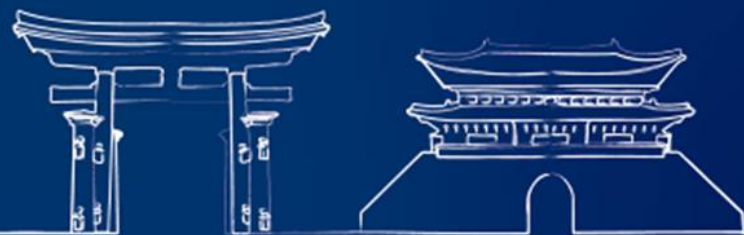


MARKET STUDY ON
CONSTRUCTION & BUILDING TECHNOLOGIES
JAPAN

2013



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1. Executive summary

Market overview, characteristics and key segments

Japan, a country of some 127 million people, is the third largest economy in the world, behind only the United States and China when measured by official exchange rates. Many years of recession and economic uncertainty, combined with government efforts to reduce its deficit by cutting back public works, pushed overall investment in construction into decline from 1990 onwards, but this trend has now been reversed with investment reaching 46.5 trillion yen in 2011 and 44.4 trillion yen in 2012.¹ Moreover, in 2012, imports of building products to Japan amounted to some 1.07 billion yen.²

Undoubtedly a major driver for growth in the short to medium term will be the continuing response to the Great East Japan Earthquake of March 2011. The earthquake and ensuing tsunamis devastated much of the Tohoku region, claiming over 15,000 lives and destroying buildings, roads, railways, and other essential infrastructure. Furthermore, subsequent soil liquefaction damaged extensive stretches of the Tokyo Bay coastline and approximately 17,000 houses and buildings in the area surrounding Tokyo.³ Considerable sums of money have now been allocated to enable the reconstruction of these areas.

As a result, the construction industry continues to account for nearly 10% of Japan's GDP and of all employment.⁴ There are more than 469,000 licensed construction-related companies, including five super general contractors whose annual turnover exceeds 1 trillion yen and who together represent about 25% of all construction business. Each of Japan's 47 prefectures also has major local construction companies. Beyond them are thousands of general and more specialised companies operating across the private and public construction sectors.

The public sector

In FY2012, public construction investments totalled 18.3 trillion yen.⁵ Government programmes for housing focus mainly on providing subsidies for residential construction by local government, and on long-term and low-interest home loans through the Japan Housing Finance Agency. For FY2013, 264 billion yen has been allocated to

¹ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

² Ministry of Finance, "Merchandise Trade Statistics: Values by Commodity", June 2013

³ NHK, "シリーズ東日本大震災"世界最大"の液状化", 10 July 2011

⁴ Ministry of Internal Affairs and Communications, Statistics Bureau, "Statistical Handbook of Japan 2011", September 2011

⁵ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

this Agency, alongside a further 491 billion yen to the Urban Renaissance Agency through a Fiscal Investment and Loan Program.⁶

Investment in infrastructure is generally focussed on extending and upgrading the transport network, including ports and airports. Significant projects include the replacement of several ageing sections of Tokyo's elevated expressways with underground tunnels, improving airport facilities, the extension of Japan's high-speed rail network and the construction of a new 286km rail line to link Tokyo and Nagoya using maglev technology.⁷ Further projects will include extensive repairs to coastal levees and ports that suffered damage in the March 2011 disaster.

Contracting procedures for public sector projects vary considerably according to the size of the project and the organisations involved and are described in detail in section 13 of the report.

The private sector

In FY2012, private sector investment in construction in Japan was valued at 26 trillion yen, accounting for 59% of total market value.⁸

The real estate market is recovering strongly from a long period of stagnation, helped by the creation of investment trusts, ongoing deregulation, and the recovery of corporate operating results, all aided by low interest rates. The office market in urban centres, which tends to lag economic recovery, seems now set to improve. New housing starts have been increasing since 2010, totalling 882,797 units in 2012.⁹

However, overall growth in the residential construction market is being hampered by the fact that Japan's overall population is shrinking, consumer spending is down and the stock of condominiums is already large.

Private-sector clients most often select contractors by means of price negotiations with a single company or by getting estimates from several companies. They generally use blanket construction-only contract systems, design-build systems, and design-bid-build systems. Payment is made predominantly by gross price (lump-sum) contracting. Examples of Construction Management and Project Management contracting can also be found, but their use remains limited.

⁶ Ministry of Finance, "Fiscal Investment and Loan Program (FILP) Plan", 24 December 2011

⁷ Central Japan Railway Company, "中央新幹線", 2011

⁸ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

⁹ Ministry of Land, Infrastructure, Transport and Tourism, "建築着工統計調査報告 平成24年計", 31 January 2013

Distribution channels – Building materials

Traditionally, importers of building materials in Japan have been classic trading companies, supplying products and long-term financing that works its way along a 5-7 layer distribution chain of regional and local wholesalers / retailers, eventually to reach the hundreds of thousands of small builders who construct most of the housing in Japan. Such an elaborate and close knit distribution system inevitably creates barriers to imported products.

Efforts are however being made to eliminate layers and hence cost in the distribution chain, such that national wholesalers sell direct to house builders, or manufacturers sell direct to regional wholesalers, who sell direct to house builders.

Moreover, almost all major construction firms also have overseas departments screening the global market for innovative building products that can be purchased and imported direct into Japan.

Challenges for doing business in this sector

Building products exported to Japan are generally subject to regulation under Japanese law and must therefore obtain approval before they can be used in construction, even if they are already widely accepted and used in other countries. The exact requirements depend on the type of product, where it is going to be used and other factors. The report offers basic information while further details and documents can be obtained from the Japanese Government and other relevant organisations (contact addresses provided in the Appendix).

Despite the strict regulation of building products in Japan, there is as yet no mandatory requirement covering sustainable design and construction. Companies that have developed products to meet European regulations may therefore find demand for these products in Japan relatively weak.

On the other hand, since Japan is earthquake-prone, the construction industry is constantly looking for improved earthquake- and fire-resistant materials. This presents an opportunity for companies able to meet this demand, but may prove a barrier to others unable to offer such materials in their ranges.

Opportunities for doing business in this sector (key subsectors and products)

Residential: construction and renovation

Large-scale civil construction projects are still abundant in Japan, especially in major metropolitan areas such as Tokyo, Osaka and Nagoya. New developments have been boosted by the Urban Redevelopment Special Law, which promotes a more hi-tech urban

landscape and improved residential environment. The Japanese Government is aiming to double the size of existing housing and remodelling markets, and to increase the supply of high-quality housing (including energy-efficient housing) by 2020, through measures such as expanding home financing and the housing tax system.¹⁰ Furthermore, the Government aims to reduce the proportion of housing that is deemed insufficiently earthquake-resistant to 5% by 2020.¹¹

Thus there are considerable opportunities for companies involved in construction and the supply of building materials for new residences and renovations.

