APPLIED RESEARCH TIMELINE

1967

Burt Hill makes an auspicious hire by the name of Dick Rittelmann, whose personal interest in energy conservation fuels the firm's rise as a leader in energy conscious design.

1972

Burt Hill forms its first Applied Research Group, thanks to the efforts of Dick Rittelmann.

1973

Dick Rittelmann is selected for membership on the NASA/NSF Solar Energy Panel. In November, he testifies before Congress as the panel's representative.

1974

While working on his thesis at Rensselaer Polytechnic Institute, Harry Gordon is paired with advisor Dick Rittelmann. Dick wastes no time in recruiting Harry to join Burt Hill upon graduation.

TOWNS ELEMENTARY SCHOOL, ATLANTA, GA 1974

In 1974, Burt Hill teamed with Westinghouse Electric Corporation's Research and Development Group to do a feasibility/planning study for solar heating and cooling of buildings for the National Science Foundation. As a result of that work, the research team was then hired to work on what was to become a landmark commission: to design a retrofit solar system application for the Towns Elementary School as a "proof of concept" (PCE) demonstration.

At the time that this solar system was designed and built, the largest solar-driven air conditioning units for use with absorption chillers were represented by a 3-ton unit under development by a team at the University of Wisconsin and a 5-ton unit by a team at the University of Florida. In contrast, Towns featured a 100-ton unit with reflector augmentation, making it the largest solar system in the world at the time by a wide margin. The 32,000-square-foot school building featured an impressive 10,000-square-foot rooftop array of flat plate collectors retrofitted to the existing building and used to drive a 100-ton lithium bromide/water absorption unit. The system also included three 15,000-gallon thermal storage tanks.

The Towns solar systems were designed to provide retrofit solar absorption cooling, as well as space and domestic water heating. Upon completion, the system was found to provide more than 60% of the building's heating and cooling loads. Burt Hill prepared a final design report for the system, which is still available through the National Technical Information Service (NTIS).

Upon its completion, this project was identified as a global exemplar by the Committee on Challenges for a Modern Society, a newly-formed NASA-sponsored international research collaborative that would later become the International Energy Agency. The project would not only prove that large-scale solar systems were feasible, it would also establish the reputation of Burt Hill as an expert in the design of solar systems.

Flat-plate collectors were retrofitted onto the existing school rooftop.

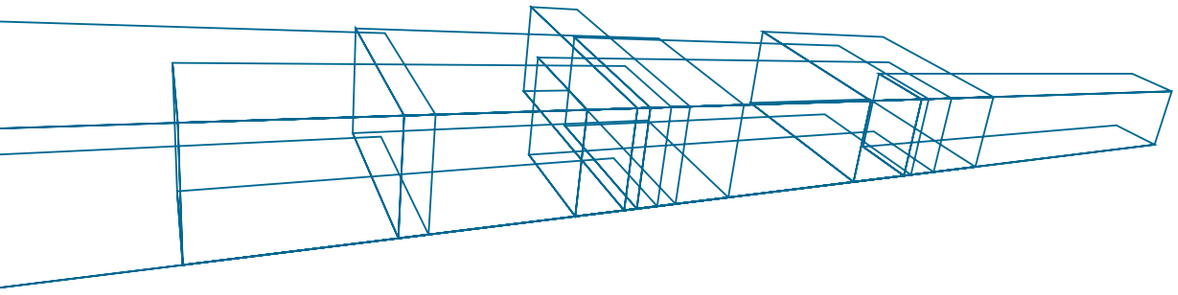
1975

Burt Hill designs a solar-assisted heat pump system that makes use of flat-plate collectors. This work wins an award for engineering excellence from the American Council of Consulting Engineers.

1976 + 1977

Working for Southern California Gas, Burt Hill designs a minimum energy dwelling (MED-I) that cuts energy usage by more than 50%. The MED Workbook, describing energy conservation features, wins a Design and Research Award from Progressive Architecture in 1977.

1967 1972 1973 1974 1975 1976 1977



1979

Fees earned by research-related activities pass the $1M threshold.

1979

Burt Hill successfully recruits Faruq Ahmed, who brings with him extensive solar energy system experience from his time as director of Solar Research Labs in Bahrain, as well as graduate work at Colorado State University.

1980

Due to substantial growth in our solar energy research activities and contract work for the U.S. Department of Energy, Burt Hill opens a new office in Washington, DC.

1980

As our DC office begins to grow its staff, Burt Hill hires another future research heavyweight, N. Scott Jones, who goes on to complete several award-winning designs for major corporations.

1982

Burt Hill participates in a series of passive solar military housing projects for the U.S. Department of the Army.

1983

The Comstock Center is designed to be the most energy efficient office building in Pittsburgh, a title it may still hold today.

