Virtual City of Zero Energy House

by kazuhiro teranishi / 2017-05-29 07:47:48 / Internazionale / 19 / EN

Address 1 - street : 981-3332 7-1-6, AKAISHIDAI, TOMIYA CITY, Japan

Population : 80 000 hab
Starting year of the project : 2013
Delivery year of the project : 2016
Key words : Zero energy house, eco diversity, mass customized prefabrication,

362 ha

2 147 483 647 €

ID CARD

Sekisui House is the biggest company, in terms of prefabrication detached house construction. Since April 2013 to January 2017, Sekisui House had built 26,841 detached houses that meet Japanese government's regulation of net Zero Energy House (ZEH). These houses are virtually connected though network and sharing information with Sekisui House.

Programme

- Housing
- Public spaces
- Green spaces
- Others

CO2 Impact

CO2 Impact : 6 978 tCO2

Method used to calculate CO2 impact

Total emission of 26,841 houses is estimated 6,978 tons of CO2/year. And reduction rate is 94.6%, compared to the conventional houses that emit 4,855 kg CO2 / year. This estimation is by Sekisui House's own calculation method.

Project progress

- Delivery phase

Prescriptions and zoning

- Particular conventions

Key points

- Quality of life
- Smart city
- Resources
- Biodiversity
- Energy /Climate

Approaches used

- Others

More info

http://www.enecho.meti.go.jp/category/saving_and_new/saving/zeh_report/pdf/report_160212_en.pdf

Data reliability

Self-declared

TERRITORY

Type of territory

Estimated total floor area of 26,841 Green First Zero houses is 362 hectares or 3.63 square kilometers. There are located in all over Japan.

Climate zone

[Cfa] Humid Subtropical - Mild with no dry season, hot summer.

KEY FIGURES

Built surface on natural or agricultural spaces

Built surface on natural or agricultural spaces : 1 811 770,00 ha

Green areas, roofs included

Green areas, roofs included : 1 811 767 m²

Housing floor area

Housing floor area : 3 623 535 m²

Number of residential units

Number of residential units : 26 841

Green spaces /inhabitant

22.65

Total investment costs (before tax)

Total investment costs (before tax) : 2 147 483 647 € HT

Total of subsidies

Total of subsidies : 269 900 000 € HT

Detail of subsidies

http://www.enecho.meti.go.jp/category/saving_and_new/saving/zeh_report/pdf/report_160212_en.pdf Japanese METI set ZEH standard and give subsidies for approved houses.
The subsidies is 1.25 million Japanese Yen per unit.
1.25 million Japanese Yen x 26,841 units / 124.31 = €269,900,000. Our average price of ZEH houses is 37 million Japanese Yen per unit.
37 million Japanese Yen x 26,841 units / 124.31 = €7,989,030,000.

GOVERNANCE

Project holder

Name : Sekisui House, LTD.

Type : Private company

General description :
Sekisui House is the biggest company, in terms of prefabrication detached house construction. Since April 2013 to January 2017, Sekisui House had built 26,841 detached houses that meet Japanese government's regulation of net Zero Energy House (ZEH).

Project management

Description : We prepared "Green First ZERO" as the specification of building materials, amount of PV generation and so on. "Green First ZERO" is selectable for various types of houses and in-house designers can easily understand and explain how to meet Japanese government's regulation of ZEH.

Project stakeholders

Ministry of Economy, Trade and Industry (METI)

Function : Other

Ministry of Economy, Trade and Industry (METI) does important role for this project. That determines ZEH regulation and gives support money for approved houses with Sustainable open Innovation Initiative (SII).

https://wwws.meti.go.jp/honsho/comment_form/contact_us.html

Construction21 company page :

More info : data/sources/users/24276/cop22-building-day-sekisui-house-presentation.pdf

SOLUTIONS

Green energy

Description :

Solar power generation system Solar cells in the roof tile module

Fuel Cell co-generation system for detached houses, that enables high energy efficiency because of utilization of heat.

Total emission of 26,841 houses is estimated 6,978 tons of CO2/year. And reduction rate is 94.6%, compared to the conventional houses that emit 4,855 kg CO2 / year. This estimation is by Sekisui House's own calculation method.

