In assembling this manual I was influenced by *Rural and Urban House Types, PAMPLET ARCHITECTURE NO.9.* That book presented a series of house types based on the needs and habits of its occupants. It documented not only the plan and design intent but also the form it implied; that logic belonging to a regional (site and climate) and an architectural (tradition) idea was expressed in the form.

In teaching an environmental technology course at Tulane University; specifically the class on bioclimatic design, I have discussed these same house types in relationship to climate, how the sun, wind and seasonal changes shape the buildings. Along with Victor Olgyay’s essays in *Design With Climate* concerning regional design characteristics, I wanted to provide my students with a manual of types and case studies that they could reference throughout the course.

This manual focuses on buildings in North America, specifically looking at historical examples, early modern houses and global multifamily housing in the 21st Century. Each of these precedents offer characteristics that should continue to inform the way we build today.

Michael Crosby

NOLA, 2010
“Five zones possess the sky which one is ever red from blazing sun ever burnt by fire.”

Virgil
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All forms of life transform to adapt to their environment. Humans and their ancestors share this instinct for survival. The adaptation of clothing, the construction of shelters, the use of tools, the domestication of fire, and the cultivation and storage of food has created a profound response to our world. The desire for survival so imbedded in our primal consciousness was directly linked to place. In other words the warmth of the sun, the chill of the winter winds, and the shade of the tree told us where we were and who we were.

Native American Indians built according to regional climatic characteristics. As they settled in different parts of the Americas the variety of climates from the cold-cool northern zone to the changeable middle regions, and the dry western territories to the hot-humid southeast, along with the availability of building materials at each location produced variations on the type of shelters constructed.

In the cold northeast compact volumes conserved heat while minimizing exposed surface area. In the cool northwest, structures stretched out to take advantage of seasonal variations in the climate yet still protected under one long roof. Many times a second inner structure formed an insulated layer from the winter cold. This outer shell could be opened up during the summer months to allow for natural ventilation and cooling.

In the temperate zones where the climate was less extreme from season to season a more open organization was developed. Villages were more dispersed, family shelters more scattered and the use of portable structures (such as the wigwam; a conical structure using poles stretched with animal skins) could protect from wind and rain. This housing typology could be easily heated from a central source and just as easily disassembled for transport.
In contrast, the hot arid zone of the southwest produced dwelling types that attempted to modify the extremes of heat and sun. The use of communal grouping for both protection and environmental comfort presented a strategy of stacking family dwellings opening to the south to form a larger complex. The use of local stone and or mud bricks produced thick walled volumes. These structures incorporated heat transfer to keep their inhabitants warm in the winter and cool in the summer in what is described as a closed building system. Solar orientation was extremely important in understanding the sun’s path. Dwellings faced south with small openings stepping back to form south-facing terraces over lower units. They were typically ori-
ented on an east-west axis, elongating along the south and north. In this way they could limit the amount of morning and afternoon sun in the hot summer months and maximize the winter sun on the south face.

The hot humid zone of the southeast inspired dwelling types that protected against heat, rain and humidity. In contrast to the closed building system of the southwest zone, the southeast region utilized an open building with a large overhanging roof form, a raised floor and few walls. This system protected the inhabitants from the hot sun and heavy seasonal rains while still allowing maximum air movement from above, below and through the dwelling.

Each zone produced a dwelling type based on its climate and appropriate construction logic. In Design with Climate, Victor Olgyay observed these climatic building types through a rigorous scientific investigation to produce building forms based on thermal comfort. Olgyay’s scientific approach cataloged an optimal organizational form in ratios of 1:1.1 for cool, 1:1.6 for temperate, 1:1.3 for hot arid, and 1:1.7 for hot-humid climates. The idea of a skin to volume ratio whose optimum shape is defined as one which calculates the exposed skin/surface with its total volume of space orients the building with the sun as a determining factor for a building’s form.
Compact buildings, slightly elongated on an east-west axis in cold/cool climates use low skin to volume ratios to reduce the building form into a nearly square plan, the slight elongation along the east-west axis is to take advantage of the limited amount of winter sun. In larger buildings this cubic form translates into a two-story plan.

