

# **SOLAR DECATHLON CHINA 2017**

## **기본설계안 및 전시회**

**INTERNATIONAL SOLAR POWERED HOUSE COMPETITION 2017, DEZHOU, CHINA**

**국제 태양열 주택 공모전 DD Scheme, Scale Model Exhibition**

# Solar Decathlon China 2017

**PURe+**  
Team SSA Korea



2017.01.12-15

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## Team SSA



Seoul National University



Sung Kyun Kwan University



Ajou UniUniversity



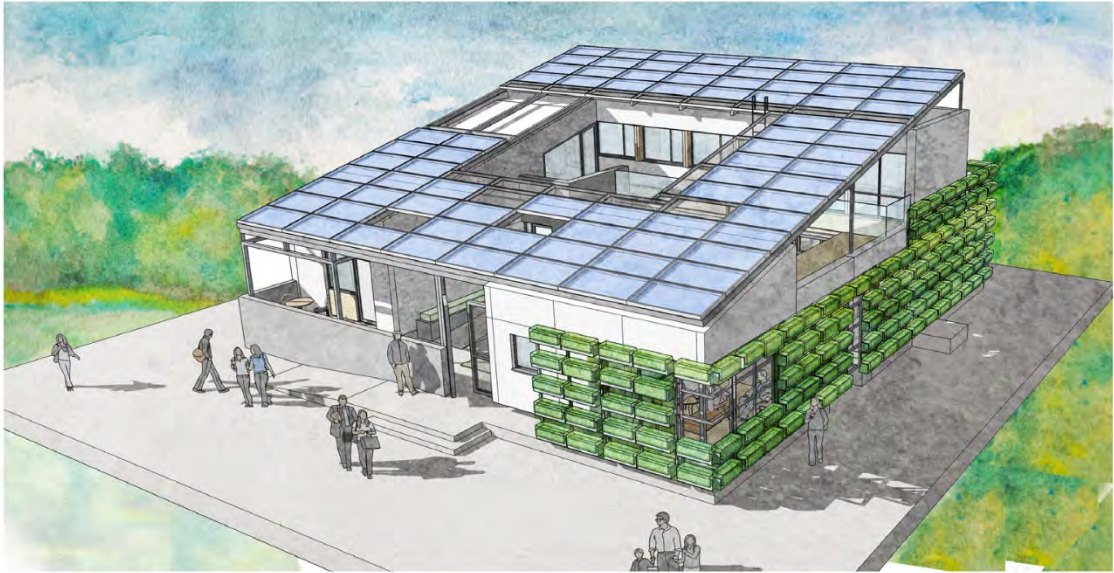
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# PURe+

## PURe+ House

PURe+ house takes its form from traditional courtyard houses that have been common throughout East Asia. A central courtyard can bring a variety of functional benefits such as ample daylight exposure and external view that each wing of the house could have, and fresh air through natural ventilation deep into the house. In addition, PURe+ house centered by a courtyard keeps an architectural form of vernacular houses that have stood in East Asia for centuries.



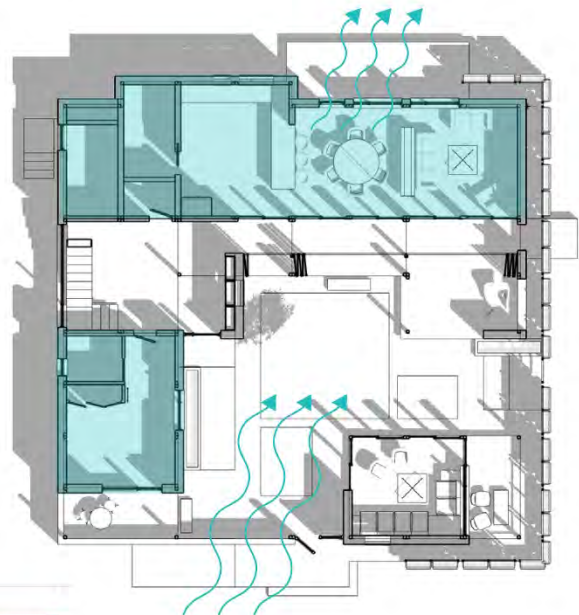
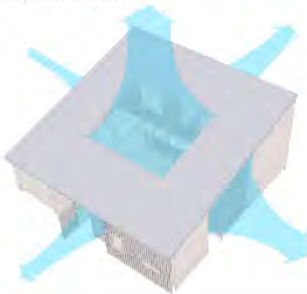
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# PURe+ Purify

## PASSIVE&ACTIVE

Purifying the air condition of indoor spaces with active system is planned as a prime concept of the house and defensive methodology towards contrasting quality of extreme critical level of PM2.5. Moreover, the house seeks to incorporate surrounding environments and outdoor space within the house in adequate level of air condition. By including a central courtyard, which is a vernacular element, PURe+ unifies dweller's life style to the decent quality of outdoor space through the environment strategy such as cross ventilation, controlling daylight exposure, etc.