CO2 Impact : 6 978,00 tCO2

- Other

Company :

Company :

QUALITY OF LIFE

Quality of life / density

Universal Design

Since the 1970s, we have been engaged in the construction of housing for people with disabilities to bring "comfortable living-now and always," not only to people with disabilities and elderly people, but also to all families under our "lifelong housing" concept, while striving to develop human resources, create ideal living environments, and pursue innovations in manufacturing to better implement this concept. In recognition of our efforts over the years to raise awareness of universal design, we were given the Grand Award/Minister of Economy, Trade and Industry Award at the IAUD Awards 2012. Dr. Roger Coleman, Chair of the Selection Committee and Professor Emeritus of the Royal College of Art, London, commended our efforts to develop sophisticated universal designs with an increased level of comfort by incorporating the experience and data gained from various experiments, as well as the opinions of users. As shown by their remarks, the jury had a high opinion of the overall aspects of our sincere commitment to the "lifelong housing" concept.

% Urban sprawl of the neighbourhood

50

Net density

74.15

Social diversity

Anti-crime

We are researching and studying the present position in livings and towns, and developing reliability of widow glasses and door locks through our viewpoints of

protecting crime. We confirm and verify crime prevention performance of the latest high performance glass as a countermeasure against glass-breaking.

And we developed user-friendly security items, such as original front door locks which can be remotely checked on.

Social inclusion and safety

Safety from an Earthquake

When an earthquake is transmitted to a building, it is shaken and deformed. There is a strong risk that the building deformation will be severe, damaging the structural frame, interior and exterior. Sekisui House's proprietary SHEQAS seismic control system converts seismic wave energy into heat energy to absorb

building movement, and can reduce building deformation by approximately 50%. The SHEQAS damper, comprising a special high-damping rubber, maintains its efficacy through repeated earthquakes and aftershocks realizing housing in which residents can continue to live with peace of mind. In FY2015, 94% of our homes were fitted with SHEQAS.

Ambient air quality and health

Airkis High-Quality Indoor Air System

Air pollution is becoming a serious problem at present. In terms of indoor air quality, from early on we focused attention on the health impact of chemical substances in our construction materials. We were the first to conduct research on healthy indoor air environments. As a result, we developed the Airkis high-quality indoor air system, which takes into consideration the fact that children are more susceptible to the impact of air pollution than adults. Using Airkis in the homes reduces indoor concentrations of five major chemical substances to less than 50% of the guideline value set by the government. In addition to reducing chemical substances, we are also engaged in ventilation and air purification to improve the overall quality of air environments. To this end, we developed proprietary ventilation and air conditioner systems. In FY2015, 85% of our homes were fitted with Airkis.

SOLUTIONS

Sekisui House Comprehensive Housing R&D Institute,

Description : Our concept of R&D is "Solving Social Problems through providing houses". In this vision, Sekisui House Comprehensive Housing R&D Institute takes responsibility for the development of housing technologies, verifies the performance evaluation of housing and offers proposals for living. Our research and development in both hardware and human aspects promotes company's concept, to realize a sustainable society and health life though providing better living environment.

Company :

- Security
- Air quality
- Other

Company :

ECONOMIC DEVELOPMENT

Circular economy

Promoting the Recycling of Waste

The Sekisui House, which aims to make effective use of limited resources, engages in initiatives that extend housing life and focuses efforts on the recycling of waste created by remodeling and renovation. Up to now, we have promoted industry-leading initiatives including the operation of our own waste disposal system centered on 19 recycling centers throughout Japan. We were also the first in our industry to acquire certification by the Wide-Area Certification System under the Waste Management and Public Cleansing Law. We are striving to achieve and maintain zero waste emissions at all levels of production, new home construction, after-sales maintenance and remodeling. In renovations including demolition work, to ensure strict adherence to the separation of individual items such as wood and tiles, we created guidelines to define waste disposal operator selection criteria that are managed internally. In addition, we are also focusing efforts on environmental education for Group company employees involved in remodeling and renovation to create a system for working with partner companies to ensure the appropriate handling and recycling of waste.

SOLUTIONS

- Circular economy

Company :

SMART CITY

Smart City strategy

New technologies may see homes evolve from places where energy is consumed, to places that supply energy to a local grid and manage the local energy supply. Eventually, homes could become the focal point of our society for energy. We have also initiated research that will contribute to the enrichment of communities, through the creation of information networks that will diversely support the everyday lives of people, in ways not limited to energy.

SOLUTIONS

Providing original HEMS service

Description : In collaboration with IBM Japan, Ltd., we have es

lized data management, makes energy consumption more visible to residents, and provides easier access to useful information (such as gardening tips and security information). Our HEMS platform provides additional value that can improve inhabitants' quality of life.

- Digital services

RESOURCES

Water management

For all Green First Zero, we supply faucets designed to save hot water and energy and water-saving toilet.