Meanwhile, Japan's rapidly ageing population is creating a need for more elderly-friendly living environments, including barrier-free housing with uniform level floors and installed handrails. The Government is stimulating the provision of such housing by subsidising programmes that make the necessary modifications to homes for the elderly.

Japan is also, like many other countries, keen to "go green" by improving building standards to create a more sustainable environment. The Government's "200-year residence" plan, launched in 2007, promotes the "sustainable society" concept, increasing interest in high quality, eco-friendly and health-conscious building products. However, for the time being, there is still only a niche market for imported products so initial sales may be small.

Finally, although the crime rate is very low in Japan compared with other developed nations, home security is considered a priority and related products sell well.

Technology

The Japanese construction sector is facing ongoing shortages in the supply of specialised labour and is looking to increased use of technology, such as robot systems, to help overcome this problem. This presents a significant business opportunity to firms able to supply such technology and accommodate the need for Japanese localisation of both the hardware and software.

There are also opportunities for firms able to work with Japanese home builders in developing "Smart Houses" - homes that reduce carbon emissions, increase energy efficiency, and utilise renewable energy sources such as fuel cells and solar power. In 2012, the

¹⁰ National Policy Unit, "21 National Strategic Projects making steady progress", 28 February 2012

¹¹ Cabinet Office, "On the New Growth Strategy", 18 June 2010

Japanese Smart House market¹² was estimated to be worth 1.84 trillion yen.¹³ As a result of the March 2011 disaster and rising consumer awareness of renewable energy and energy efficiency, the market is predicted to grow, reaching 3.63 trillion yen by 2020.¹⁴

Government incentives

Post March 2011 reconstruction

The Japanese Government has allocated a total of 19 trillion yen for the reconstruction of the disaster affected Tohoku region. The reconstruction timeframe has been set at ten years, of which the first five years are considered a “concentrated reconstruction period”.¹⁵ Similar arrangements have been made for regions affected by the Fukushima I Nuclear Power Plant. Government guidelines, issued by the Reconstruction Headquarters, include a variety of policies and measures of potential interest to the construction and building technologies industry, such as the intention to “rebuild the regions taking into account the ease of living, anti-crime measures, landscape, renewable energy, energy conservation, environment, recycling, safety and security” and to “promote earthquake-resistant and energy-saving housing and buildings”.

Energy and environmental conservation

The Government has implemented a number of policies to promote energy conservation and greenhouse gas reduction in the built environment. The Energy Conservation Law specifies use of energy control systems in commercial buildings. Further mandatory measures require reporting of conservation measures in new constructions and extensions or rebuilding of buildings with a total floor space of 300 sq m or more. In addition, the “Law for Energy Conservation and Recycling Support” creates financial incentives to boost investment in developing energy efficient products and technologies.¹⁶

The “Cool Earth-Innovative Energy Technology Program”, launched in 2008, prioritises 21 innovative energy technologies.¹⁷ Commercial sales of residential fuel cell systems began in 2009 with a Government subsidy programme providing up to half the unit and installation costs.¹⁸ Meanwhile, the residential market for solar photovoltaic (PV) systems is growing strongly, attributable to

¹² Energy efficient home appliances, residential solar power generation systems, heat pump water heaters, EV/PHV, residential power distribution board, residential fuel cell systems, energy monitors, broadband routers, smart gas meters, smart electricity meters, etc.

¹³ Fuji-Keizai Group, “スマートハウス関連システム・サービスの市場を調査”, 19 February, 2013

¹⁴ Ibid.

¹⁵ Reconstruction Headquarters in response to the Great East Japan Earthquake “Basic Guidelines for Reconstruction in response to the Great East Japan Earthquake”, 24 August 2011

¹⁶ The Energy Conservation Center, “Japan Energy Conservation Handbook 2011”, 14 May 2012

¹⁷ Ministry of Economy, Trade and Industry, “Cool Earth-Innovative Energy Technology Program (Summary)”, 5 March 2008

¹⁸ Ibid.

declining equipment costs, central and local government subsidies, and a feed-in-tariff system requiring electric utilities to purchase any surplus power generated.

To further advance energy conservation, a number of local municipal governments have adopted a “Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)”, jointly developed by industry, government and academia. The system assesses and rates the environmental performance of the built environment. Many cities offer incentives to encourage high-rated projects, including subsidies, lower-interest home loans or increased maximum floor-area ratios.

Examples of successful companies penetrating this market

Section 14 of the report provides examples of European companies that have succeeded in establishing themselves in the Japanese construction and building technologies market.

- **Forbo Flooring B.V. Japan Branch**
- **Gretsch-Unitas Japan, Ltd.**
- **Häfele Japan K.K.**
- **HALFEN GmbH**
- **Honka Japan Inc**
- **MAG-ISOVER K.K.**
- **Ove Arup & Partners Japan Limited**
- **Permasteelisa Japan K.K.**
- **Saint-Gobain K.K.**
- **Schott Nippon K.K.**
- **StoneTech Japan K.K.**

Further contacts and sources of information

Section 15, the Appendix to the report, lists details of a variety of sources of information that may be helpful to companies interested in entering the Japanese market:

- Trade fairs in Japan (section 15.1)
- Government agencies (section 15.2)
- Organisations and Associations (section 15.3)
- List of EU Embassies in Japan (section 15.4)

2. The Great East Japan Earthquake

2.1. Overview

On 11 March 2011, an earthquake of magnitude 9.0 struck off the Pacific coast of north-east Japan (Tohoku region). It was the most powerful earthquake on record ever to have hit Japan and the fourth largest in the world since 1900.¹⁹ The earthquake triggered destructive tsunamis: according to the Japan Meteorological Agency, the height of the tsunami waves ranged from a few centimetres up to 9.3 metres or more.²⁰ The earthquake and tsunamis caused a humanitarian crisis, claiming over 15,000 lives and displacing a large number of people, as well as extensive structural damage to buildings, roads, railways, and other essential infrastructure, such as electricity and water supplies.

Furthermore, the earthquake triggered an unusually severe and widespread shift in soil through liquefaction, causing extensive damage to over 4,200 hectares along the Tokyo Bay coastline and to approximately 17,000 houses and buildings in the Kanto area surrounding Tokyo.²¹ The capital itself and its skyscrapers were tested to extreme limits, but withstood this strain test without major casualties.

In addition to causing significant loss of life and destruction of infrastructure, the tsunamis were responsible for considerable damage to the Fukushima I Nuclear Power Plant run by the Tokyo Electric Power Company (TEPCO), leading to the meltdown of three reactors, mandatory evacuation of residents living within a 20km radius of the power station, and other economic, environmental, and health issues.

