Energy efficient building and energy saving products

Oct 10th ,2019

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SIAM DAIKIN SALES CO.,LTD.
JOINT VENTURE DIVISION

CONTENTS

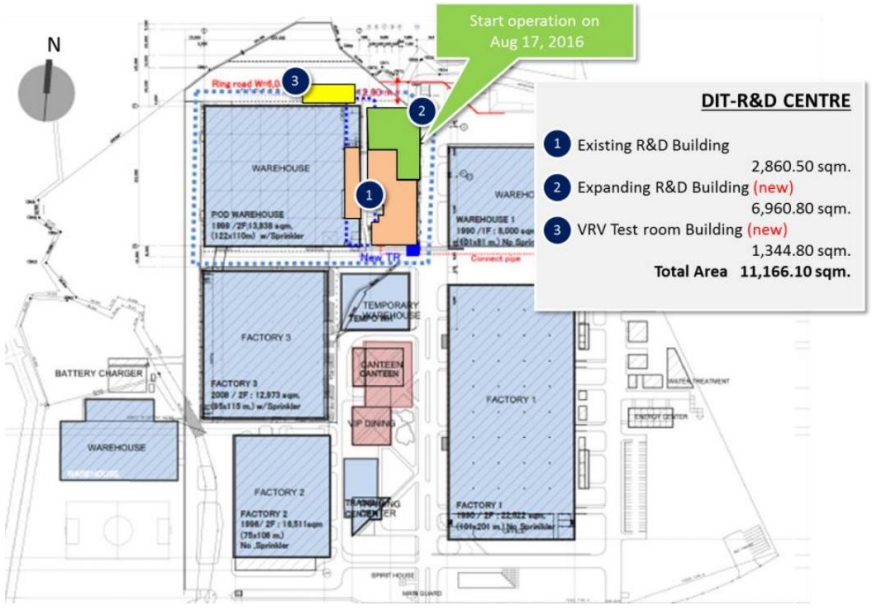
Daikin Industries (Thailand) Ltd.
Research & Development Centre

Thai Green Building Institute

TREES-NC; Thai's ***R***ating of ***E***nergy and ***E***nvironmental ***S***ustainability
for ***N***ew ***C***onstruction and Major Renovation

Project details

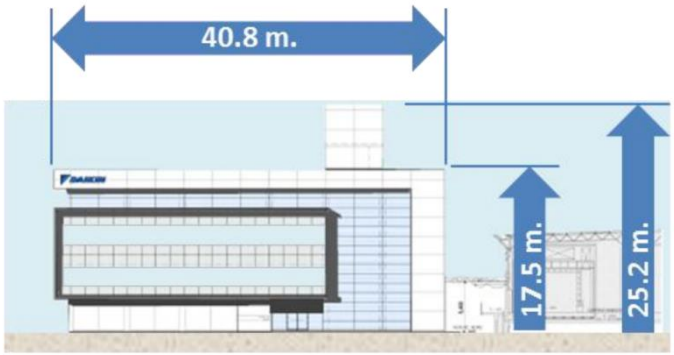
The Research and Development Centre consists of 3 buildings.
No.2 building is assessed on the basis of TREES-NC.

