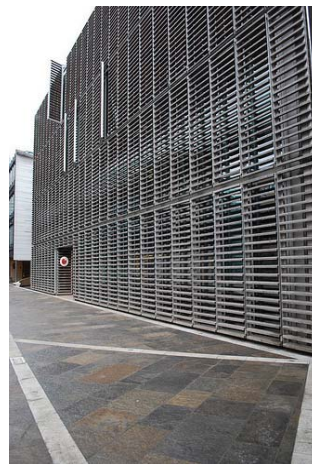
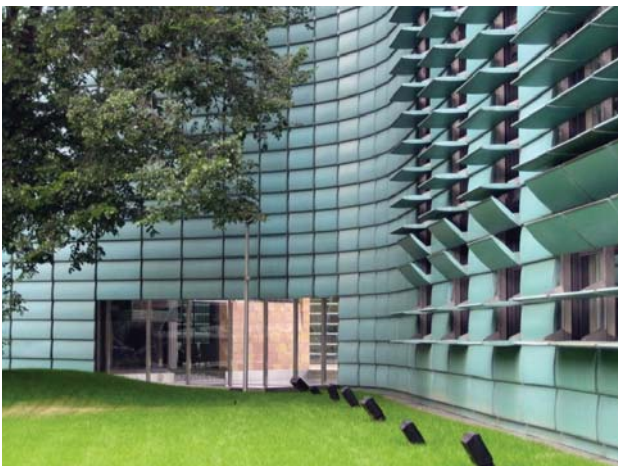


Case Study One: *Nordic Embassies : Berlin, Germany*

Architect: Berger + Parkkinen/ 3xn

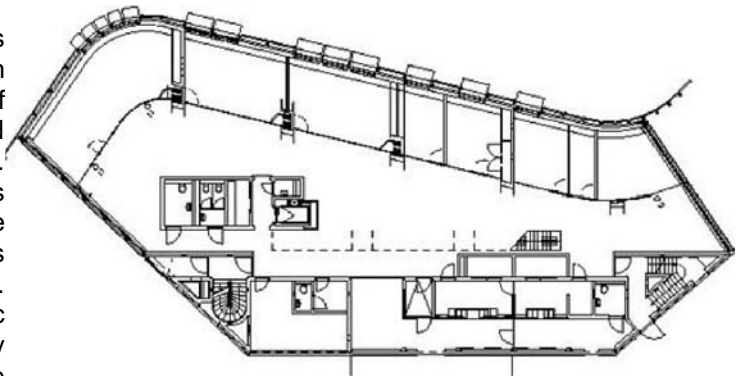
Key Strategies: operable exterior louvers, natural ventilation

The Nordic Embassy Complex is a collection of coordinated buildings representing the countries of Denmark, Norway, Finland, Sweden, Iceland, and one additional common building open to the public; the Felleshus/Common House. A gently undulating metal facade encloses the six buildings of the embassy as a continuous and autonomous element. This skin is clad with approximately 4000 pre-patinated copper panels mounted on stainless steel construction with horizontal louvers at the windows. The angles at which the copper louvers are inclined control the amount of permeability for light, view and air.



The individual buildings use a range of facade strategies including operable exterior shading.

The Finnish Building, designed by Architects VIIVA arkkitehtuuri Oy, had the most information available regarding its enclosure. The facades of the building are made of triple glazed insulated units, which are fixed to a metal profile system. The profiles support also the Venetian blinds which cover the exterior of the glazing. The blinds consist of wooden lattice work elements which are placed into a metal profile frames. Some of the blinds are equipped with hydraulic pumps with which they are electrically maneuvered from the interior. The pumps are located between the Venetian blinds and the glazing and thus the wooden facades continue without interruptions. All wooden elements are manually openable from exterior for the maintenance of the glass facade.



