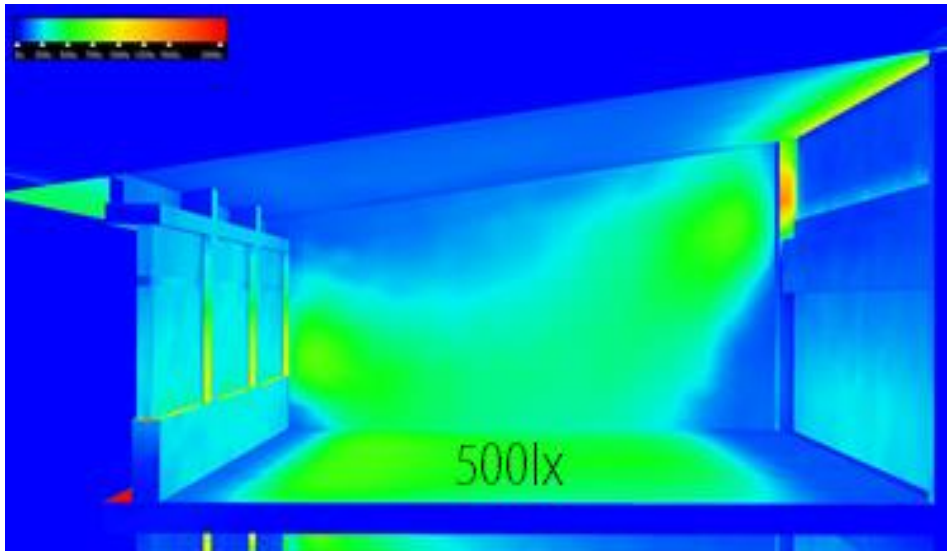
Light shelf

Perform lighting simulation only with natural lighting

Reduce lighting energy as much as possible by natural lighting on both sides

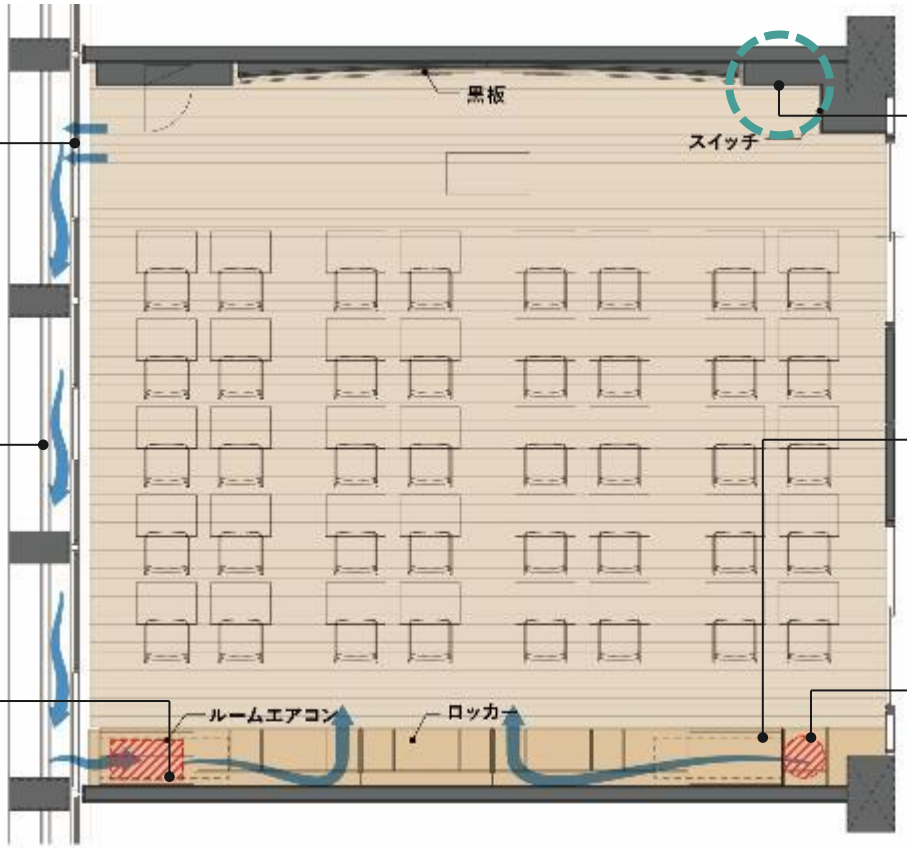


Ordinary classroom

Think about their living environment and carry out eco activities

