References

Seocho House



Uponor involvement

534sqm

Seocho House

Radiant heating and cooling applied in an energy smart house.
Seocho house is a 534.98m^2 light wooden house (1 underground and 2 stories) located in Seocho-dong, Seocho-gu, Seoul. This is a low-energy house with thermal insulation and airtightness of passive house level and with solar and geothermal energy systems as an active elements. Uponor underfloor heating and cooling system has been adopted in this project, in which pipes are embedded in the floor screed and the floors are used as radiant surfaces.

Project Facts:

Location	Completion
Seoul, Korea (Republic of)	2017
Vrsta objekta	Product systems
Single family home	Površinsko grejanje i hlađenje
Address	Project Type
Seocho-dong, Seocho-gu, Seoul	New building

Partners

Design Dae-Hyun Architects Office

Construction Poongsan Wood Home

Cooling and heating system Uponor
Korea

The architect of Seocho house designed it as an eco-friendly house with wooden structure and diatomaceous earth materials, and also using solar power and geothermal system as the active elements of power supply. The highlight of the project is that underfloor heating and cooling system integrated with geothermal system ensures comfort and healthy indoor environment.

Co-existence of open and closed spaces

The land area of Seocho house is about 400m^2 in a long rectangular shape. The south east side is the two-storey house, and the single-storey house is located in the north west side and the north east side. The house was placed on the southeast side in consideration of the convenience of entering from the road, sunshine, view, and natural ventilation.

On the south western side of the house, the architect planned a ramp and gate from basement where with a parking lot and a fitness room to access each floor through stairs, and each floor has a door for security and privacy. The first floor is an open structure, with a living room and a kitchen-dining room close to the front door, and a walk-in closet inside a bathroom.

On the second floor are 2 rooms for owner's son and daughter, also with a living room and a kitchen-dining room in front of the staircase. The veranda in front of the living room on the second floor is a space where owner can enjoy the outdoor atmosphere without stepping on the yard.

Seocho house has been focused on the construction of high insulation, high confidentiality and eco-friendly materials usage as this will be the house for the owner, his sons and his future grandchildren. The design theme of the house is clean and simple, and using wood and diatomaceous earth as interior materials to create warm color tone. Utilizing raw materials such as woods and diatomaceous earth can also prevent allergy and perform moisture control.

Energy Smart Home - SYSTEM FLOW

1. Geothermal heat pump system

- Energy savings of up to 37% over air heat sources
- One unit of equipment enables both cooling and heating
- No defrosting required during heating
- Reduce gas usage by preheating with hot water

2. Solar system

- The Grid-connected system allows to receive stable power supply from city power system when solar electricity cannot be produced on cloudy days or at night and to sell the remaining electricity to utility companies when the generated electricity is more than enough.
- Saving an average of 286 kWh per month

3. Dehumidifying ventilation unit

- Resolution of the ventilation problem in passive house

- Heat exchanging indoor and outdoor air during summer ventilation, dehumidifying function simultaneously with energy recovery
- Decrease in energy consumption through heat exchange between outside and exhaust air when ventilating in summer.
- Indoor air quality can be maintained by program operation

4. Hot water

- During the winter season, the water passes through the hot water tank for the geothermal heat pump first to pre-heat water to 30 ~ 40 □ and the boiler operates only the necessary hot water temperature.
- During summertime, water passes through the Geothermal Heat Pump Condenser Heat exchanger's auxiliary tank, and sent to the boiler after preheating.

5. Underfloor heating and cooling system

- Radiant heating and cooling system works directly on the human body and provides the same comfort when it is cooled by 1 ~ 2 □ lower (when heating) or higher (when cooling) compared with existing convection system.
- Reduce energy consumption and operating cost by more than 12% compared to existing air conditioning system

6. Integrated control system

- Integrated operation of the heat source (geothermal heat pump, boiler) inside the building and the heating / cooling (floor radiating / heating, dehumidification ventilation unit) into one system
- Connected to the thermostat of each room and communicated with it,
- Checking and controlling the room temperature and light condition from outside the Internet

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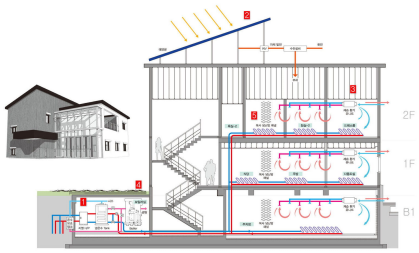

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