

# O O K A L A B .

## Future urban planning Future energy system to realize ZEB

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### Prediction of Building and Urban Environment

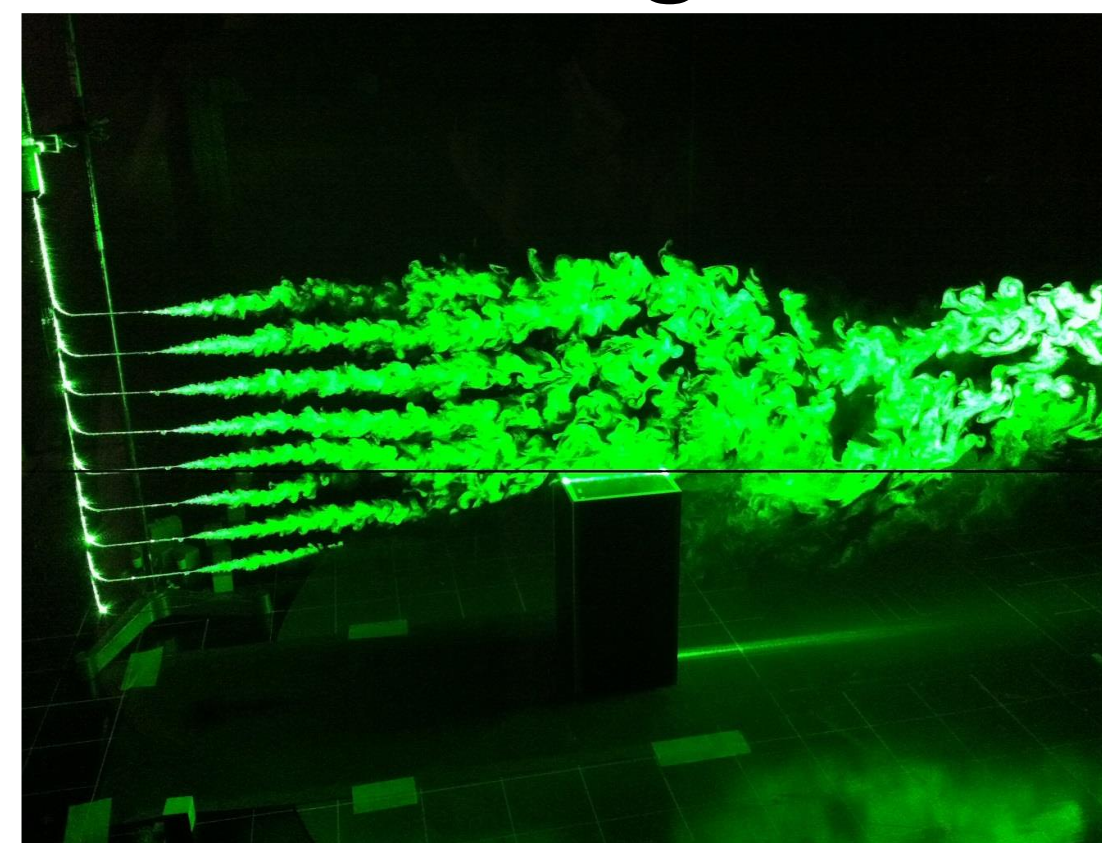
Prediction systems of building and urban environment have been developed to create sustainable building and urban spaces. We focus on flow, heat and pollutant dispersion in multiple scales from human-ambient to urban/regional.



■ Wind velocity observation with a Doppler lidar



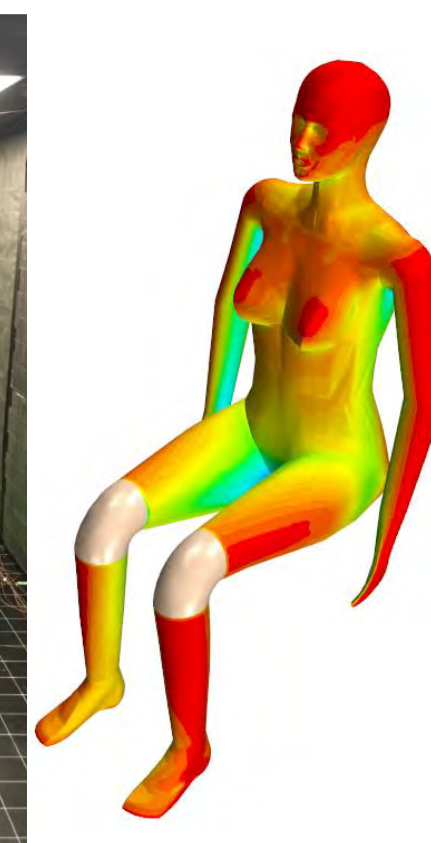
■ Estimation of heat fluxes using Scintillometer