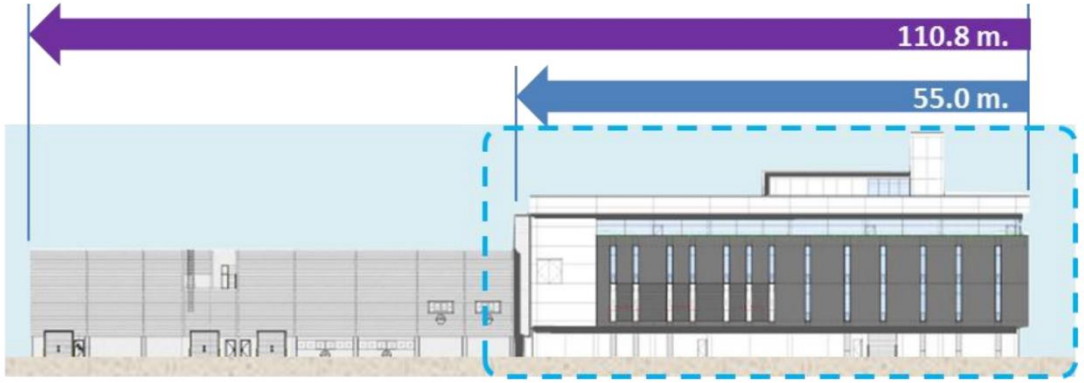


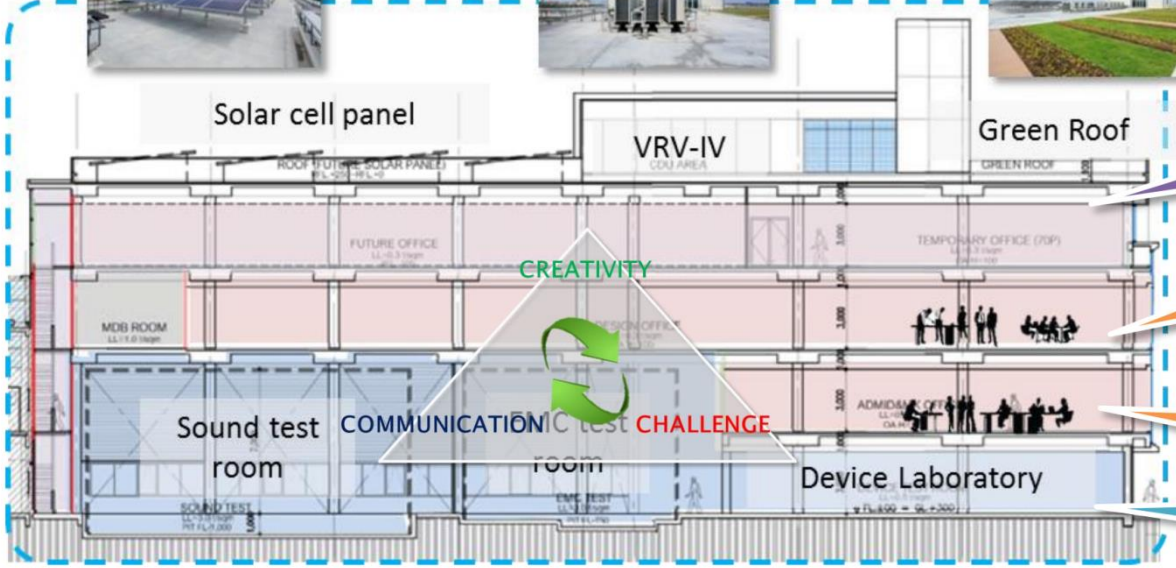
Project Name	Research and Development Centre
Floor Area	6,960.80 sq.m.
Number of Storey	4 Floor

Project details

[H25.2 x W40.8 x D55.0 m.]







R&D Working space:	1,443.67 m²
R&D Office:	1,464.59 m²
PEN&QC Office:	1,063.14 m²
Test room Zone:	1,448.75 m²

Highlights (Green Building criteria)

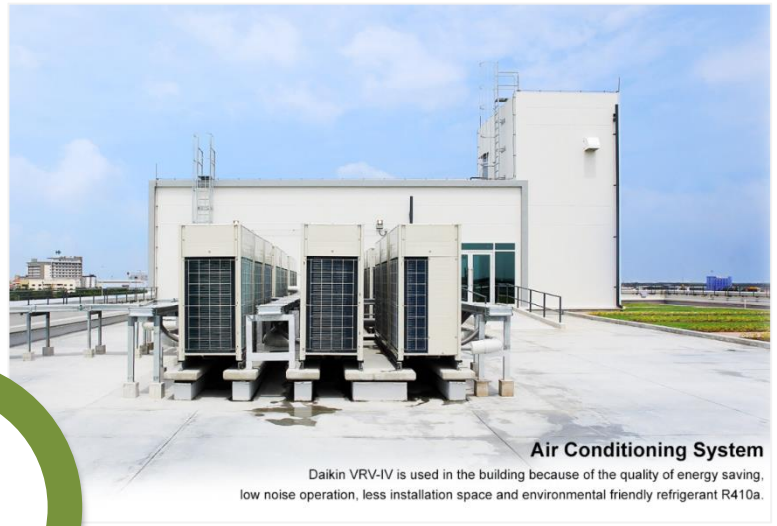
"Energy efficiency"

It can reduce energy consumption by as much as 43.1% and exceed the highest standard requirement (41%).

Building Envelopes

Selection of material for building envelops system mainly considers the heat transferred to the building
The material should be able to prevent high heat using the fewest glass and have more insulat
For the front of the building that uses lots of glasses, it is usually located on the north which faces the lowest
The glass helps to reduce 70% of heat to the building and has low reflection rate to the nearby buildings according to T
(OTTV less than standard building 19% and RTTV less than standard buildin

