The Center for Design Research
School of Architecture, Design and Planning

Studio 804,Inc
The University of Kansas

Notable Features of the CDR
Over the last three years, Studio 804, Inc., has designed and built three LEED (Leadership in Energy and Environmental Design) Platinum buildings in Kansas; the 5.4.7.Art Center for tornado ravaged Greensburg, KS, (the first LEED Platinum in the state) and two LEED for Homes in Kansas City, KS. They have also completed their first Passive House Certification last fall (one of only about a dozen across all of North America that boast of a 90% reduction in energy costs when compared to conventional houses). It is expected that The Center for Design Research will also be LEED Platinum and the first Commercial Certified Passive building in North America. A few of the features that are involved in the pursuit of this achievement are called out on the pages that follow.

Alternative Transportation - Routes and facilities, such as bicycle racks and preferred parking for green vehicles, will help to reduce vehicular traffic.

Energy Recovery System- The large hoods on the north side are for the ERV's (Energy Recovery Ventilators) and are the backbone of a very sophisticated heating and air conditioning system that provides a constant supply of fresh air into the building.

Heavy Frame Construction- The skeletal frame of the CDR is over three times thicker than conventional wall systems. That enables much more insulation to be used in the cavities that exist between to frame materials.

Material responsibility- We keep accurate records of all of our materials and use environmentally friendly substitutes when possible. For example, our concrete contains an average of 20% fly ash, a waste product of coal burning, without compromising structural qualities.

Smart Metering- With this new metering system the excess energy we produce during the day can be credited back to us for consumption at night when the sun isn't shining or the wind blowing.

High Tech Shades - The broad southern facade is made up of electrochromic glass, a smart glass that assists in maintaining thermal comfort by mitigating solar heat gain through automated tinting technology. It lets the sun light in during the winter and keeps it out in the summer.

Blown Cellulose Insulation - Engineered lumber framing allows for more insulation, resulting in higher R-value. Cellulose is 75-85% recycled paper fiber produced from newspaper waste. The CDR is super insulated with values over 4 times the conventional levels.

Super Insulated Basement- In the CDR we used 10 inches of solid rigid insulation board and painstakingly taped and sealed all of the joints between the boards. We followed this with a ten mil barrier that wraps the entire building.

Glass and Steel- The widespread use of glass and steel, as in the floor surface and handrails, is because both of these materials are highly recyclable and we like the clean lines of each.

Energy Efficient LED Lighting - Light emitting diodes will help to reduce the building's overall power consumption by almost 80 %. They are the latest advance in lighting technologies.

Living Wall - An installation of plants along the building's north wall will help improve the indoor air quality of the space while utilizing rain-water harvested from the roof top. It contains over 10,000 ferns!

Low V.O.C. Finishes - These improve the indoor air quality of interior spaces. Valcucine, a global leader in sustainable design, donated the cabinetry and tables to the project. The entire line of cabinetry is made of glass and aluminum.

Reclaimed/Recyclable Materials - Helping to conserve natural resources and reducing the load on landfills, a variety of reclaimed/recycled materials have been incorporated, such as stone tailings. Tailings are the leftover pieces from the stone fabrication process that are ordinarily of no use and are taken to a dump site.

Accounting for Waste- Integral to the LEED (Leadership in Energy and Environmental Design) process is being responsible for every aspect of the building construction including how much waste was generated. We used our waste stone from cutting the tailings into the proper shapes along the north side for fill. There are multiple layers of stone pieces below the finished surface.

Cut Stone- In an effort to complement the existing stone Chamney Farm complex we cut more than 100 tons of stone we reclaimed from Kansas quarry dump sites.

Thermal Mass - Not unlike the heat build up that occurs in a vehicle left in the sun with its windows up the trombe wall, the interior stone wall, uses this passive strategy to take on and store heat in the winter when the glass is not shaded and radiate the stored energy at night as heat.

