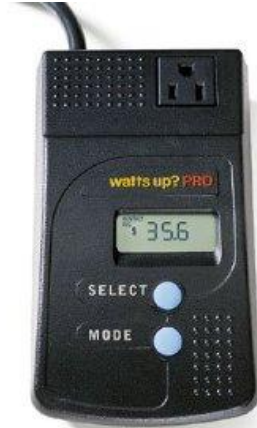
- Energy efficiency projects
- Demand response projects
- Equipment commissioning

Users access the library via the IDL website

Users fill out a proposal which describes the project they want to work on and if they would like to speak to IPC staff.



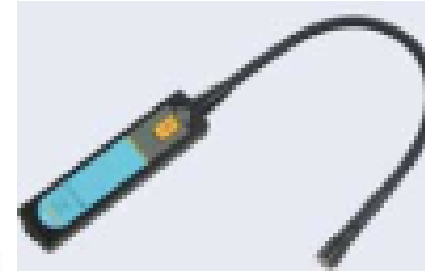
# Power, Power Quality, Current, and Cost



# Illuminance, luminance, Sound, Temperature, CO<sub>2</sub>, VOC



# Air Pressure and Flow, Liquid Flow, Compressed Air Leaks







**UIIDL Channel**

Subscribe 11

Videos Discussion About

Uploads Date added (newest - oldest)

- October BSUG 2013 Meeting - "Beyond the Template-Simul..."** 38:10 9 views 11 hours ago
- 2013 FLS - "Total Value Analysis" - Molly McCabe, ...** 1:21:41 21 views 2 weeks ago
- Tutorial\_UIIDL\_EnergyPlus\_H VAC\_Generator** 10:12 119 views 2 weeks ago
- September BSUG - "Does Energy Efficient Design = R..."** 48:18 19 views 1 month ago
- 2013 08 15 JD OSE Workflow R2** 1:01:59 11 views 2 months ago
- 2013\_07\_17\_CHRIS\_DYKE\_Bli nd\_Control\_Algorithms** 51:02 12 views 3 months ago
- June 2013 BSUGS 2.0 - Low Energy Buildings Design an...** 59:02 134 views 3 months ago
- [Lecture] 2012-11-27\_Joe Swinford\_Residential Adva...** 1:30:08 24 views 4 months ago
- [Lecture] 2012-12-06\_Heather Burpee\_Targeting 100! How...** 1:13:52 5 views 4 months ago
- [Lecture] 2012-10-29\_Kyle Konis\_PhD\_Effective Dayli...** 1:31:32 15 views 4 months ago
- [Lecture] 2012-02-29\_Craig Curtis\_The Miller Hull Part...** 1:05:47 33 views 4 months ago
- [Lecture] 2011-09-29\_Blake Bilyeu-Alison Kwok\_Buildin...** 1:30:31 57 views 4 months ago
- [Lecture] 2008-04-03\_David Eijadi\_Net Zero Commercial...** 1:20:24 5 views 4 months ago
- [Lecture] 2009-10-15\_Terry Egnor\_Design Implications...** 1:30:36 5 views 4 months ago
- [Lecture] 2011-10-06\_Deam Desai\_ISO 50001 2011 Ener...** 1:18:26 7 views 4 months ago
- [Lecture] 2011-09-22\_Mark Lyles\_Deep Savings in Exist...** 1:31:49 10 views 4 months ago
- [Lecture] 2010-11-18\_Deep Energy Savings through Exi...** 1:31:15 13 views 4 months ago
- [Lecture] 2010-11-04\_Living Case Study Improvement of...** 1:30:39 5 views 4 months ago
- [Lecture] 2010-10-28\_Iain Macdonald PhD-Benjamin B...** 1:38:42 1 view 4 months ago
- [Lecture] 2010-09-30\_Alison Kwok\_Post Occupancy Ene...** 1:25:21 16 views 4 months ago

# Professional AEC Education





# Technology Demonstration



Join us for a tour!