43% saving

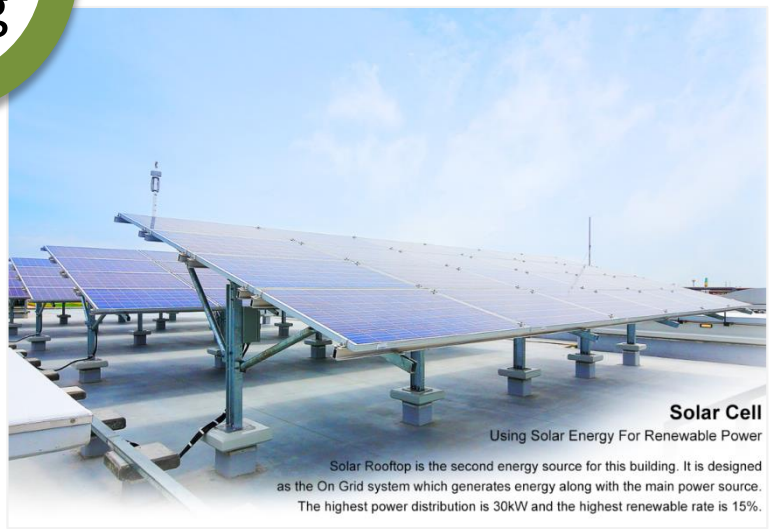


Air Conditioning System

Daikin VRV-IV is used in the building because of the quality of energy saving, low noise operation, less installation space and environmental friendly refrigerant R410a.

Lighting system

LED bulbs are used in the building which saves 18% of electricity comparing to using the general light bulb. In the central hallway,natural light is used to reduce the use of lighting system during daytime.



Solar Cell

Using Solar Energy For Renewable Power

Solar Rooftop is the second energy source for this building. It is designed as the On Grid system which generates energy along with the main power source. The highest power distribution is 30kW and the highest renewable rate is 15%.

Highlights (Green Building criteria)

"Energy efficiency" Design a building envelop system that reduces the amount of heat entering the building.

Selection of material for building envelops system mainly considers the heat transferred to the building.
The material should be able to prevent high heat using the fewest glass and have more insulation.
For the front of the building that uses lots of glasses, it is usually located on the north which faces the lowest heat.
The glass helps to reduce 70% of heat to the building and has low reflection rate to the nearby buildings according to TREES
(OTTV less than standard building 19% and RTTV less than standard building 45%)

Highlights (Green Building criteria)

"Energy efficiency" Use natural light in the hallway area. Use high performance (LED) bulbs for all area of the building.

Lighting system

1) Natural light for public zone

2) LED type for all lighting

Lighting system

LED bulbs are used in the building which saves 18% of electricity comparing to using the general light bulb. In the central hallway,natural light is used to reduce the use of lighting system during daytime.

Highlights (Green Building criteria)

"Energy efficiency" Install a renewable energy system from solar cell (30kW).

Highlights (Green Building criteria)

"Energy efficiency" Use High efficiency of air conditioning system.

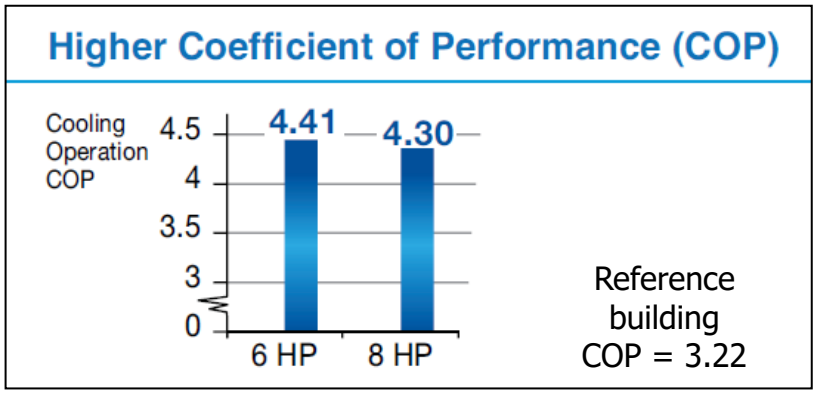
Air Conditioning System

Daikin VRV-IV is used in the building because of the quality of energy saving, low noise operation, less installation space and environmental friendly refrigerant R410a.

Highlights (Green Building criteria)

"Energy efficiency" Use High efficiency of air conditioning system.