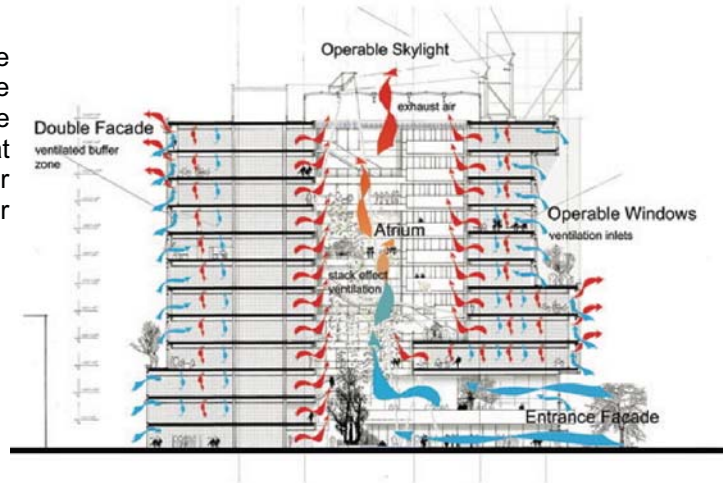
I think this complex is a particularly interesting example of High Performance Envelopes because it shows how cultural differences can influence the design of the facade. All the buildings demonstrate the sensitivity that Nordic countries have for the control of light in their designs, however, each country used different materials and form to represent their culture. I appreciate the fact that integrated facades can still retain regional characteristics.

Case Study Two: Genzyme Center : Cambridge, Mass

Architect: Behnisch, Behnisch and Partner

Key Strategies: Ventilated double-facade, operable windows, passive cooling, solar tracking mirrors

Genzyme Center is a twelve-story, 350,000 square foot office building with a high-performance curtainwall glazing system. More than 32% of the exterior envelope is a ventilated double-facade that blocks solar gains in summer and captures solar gains in the winter. Steam from a nearby power plant is used for central heating and cooling.



The building's central atrium acts as a huge return air duct and light shaft. Fresh air moves into the atrium and up and out exhaust fans near the skylight. Natural light from the fully glazed facade and from the atrium (brought in by solar-tracking mirrors above the skylight) is reflected deep into the building.

I chose the Genzyme Center as a precedent for HPE because of the double envelope, in this case a corridor facade configuration, in which the intermediate space is used to buffer the thermal impacts on the interior. With operable elements in the glass, such as motorized blinds and ventilation flaps, the user can ventilate the interstitial space on warm days, and allow partially- conditioned air into the room on cold days.

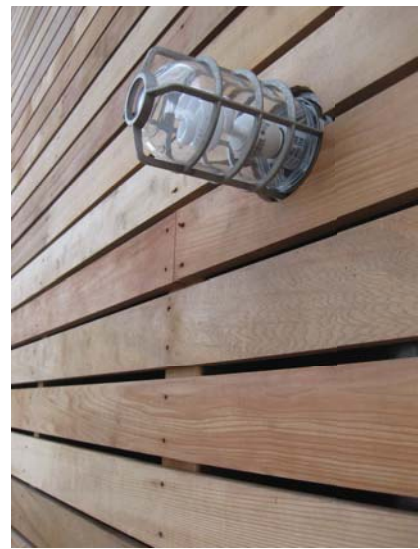


Case Study Three: *Harpoon House : Portland, Oregon*

Designer: Matt Kirkpatrick

Key Strategies: SIPS, Triple pane windows, green roof, HRV, Rainscreen siding

Located on an urban infill lot in the inner Southeast Portland neighborhood of Buckman, the Harpoon House is 16 by 28 by 28 feet tall (1152 square feet). The house is built of structurally insulated panels, with the exception of the unconditioned basement, which is concrete and stick framing. The siding is a ventilated rainscreen, held off the sheathing with 4x4 posts. Waste pipes and other utilities are hidden behind the screen to reduce thermal bridging that would occur by chopping up the panel insulation. The house has beautiful triple pane wood windows, which I am sure didn't come cheap, and the roof is 100% green roof composition.



I chose this house because I think the owner/ designer has done an excellent job of building an extremely energy efficient and beautiful house on a pretty tight budget (less than \$200,000), but I am also concerned about the trend in residential construction for tighter and tighter envelopes and how that may affect ventilation and mold issues in the Northwest. In this case they are using a Heat Recovery Ventilator to get the necessary air exchanges without exhausting all of the heated air. I am unsure why or if a rainscreen and SIP's are a good match.