¹⁹ U.S. Geological Survey, "Largest Earthquakes in the World Since 1900", 15 March 2011

²⁰ Japan Meteorological Survey, "The 2011 off the Pacific coast of Tohoku Earthquake -Portal-, Earthquake Summary", 2011

²¹ NHK, "シリーズ東日本大震災"世界最大"の液状化", 10 July 2011

As of 10 May 2013, the disaster toll and status of damage was estimated as follows:

Status of Casualties and Damage

(as of 10 May 2013)

Casualties (persons)	
Deceased	15,883
Missing	2,676
Injured	2,699
Structural Damage (buildings)	
Completely destroyed	126,421
Half destroyed	272,028
Partially damaged	740,572
Completely destroyed by fire	79
Partially destroyed by fire	218
Inundation above floor level	3,352
Inundation under floor level	10,218
Non-dwelling houses	59,081
Other Damage (places)	
Roads	3,918
Bridges	78
Landslides	205
Break of dykes	45
Railroads	29

Source: National Police Agency of Japan 2013

In order to prevent secondary disasters caused by aftershocks, emergency risk examiners investigated affected buildings in 10 prefectures to assess and decide the feasibility of use. Out of 95,381 buildings, 11,699 were deemed "unsafe", 23,191 as "Limited Entry", and 60,491 as "Inspected (Pass)".²²

As Japan has been dealing with natural disasters throughout its history, the recovery effort quickly gained momentum, although the scale of the disaster and nuclear worries at times hampered progress. Examples of extremely fast recovery actions include: the partial restoration of the Tohoku Expressway, of which 374km of the entire 675km length was damaged, within 6 days and completion of the remainder by 24 March 2011; repair of the severely damaged airport in Sendai such that the entire runway was operational by 29 March 2011²³; partial resumption of domestic flights by 13 April 2011; resumption by automobile makers of their sea shipments to Sendai port on 8 April 2011; and the resumption of operations along the JR Tohoku Shinkansen network by the end of April, after about 1,200 sites were damaged covering over 500km - which was remarkably

²² Ministry of Land, Infrastructure, Transport and Tourism, "東日本大震災 住宅局の対応状況（5月7日 10:00 時点）", 7 May 2012

²³ National Policy Unit, "Road to Recovery", 1 March 2012

fast compared to previous earthquakes, due to improved implementation learnt from past interruptions.

To cope with the large number of displaced people, the Japanese Government announced on 19 April 2011 that it estimated 72,000 temporary housing units would be required and expected to complete construction no later than August 2011. However, securing sufficient land for these temporary houses proved a major issue.²⁴ On 1 April 2013, the number of temporary housing units required was revised down to 53,627, with 53,537 units already completed.²⁵

Status of Temporary Housing

(as of 1 April 2013)

Prefecture	Required Units	Completed	Under Construction
<i>Iwate</i>	13,984	13,984	0
<i>Miyagi</i>	22,095	22,095	0
<i>Fukushima</i>	17,233	17,143	0
<i>Ibaraki</i>	10	10	0
<i>Chiba</i>	230	230	0
<i>Tochigi</i>	20	20	0
<i>Nagano</i>	55	55	0

Sources: Ministry of Land, Infrastructure, Transport and Tourism 2013

Japanese home builders like Misawa Homes, Panahome, Daiwa House and Toyota House began to offer specially reduced prices to eligible quake victims, with reductions varying in the 1-3 million yen range.²⁶ The discounts were made possible partly by reducing the number of floor plans available, which shortens the construction period.

2.2. Economic impact

In June 2011, the Japanese Government's Cabinet Office estimated the cost of the physical damage caused by the Great East Japan earthquake to be approximately 16.9 trillion yen.

²⁴ Ministry of Land, Infrastructure, Transport and Tourism, Housing Bureau, "応急仮設住宅の発注計画について", 19 April 2011

²⁵ Ministry of Land, Infrastructure, Transport and Tourism, Housing Bureau, "応急仮設住宅着工・完成状況", 1 April 2013

²⁶ The Yomiuri Shimbun, "House prices cut to aid disaster victims", 9 May 2011

Damaged Stocks in Disaster Areas

Buildings, etc (housing, offices, plants, machinery)	10.4 trillion yen
Lifeline Utilities (water, gas, electricity, communication/broadcasting)	1.3 trillion yen
Social Infrastructure (river, road, harbours, drainage, airports, etc)	2.2 trillion yen
Others (including agriculture, forestry, fisheries)	3.0 trillion yen
TOTAL	16.9 trillion yen

Source: National Policy Unit 2013

In May 2011, a first supplementary budget was passed, covering measures to repair social infrastructure and maintain employment.²⁷ A second supplementary budget, dealing with damage caused by the Fukushima I Nuclear Power Plant, was passed in July 2011.²⁸ In November 2011, a third supplementary budget was passed and included substantial measures focusing on reconstruction and future disaster prevention, as well as Japan's economic recovery, based on the Government's "Basic Guidelines for Reconstruction in Response to the Great East Japan Earthquake"²⁹ (see below). A fourth and final supplementary budget, aimed at covering additional mandatory spending and expenses, was passed in February 2012.³⁰

²⁷ Ministry of Finance, "Outline of the Supplementary Budget for FY2011", 22 April 2011

²⁸ Ministry of Finance, "The Outline of the 2nd Supplementary Budget of FY2011", 5 July, 2011

²⁹ Ministry of Finance, "The Outline of the 3rd Supplementary Budget of FY2011", 21 October 2011

³⁰ Ministry of Finance, "The Outline of the 4th Supplementary Budget of FY2011", 20 December 2011

FY2011 Supplementary Budgets

First Supplementary Budget		<i>approved 2 May 2011</i>
1. Disaster Relief		482.9 billion yen
2. Disposal of Disaster Waste		351.9 billion yen
3. Public Works in Response to Disaster		1,201.9 billion yen
4. Rebuilding of Facilities		416.0 billion yen
5. Disaster-related Public Financing Programs		640.7 billion yen
6. Local Allocation Tax Grants		120.0 billion yen
7. Other Disaster-related Spending		801.8 billion yen
TOTAL		4.02 trillion yen
Second Supplementary Budget		<i>approved 25 July 2011</i>
1. Expenses related to the Act on Compensation for Nuclear Damage		275.4 billion yen
2. Expenses for support to disaster-affected people		377.4 billion yen
3. Reserve for Recovery and Reconstruction		800 billion yen
4. Local Allocation Tax Grants		545.5 billion yen
TOTAL		2.00 trillion yen
Third Supplementary Budget		<i>approved 21 November 2011</i>
1. Expenses related to the Great East Japan Earthquake		11,733.5 billion yen
2. Others		369 billion yen
TOTAL		12.10 trillion yen
Fourth Supplementary Budget		<i>approved 8 February 2012</i>
1. Expenses for disaster-related measures		6.7 billion yen
2. Others		2,527.8 billion yen
TOTAL		2.53 trillion yen
Total of all Supplementary Budgets		
Expenses related to the Great East Japan Earthquake		17.75 trillion yen
Other expenses		2.90 trillion yen
TOTAL		20.65 trillion yen

Source: Ministry of Finance 2012

2.3. Market potential and opportunities

On 29 July 2011, the Reconstruction Headquarters established in response to the disaster issued "Basic Guidelines for Reconstruction in response to the Great East Japan Earthquake", a blueprint for the Japanese Government and other involved parties to tackle the challenges of the reconstruction process.