Air Conditioning system

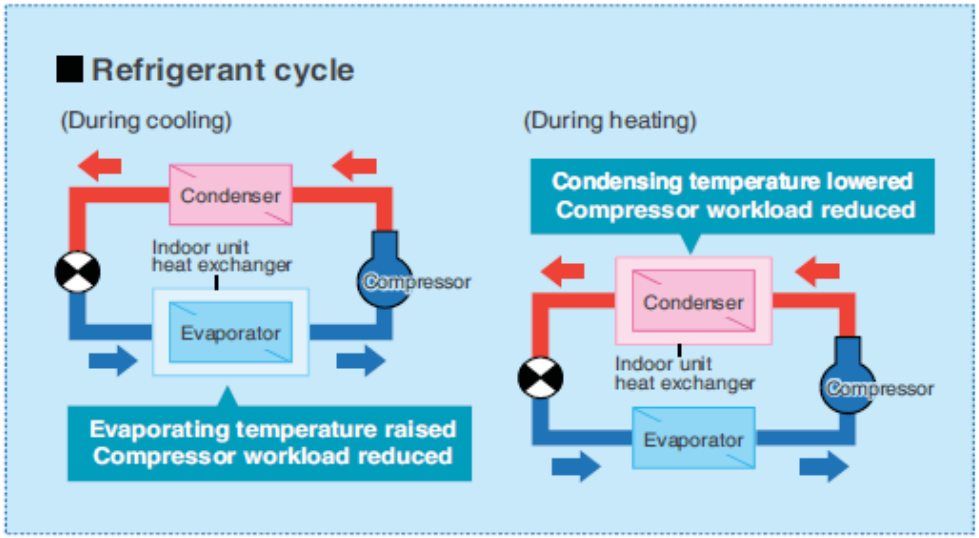


Customise your *VRV* system for optimal annual efficiency

The new ***VRV*IV** system now features VRT technology. VRT automatically adjusts refrigerant temperature to individual building and climate requirement, thus further improving annual energy efficiency and maintaining comfort. With this excellent technology, running costs are reduced.

How is energy reduced?

During cooling, the refrigerant evaporating temperature (Te) is raised to minimise the difference with the condensing temperature. During heating, the condensing temperature (Tc) is lowered to minimise the difference to the evaporating temperature. Compressors work less, and this reduces power comsumption.

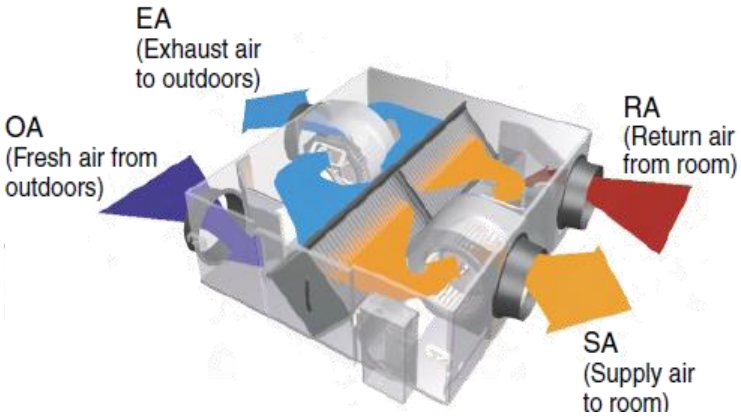


Highlights (Green Building criteria)

"Energy efficiency" Reduce the workload of air conditioning through the HRV

Ventilation system

HEAT RECLAIM VENTILATOR — VAM SERIES



23%

Total heat exchange ventilation

This unit recovers heat energy lost through ventilation and curbs room temperature changes caused by ventilation, thereby conserving energy and reducing the load on the air conditioning system.

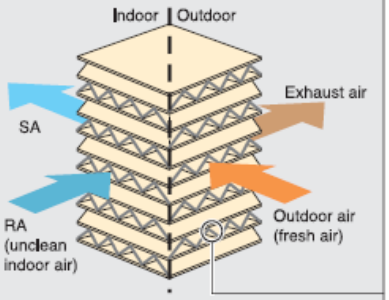
Enthalpy efficiency drastically improved by employing thin film element! (VAM-GJ model)

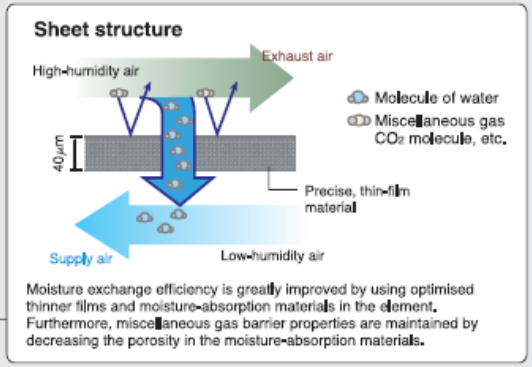
Due to the thinner film…

- Decreases the moisture resistance of the partition sheets drastically.
- Realises more space for extra layers in the element, resulting in increased effective area that supply and exhaust air can be exposed to.

Moisture absorption increased by approx. 10%!

