INTEGRATED DESIGN LAB
University of Idaho

Introduction:

EACH YEAR THE IDL DEVELOPS A SERIES OF LUNCH AND LEARN TOPICS FOR PRESENTATION TO PROFESSIONAL ARCHITECTURE & ENGINEERING FIRMS. THE TOPICS REFLECT BEST PRACTICES IN ENERGY EFFICIENCY DESIGN AND ARE PROVIDED OVER A LUNCH HOUR – WE PROVIDE LUNCH. ATTENDEES RECEIVE 1 AIA CEU AS WELL AS A CERTIFICATE TO VERIFY ATTENDANCE. THE CLASSES MARKED WITH (HSW) QUALIFY FOR HEALTH, SAFETY AND WELFARE CREDIT. FOR A COMPLETE LIST OF TOPICS OFFERED FOR LUNCH AND LEARN VISIT:

HIGH EFFICIENCY HEAT RECOVERY
(TOPIC 1903)

This session will cover the role that high efficiency HRV's play in designing and specifying high-performing Dedicated Outdoor Air systems. Several recent northwest case studies have shown whole-building savings of 40 to 60% on existing building retrofits using DOAS with high efficiency heat recovery. The current code requirements of HRVs will be contrasted with the performance of new and emerging products. High efficiency HRV's can have a high capital cost but can generate large energy savings with increased control of cooling and ventilation. Several economic models will be presented showing financial impacts of using high efficiency HRVs in a project.

FUTURE OF LIGHTING CONTROLS
(TOPIC 1901)

Although LEDs have shown, they are a big game changer in the commercial lighting realm; lower lighting power density is not the only area of value when considering lighting. We can further increase savings from these highly efficient lighting systems by introducing control systems that collect data and user input to create an evolving feedback loop that seeks peak system operation. While LLLC's (Luminaire Level Lighting Control) use this feature, they still use the same infrastructure as the lighting and control system that have come before it, which can be a limitation for expanding the systems efficiency and integration to other building systems. We believe the internet of things (IoT) will change the lighting and controls industry, providing an excellent medium for an integrated, multi-service IoT platform. Why? Where there are people, there are lights; where there are people, there will also be the need for connectivity. New and connected lighting controls provide a means to deliver valuable IoT services and increased energy savings.

THE ARCHITECTS' BUSINESS CASE FOR ENERGY PERFORMANCE MODELING
(TOPIC 1902)

Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

ENERGY PLUS / OPEN STUDIO WORK FLOW
(TOPIC 1404)

As a whole, building simulation software rapidly develops and evolves. Understanding an effective workflow between the tools and disciplines is critical to the integrated design process and resulting energy savings potential. Front-end graphic user interfaces have made powerful simulation engines like EnergyPlus more accessible to both architects and engineers. It has also made the simulation process easier, smoother, and, perhaps, most importantly, faster. This presentation will focus on describing the integrated energy and daylight simulation workflow of OpenStudio, a free graphic user interface developed by the Department of Energy, and its relationship with Radiance and EnergyPlus.

DAYLIGHT IN BUILDINGS: GETTING THE DETAILS RIGHT (HSW)
(TOPIC 1409)

This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

RADIANT HEATING AND COOLING DESIGN (HSW)
(TOPIC 1407)

Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of

an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

COLD FEET: MANAGING CONTROLS AND CONDENSATION FOR RADIANT SLAB COOLING (HSW)
(TOPIC 1601)
Radiant slab systems have the potential to use significantly less energy than conventional all-air HVAC systems. In a 2012 survey by the New Buildings Institute, roughly 50% of net-zero buildings chose to pursue radiant designs for their HVAC systems. However, if not controlled properly, radiant slabs can lead to higher energy use and issues of simultaneous heating and cooling in both energy models and real buildings. This session will cover current design guidelines for radiant slab systems, particularly when used for cooling. The lecture will also include a discussion of operational best practices, capacity calculations, and condensation management based on the current literature. We will present some of the latest research on radiant systems, their unique load profiles, and control requirements.

HYBRID GROUND SOURCE HEAT PUMP SYSTEM (HSW)
(TOPIC 1419)
The initial cost of ground-source heat pump systems can be substantially higher than conventional systems, limiting it as a design option. This presentation will highlight how, with a hybrid GSHP system, it is possible to optimize the overall system life-cycle cost while reducing initial cost and maintaining a low operating cost. The GSHP system should be sized based on coincidental building loads and the system components including, the heat exchanger and additional central plant equipment.

INDOOR AIR QUALITY (IAQ) AND ENERGY EFFICIENCY IN BUILDINGS (HSW)
(TOPIC 1702)
In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

CHILLED BEAMS
(TOPIC 1801)
How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

VRFS & HEAT PUMPS
(TOPIC 1802)
Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's

climates. Including ERVs with DOAS.

ABSORPTION COOLING TECHNOLOGIES AND APPLICATIONS (TOPIC 1803)

The absorption cooling technology uses a heat source to drive an absorption chiller to cool buildings. This technology shows great potential in applications where adequate waste heat is abundant. The presentation will introduce the absorption cooling technologies and their potential applications in buildings to reduce annual electricity usage and summer peak.