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## PURe+ Unify

PURe+ unifies the environmental features, architectural elements and life style of the dwellers. Every environmental gesture in PURe+ leads to architectural activities. The corridor surrounding the courtyard generates double-layer between indoor space and outdoor space as a way of passively controlling temperature. This corridor can also be utilized as casual space for sitting around the courtyard, or an expansion of the indoor space. Vertical green wall of the house creates translucent boundary toward the west, but this edible plants and vegetables also suggest a sustainable activity cycle of home planting and cooking.



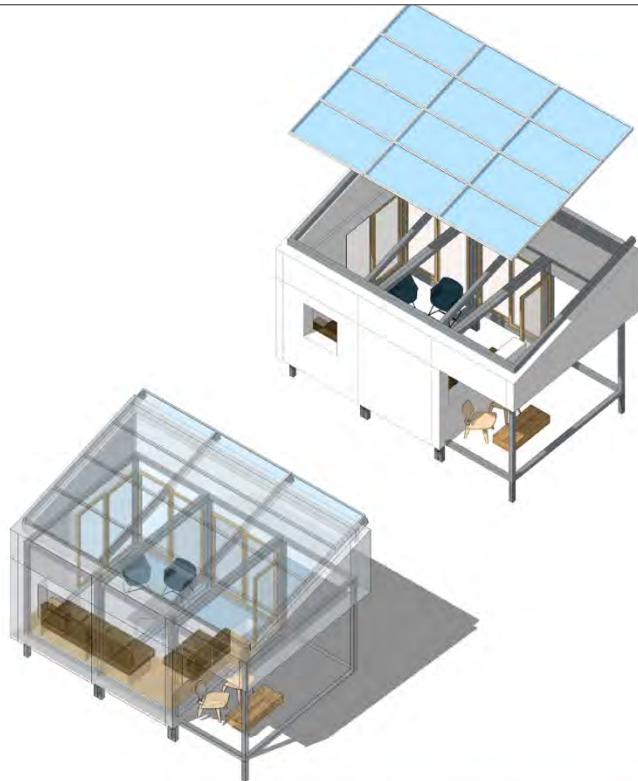
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## PURe+ Recycle

### Modular System

PURe+ employs two ways of recycling. First way is to recycle in dwellers' living cycle. Recycling water system is the core system to generate sustainable living. Second way is to recycle the structure. PURe+ incorporates modular system to successfully sustain diversifying life style of modern society. It contributes to diversify the variation of the house. The house can adopt all different life styles and family members by re-moderating specific part of the house. Moreover, recycling the modules of the house can also directly benefit the environment by easy construction and easy destruction. Modular system would help to complete the construction within the limited construction period.



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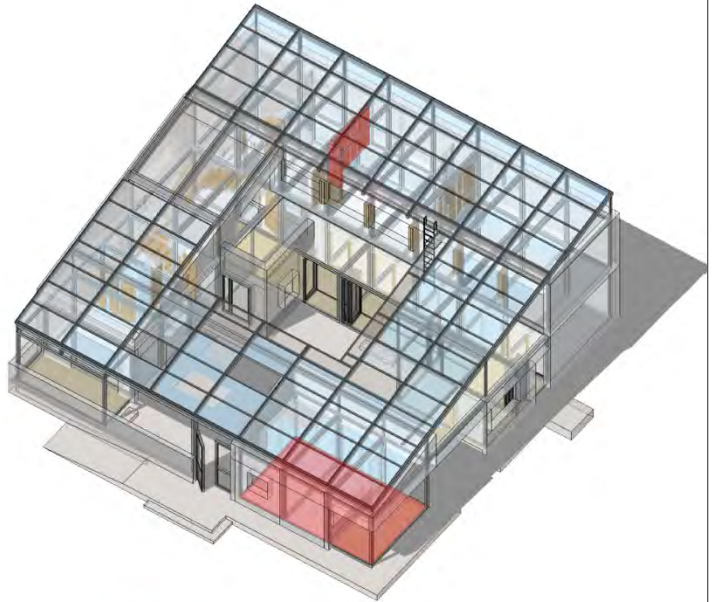
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## PURe+ Recycle

### Life Style

Besides environmental issues, there are needs in a prompt housing plan to accommodate various types of families and changes of family forms along passage of time. In an era where building is more frequently for renting and letting other people than client to live, adaptability and mobility is prioritized. PUR-e House gives an example of light, adaptive, and functioning housing which can change lives of people regardless of region or social and cultural grounds.