Thickness of the partition sheet **40 μm**

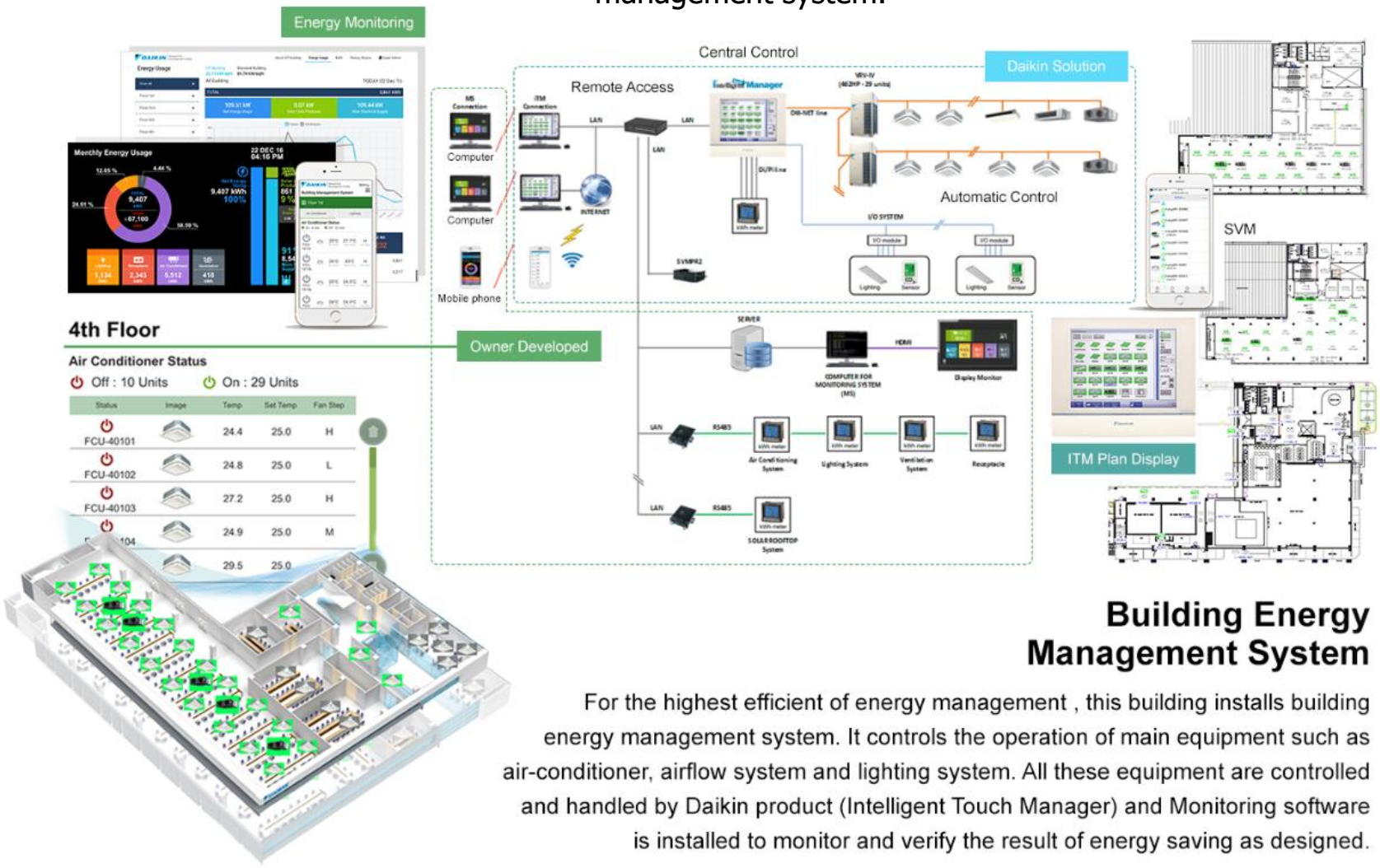




Moisture exchange efficiency is greatly improved by using optimised thinner films and moisture-absorption materials in the element. Furthermore, miscellaneous gas barrier properties are maintained by decreasing the porosity in the moisture-absorption materials.

Highlights (Green Building criteria)

"Verification to confirm energy saving" There is a powerful monitoring system and Excellent Energy management system.



Building Energy Management System

For the highest efficient of energy management , this building installs building energy management system. It controls the operation of main equipment such as air-conditioner, airflow system and lighting system. All these equipment are controlled and handled by Daikin product (Intelligent Touch Manager) and Monitoring software is installed to monitor and verify the result of energy saving as designed.

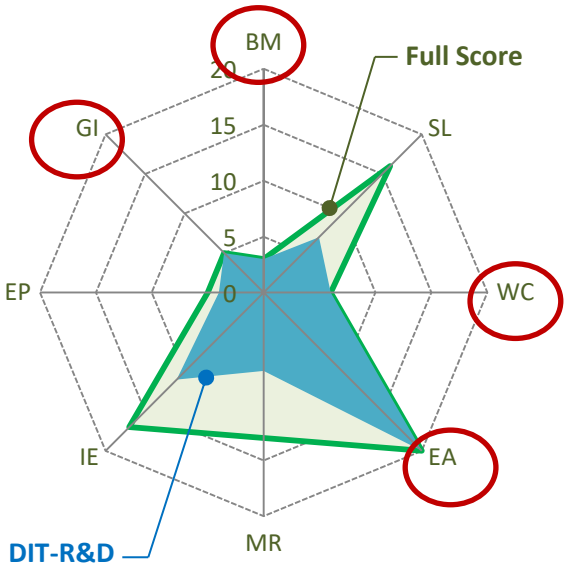
Scoring

TREES-NC There are 8 criteria for assessment. The scores are very different depending on the importance of each criterion. And the total score is 85 points.