Based on the process that followed the Great Hanshin-Awaji Earthquake of 1995, the reconstruction timeframe was set at 10 years, of which the first five years are considered as a "concentrated reconstruction period".³¹ The budgetary scale for the total 10 year period is estimated to be at least 23 trillion yen, of which approximately 19 trillion yen is to be used during the "concentrated

³¹ Reconstruction Headquarters in response to the Great East Japan Earthquake "Basic Guidelines for Reconstruction in response to the Great East Japan Earthquake", 24 August 2011

reconstruction period".³² Similar arrangements will have been made for regions affected by the Fukushima I Nuclear Power Plant.

The Guidelines, translated by the Reconstruction Headquarters, include, amongst others, the following policies and measures which may be of interest to the construction and building technologies industry:

Building disaster-resistant and resilient regions

- Promote regional development and infrastructure buildings in an efficient manner by prioritising necessary infrastructures based on the concept of selection and concentration.
- Rebuild the regions taking into account the ease of living, anti-crime measures, landscape, renewable energy, energy conservation, environment, recycling, safety and security, as well as enhancing regional self-efficiency and creativity by utilising local resources and business cycles within the region.

"Disaster reduction"

- Combine and implement the following measures, taking into account the risk of large-scale tsunamis like the current case, and depending on regional conditions, for instance:
 1. regions with urban functions located in low-lying areas that were almost entirely affected by the tsunami
 2. regions where low-lying areas were affected and areas on high ground escaped damage
 3. regions built on hills running down to the coast with few low-lying areas and settlements
 4. coastal plains and situation regarding liquefaction:
 - a. Restore and build coastal and river dikes and strengthen the functions of disaster-prevention/drainage facilities such as floodgates and water shoot pipes
 - b. Establish an alert and evacuation system by designating possible flood zones, preparing hazard maps, developing evacuation plans and implementing drills;
 - c. Develop mid to high-rise evacuation buildings, secure evacuation centers, maintain, and improve the functions of evacuation buildings, evacuation routes and disaster-prevention operation centers
 - d. Utilise road and railroad structures with setback levees;

³² Reconstruction Headquarters in response to the Great East Japan Earthquake "Basic Guidelines for Reconstruction in response to the Great East Japan Earthquake", 24 August 2011

- e. Secure access to arterial traffic network which is essential for rescue activities in the time of disaster
 - f. Develop urban areas and mass relocation for recovery of central functions of disaster-afflicted cities
 - g. Flexibly apply existing land use regulations, architectural regulations and other regulations
- Implement technical arrangements to render coastal dikes and tide barriers sufficiently effective in times of large-scale tsunamis.
 - Reconsider comprehensively “projects promoting mass relocation for disaster prevention”, which allow buying up of lands and other measures, in order to enable relocations for various purposes, corresponding to the situation of each region.
 - Examine preventive measures to avoid recurrences of liquefaction in public infrastructures as well as unified preventive measures incorporating public facilities (roads, sewers, etc.) and adjacent housings
 - Conduct research on the liquefaction generating mechanism and promoting technological development of safer and low-cost liquefaction countermeasures.

Swift reorganisation of land use

- Consider a set of special measures to rapidly coordinate land use at areas which necessitate integrated reorganisation of land use for the reconstruction needs in response to damage resulting from tsunami and other disasters.
- This measure would enable various procedures relating to the City Planning Act, the Act concerning Establishment of Agricultural Promotion Areas, Forest Act, and other regulations to be treated under one scheme in an integrated way (one-stop).
- Promote provision of information on the guidelines on coordination of land use and other relevant actions, so that municipalities will specify priority areas to lead and facilitate construction and development activities, so that the private sector can advance smoothly and promote reconstruction activities there, with a view to supporting early recovery of local industries.
- Consider projects for integrated development of residential zones, agricultural zones and other zones, including the conversion from residential to agricultural zones.

Secure stable residence for affected people

- Provide low-interest housing loans for disaster reconstruction for those acquiring new housing.

- Improve and make use of the system such as low-rent public housing for disaster-affected persons and promote its supply for people affected by the disaster who cannot rebuilt or obtain housing on their own.
- Advance the sale of low-rent housing smoothly to residents under certain conditions, and prepare options of either sale or lease in regards to the housing site.
- Develop housings and other facilities in a way that community functions and service functions for the elderly are well combined to enable residents, including the elderly, to have easy access to service such as nursing care and to rebuild their lives.
- Promote construction of wooden housing in areas with no risk of tsunami and utilisation and efficient procurement of certified wood, etc.
- In areas where deteriorated housing is densely situated, conduct land development to rebuild housing in accordance with the reconstruction plan of disaster-afflicted regions.

Human resources assistance for reconstruction projects

- Promote utilisation not only of public organisations and injection of public funds but also of private funds, management ability, technical capabilities, public-private partnerships (PPP), PFI method as well as reconstruction of disaster-affected regions by “New Public Commons” led by various entities including NPOs, local companies, town building companies and local organisations, in order to engage in disaster reconstruction with the cooperation of public and private sector.

Mutual support in communities

- Consider ways in which development can lead to promotion of local communities and industries, for instance, utilisation of local wood to stimulate local forestry, in times of developing facilities.

Forestry

- Promote the use of woods made in the disaster-affected areas for housing and public buildings.

Promotion of introducing renewable energy and energy conservation measures

- Further promote the introduction of residential photovoltaic and building energy management system (BEMS) and take necessary support measures in order to diffuse chargeable batteries which contribute to a stable power supply at an accelerated pace.
- Promote the introduction of privately-owned electrical power facilities and high-efficient gas air conditioning.

- Promote co-generation system and housing energy management system (HEMS) with a view to the utilisation for community central heating and air-conditioning, high-efficient air conditioning, energy-saving products such as high-efficient lighting (e.g. LED lighting), accelerate diffusion of net-zero energy housing, housing with energy-saving diagnosis and investment in energy conservation of plants and buildings.

Reconstruction open to the world

- Establish an attractive investment environment to the international business world, in order to promote foreign investments to Japan, primarily including to the disaster areas, and to promote global companies' establishment of their research and development facilities and their Asia region headquarters functions in Japan and in the disaster areas.

Preparing for future disaster

- Promptly realise a "Tsunami Resilient Town-building System" with "multiple defenses", combining hard and soft response measures.
- Promote earthquake-resistant and energy-saving housing and buildings as well as encourage research and development on improvement of earthquake resistance, in order to alleviate human suffering and economic damage in times of large-scale earthquakes.
- Promote disaster-prevention measures such as reconstructing earthquake-resistant schools and laboratories/research institutions and back-up of disaster management functions.
- Strengthen disaster-prevention functions of buildings of the Government including earthquake-resistance, from the standpoint of supporting local governments at the time of disaster.