In the temperate zone where more of a balance between summer and winter conditions occur, a more elongated form allows the building to take advantage of air movement in the summer and solar radiation in the winter. L shapes can produce enclosed outdoor spaces as well as help to orient wings that can be attached for specific solar conditions such as early morning warming.

In the hot arid climate, the form is more compact with an enclosed courtyard. This space is protected from the hot summer winds and provides a microclimate space where inhabitants adjust their behavior to follow the sun in winter and shade in summer. Thick walls, which transfer temperature slowly, hold heat for night time warmth in the winter. Under the hot summer conditions, this idea is reversed by opening up the building at night to take advantage of diurnal swings, and then close down during the day to conserve cooler interior temperatures. The hollowed out of the central courtyard adds an outdoor room with light and air.

In the hot and humid southeast zone, sun and humidity affect the building most of the year. A strategy of an open building system containing a long and narrow footprint along an east-west axis minimizes the morning and afternoon sun and with the addition of an overhang along the south elevation so that the long wall is protected from direct solar gain. The idea of an open or permeable wall system and a thin or one room deep plan maximizes the building’s wind access. A comprehensive analysis of these forms can be found in G.Z. Brown’s book *Sun, Wind, and Light*, a standard in an architecture school’s environmental design courses.

This manual builds upon *Sun, Wind, and Light* by documenting the design strategy found in each house type. These types rely on climatic responses which produce forms specific to their location. This book describes historic (pre-twentieth century) house types and early modern case study examples to give the student a foundation and history of earlier traditions. Conceived as a manual, the pages are arranged in a way to help students apply climate-specific responses to their own design projects. In conclusion, four multi-family housing types address global issues concerning bioclimatic design in each of the four climate zones. These projects use many of the environmental strategies presented throughout this book, test those ideas in an urban context, and suggest appropriate strategies for the 21st century.
These icons are used to help clarify building form, site location, landscape, and climatic details. Running along the bottom of each page they form a footnote for each example. Where building location or designs overlap zones all icons that apply are included.
EARLY AMERICAN HOUSE TYPES

- New England Cottage
- New England Salt Box
- One Room Cabin
- Dogtrot Cabin
- Sod House
- Bungalow House
- Ranch House
- Courtyard House
- Southern Farmhouse
- Southern Farmer's Cabin
- Plantation House
- West Indies House
- Side Gallery Townhouse
- Shotgun House

The following early American house types are catalogued according to form. The form diagrams reflect the skin to volume ratio for each of the four climate zones. Some forms transcend from one climate to the next but with formal variations adapted to their new location. Running across the bottom of the page are sets of icons which describe bioclimatic design ideas.
New England Cottage

This house type began as a simple one room farm structure based on a European model and adapted to a new climate and to local building traditions. A stone fireplace for cooking and as a heat source was placed at one end of the room. A porch or entry space was attached to the fireplace wall and formed a zone to mediate the climate. In summer it could be left open, in the winter closed to conserve heat. The roof formed a simple gable (typically 45 degrees) creating a loft space used for sleeping or storage accessed by a stair in the fireplace wall. This steep roof form diverted cold winter winds and accelerated the removal of snow or rain. As the family grew a second room could be added. The entry and fireplace now occupied the center of the house. Later additions to the rear typically contained a kitchen, storage, or bedroom.

The typical footprint elongated the house on an east/west axis with entry on the south along with larger window openings. The north side had fewer and smaller windows and with the later service additions added a zone of protection from cold winter winds. Coniferous trees protected the north and west sides, deciduous trees shaded the south side and a kitchen garden opened to the east and south.
New England Salt Box

Expanding on the tradition brought from Europe, the New England “Saltbox” house extends the one room deep English Cottage by adding a lean-to off the rear. The traditional “Saltbox” house would have a one and a half or a two story front elevation and a one story rear elevation.