Modular System helps to acquire sustainable living by changing configuration of the rooms and modules according to the family member. The house could be modified to choose the suitable life style.

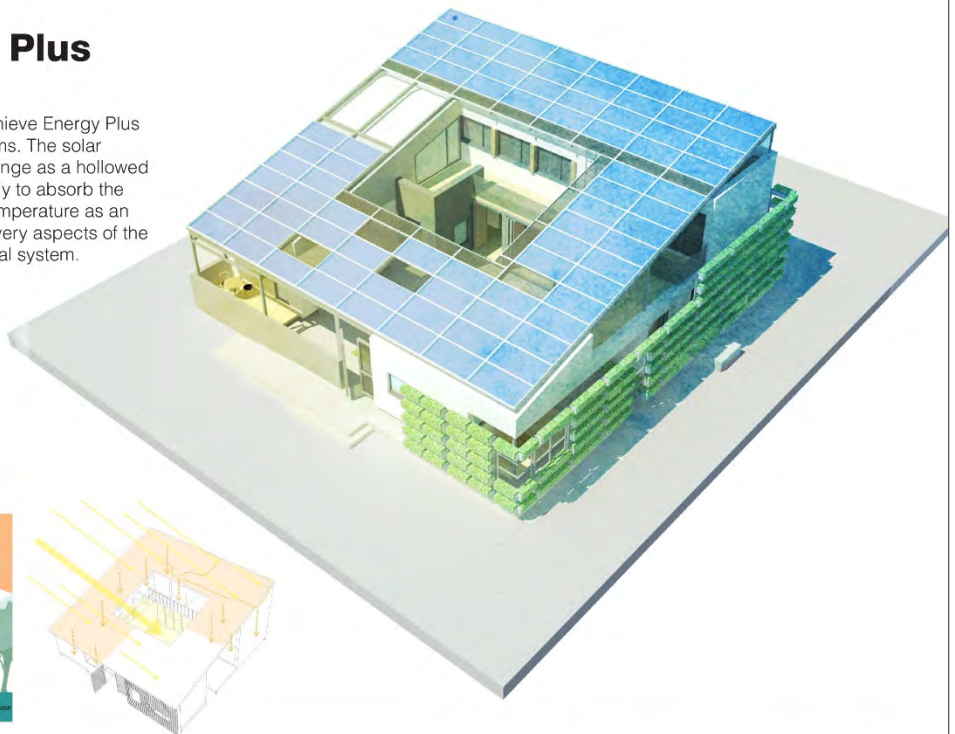


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## PURe+ Energy Plus

PURe+ house strive to achieve Energy Plus with the solar panel systems. The solar panels by itself would arrange as a hollowed rectangular roof to primarily to absorb the sunlight, controlling the temperature as an envelope and blends in every aspects of the house into one architectural system.



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# PURe+ Energy Plus

## Cutting Edge Building Technologies

PURe+ house will be equipped with contemporary building materials, wired/wireless sensors and cutting-edge building technologies including dynamic building envelopes responsive to time-varying indoor and outdoor environment, smart shading devices, active PV panels, Variable Refrigerant Flow (VRF) heat pump for heating and cooling, Energy Recovery Ventilator (ERV), radiant wall panel, etc. All aforementioned technologies have been virtually tested and optimally designed with advanced building simulation tools. The tools and methods used for the PURe+ house design include the following:

### Energy Simulation

#### PHPP 2007 (ISO 13790 based):

to estimate heating and cooling demand (monthly, annual) of PURe+ house

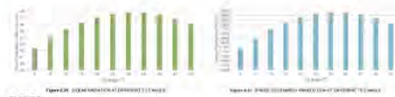
**Therm6:** to analyze heat bridge phenomena in building envelopes

