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Top -level research and data

Housing and built environment research that contributes to carbon neutrality

(Representative papers)

Progress in thermal comfort research over the last twenty years, Indoor Air Vol.23, No.6, 442-461, 2013, 12, doi.org/10.1111/ina.12046
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Deployment targets (sites, materials, etc.)

Houses, buildings, regions, and cities

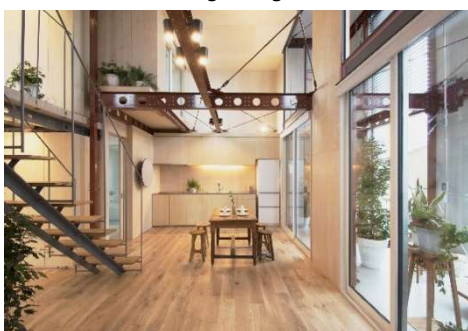
Features (implementation means, etc.)

Keyword

- Carbon neutral
- Net zero
- ZEB/ZEH
- Thermal comfort
- Indoor environment
- Energy conservation
- Wellness

In the housing and construction sectors, energy conservation efforts have focused on improving building and equipment performance. In the future, considering how digital technologies can be utilized for energy conservation and for the effective use of renewable energy in the housing and construction sectors will be important. Achieving net zero requires thinking not only from the energy supply side but also from the demand side. Research is being conducted on the following three points to simultaneously improve wellness performance, such as comfort and health for residents:

1. Research and development that combines electricity and architecture is being conducted to significantly reduce the energy consumption of the household sector, business, and other sectors, which account for 34% of Japan's energy consumption, and introduce a large amount of renewable energy. Empirical research on actual net zero energy buildings (ZEB) and net zero energy houses (ZEH) is also being conducted.
2. In some cases, simply optimizing houses and buildings to minimize energy consumption may impair the livable environment for residents. Therefore, research is being conducted on technologies that not only increase energy efficiency but also improve wellness performance, such as comfort and health for residents. A built environment plan that flexibly responds to changes in work and living styles caused by the COVID-19 pandemic is being promoted. Proposals for behavioral change and improving resilience performance regarding climate are also being made.
3. The energy conservation performance of individual units such as ZEH / ZEB as well as energy issues as a whole, including the use of renewable energy, are being examined, and contributions are being made to solve problems at the regional and city levels. Additionally, support is being provided to the use of renewable energy in accordance with the local environment and social characteristics, and net zero in regions and cities in accordance with energy consumption patterns that match lifestyles is also being realized. Furthermore, research and policy recommendations regarding decarbonization in the agricultural and aviation sectors are being conducted.



Interior view of Waseda Shibaura Building
(Net Zero Energy House: ZEH)



Kaisei Town Hall cross-section

Associated proprietary technologies

- ZEH / ZEB promotion and planning
- Research on thermal comfort and wellness
- Creation of scenarios for energy forecasting and environmental measures
- Realization of thermal comfort through personal air conditioning
- COVID-19 countermeasures
- Decarbonization in the airport and agricultural sectors

Assumed outlets / applications

Zero energy houses (ZEH) and buildings (ZEB) that emphasize wellness, such as comfort and health

Associated SDGs