Typically elongated on an east-west axis, the rear addition would protect front rooms from the cold winter winds and form a buffer zone from the outside to the central fireplace, the main heating source. The steep roof shape provided wind protection on the front or south elevation by directing the flow up and over the rear section. Coniferous trees to the north and west form a buffer from cold winter winds and deciduous trees to the south provide summer shade. A kitchen garden was often placed near the house on the eastern side.
One Room Cabin

The one room cabin similar to the New England Cottage used additive elements to produce variations. Depending on the climate the fireplace could be interior or placed on an outside wall. As the building type moved south the addition of an outdoor covered connection between one-room cabins (the dog trot) formed a shaded outdoor room. Later, a variation enclosed the space to form a central hall. The cabin form could be attached to a larger more formal set of volumes in the case of the southern farmhouse type and would be attached as a service wing. The L-shaped rear addition produced an outdoor space typically galleried to form another connection. The gallery or porch was an important extension of the living space to the outdoors and used during the summer months. The plantation house type wraps the porch completely around a two room raised cabin. The urban cabin type (southern shotgun house) lined up rooms one behind the other on a deep narrow lot and used a side gallery as circulation. Later variations enclosed the gallery.
**Dogtrot Cabin**

The dogtrot cabin or “possum trot” connects two one-room cabins with an outdoor breezeway by attaching the two volumes with a second floor loft spanning both. This loft forms an outdoor covered room below. In the summer this outdoor space becomes a cool and shady zone. In the winter it is a protected storage area from the wind, the rain, and the snow. In many examples, as the cabin was transformed this space was enclosed to form a type of center hall house.

In the temperate zone building materials were typically stacked logs (“the log cabin”) and as this house type moved to the hot humid zone the logs would be replaced by a lighter, more transparent skin. More windows were added for greater ventilation and wood lap siding was used over logs to shed seasonal rain.
The sod house was a very simple shelter more like a dugout than a house. Sod bricks were cut out and stacked to form walls. Much like a polar igloo, the house’s low skin to volume ratio helped the limited heat source (usually a small firebox to keep its occupants warm). The thermal qualities of the building system and the majority of the space being below ground added to its thermal design strategy.

An earth berm would be built up on the north and west side of the building with an entrance opening to the south. This berm would direct cold winter winds over the closed wall protecting the north and west sides.
Southwest Courtyard House

The courtyard house or patio house turned the house form toward the interior court. A series of one-room deep spaces were connected by an outdoor veranda. Many times, this space was used as a hallway to enter each room. The thick adobe walls provided the house with insulation from the hot desert air. At night because of the diurnal swings, the courtyard could release the hot air into the night sky. Depending on the season, the inhabitants could move from interior rooms to the veranda to the patio for maximum comfort.

As the sun moved through the sky, inhabitants could move around the courtyard to stay in the shade and out of the hot desert wind during the summer months or move around to follow the sun during the short winter season.
Ranch House

The ranch house used the components of the courtyard house type, by simplifying the house to a set of rooms entered along a veranda this set of spaces could be attached together to form a line or in an L-shape to enclose a patio. Because of the mild climate, the patio became the focus of the house as well as its largest room. The addition of an outdoor fireplace extended livability.

Because of diurnal swings from hot day temperatures to cooler nights, the thick walls would hold the heat and re-radiate to the outdoors and night sky, keeping interior rooms cool. During summer months the veranda provided both a shaded outdoor space and structure for seasonal planting.
Bungalow

The bungalow type, based on the vernacular hipped roof colonial houses of India, was typically a one-story dwelling. It used an arrangement of rooms usually without hallways to maximize cross ventilation. A large hip roof protected the house’s interior from the hot sun and provided a shaded outdoor porch space. In larger bungalow types, a second floor sleeping porch became another way of extending the living space outdoors.