HOOKER OFFICE BUILDING, NIAGARA FALLS, NY 1981

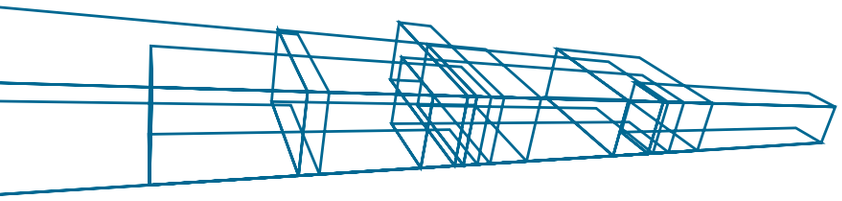
Hired by Cannon Design to perform energy and passive solar system consultant services, we helped to shape the design of a 200,000-square-foot office building for the Hooker Chemical Corporation. Burt Hill made recommendations on building siting, concept and materials, the most significant of which called for a novel envelope design. Clad in a glazed double skin with its two glazed planes approximately four feet apart, the Hooker Building featured computer-controlled, motorized louvers between these planes to control heat gain and loss – this was the first building in North America to be built with a double-skin façade. While the design energy budget was set at 114,000 BTUs per square foot per year, the building design was projected to use a mere 15,400 BTUs per square foot per year. In recognition of its exceptional energy performance, the project was honored with an Owens-Corning Fiberglass Energy Conscious Design Award in 1981.

In later years, the Hooker Chemical Office Building became the Occidental Chemical Corporation. In March of 2000, when the EPA announced the Energy Star Buildings program, 100 buildings were selected as inaugural inductees. The Occidental Chemical Center made the list and is profiled on the Energy Star web site with the following description:

"Conceived and constructed in the midst of the oil crisis of the early 1980s, this landmark structure continues to maintain its place as one of the most energy efficient commercial buildings in the world. One of the original 'intelligent buildings', it serves as a testament to the seamless integration of innovative engineering strategies and award-winning design."

photo by Kate Harrison

1979 1980 1981 1982 1983



THE MARX CENTER AT HOOD COLLEGE, FREDERICK, MD 1983

While it may seem odd to find a state-of-the-art home management education facility hiding behind a neo-Georgian façade, that is exactly what occurred with the Marx Resource Management Center. Burt Hill designed this energy efficient, passive solar resource management facility for Hood College. The building implemented a number of methods, from passive strategies like site optimization, building orientation and daylighting, to more active features such as water tubes for heat transfer and solar collectors on the roof. The project also collects "living experiment" data for the school's curriculum.

Energy monitoring was an important component of the project, and metering equipment was provided throughout the building so that students could measure energy usage and performance. This project won an Owens-Corning Fiberglass Energy Conscious Design Award in 1983.

1983 SHELLY RIDGE GIRL SCOUT CENTER, PHILADELPHIA, PA

A collaboration with Bohlin Powell Larkin Cywinski as architectural lead and Burt Hill in charge of energy design, the Shelly Ridge Girl Scout Center was a demonstration project in the DOE's Passive Solar Commercial Buildings Program.

The project features an 861-square-foot unvented trombe wall, a direct gain sunspace, and two rooftop collectors for heating domestic water. Data was collected at the Center using an Aeolian Kinetics PDL-24 data acquisition system and compiled hourly. Solar energy satisfies about half of the building's heating, lighting, and domestic hot water needs.

The International Solar Energy Society recognized the center with an award in 1986 for its excellent integration of solar technology and architectural design.

1983

Burt Hill wins a $1.1M contract from the U.S. Department of Energy to provide technical assistance to 40 design teams participating in their Passive Solar Commercial Buildings Program. Results are compiled into a passive design handbook.

1983

Burt Hill develops a series of energy nomographs for use by A/E professionals in assessing energy-conscious design features.

1983

Working for Sandia National Labs, Burt Hill develops protocols for automated installation of photovoltaic systems.

1983

1985

Burt Hill is contracted by the World Bank to do technical feasibility studies for solar water heating in Senegal and Sudan. The previous year, the firm teamed with the World Bank to study the feasibility of a photovoltaic-powered telecommunication system in Western Samoa.

1985

Burt Hill is hired by the U.S. Department of the Navy to conduct energy studies on 4,000 buildings. As part of our analysis, we suggest looking at ice- or chilled-water storage to reduce peak demand – a forward-thinking design concept that will not come into common use for another ten years.

1985

Burt Hill consults on International Energy Agency (IEA) Task V: performance of heating, cooling and hot water systems using evaluated solar collectors. One year later, we also provide lead country support for IEA Task VIII: passive and hybrid solar low-energy buildings.