Evaluation on each topic scored are two types, one is Prerequisite topic and another one is Topics are measured at the score level which must meet all the Prerequisite topic then able to assess the score. The score level will be the award level, divided into 4 levels; Platinum, Gold, Silver and Certified At Platinum level is the highest level.

< Award Level>

< Platinum award >



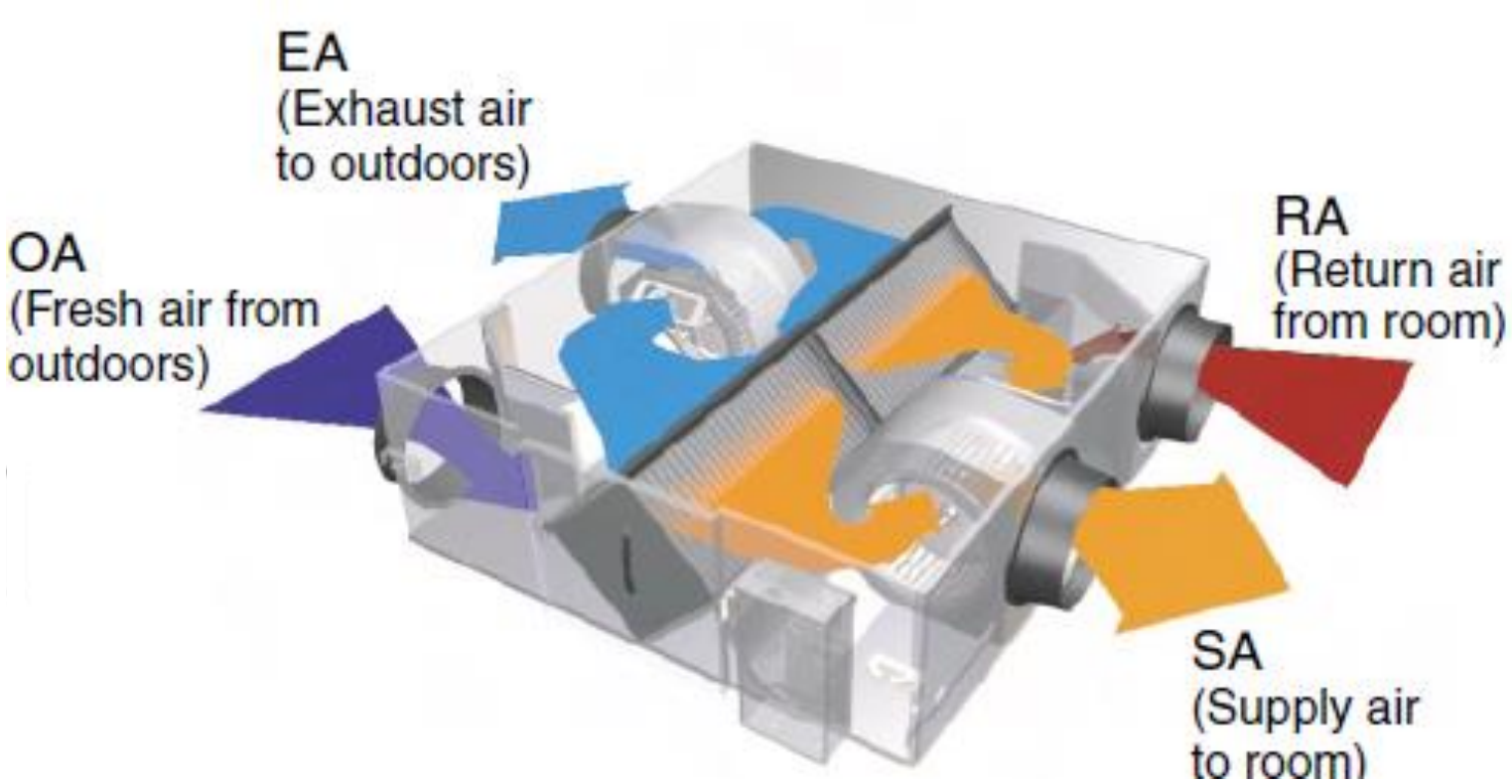
This project can get full score in 4 criteria. The rating score is 63, which is rated at Platinum level.