Its compact footprint used the covered porches, verandas or galleries to extend the living to the outdoors as shaded outdoor rooms. In more humid locations the house could be raised above the ground to allow wind flow and protection from ground moisture.
Southern Farmhouse

This house type used the simple cabin form and room arrangement but added a second floor. Somewhat different from the saltbox, this type was less protected on the north side. Many times an extended service wing was attached to the rear to form an L-shaped extension; these extensions would include covered porches or galleries. A front porch was typically applied to extend outdoor living in the summer and form a covered entry in the colder months of the year.

The building’s orientation and site placement would adjust to local climatic conditions with kitchens and service spaces extending off the rear from the original structure, producing protected outdoor spaces.
Southern Farmer’s Cabin

A variation of the one room cabin, this house form included a front porch, dormer, and typically an outdoor ladder to the loft space. Raised off the ground for air ventilation and moisture protection, the one room usually would have a twelve foot floor to ceiling height. The front porch would extend living to the outdoors by providing shade and rain protection.
Plantation House

Plantation houses used galleries to extend the living area to the outdoors; galleries could be on one, two, three, or on all four sides of the house. The widths of the galleries responded to the sun angle, allowing for shaded spaces in the summer and sunny spaces in the short winter months. High ceilings and clear stories as well as day lighting lanterns with operable openings at the peak of the roof enhanced cross and stack ventilation. The house form is derived from the large roof enclosure with zones of space from the outside galleries to the interior rooms. Typically the houses were raised with center hall galleries and rooms at each corner provided cross ventilation to each room as well as throughout the entire house.
West Indies House

The Pitot House located on an early waterway, Bayou St. John, in New Orleans was built in 1718. Based on the West Indies plantation house type this building was modified to fit the location. Built one floor above a masonry-raised cellar the house has open galleries on two sides. Each elevation has a specific orientation to the site and to the four compass positions. At the second level on the east elevation a space (loggia) is enclosed by a shutter wall of louvers that can operate as one large opening or in smaller components. The space works as a covered outdoor room extending or controlling the living space of the house. An open gallery extends around the south and west elevations with the north wall the most closed and protected.
The Charleston or Savannah house type elongated a New England stacked house form with a southern gallery or side porch in a shotgun plan form. Typically one room deep with a long side gallery which faced an enclosed garden, the house most often was entered from this gallery by a front door at the street. Galleries could be stacked two stories high to extend shaded living spaces. Like the shotgun house, this form produced a very high skin to volume ratio.

When grouped together the buildings would form an urban pattern of house, garden, house, garden, house, garden along the street.
Shotgun House

The shotgun house form produces an extremely high skin to volume ratio. The elongation of the sidewall produces a thin building footprint that allows for an easy flow of air for cross-ventilation. The one room width with long window openings on opposite walls helps emphasizes this. Even in small cottages the ceiling heights typically are at least 10′-0” which produces a stack ventilation effect. Front porches extend a shaded outdoor living space toward the street.

In its simplest form, rooms would be entered along a covered outdoor gallery. A single room could be added at the second level typically at the rear to form a “camelback” house type or side to side to form a double. Narrow side yards would separate each house to induce wind flow between and through open windows along the side elevations. The front porch provides a common public space down the block.
Located in the French Quarter of New Orleans is the Gallier House, a 19th century Town Home. The house, now a museum, goes through an interesting metamorphosis each year. The term used to describe this wonder is “winter dress/ summer dress”. What happens is a series of events that change the décor and furnishings. Rugs are rolled up, mosquito nets are installed, draperies changed to light cotton, adjustments to windows, doors, transoms, and shutters; change the house both inside and out. Growing up, I remember the annual spring-cleaning at my grandparent’s house where a similar transformation occurred. Storm windows were removed and replaced with screens and metal awnings; a back porch that was covered in glass panels was suddenly a cool and breezy room. Attic vents were opened, dead leaves pulled from trellises and new vines planted.