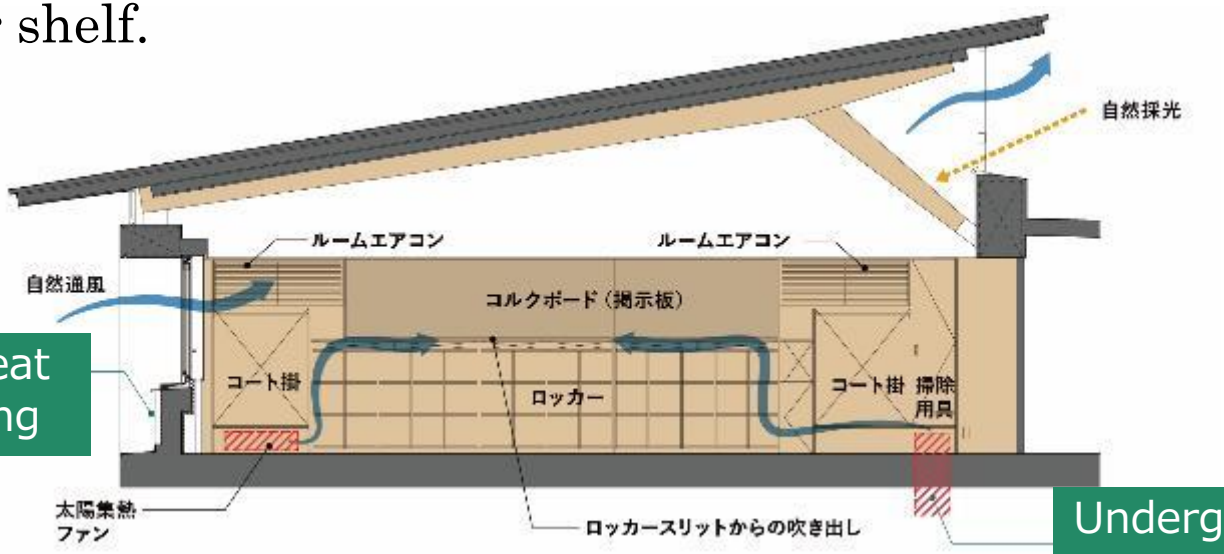
Ordinary classroom

Students themselves think about a comfortable and energy-saving environment



Underground heat recovery and Solar heat collecting

Blow out solar heated warm air or air cooled by geothermal heat from the locker shelf.