SOLUTIONS

Faucet designed to save hot water

- Water management

Company :

BIODIVERSITY

SOLUTIONS

"Gohon no ki" Greenery Project

Description : Since 2001, Sekisui House has promoted gardening and landscaping activities known as the "Gohon no ki" greenery project. This involves the proactive proposal of indigenous species able to provide a high level of support for local creatures in consideration of the ecosystem as opposed to the frequent and exclusive use of garden or non-native species. We plant native plants according to "Gohon no ki" projects, 1 million per year and 13 million in total. This project is adopted for Green First Zero too.

- Other

Company :

ENERGY/CLIMATE

Climate adaptation, resources conservation, GHG emissions

Utilizing natural energy effectively. Using different types of glass, depending on the direction the window faces,and adapting the design to control solar radiation and optimize ventilation

Energy sobriety

Launching and spreading the Green First Zero model, which provides energy-neutral housing environments in line with the ZEH standards. Green First Zero features are

- High Insulation Providing advanced heat-insulation systems, including argon gas-filled double glazing as standard
- Introducing comprehensive energy-saving solutions Providing-as standard-high-efficiency air conditioning systems,equipment that uses less hot water, LED lighting equipment, and HEMS (home energy management systems)
- Utilizing natural energy effectively. Using different types of glass, depending on the direction the window faces,and adapting the design to control solar radiation and optimize ventilation

Total electricity needs of the project area /year

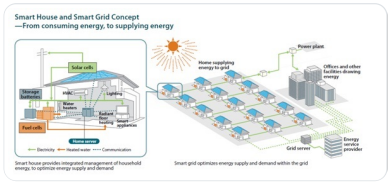
Total electricity needs of the project area /year : 142 096 000,00 kWh

Total electricity production of the project area /year

Total electricity production of the project area /year : 149 574 000,00 kWh

SOLUTIONS

Description : Estimated Electricity needs is calculated : 49% of "all electric" houses requires 6615 kWh/year, and 51% of "with gas" houses requires 2260 kWh.



- Average electricity requirement = 142,096,254 kWh (5294 kWh/year x 26,841 unit)
- Photo-voltaic cell generation : Average PV = 118,637,220 kWh (amount of unit 4.42 kW x 26,841 unit x Average PV generation in Japan 1,000 kWh/kW)
- Fuel cell generation : Average Fuel cell generation = 30,936,937 kWh (2,260 kWh x 26,841 unit x 51% (the percentage Fuel cell installation)
- Total generation = 149,574,157 kWh (PV 118,637,220 kWh + Fuel cell 30,936,937 kWh)

- Climate adaptation
- Renewable energies
- Low-carbon materials/ infrastructure
- Other

Contest

Reasons for participating in the competition(s)

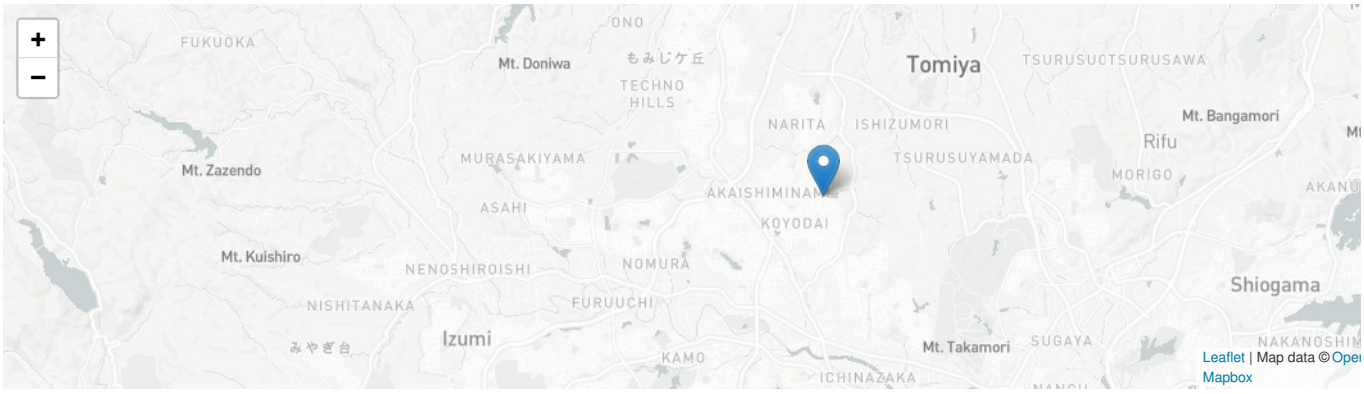
Affordable Zero Energy Houses by prefabrication. Since 2013, we already had built 26841 Zero Energy Houses till January 2017.

Building candidate in the category

Green Solutions AWARDS powered by Construction21.org

Sustainable City Grand Prize

Users' Choice



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