3. Japan at a glance

3.1. Basic facts

Japan – Basic Facts

Geography	
Capital	Tokyo
Area	377,915 sq km
People & Society	
Population	127,253,075 pers. (2013 est.)
Age Structure	-
0-14 years	13.4%
Male	8,808,568 pers.
Female	8,204,514 pers.
15-24 years	9.7 %
Male	6,394,809 pers.
Female	5,958,408 pers.
25-54 years	38.3%
Male	24,149,308 pers.
Female	24,588,409 pers.
55-64 years	13.8%
Male	8,785,719 pers.
Female	8,786,968 pers.
65 and over	24.8%
Male	13,656,792 pers.
Female	17,919,580 pers. (2013 est.)
Economy	
Currency	Yen (¥)
GDP (purchasing power parity)	3.4538 trillion euro
GDP per capita (PPP)	27,634 euro
Real GDP growth	0.2% (2012 est.)
Labour Force	65.02 million pers.
- by occupation	-
Agriculture	3.9%
Industry	26.2%
Services	69.8% (2010 est.)

Source: CIA World Factbook 2013

3.2. Economic development

When measured by official exchange rates, Japan remains the third largest economy in the world, behind the United States and China, having slipped in 2010 from second place. Measured on a purchasing power parity basis (PPP), however, Japan is now the fourth largest

economy in the world, behind the United States, China, which passed Japan in 2010, and thirdly India, which edged out Japan in 2012.³³

From 1960 to 1990 Japan recorded the highest growth rate among G7 countries while both maintaining a controllable inflation and unemployment rate, and accumulating huge surpluses in foreign trade. The rapid development was in large part due to a strong work ethic throughout the workforce and high levels of public and private investment based on government-industry cooperation. During this period of economic development, priority was placed on sectors generating high value-added growth, which in turn increased Japan's competitiveness in the world economy.

In the 1980s, high rates of lending and over investment, combined with high levels of speculation in the real estate market, resulted in over-inflated land prices and the creation of a "bubble economy" in Japan. Real estate and stock prices fell in early 1991, and for the remainder of the 1990s the Japanese economy dipped in and out of recession. Throughout the 1990s the Government tried to restructure the economy and eliminate speculative excesses in the real estate and stock markets. However, most of the economic stimulus packages introduced during this period proved unsuccessful, which has led many to characterise the 1990s as a "lost decade" for Japan.

By 2004 Japan had begun to experience a turnaround, with economic growth at its highest since 1996, due to a cheaper yen and strong export demand from the US, China and Europe (which helped Japan achieve an annualised growth rate of 6.1% that year). However Japan again entered into recession in 2008, marking a return to near 0% interest rates in 2009. While the Japanese financial sector was not deeply exposed to, nor affected by the global credit crunch, the downturn in global demand for exports proved highly damaging.

Before the set-back caused by the March 2011 disaster, the economy appeared to have started to recover, due to Government stimulus spending. Japan's Gross Domestic Product (GDP) shrank in the period April-June 2011, mostly attributable to distribution difficulties arising from the disaster and leading to a fall in exports.³⁴ However, the negative impact began easing from May, with supply-chain recoveries enabling production and exports to get back on track.³⁵ By September, all losses resulting from the disaster had been recovered, with Japan posting a 300.4 billion yen trade surplus and a 2.4% increase in exports.³⁶

³³ Central Intelligence Agency, "The World Factbook", 10 April 2013

³⁴ Nikkei, "Economy To Recover From July-Sept: Govt", 15 August 2011

³⁵ Ibid.

³⁶ Nikkei, "Japan Exports, Trade Surplus Recover To Pre-Quake Levels", 24 October 2011

A METI survey of 123 major manufacturers, retailers and service companies revealed that 80% of corporate production bases damaged by the disaster had been restored to pre-disaster output levels as of 1 July 2011.³⁷

Nevertheless, Japan recorded an overall trade deficit of 2.49 trillion yen for 2011.³⁸ The impact of the earthquake and tsunami, combined with the weakness of the US and European economies and a rising yen, led to an overall fall in Japanese exports of 2.7% compared to the previous year.³⁹ Meanwhile imports rose by 12%, not least because of the need to bring in energy supplies from abroad while domestic power plants remained shut down.⁴⁰

In March 2013, the Government revised its GDP data, indicating that Japan's economy has pulled out of its 2012 downturn faster than previously estimated.⁴¹ The Government announced that GDP increased at a price-adjusted 0.2% in annualised terms in the fourth quarter, up from the previous reading of a 0.4% contraction. That followed annualised declines in the April-June and July-September periods.

The revision was due largely to a smaller drop in corporate capital expenditures than initially reported, as well as to a small increase in private consumption. However, Japan's deteriorating trade balance has continued. The current account deficit came to 364.8 billion in January before seasonal adjustments after a 264.1 billion deficit in December.

Newly-elected Prime Minister Shinzo Abe has declared the economy to be his Government's top priority. He has pledged to reconsider his predecessor's plan to permanently close nuclear power plants and is pursuing an economic revitalisation agenda of fiscal stimulus and regulatory reform, pressing the Bank of Japan to loosen monetary policy, which it did in (month/year).

The new Government will continue a longstanding debate on restructuring the economy and reining in Japan's huge government debt, which exceeds 200% of GDP. Persistent deflation, reliance on exports to drive growth, and an ageing and shrinking population present major long-term challenges for the economy.

3.3. Regions

Japan is a highly centralised country with its main economic, political and social activity concentrated in the Kanto region, where the two

³⁷ Nikkei, "80% Of Quake-Hit Output Bases Back To Normal: METI Poll", 1 August 2011

³⁸ BBC News, "Japan posts first annual trade deficit in 30 years", 25 January 2012

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Nikkei, "DJ: GDP Turns Positive, Current Account Still In Red", 8 March 2013

most populous cities, Tokyo (13,187,461 persons)⁴² and Yokohama (3,692,523 persons)⁴³ are located. The entire Kanto region has a population of around 42 million people⁴⁴ who live in an area of 32,424 square kilometres⁴⁵, making this one of the most densely populated areas on earth (1,297 people/sq km).

The second most important economic region in Japan is Kansai, which is where three other large cities, Osaka, Kobe and Kyoto are located. The Kansai region is home to 24 million Japanese or about 16% of the total population.⁴⁶ Traditionally known as a hub for trade, the Kansai region contributes 19% to Japan's GDP.⁴⁷

Between the Kansai and Kanto regions lies Chubu. This region has a total population of 16 million (12.5% of total population) and includes the major city of Nagoya. Chubu is where many world-class manufacturing companies, such as the Toyota Motor Company, have production facilities. The region is a vital logistics hub and export generator for Japan and contributes more than 15.1% to Japan's total GDP.⁴⁸

There is considerable difference in the level of economic activity, lifestyle trends and infrastructure support in large urban centres such as Tokyo, Osaka, Kobe and Nagoya compared to smaller, suburban cities in surrounding areas. This should not be overlooked when doing business in Japan.