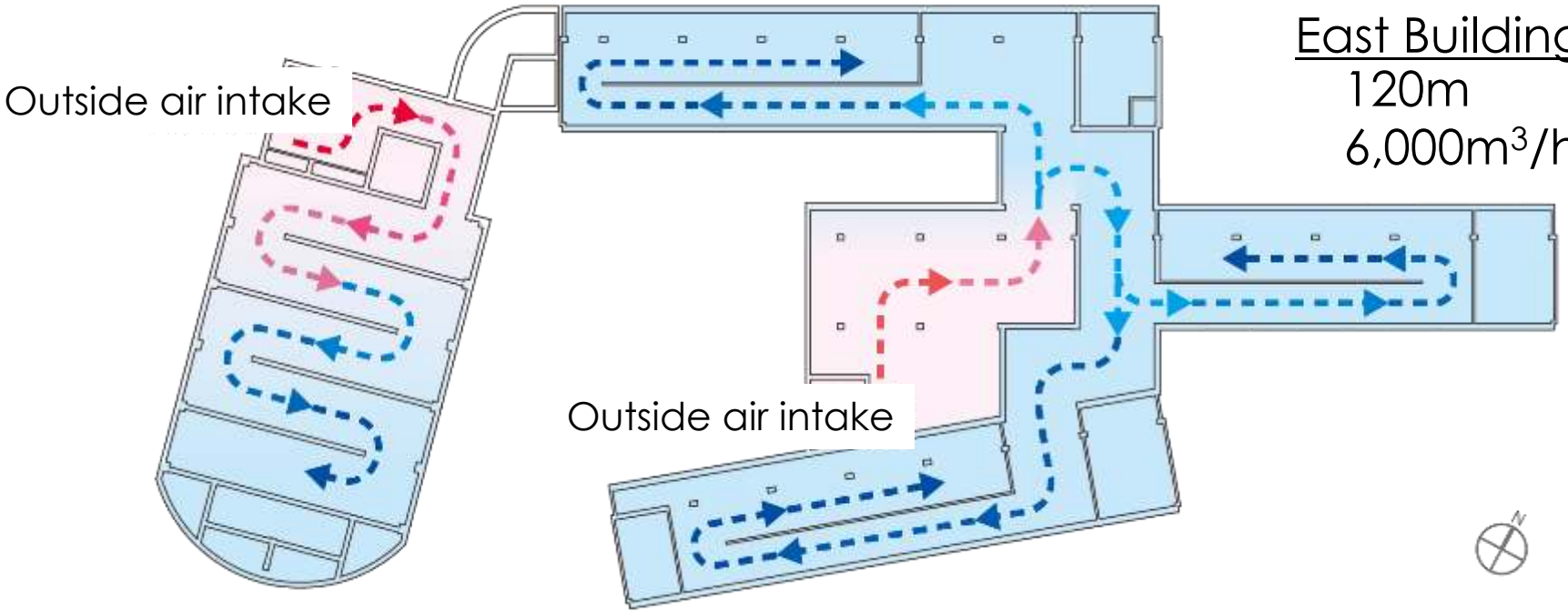
Solar heat collecting

Underground heat recovery for air intake

Air cooled and warmed by using geothermal heat

North Building
120m
9,000m³/h

East Building
120m
6,000m³/h

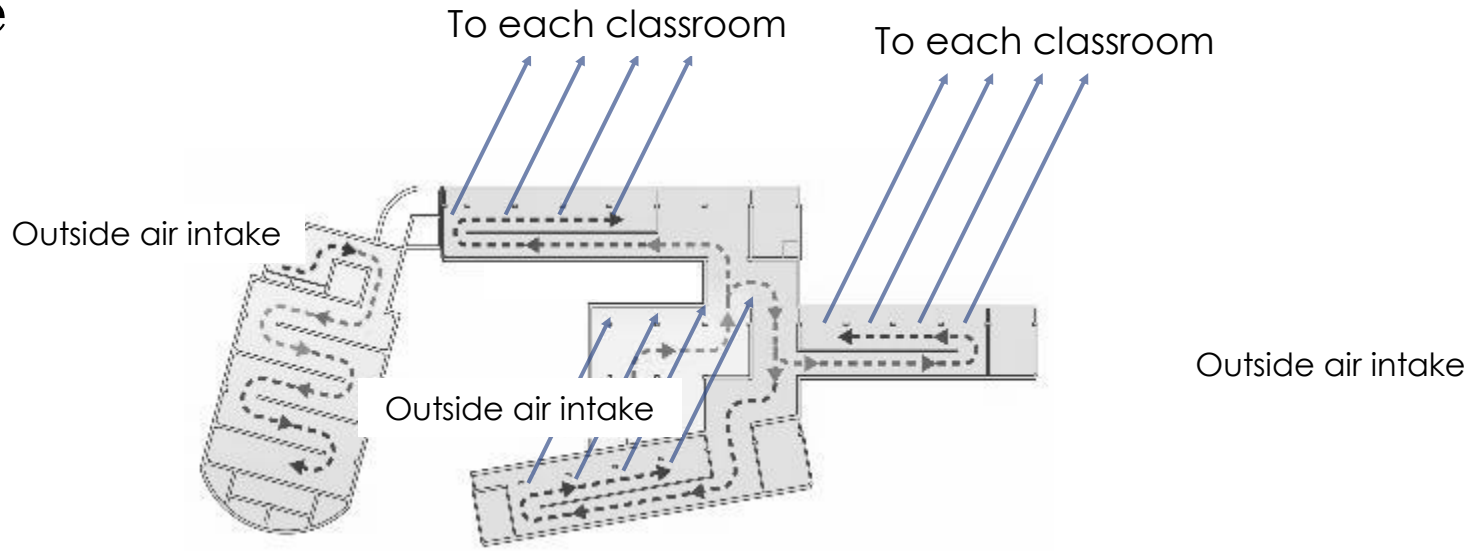


Indoor playground
115m
4,800m³/h

South Building
150m
12,000m³/h