**RETScreen:** to analyze solar radiation and energy production of PV system

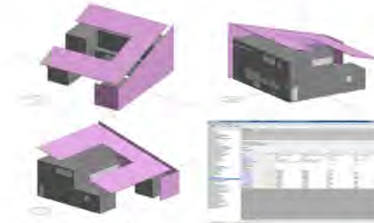
**EnergyPlus & MATLAB:** sensitivity and uncertainty analysis for design variables (e.g., insulation thickness, U value and g-value of windows, lighting)



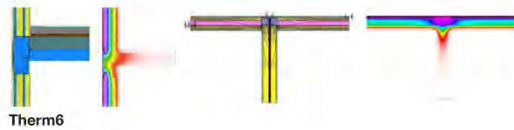
PHPP 2007 (ISO 13790 based)



RETScreen



EnergyPlus & MATLAB



Therm6

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plan 1F



plan 2F

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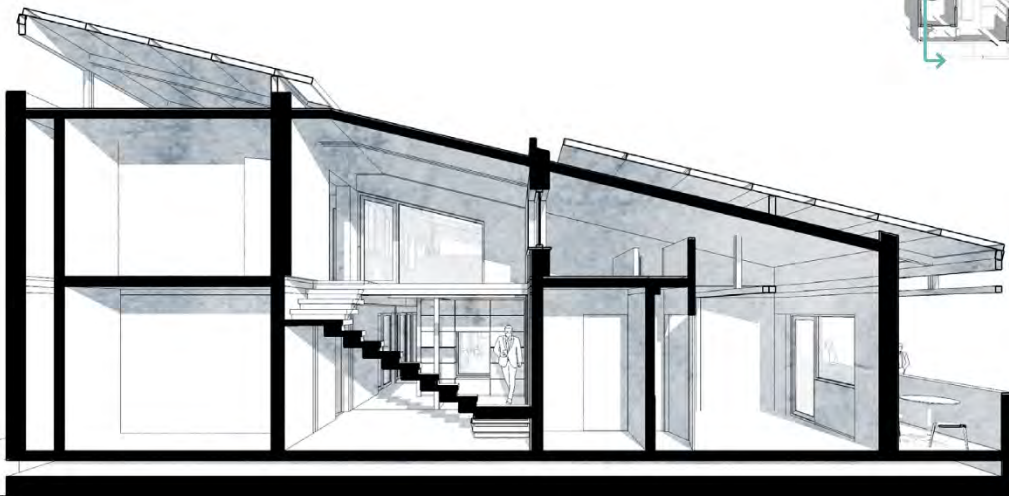
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**section perspective**

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**section perspective**

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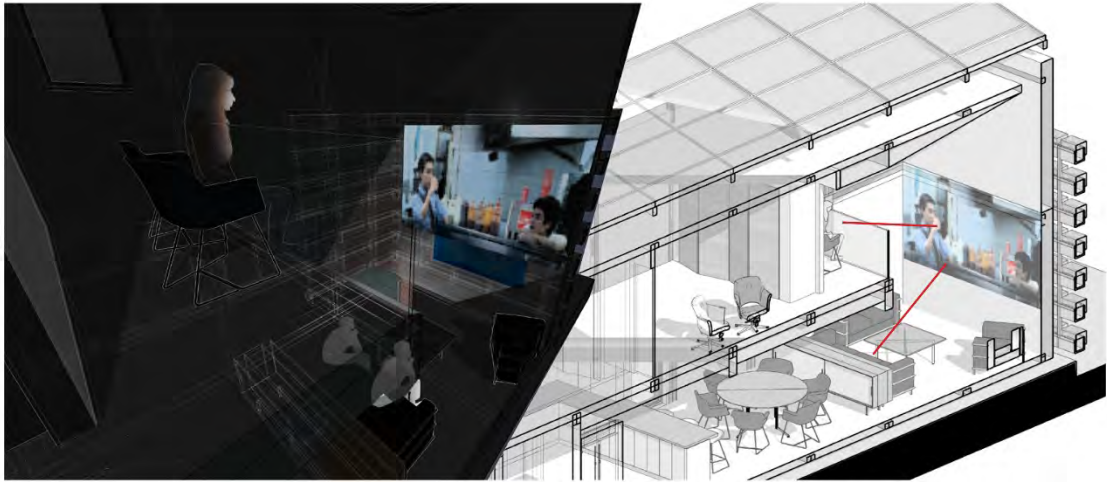
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## Movie Night

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## Perspective

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