3.4. Climate

There are four distinct seasons in Japan. Average temperatures vary considerably between the north and south, with the north characterised by relatively cold winters. Summer generally begins in mid-July following a rainy season of about a month, and the next 6-8 weeks tend to be very hot and humid.

Although the average maximum temperature through the summer months is 25.2°C in Tokyo, July and August are characterised by long continuous periods of temperatures above 30°C combined with extremely high humidity.

⁴² Tokyo Metropolitan Government, "東京都の人口（推計）", 27 September 2011

⁴³ City of Yokohama, "Population News No.1022", 1 October 2011

⁴⁴ Ministry of Internal Affairs and Communications, Statistics Bureau, "Population Estimates", 2010

⁴⁵ Geospatial Information Authority of Japan, "Area of Japanese Prefectures as of October 1, 2009", 2010

⁴⁶ U.S. Commercial Service, 2011

⁴⁷ The Foundation for Kansai Region Promotion, "Kansai Data", 2011

⁴⁸ Cabinet Office, "Annual Report on Prefectural Accounts", 2011

4. Size of the Japanese Construction Market

With the construction industry accounting for nearly 10% of both GDP and overall employment, it is one of the core industries in Japan.⁴⁹ In 2012, investment in construction was estimated to have increased by 6.4% compared to the previous year, totalling 44.4 trillion yen.⁵⁰ Investment from the private sector, which accounts for 59% of total market volume, was valued at 26 trillion yen while public construction investment reached 18.3 trillion yen.⁵¹ Building construction totalled 24.2 trillion yen (14.4 trillion yen being residential and 9.8 trillion yen being non-residential) and civil engineering works amounted to 20.1 trillion yen.⁵²



Source: Ministry of Land, Infrastructure, Transport and Tourism, 2013

Total imports of building products to Japan in 2012 decreased by 3.2% to 1.07 trillion yen compared to 1.11 trillion yen in 2011.⁵³

As of March 2013, the Japanese construction industry employed 5.05 million people⁵⁴ in 469,900 construction-related companies.⁵⁵ From 2000 onwards, the number of construction-related companies

⁴⁹ Ministry of Internal Affairs and Communications, Statistics Bureau, "Statistical Handbook of Japan 2011", September 2011

⁵⁰ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

⁵¹ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

⁵² Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013年4月)", 22 April, 2013

⁵³ Ministry of Finance, "Merchandise Trade Statistics: Values by Commodity", June 2013

⁵⁴ Statistics Bureau, "労働力調査(基本集計)平成25年(2013年)3月分(速報)", 30 April, 2013

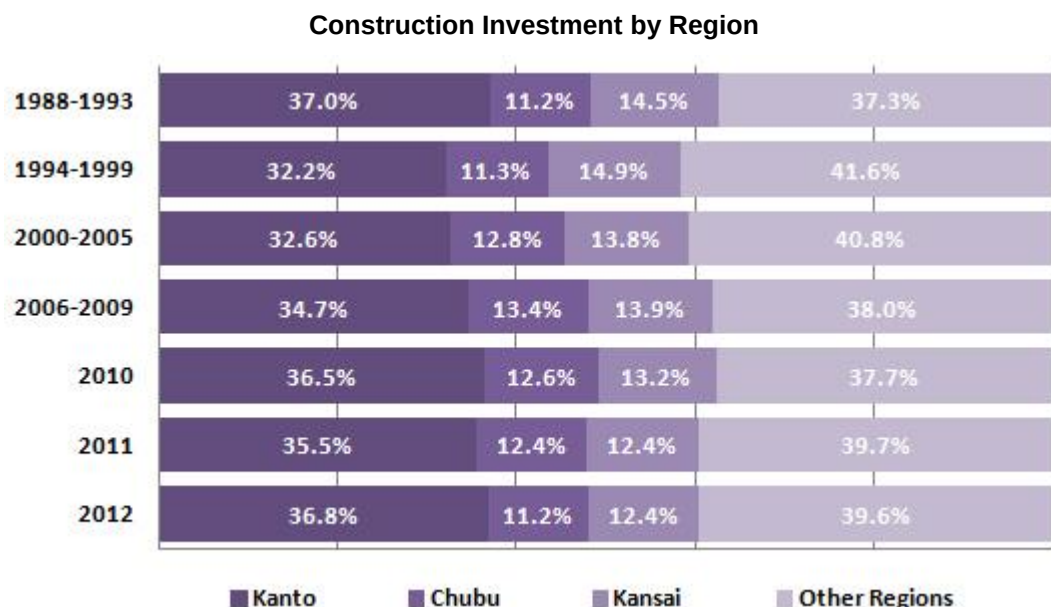
⁵⁵ Ministry of Land, Infrastructure, Transport and Tourism, "建設業許可業者の現況(平成25年3月末現在)", 28 May, 2013

declared bankrupt increased, reaching a peak of 6,214 bankruptcies in 2008, with combined liabilities of 1.451 trillion yen.⁵⁶ However, this trend has been on the decline since 2009. At the end of 2012, the number of bankruptcies had fallen to 3,002, a 1.5% reduction compared to 2011, and combined liabilities amounted to 403 billion yen, a 16.3% decrease from 2011.⁵⁷

Compared to Europe, large-scale civil construction projects are still abundant in Japan, especially in large metropolitan cities such as Tokyo, Osaka and Nagoya, reflecting the Urban Redevelopment Special Law, which aims to develop a hi-tech urban landscape and improved residential environment.

In Tokyo, Roppongi Hills and Tokyo Midtown are the most recent examples of private sector developments built using Project Management, a more objectively-oriented practice well established in the US and Europe. Japan is on the verge of introducing this method in the public sector as well, encouraged by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

In 2012, construction investment was higher in the Kanto region than in the Chubu and Kansai regions. While construction investment continued to grow in the Kanto region in 2012, it remained the same in Kansai and declined in Chubu from their respective 2010 levels.



Source: Ministry of Land, Infrastructure, Transport and Tourism, 2013

⁵⁶ TSR, "2012 年(平成 24 年)[1-12 月]全国企業倒産状況", 15 January, 2013

⁵⁷ Ibid.

5. Public Sector

5.1. Overview

At the beginning of the 1990s, Japan's total public works spending was more than double the amount spent in 2012. The ratio between central and regional government spending has not changed much over the last 20 years, but both have halved their budgets for public works.