Underground heat recovery

Enhance students' interest by making intake and routes visible



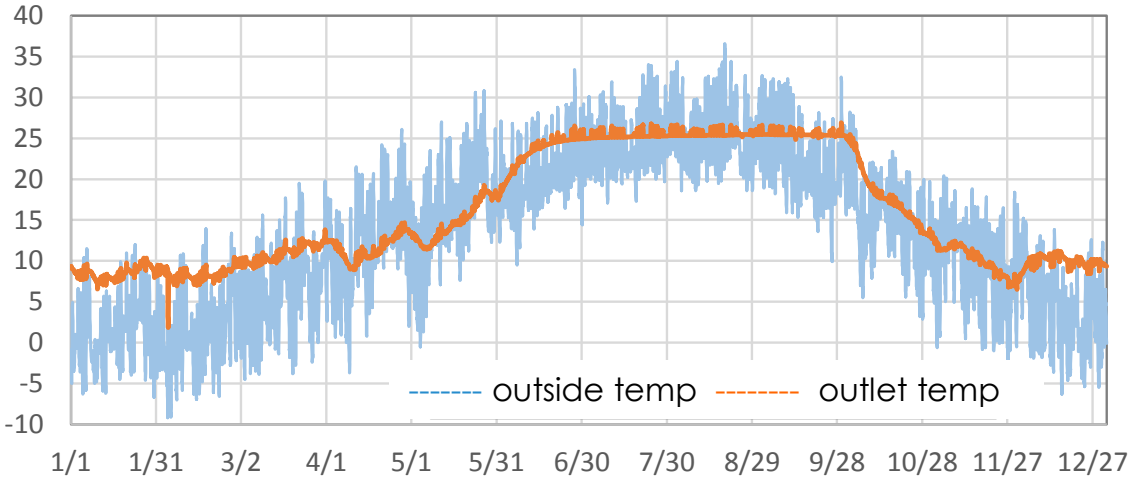
Air intake under spiral staircase

Window to observe the underground pit

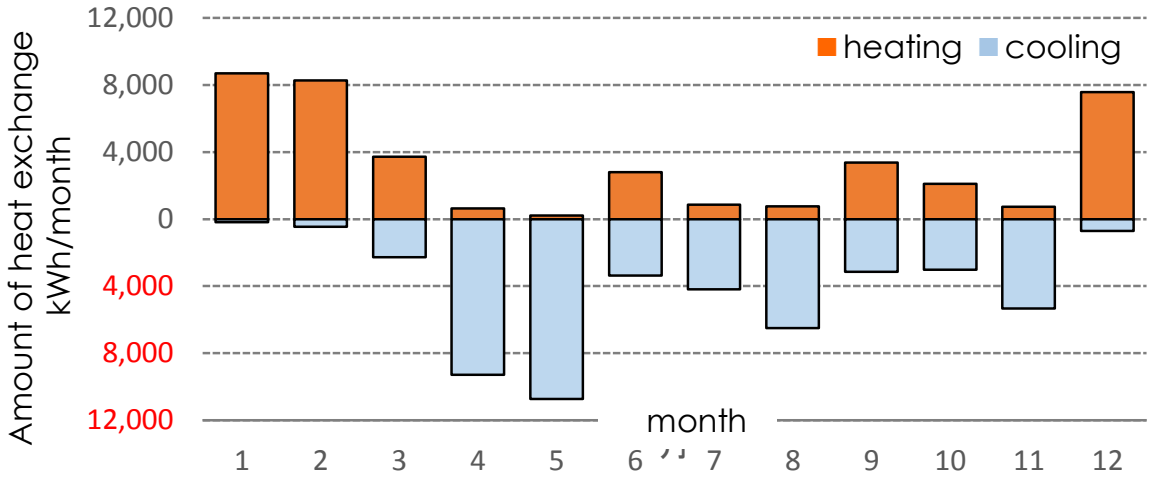
Prediction of cooling and heating effect by using geothermal heat