1985

Burt Hill joins a group of our A/E peers to conduct a detailed review that assesses the validity and practicality of proposed revisions to the venerable ASHRAE 90.1 Standard.

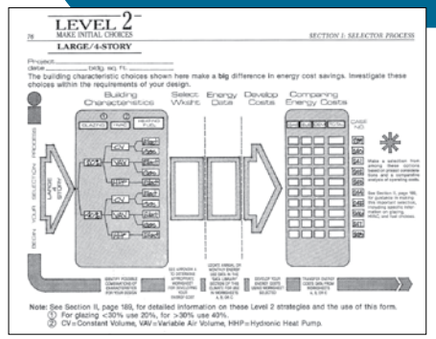
1985

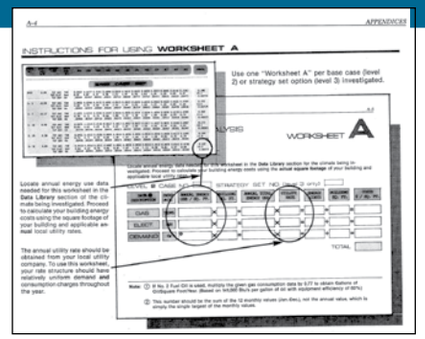
Working with the U.S. Customs Service to design and build C3I facilities, Burt Hill develops a low cost EMF/RFI shielding method, which we still utilize today.

SMALL OFFICE BUILDING HANDBOOK:
DESIGN FOR REDUCING FIRST COSTS AND UTILITY COSTS 1985

As is often the case with contract grant projects, compiling the results into an accessible end product is almost as important as gathering good data and doing rigorous analysis. Such was certainly the case with the passive solar design research that we did in 1983 for the Battelle/Pacific Northwest Labs. Widely considered to be a pioneering effort in whole-building cost-based energy analysis, the resulting manual included a step-by-step guide to selecting appropriate energy-saving strategies in any of the five climatic regions found in the contintental United States. The book was intended to help architects, engineers, contractors and building owners design and maintain energy efficient office buildings of less than 50,000 square feet. Burt Hill received the Progressive Architecture Award for Applied Research in 1985 for work on this handbook.

"A tool that can and will be used in everyday practice... a remarkable job in bringing together the data and analysis procedures for energy and cost studies in a simplified format."
— Jerold W. Jones, Ph.D, P.E.
University of Texas at Austin





1986

The firm is hired by Westinghouse to perform a fuel cell study.

1986

BH provides lead country support for IEA Task VIII: passive and hybrid solar low-energy buildings.

1986

While working on a project for Slippery Rock University, Burt Hill develops a Unit Pricing process, which allows this publicly-funded institution to choose a specific controls manufacturer. This process is presented at an APPA conference later in the year.

1985 1986

1987 U.S. POSTAL SYSTEM: KIT-OF-PARTS

In the 1980s, Burt Hill began what is still an ongoing relationship with the U.S. Postal System (USPS), serving as alternative energy specialists. The work includes programs for Greening of Medium Standard Buildings, Energy Assessment and a post-occupancy evaluation handbook. The early emphasis of our work with the USPS was energy conservation through strategies like daylighting. One such project, the Kit-of-Parts program, was an attempt to develop prototypical standards that could be applied to categories of facilities by type or size.

1988

Co-authored by Burt Hill and Min Kantrowitz Associates, *Commercial Building Design* wins a Progressive Architecture Research Award in1988. The book is the culmination of a U.S. Department of Energy program studying the effectiveness of passive solar systems in commercial design.

1986 TO 1989

Burt Hill participates in a solar-assisted energy-efficient home demonstration project. A spec-built home is designed with all electric energy-efficient features, then equipped with a Burt Hill-designed 60-point data and instrumentation system and monitored for two years.

1989

Burt Hill becomes a founding member of Integrated Building and Construction Solutions (IBACOS), a research consortium focused on systems integration related to residential construction. IBACOS created what is now called the Building America Program and remains active today.

1989

Working on a renovation for the University of Pittsburgh Medical Center, Burt Hill develops procedures to minimize radiofrequency interference caused by construction near facility-critical spaces like operating rooms. Burt Hill still uses this protocol in all of our hospital work.

UNIVERSITY OF PITTSBURGH MEDICAL CENTER BIOMEDICAL SCIENCE TOWER NORTH 1991

One example of a laboratory project incorporating sustainable design strategies is the 400,000-square-foot Biomedical Science Tower at the University of Pittsburgh Medical Center. Because of its proximity to a large hospital complex, the project's HVAC system was designed to "recycle" excess heat loads from the thermally-heavy hospital complex. Through the use of heat exchangers, the excess heat from the exhaust air stream of the hospital complex is used to preheat the incoming fresh air stream of the lab building. The result, often referred to as "free cooling," is a system with significant reductions in energy use. "Free cooling" is now common practice, and the project won a Laboratory of the Year Award from *Research & Development* magazine.