Value of Public Works Construction

(unit: million yen)

Year	National Government Organisations		Local Government Organisations		TOTAL	
	Value	% Δ from previous year	Value	% Δ from previous year	Value	% Δ from previous year
2002	5,623,904	-	12,834,899	-	18,458,803	-
2003	4,947,101	- 12.0	11,228,522	- 12.5	16,175,623	- 12.4
2004	3,866,069	- 21.9	10,038,200	- 10.6	13,904,269	- 14.0
2005	3,796,934	- 1.8	9,510,568	- 5.3	13,307,502	- 4.3
2006	3,398,739	- 10.5	8,687,158	- 8.7	12,085,897	- 9.2
2007	3,781,879	+ 11.3	8,144,934	- 6.2	11,926,813	- 1.3
2008	3,726,914	- 1.5	7,863,109	- 3.5	11,590,023	- 2.8
2009	4,153,935	+ 11.5	8,558,098	+ 8.8	12,712,033	+ 9.7
2010	3,114,657	- 25.0	8,247,859	- 3.6	11,362,516	- 10.6
2011	2,827,840	- 9.2	8,147,660	- 1.2	10,975,500	- 3.4
2012	3,543,896	+ 25.3	8,998,409	+ 10.4	12,542,305	+ 14.3

Source: East Japan Construction Surety Co., Ltd.2013

However, in January 2013, Japan's Prime Minister, Shinzo Abe announced a 13.1 trillion yen supplementary budget for FY2012, whereby around 1.6 trillion yen would be allocated to accelerate the reconstruction process in the Tohoku region affected by the March 2011 disaster, and around 1.4 trillion yen would be used for public works projects, specifically infrastructure repairs and the construction of earthquake resistant schools, hospitals, bridges and tunnels across Japan.⁵⁸

5.2. Market Players

There are approximately 469,900 licensed construction-related companies registered in Japan in accordance with the Construction Industry Law. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) conducts regular surveys of such companies, mailing out questionnaires to collect information. The survey data is used to tabulate: Amount of orders received (separately for investors and construction type); amount of completed work at month-end;

⁵⁸ Ministry of Finance, "平成24年度補正予算の概要", 23 January 2013

amount of unfinished construction at month-end; and remaining orders received in terms of the number of months.

Big 50 Constructors

The MLIT survey identifies the top 50 construction companies, known as the “Big 50 Constructors”. Among these Big 50 companies, there are five super general contractors: Kajima, Shimizu, Taisei, Obayashi and Takenaka, whose turnover exceeds 1 trillion yen on an annual basis. These five also manage overseas construction sites on all continents through their branch networks outside Japan. These Big 5 contractors together account for about 25% of total construction business in Japan.

Other major constructors among the 50 big constructors are Penta-Ocean, Nishimatsu, Maeda, Haseko, Toda and Mitsui Sumitomo, all with an annual turnover of more than 300 billion yen. A second tier amongst the Big 50 consists of companies like Kumagaya, Tokyu, Fujita, Konoike, Okumura, Ando and Hazama, almost all of whom have or have had major cash flow issues sometime during the past two decades.

Local 470

In the same survey, MLIT uses the term “Local 470” for the top 10 companies in each of Japan’s prefectures (47 prefectures x 10 = 470) in terms of completed construction work. (The total of 470 companies excludes the Big 50.) Their share is about 10% of the total construction market nationwide.

The 3100 Contractors

This term is used by MLIT for 3,100 construction companies from all over Japan, sampled in terms of business categories per prefecture. These companies execute the actual work of general construction companies or other specialised construction companies and operate both in the private and public construction sector. Their total share is about 65-70% of total construction orders on an annual basis in Japan.

5.3. Infrastructure Projects

On average, transport has accounted for the majority of spending on infrastructure projects. This trend is expected to continue in 2013, with the sector forecast to account for 55%, equal to 4.77 trillion yen, of total infrastructure industry value.⁵⁹ Steady growth is expected to continue with transportation infrastructure accounting for 58% or 5.95 trillion yen of the total infrastructure value by 2022.⁶⁰

⁵⁹ Business Monitor International, “Japan Infrastructure Report Q2 2013”, April 2013

⁶⁰ Ibid.

Japan's infrastructure industry is highly-developed, and the quality and reach of the country's transport infrastructure is so advanced that there are few opportunities for further high-growth investment. When new projects are announced, they are predominantly projects for upgrading or expanding existing structures.

However, ongoing expansion plans mean that airports and ports are expected to become the two fastest growing transport infrastructure sub-sectors, averaging an annual real growth rate of 4.0% between 2011 and 2015.

Transport Infrastructure Industry Data and Forecasts

Industry Value	2008	2009	2010	2011	2012e	2013f	2014f	2015f	2016f	2017f
% of Total Infrastructure	57.2	56.9	54.5	54.5	54.4	54.8	55.3	55.6	55.4	55.6
Industry Value, JPYbn	4,372.8	4,635.6	4,035.9	4,188.7	4,317.7	4,513.1	4,769.5	4,964.9	4,925.9	5,069.3
Real Growth (%)	19.6	- 5.8	- 12.9	5.8	3.1	4.3	4.9	2.8	- 2.5	0.7
% of GDP	15.6	17.2	15.1	15.8	15.9	16.1	16.3	16.5	16.3	16.4

Source: Business Monitor International 2013

5.3.1. Road Development

The development of economic activities and improvements in standards of living have led to steady increases in road traffic. Road improvement not only enhances the infrastructure for economic activities, but also serves to enrich the living environment.

With 1,203,777kms of roads, of which 961,366kms are paved including 7,560kms of expressways, roads are the dominant form of surface transport in Japan.

In Japan, expenditure on road improvement is, in principle, disbursed from the Road Improvement Special Account. A large part of the funding in this Special Account is derived from earmarked revenue sources, such as gasoline and liquefied petroleum gas taxes.

Outlines and Actual Results of Improvement and Expansion of High-Standard Arterial and Regional Roads

High-standard arterial roads	
Roads extended	
End of FY2011	10,052 km
End of FY2012 (projected)	10,532 km
Roads to be extended during FY2011	• Dai 2 Tokai Expressway (Gotenba JCT to Hamamatsu Inasa JCT) • Metropolitan Inter-City Expressway (Togane JCT to Kisarazu East)

Source: Ministry of Land, Infrastructure, Transport and Tourism 2012

In October 2012, the Japanese Government announced that it was considering the removal of several ageing sections of Tokyo's elevated expressways, replacing them with underground tunnels. The estimated cost of the project is around 4.3 trillion yen and appears to be on track. The need for the project was emphasised when the ceiling panels in the Sasago Tunnel of the Chuo Expressway, in Yamanashi prefecture, collapsed and killed nine people in December 2012. Suggested causes for the collapse of the 35 year old tunnel include poor maintenance and the lack of investment in rehabilitating the tunnel.

Furthermore, the collapse of the Sasago Tunnel has raised serious questions regarding how to deal with on ageing infrastructure and public facilities. According to the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), in 20 years over 50% of Japan's bridges and around 50% of its 10,000 road tunnels will be over 50 years old. Additionally, Japan's aged road network is unable to handle high traffic volumes due to antiquated designs and narrow lanes, which could subsequently require the expansion of existing routes or the construction of new underground tunnels to increase access.