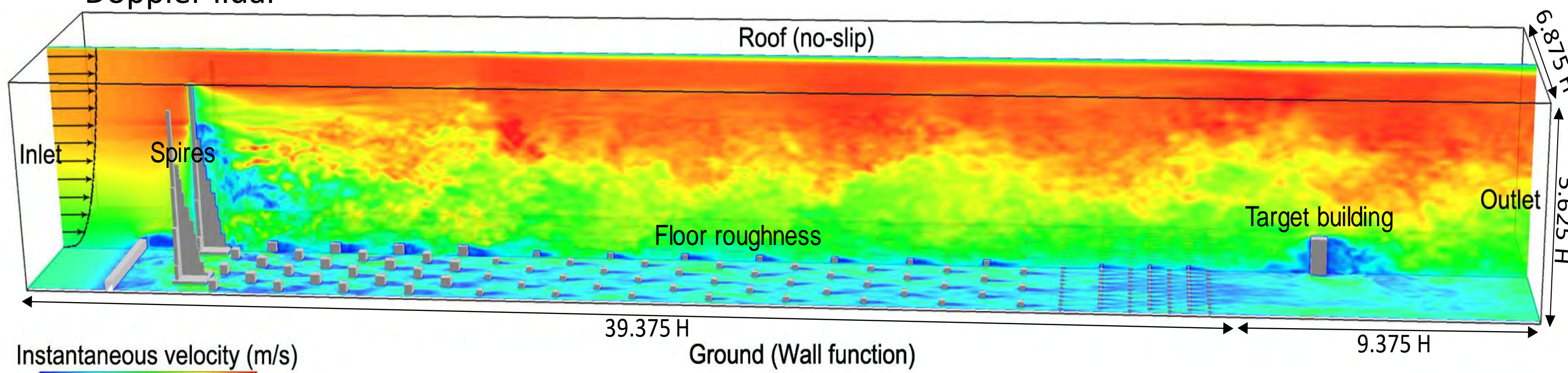
■ PIV measurement of air flow around building



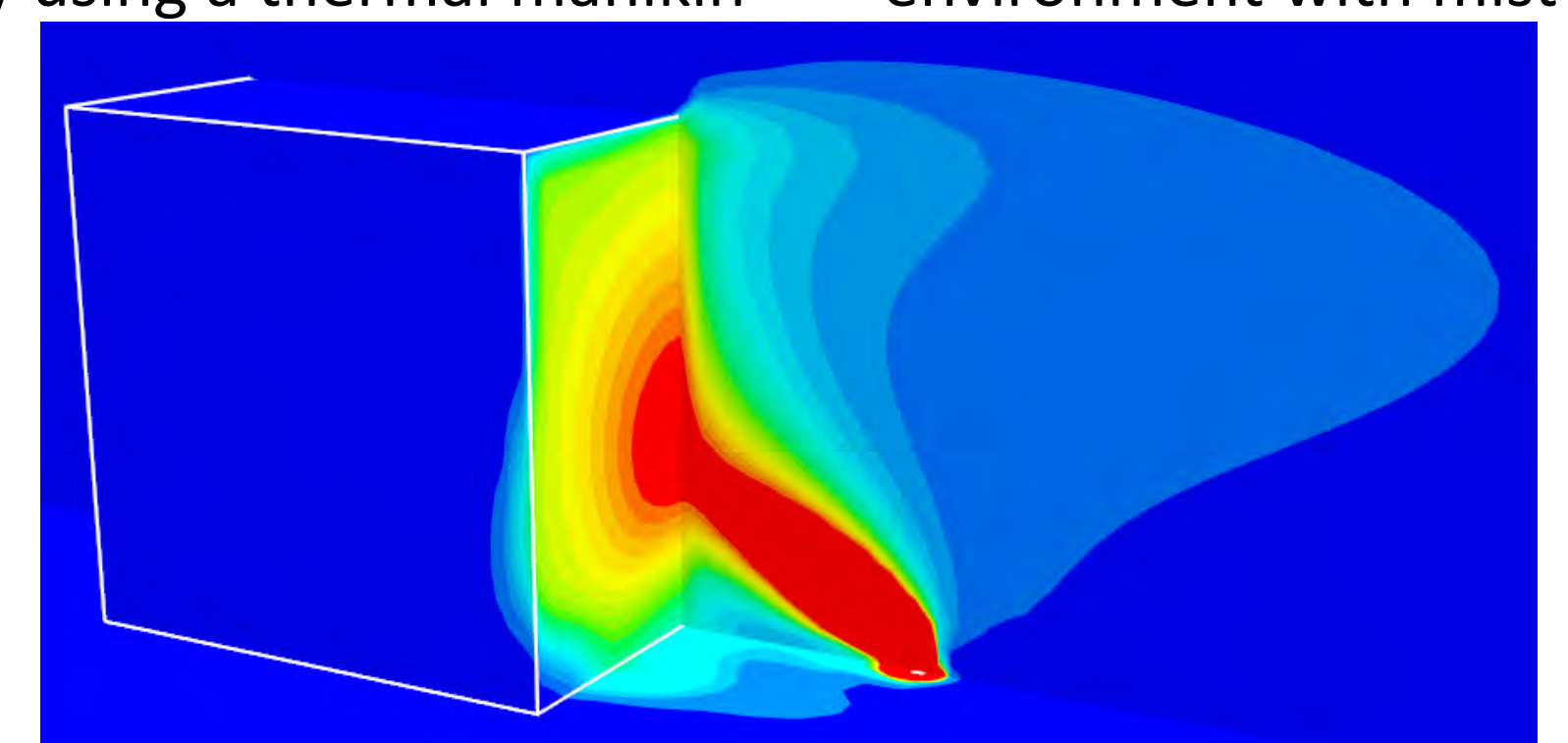
■ Evaluation of thermal environment around human body using a thermal manikin