Outlet temperature

Summer : 25～26℃
Winter : 10～12℃

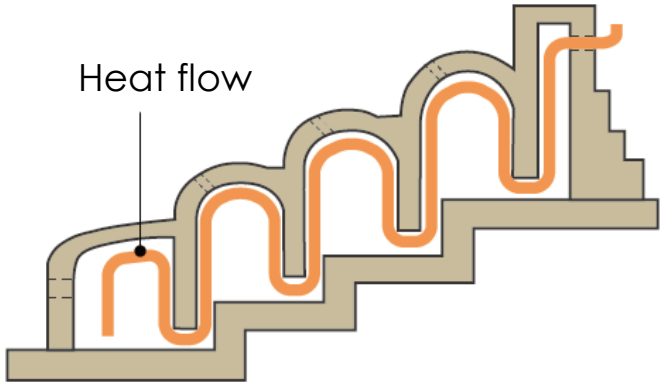


Cooling and heating Calculation



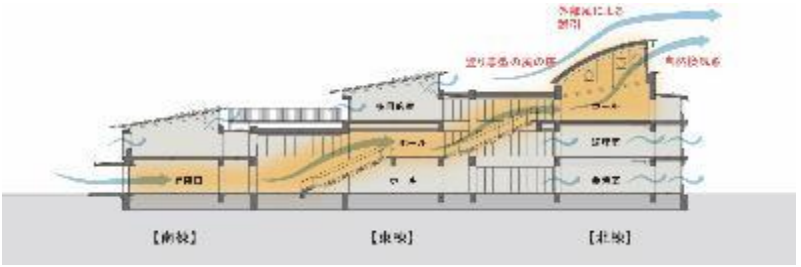
Natural Ventilation

Use the principle of ascending heat in a pottery baking kiln



Natural Ventilation

Air continually rises to the upper floor and heat escapes from the ventilation window in the wind tower



Mechanism for encouraging natural ventilation throughout the building

Solar power panels and accumulators batteries

Install up to 120 KW solar cells on the slope roof

Part of the electricity generated is stored in the storage battery and it can be used even during a power outage.

Wind power generator

Wind power generator 1kW that can sense wind direction and wind speed

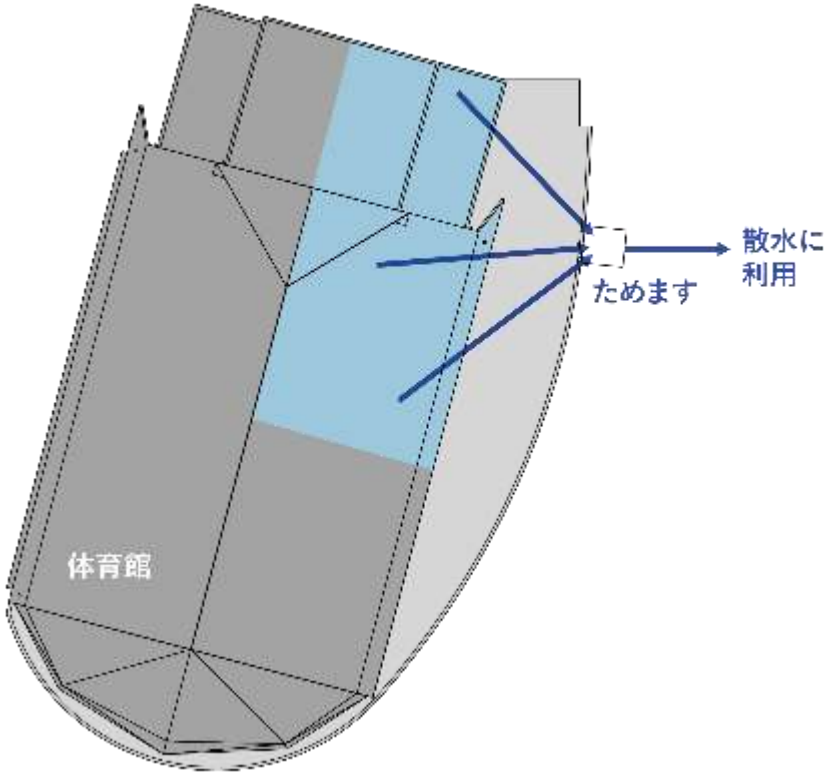
Placed at the entrance to the “Breezing” forest