Water Reclamation - Rainwater collected from the roof will be diverted to an underground cistern and used to irrigate the living wall, helping to reduce potable water demands and storm water runoff. It also supplies the toilets.

Cross Ventilation - Airflow can be manipulated to exhaust warm air out of the building through operable skylights along the north wall of the building. With built in rain sensors they can close atomatically.

Electric Car Charging Station - Professor Greg Thomas, Executive Director of the CDR, helps Provost Vitter plug in the first car at the CDR, one of the first such stations in the region.

Wind Turbine - Located to the west of the building, this tower will harness the wind energy that exists at the site and convert it to electricity for distribution.

Public Open House- The easily accessible location and high visibility helped shape our choice to use the building to publically demonstrate the latest technologies throughout the design of the building.

White Roof- Most roofing materials are dark in color but the industry trend, to avoid the heat island effect, is to use a light color to reflect heat in climates where air conditioning in the summer months is necessary.

All Construction Joints are Sealed- We spend a great deal of time sealing up the building during the course of construction. All of the joints between materials are caulked, foamed and covered with tape. Air loss at windows and doors has been kept to a minumum by using good installation practices and purchasing the best performing window/frame combinations that are available. We pressurized the building following construction to confirm its tightness and chase down any tiny air leaks that are revealed in the process to seal them up tightly .

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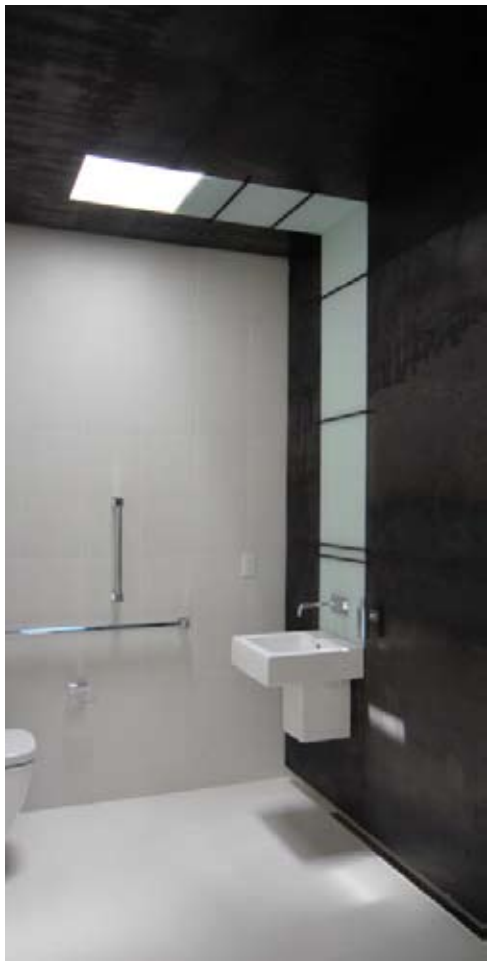
Intelligent Building Orientation - A narrow footprint positioned within the site maximizes passive strategies and takes advantage of a south face.

North Side- In keeping with the Passive Institute's design strategies we purposely avoid any and all openings on the north side of the building.

Photovoltaic Panels - Capturing light energy (photons) from the sun, these roof top panels will help reduce the building's energy needs considerably.



Real Time Display- Our goal is to provide a second by second display or energy consumption within the building. Turn on a light and see the impact that makes in a graphic depiction of the energy being consumed.

KU Research- There is fascinating research going on in basement laboratories and garages all around campus. A goal of the CDR is to share with the public some of the outstanding ideas the KU faculty are exploring.

Green Roof- The Sedum roof top plants are functioning as storm water detention; helping to insulate the building and reduce the heat island effect.

Low Flow Fixtures- All of the fixtures in the CDR use controlled water quantities and the toilets use water harvested from the roof. The mirror is away from the lavatory to avoid prolonged water usage at the sink!

Studio 804_12- This entire project was conceived designed and built by twenty one architecture students and Distinguished Professor Dan Rockhill over the course of a seven month period.