< Evaluation Criteria>

Items	Full Score	R&D Centre
BM (Building Management)	3	3
SL (Site and Landscape)	16	7
WC (Water Conservation)	6	6
EA (Energy and Atmosphere)	20	20
MR (Materials and Resources)	13	7
IE (Indoor Environmental Quality)	17	11
EP (Environmental Protection)	5	4
GI (Green Innovation)	5	5
Total	**85**	**63**

Energy saving product

VAM series

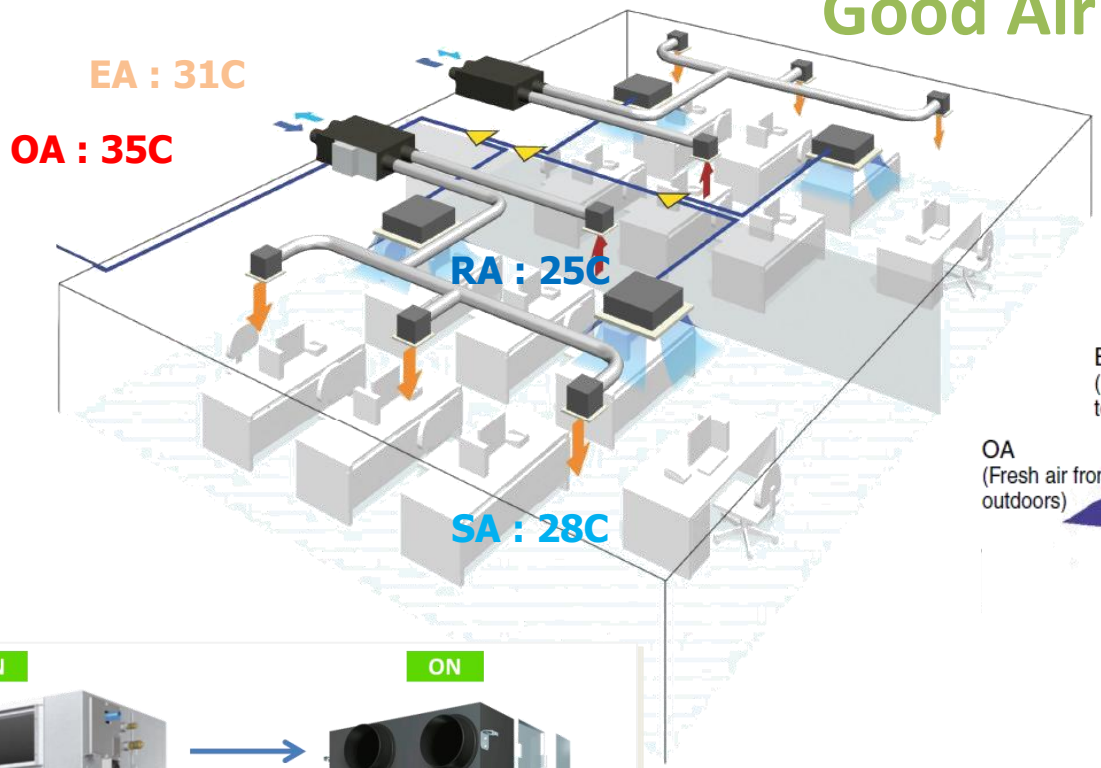


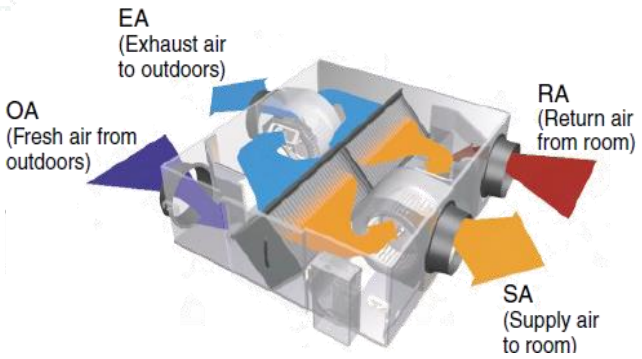
Heat exchange ventilation

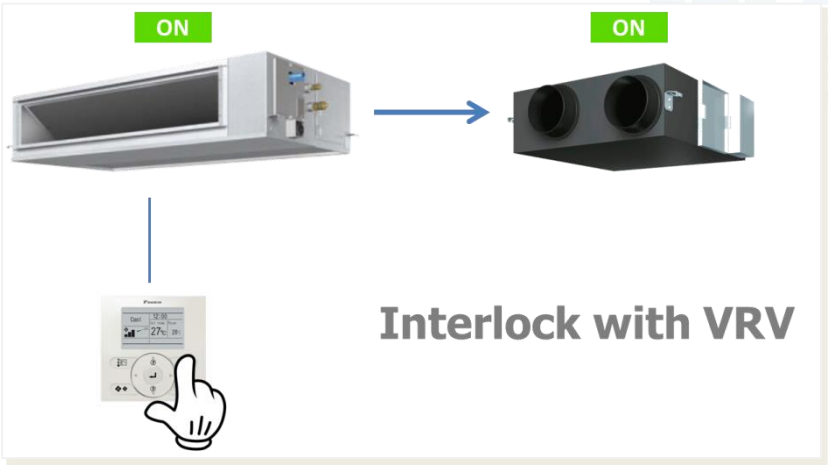
- Recover heat energy lost through ventilation and curbs room temperature changes caused by ventilation, thereby conserving energy and reducing the load on the air conditioning system