■ Evaluation of thermal sensation in an outdoor environment with mist



■ High-speed, high-resolution analysis of outdoor air flow using the lattice Boltzmann method-based large-eddy simulation



■ Prediction of concentration distribution of high-temperature exhaust gas using a simple compressible k-ε model

### Systems to Realize Zero Energy Building

In order to realize Zero Energy Building (ZEB), it is important to improve the efficiency of heat source systems. We have improved them to reduce energy consumption. Air conditioning system with renewable energy sources and optimization of heat source system have mainly studied.



■ 21KOMCEE at Komaba campus



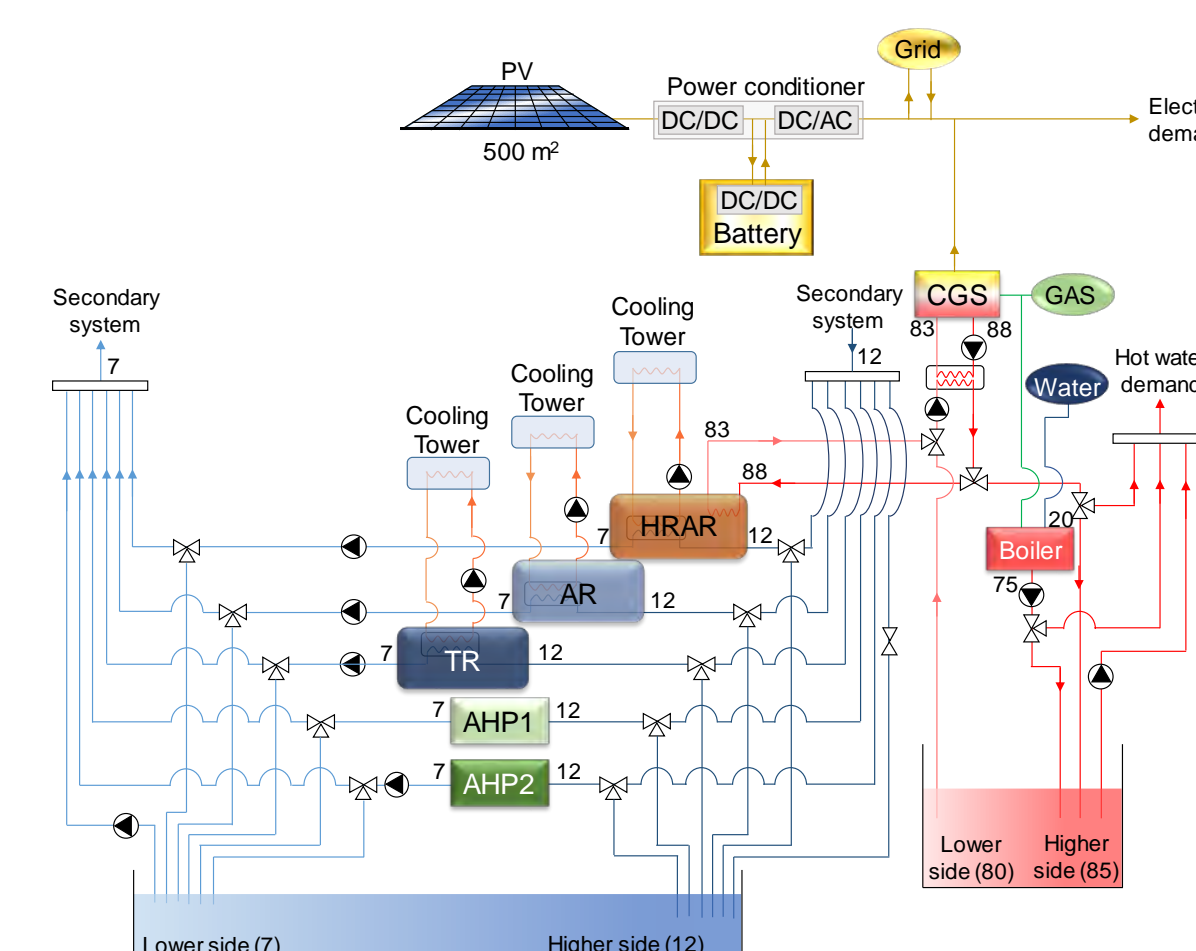
■ HVAC system using Pile heat exchanger



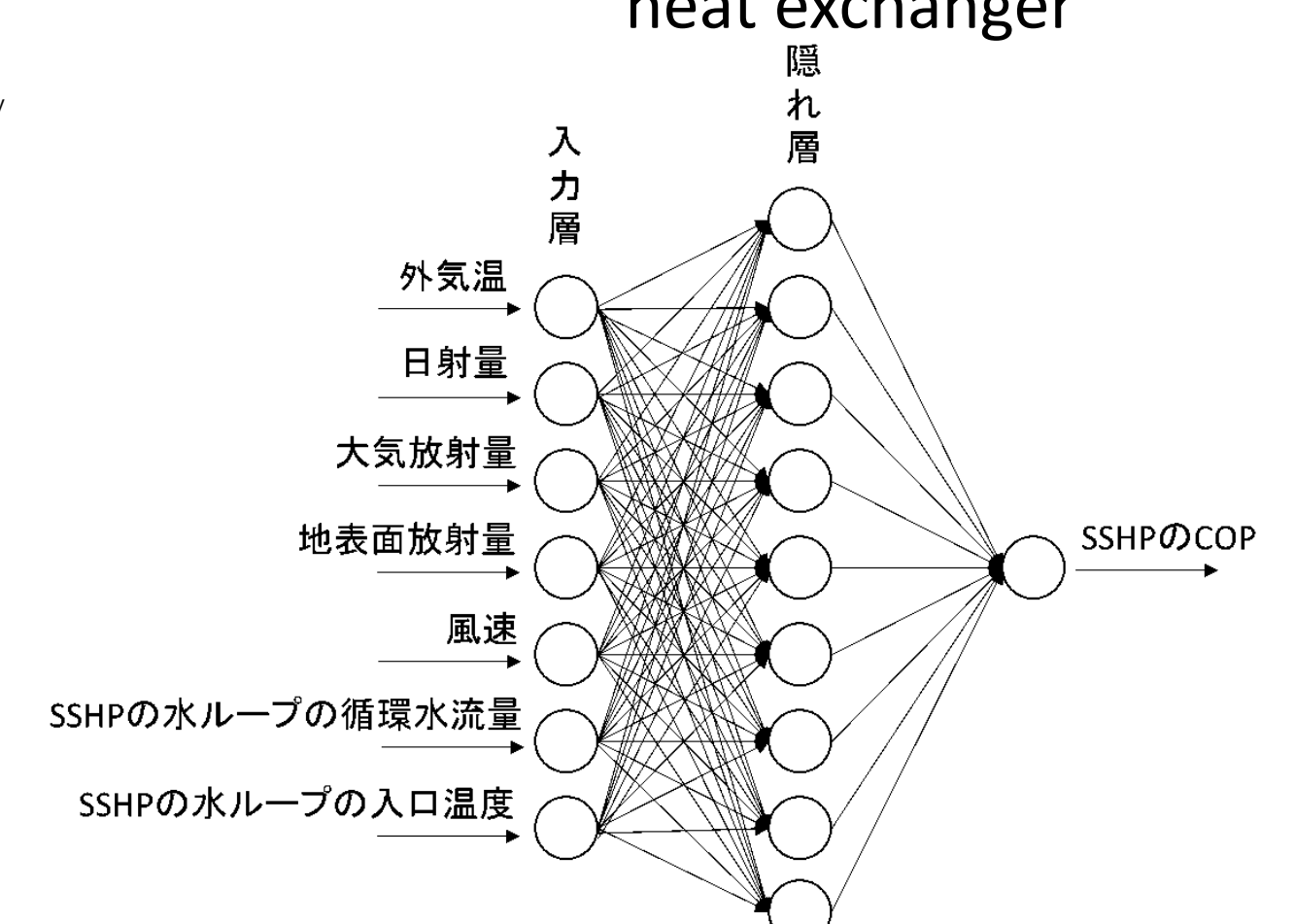
■ RE house at Kashiwa campus



■ Experimental system of Thermal response test



■ Optimization of thermal and electrical grid



■ Prediction of performance of SSHP (Sky Source Heat Pump) using ANN