These types of rituals mark not only the passing of time but connect these houses specifically to place and climate. Many of the vernacular houses described in this book use architectural elements to transform or adapt the house to the seasons. The shift of the fireplace from the center of the house to an outside wall, the addition and orientation of the porch, the size and placement of windows and the height and shape of the roof make the buildings. The early modern case study examples included here take their clues from these vernacular houses set in each specific climate zone. The Gropius House near Lincoln Massachusetts is a traditional New England House. Compact and simple in plan it opens to the south and is closed and protected to the north. Wright’s Usonian House modernizes the Midwestern Farmhouse, ex-
tending it with the L plan to shape it into the landscape. The kitchen as the heart of the house forms the hinge that living and sleeping spaces extend from. In a weekend house by Paul Rudolph the traditional southern shutter wall and umbrella roof (turned upside down) continue the logic of the open frame and big roof form in a hot humid climate. The Schindler Kings Road House in West Hollywood California utilizes a plan that organizes the lot into a series of outdoor rooms, these rooms are enclosed by walls of sliding door panels which disappear into the side of the house producing a continuation of the inside and out that is perfect for this mild desert climate. The other walls are formed by the concrete tilt-up panels and outdoor fireplaces which extend the outdoor living to the night time.

The Pitot House located on an early waterway, Bayou St. John, a natural levee on the edge of New Orleans, was built in 1718. Based on the West Indies Plantation House Type, this building was modified to fit its location. Built one floor above a masonry ground level cellar the house has open galleries on two sides. Each elevation has a specific orientation to the site and to the four compass points. At the second level on the east elevation a space (loggia) is enclosed by a shutter wall of louvers that can operate as one large opening or in smaller components adjusting to specific climatic conditions. The space works as a covered outdoor room extending or controlling the living area of the house. An open gallery wraps around the south and west elevations with the west gallery deeper to adjust for the sun in the summer, the south calculated for summer shade and winter sun and the north elevation absent of any gallery, forming the most closed and protected side.

These simple ideas produce designs of logic and connection to their place and climate. As students of architecture they teach us by example. We do not need to reproduce them (in a historical sense) but we need to continue their logic as we design for our own time.
20th CENTURY CASE STUDIES

Gropius House

Hemicycle House

Esherick House

Jacobs House I

Eames House

Schindler King’s Road House

Healy Guest House

Hiss House

The 20th Century case studies show two examples of each climate zone and are analyzed through the diagrammatic drawings. These diagrams define the characteristics of the climate and building form with appropriate responses. Some house types show characteristics of overlapping zones and adaptations to their place. In all cases, landscape, solar orientation, and wind patterns are addressed as important elements of passive design strategies. The diagrams used to illustrate the case studies are consistently drawn showing the southern solar orientation to the bottom right of each axonometric diagram and north always facing up on all plans. As a concluding note each house is shown through a sun study. Based on each house’s latitude and solar orientation the shadows present the building over the course of a year and through hours of the day. Summer Solstice, the Vernal Equinox and the Winter Solstice.
The Gropius House sits at the top of an apple orchard and is elongated along an east-west axis. Entered from the north under an enclosed porch, the cold winter winds are blocked and the entrance provides a covered and protected foyer. The house opens to the south with a screened-in porch extension with views towards the trees. A large glass wall faces south in the main living space and has a roof extension calculated for passive solar utilization, allowing winter sun in and shading the summer sun. A west facing side window includes a sliding metal shutter on the exterior to control the afternoon sun, it can slide into position to block the hot summer afternoon sun or remain open to watch a winter sun set. An outdoor sunspace on the second floor includes a trellis overhead for summer planting. This house uses its program of spaces to organize itself around a solar orientation appropriate for a cold climate, more closed and protected on the north and more open and transparent on the south. This house uses many of the techniques and strategies found in the traditional New England Farm House.
Hemicycle House
Middleton, Wisconsin
1943
Frank Lloyd Wright