Roof top greening

Increase the insulation performance of the building and create a green landscape

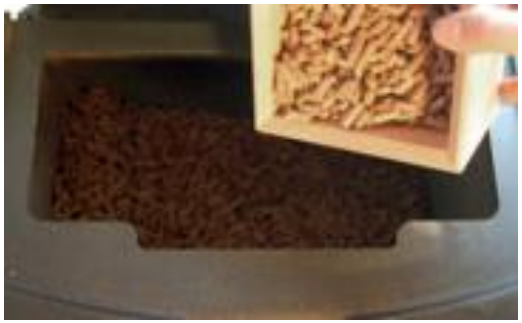
Rainwater retention

Rainwater falling on the roof of indoor playground is used for watering for planting



Pellet stove

Heating equipment using pellet fuel utilizing local waste wood waste



1. Background and Concept

2. Technology for ZEB

3. Education and Operation

Operation management

SI /student intelligence drives the operation of ZEB

Teachers and students have deepen their understanding of buildings and realize zero energy

Know the climate
and buildings

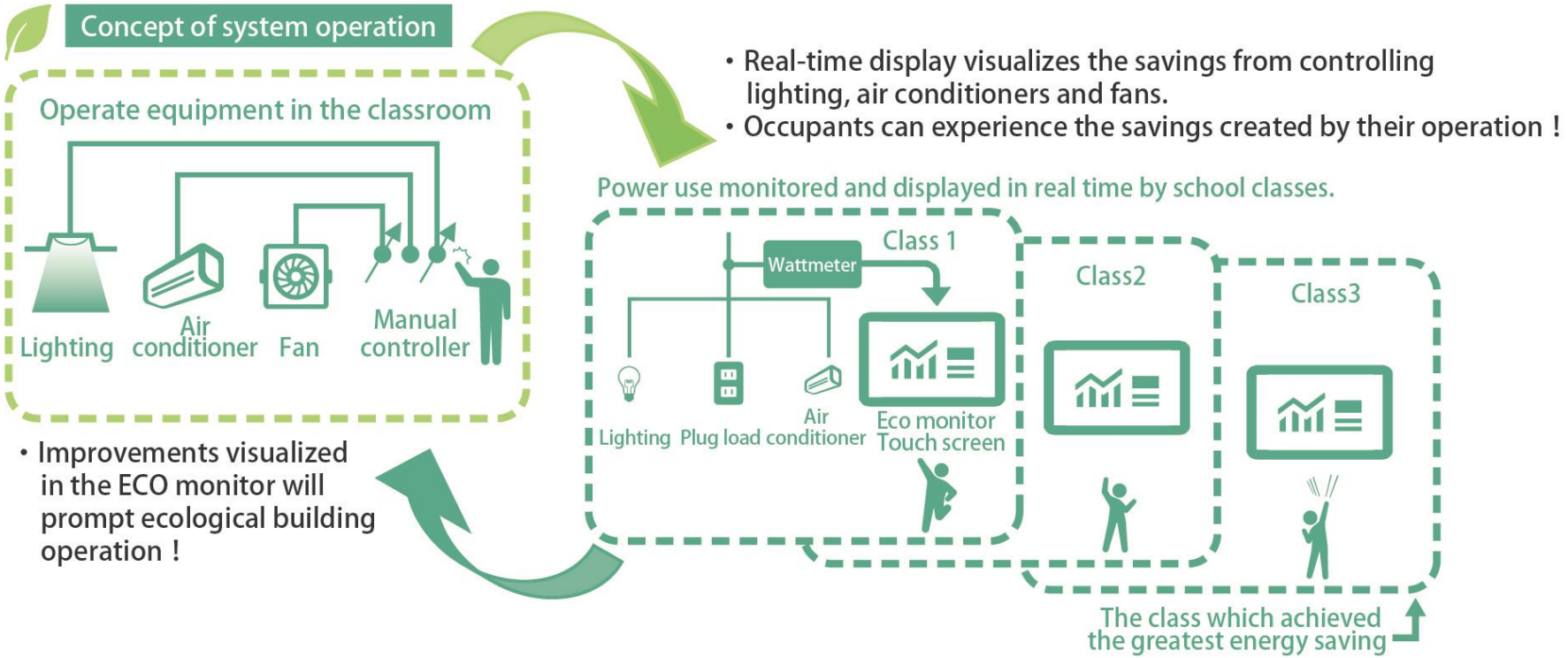
Understand
how to use eco tools

Actually use them

Consider the results

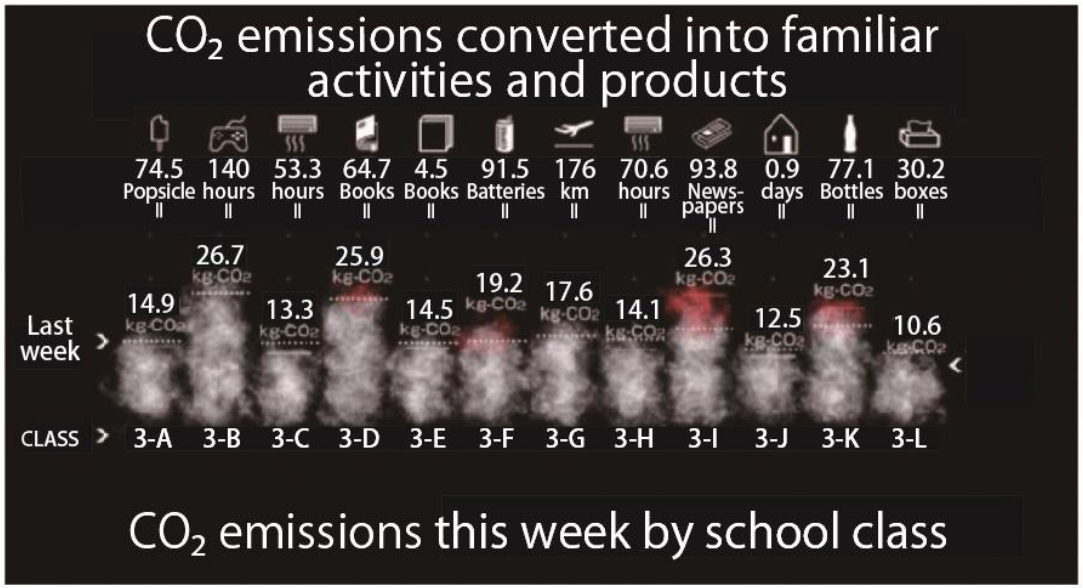
Further devising
, think about the environment