END OF 1980s

Burt Hill earns nearly $15M in fees for research-based work in the course of this decade.

1991

Through our ongoing work for the IEA, Burt Hill serves as the U.S. Representative to Task XI, which includes a focus on the design of atrium spaces using passive solar and energy conservation features. Harry Gordon represents the firm on this challenge. Lessons learned are not forgotten and will later be applied to an atrium at Harry's alma mater, Rensselaer Polytechnic Institute, in 2004.

1990

Harry Gordon becomes a founding member of the AIA Committee on the Environment (COTE), serving on the Steering Group and also as chairman.

1986 1987 1988 1989 1990 1991

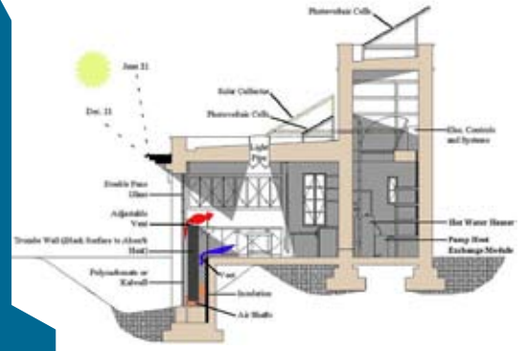
1993 SOLAR POWERED DISPENSARY IN KASTEL, TIBET

Burt Hill helped the U.S. Tibet Society and Swedish Tibetan Society for School and Culture by designing a small, self-sustained passive solar system to maintain a high-altitude dispensary in Kastel, Tibet. Kastel sits on a remote high plateau at 12,100 feet above sea level and enjoys an arid and sunny climate; winters are generally cold with clear skies. The dispensary is intended to provide minimal modern amenities for outpatient treatment.

As sources of fuel are scarce, this small dispensary was designed by Dick Rittelmann and Faruq Ahmed to use solar energy systems to provide space heating, water heating, and electric power. Daylighting is used extensively, combined with solar-powered sun trackers, to provide light and illuminate the patient examination table.

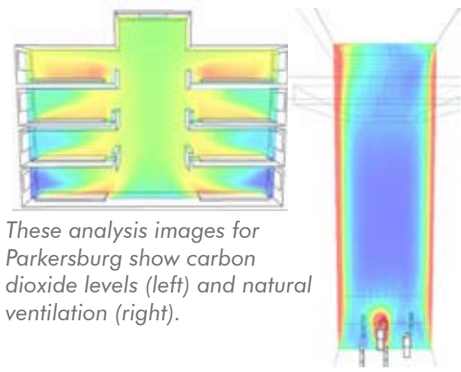
The building was designed to use locally available materials and technology, which precludes the use of sophisticated construction practices or even the use of building insulation. Because early building performance calculations indicated only a marginal improvement in building temperature with insulation, the structure was designed without it.

The work was presented at the 1995 National Solar Energy conference.



2007 PERFORMANCE-BASED ENERGY MODELING

In formalizing a group dedicated to analyzing building energy performance, Burt Hill renews its commitment to the value of putting energy performance feedback into the hands of designers in the early stages of design. Early feedback supports greater project benefits at lower costs, and routine energy modeling helps to advance design while facilitating integration and achieving high-performance buildings. The Performance-Based Energy Modeling Group is launched as a firm-wide resource.



These analysis images for Parkersburg show carbon dioxide levels (left) and natural ventilation (right).

1994

Burt Hill becomes the first A/E firm to join the U.S. Green Building Council (USGBC), only one year after the Council was formed.

2007

Burt Hill formalizes its Sustainability Group. The firm also becomes a founding member of the Indian Green Building Council (IGBC), whose vision is to facilitate India's emergence as one of the world leaders in green buildings by 2010.

1993

Through our involvement with AIA's COTE, Burt Hill leads several prominent sustainably-focused design charrettes to look at ways to make many American landmarks more energy conscious. Along with the Greening of the White House, the Pentagon and the Grand Canyon were also addressed in this program.

1999

Burt Hill designs a renovation for the Social Security Administration's main operations center using an early-generation BIM program to create partial models of critical project areas. The firm's efforts in exploring the use of a unified building model are featured in the February 1999 issue of *Architectural Record*.

2000 TO 2003

Dick Rittelmann serves as chairman of the Research Advisory Board for Oak Ridge National Laboratory, concentrating on research management and evaluation.

1993 1994 1999 2000 2007