Energy saving product

Good Air Indoor Quality







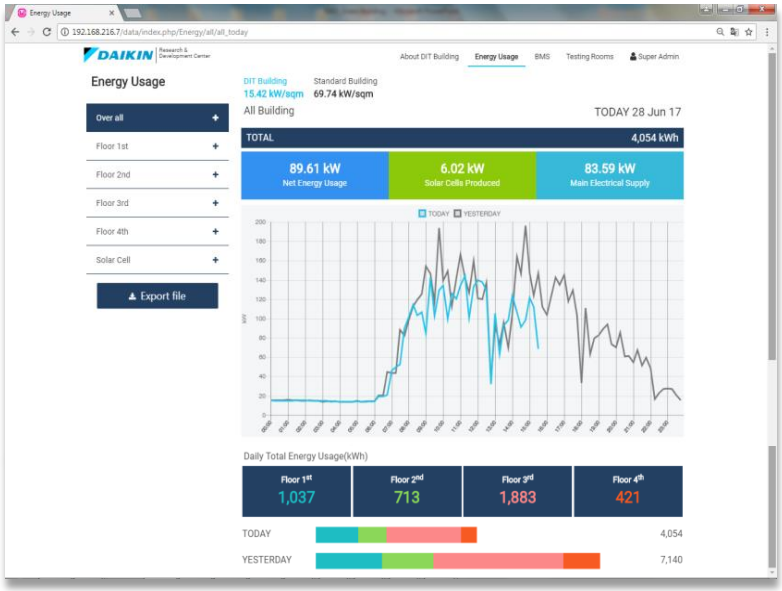
The Daikin HRV (Heat Reclaim Ventilation) unit recovers heat energy lost through ventilation and maintains a comfortable and clean indoor environment.

VAM : 150 CMH – 2,000 CMH

Remote monitoring system

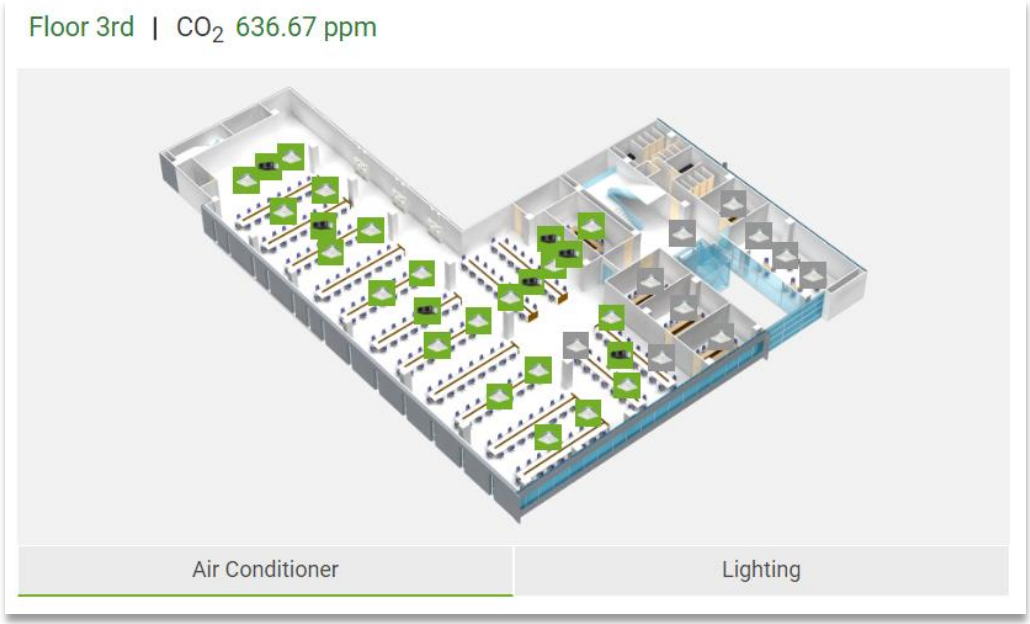
"Verification to confirm energy saving" There is a powerful monitoring system and Excellent Energy management system.

Monitoring system via the Internet



<Grouping by Load>

<Status of Air Conditioning and Lighting>



Remote monitoring system

Airnet maintenance is about a network contract of equipment. Remote Monitoring of VRV system 24 hours. Provides “Prompt response” for emergency, “Prediction” of breakdown and “Energy management”.

ADVANTAGES

24/7
Remote monitoring

For emergencies
PROMPT RESPONSE

Preventing Breakdowns
Long Product Life

Energy Management
Savings

[FAULT MANAGEMENT (WEB / APP)]

[ENERGY MANAGEMENT]

Thank you