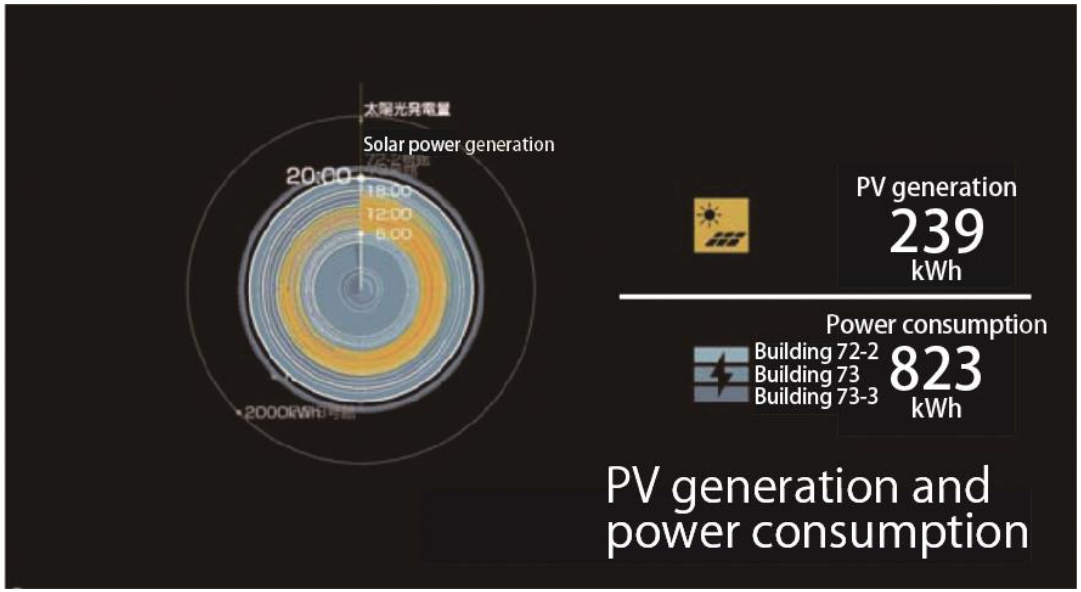
Eco monitoring



The concept of real-time eco monitoring

Eco monitoring





Example of real-time eco monitoring

Eco monitoring

Get information visually by simple operation
like a smartphone

Environment Information

Eco sign for good behavior

Energy Saving rate

Lighting power

Plug load / HVAC power

Energy Saving Ranking

CO2 Concentration

Icons for Eco tool

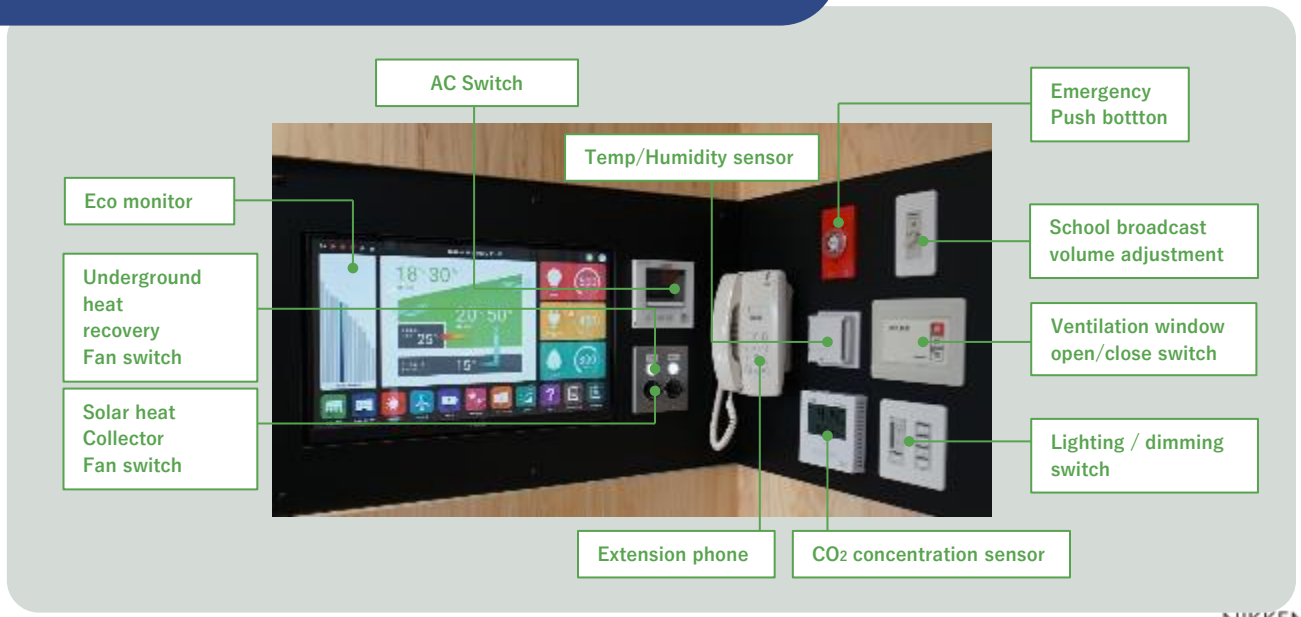
Q / A

Information

Eco monitoring

Touch panel monitor for students themselves to take action by obtaining information on indoor temperature and humidity and power consumption

Eco monitor panel and switch



Conclusion

・In order to aim for ZEB, It is necessary to take regional and climate into account for building.

・It is important to consider not only for energy saving but also for the surrounding environment.

・Adopt the latest technology in consideration of operation

・Continuing ZEB realization by working on education system for operation.

NIKKEN

EXPERIENCE, INTEGRATED