Entered through an earth berm on the north side, this house in the form of a semi-circle is closed and protected from the cold winter winds yet opens itself up to the south with a wall of glass doors and transoms. The south facing roof overhang is calculated to provide shade in the summer and full sun in the winter through the glass doors and transom wall. A concrete slab floor takes advantage of thermal mass by holding solar radiation in the floor during winter months. A second floor loft opens to the living space below to capture solar thermal gain. A set of horizontal windows along the north bedrooms use cross and stacked ventilation for seasonal cooling.
The Esherick House, designed by Louis Kahn, is a simple volume organized around a set of served and service spaces. Elongated on an east-west axis, the house is entered from the north through an entry zone. Windows on the north contrast with the large wall of glass found on the south side. This wall of glass is made more complex by the use of operable shutters which can close up the wall to various degrees. The windows are recessed in the wall with the roof forming an overhang which blocks summer sun while allowing the winter sun in. The west wall, which has no openings except for a slot along the fireplace chimney, forms a barrier against cold winter winds and the hot summer sun. The kitchen and bath on the east side of the house serve as another layer of protection from the elements. The use of an operable window system and the double height volume in the living space is optimum in promoting cross and stacked ventilation.
Wright’s Usonian house modernizes the Midwestern Farmhouse. It includes the idea of the one room cabin with a fireplace as the center of the main living room. A secondary set of rooms for sleeping are attached (typically along an east-west axis) to one side of the main space. This arrangement would form an L-shape and would enclose a garden space connected on the east elevation with the living space. A hallway along the northern edge with small openings would protect this side from cold winter winds and provide privacy to these spaces. Large windows facing south in each bedroom would sit under overhangs allowing winter sun in the rooms and blocking the hot summer sun. In the main living space large glass doors would open to the garden space and along the west wall small clerestory windows temper the western sun yet allow the sunset to be viewed from the room.
The Eames house in Pacific Palisades California uses the idea of two separate volumes to form an outdoor room (courtyard). Wedged into the hillside, the house stretches out to form a long and thin footprint. With windows on each side and two-story volumes connected by lofts, the house takes advantage of cross and stack ventilation for cooling. The long walls use a variety of fenestration types to fill the house with light and air. Oriented toward the Pacific Ocean, the long window wall is filtered by a row of eucalyptus trees. Adjustments to the window wall control the amount of ventilation moving through the house. The roof extension over the south wall forms a covered outdoor porch with a view past the palisades toward the Pacific Ocean.
The Schindler House on Kings Road in Hollywood, California is part cave and part tent. Using massive concrete tilt-up walls and light frame-like window and door systems, the wall either forms a barrier or essentially disappears into pockets in the walls. The organization of the house is a set of interlocking L’s forming outdoor living spaces including large outdoor fireplaces built into the thick wall system. Original to the house were sleeping tents on the roof enclosed only by canopies for protection. The ability of the house to actively engage it’s occupants in the particularities of the southern California environment through a set of patios and roof top tents blurs the notion of inside and out.
Located near Sarasota Florida, the “Cocoon” house is a small guest house using an open building system for ventilation and the idea of a “breathing wall” composed of shutters which can open and close depending on the time of day or season. The overhang of the roof provides both shade and protection from the elements. It’s butterfly roof opens to the exterior walls extending the open wall up to clearstory lighting. The shutter system adjusts for both ventilation and light. Roof extensions shade the glass end walls.
The “Umbrella” house uses a shading system as a primary roof form which connects an outdoor terrace and pool to the house. The large trellis provides shade from the intense Florida sun while allowing indirect natural light into the house. A large opening over the pool plays against the patterned light allowing direct sun to warm the pool.
Gropius House
Lincoln, Massachusetts
Lat. 42.25N / -71.19W
Hemicycle House
Middleton, Wisconsin
Lat. 43.04N / Long. -89.32W

Winter Solstice 9am
Winter Solstice 12pm
Winter Solstice 4pm

Equinox 9am
Equinox 12pm
Equinox 4pm

Summer Solstice 9am
Summer Solstice 12pm
Summer Solstice 4pm
Escherick House
Chestnut Hill, Pennsylvania
Lat. 40.04N / Long. -75.12W
Jacobs House
Madison, Wisconsin
Lat. 43.03N / Long. -89.26W
Eames House
Pacific Palisades, California
Lat. 34.01N / Long. -118.31W
King’s Road House
West Hollywood, California
Lat. 34.05N / -118.22W
Healy Guest House
Sarasota, Florida
Lat. 27.18N / Long. -82.33W

Winter Solstice 9am
Winter Solstice 12pm
Winter Solstice 4pm

Equinox 9am
Equinox 12pm
Equinox 4pm

Summer Solstice 9am
Summer Solstice 12pm
Summer Solstice 4pm
Hiss House
Sarasota, Florida
Lat. 27.19N / Long. -82.34W

Winter Solstice 9am
Winter Solstice 12pm
Winter Solstice 4pm

Equinox 9am
Equinox 12pm
Equinox 4pm

Summer Solstice 9am
Summer Solstice 12pm
Summer Solstice 4pm
The focus of this manual has been on the single-family house type and designs for four North American climate zones as a way to address specific issues concerning bioclimatic design and analysis. For this final segment, let us examine a more global agenda of housing at a more dense scale for a new century.

Concepts for solar cities are not new, ancient cities in China were always planned on an orthogonal grid and oriented north-south. The Chinese courtyard house had its front door or entrance to the south and all rooms opened to the courtyard. Greek cities used this same orientation with living surrounding an open courtyard and garden. Roman baths and city plans followed that system as well translating it into the plan for the ideal roman military camp. The Native American Indian settlements in the South West; Acoma, Publeau Bonito, White Rock and Mesa Verda orientated their villages to the south and protected them from the north to adjust for the cold high desert winters.

Ebenezer Howard’s proposal for a ring of garden cities suggested the idea of healthy solar living surrounded by country-side and proposed a relationship to its environment with solar orientation, wind and air ventilation along with landscaping plans appropriate for the temperate climate. Coniferious trees were planted for winter wind protection and deciduous trees for summer shade. The Weissenhof Housing Exhibition was planned with an east west orientation along a south facing slope and included JP Oud’s worker housing similar to the traditional greek house and courtyard garden; Mies van der Rohe’s linear housing block with shared outdoor patios and Le Corbusier’s Citron House type with roof top terrace; all emphasized the idea of a passive system for solar, natural light, and ventilation. In more recent years the 2000 Solar City Exhibition took a more aggressive approach emphasizing active systems in addition to the traditional use of passive strategies.
The four climate zones are represented as multifamily housing case studies using the same techniques to understand bioclimatic design but now at the urban scale relying on techniques used in both the early vernacular house types and later modern case studies these multi-family types suggest density and urban living for each of the four now global climate zones.

In the Amsterdam harbor, the Silodam housing block uses a compact building form with a low skin to volume ratio to conserve heat in the winter months in a cold climate but with ample natural light to each unit taking advantage of spectacular views. The BedZed in Wallington England a suburb of London stretches out east to west with south facing glass sunrooms and service space along the north wall. This is a bioclimatic organizational strategy that is appropriate to a temperate zone. The Madrid Social Housing Block is based on the courtyard type, with lattice shading devices, and natural ventilating towers to stay cool in a hot and arid climate. The North Claiborne Avenue mixed–use development in New Orleans’ Ninth Ward orients itself along a east-west bar with thin shaded living spaces raised one floor above a ground floor for cross ventilation. The ground floor is a shaded commercial zone with a continuous gallery which is traditional to a hot and humid city like New Orleans.

As we begin the 21st century, more people now inhabit our urban areas than rural or suburban. This shift in many ways is more ecological allowing for more compact living, solar oriented streets, walkable neighborhoods, consolidation of transportation systems, and the possibility of collective clean energy services. This next generation of housing has the potential to produce forms appropriate to a new century yet still taking their clues from principles that are timeless.
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Note:
As a follow-up a second manual is underway which will look at these issues at a global scale.