Road and Bridges Infrastructure Industry Data and Forecasts

Industry Value	2008	2009	2010	2011	2012e	2013f	2014f	2015f	2016f	2017f
% of Total Infrastructure	49.8	48.0	51.1	51.1	51.3	51.8	52.9	53.1	52.0	51.9
Industry Value, JPYbn	2,179.1	2,223.2	2,061.5	2,139.6	2,213.0	2,337.8	2,521.9	2,634.8	2,634.8	2,633.5
Real Growth (%)	8.2	-9.4	-7.2	5.8	3.4	5.4	7.1	3.2	-4.5	0.5
% of Total Infrastructure	28.5	27.3	27.8	27.8	27.9	28.4	29.3	29.5	28.8	28.9
% of Total Construction	7.8	8.2	7.7	8.1	8.1	8.3	8.6	8.8	8.5	8.5

Source: Business Monitor International 2013

5.3.2. Airports

As demand for air transportation increases, there is a growing need to improve airport facilities to enhance networks of domestic and international passenger air services and to promote implementation of environmental protection and safety measures.

There are 176 airports in Japan, 144 of which have paved runways.⁶¹ Seven of these airports have runways longer than 3,047m.⁶²

Japan's main airport is Narita International, which serves Tokyo and the surrounding areas. From the time it opened in 1978 until 2002, Narita handled all passenger and cargo flights on a single 4,000 metre runway. In 2002 a second, 2,180 metre long runway opened for "provisional" operations.⁶³ A long-standing land dispute between Narita International Airport Corp and neighbouring landowners meant

⁶¹ Central Intelligence Agency, "The World Factbook", 3 May 2012

⁶² Ibid.

⁶³ The Japan Times, "Narita's second runway marks 10 contentious years", 24 April 2012

that completion of the second runway to its full length of 2,500 metres was not achieved until 2009.⁶⁴

While Narita International Airport is still considered as Japan's international gateway, the Japanese Government has embarked on plans to make Haneda International Airport, also located in the Tokyo area, the main international hub for air travel in the country. Previously, Haneda's operations were limited to domestic routes and regular charter flights to limited destinations in East Asia.⁶⁵ In October 2010, Haneda opened a new international passenger terminal and runway and the Ministry of Land, Infrastructure, Transport and Tourism announced plans to expand the new international terminal building by FY2013 to cope with an expected 30,000 additional international flights, costing more than 100 billion yen.⁶⁶

Plans to expand the Naha airport in Okinawa have also been announced. In January 2013, the Japanese Government advised that it had decided to commence construction works on a second runway there, having completed the environmental assessment for the 190 billion yen project.⁶⁷ The construction period for the new runway is estimated to be seven years, however the Government is aiming to reduce the construction timeframe for the project by a year.

With the rapid growth in low-cost carriers, Japanese airports have been driven to develop specialised terminals for budget services. Narita International Airport had long been mulling the development of a budget terminal and in November 2012, Central Japan International Airport announced it had entered into discussions with Malaysia's AirAsia on the construction of a budget terminal.

Airport Infrastructure Industry Data and Forecasts

Industry Value	2008	2009	2010	2011	2012e	2013f	2014f	2015f	2016f	2017f
% of Total Infrastructure	8.4	12.6	10.3	10.3	8.9	8.7	8.4	8.4	8.4	8.2
Industry Value, JPYbn	369.5	582.0	415.8	431.6	382.4	391.6	398.5	417.0	414.0	417.5
Real Growth (%)	7.2	39.8	- 28.5	5.8	- 11.4	2.2	1.0	3.4	- 2.5	- 1.4
% of Total Infrastructure	4.8	7.1	5.6	5.6	4.8	4.8	4.6	4.7	4.7	4.6
% of Total Construction	1.3	2.2	1.6	1.6	1.4	1.4	1.4	1.4	1.4	1.3

Source: Business Monitor International 2013

5.3.3. Harbours and Ports

Currently, Japan has a total of 996 harbours and ports, with the main ports including Chiba, Kobe, Nagoya, Osaka, Tokyo and Yokohama.⁶⁸

⁶⁴ The Japan Times, "Narita's second runway marks 10 contentious years", 24 April 2012

⁶⁵ Web Japan, "Haneda Airport: Gateway to Tokyo from the World", 2010

⁶⁶ The Yomiuri Shimibun, "Haneda intl terminal set for expansion / FY2013 plan to cope with extra flights", 27 October 2010

⁶⁷ FlyTeam, "那覇空港の第2滑走路、2014年1月着工へ 政府予算案", 30 January, 2013

⁶⁸ Ministry of Land, Infrastructure, Transport and Tourism, "港湾数一覧、国際戦略港湾、国際拠点港湾及び重要港湾位置図", 1 April 2012

Many of these harbours and ports face the open sea and a significant number of them are exposed to harsh conditions, such as waves exceeding 10m in height.⁶⁹ Moreover, many have been constructed on thick strata of cohesive soil deposited on the sea floor.⁷⁰

Since Japan is one of the world's most earthquake-prone countries, its harbours and port facilities are further exposed to severe natural disasters such as earthquakes and tsunamis, as was the case in the 2011 Great East Japan Earthquake. According to MLIT, every port between Hachinohe (Aomori prefecture) and Kashima (Ibaraki prefecture) facing the Pacific Ocean received extensive damage in this disaster, mainly to coastal levees and piers.⁷¹ Large tsunamis either completely or partially destroyed the coastal levees at the ports of Hachinohe, Kamaishi, Ofunato, and Souma, while the ports of Onahama, Souma, and Ibaraki (Hitachinaka area) received damage from soil liquefaction.⁷² As a result of the disaster, efforts will be undertaken to rebuild and construct wave-, tsunami-, and earthquake- resistant harbour and port facilities.

Harbours, Ports, and Waterways Infrastructure Industry Data and Forecasts

Industry Value	2008	2009	2010	2011	2012e	2013f	2014f	2015f	2016f	2017f
% of Total Infrastructure	2.7	4.0	3.3	3.3	2.8	2.7	2.6	2.6	2.6	2.6
Industry Value, JPYbn	116.7	183.8	131.3	136.3	120.7	123.7	125.8	126.7	125.8	130.6
Real Growth (%)	7.2	39.8	-28.5	5.8	-11.4	2.2	1.0	-0.6	-2.5	1.6
% of Total Infrastructure	1.5	2.3	1.8	1.8	1.5	1.5	1.5	1.4	1.4	1.4
% of Total Construction	0.4	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4

Source: Business Monitor International 2013

5.3.4. Railroads

Japan has a total of 26,435km of railroad. Of this, 3,978km operate on a 1.435m standard gauge, while the rest operate on various narrow gauges.

The largest planned project in the transport infrastructure space is the new Central Japan Railway (JR Central) high-speed rail line. The construction of a new 286km rail line, known as the Chuo Shinkansen, will link Tokyo and Nagoya and eventually extend to Osaka. The rail line is expected to be completed in 2027 and will use maglev technology, which propels trains using magnetic power, allowing carriages to float above the track at speeds up to 500km per hour.⁷³ The new maglev train would reduce the journey from Tokyo

⁶⁹ The Overseas Coastal Area Development Institute of Japan, "Technical Standards and Commentaries for Port and Harbour Facilities in Japan", December 2009

⁷⁰ Ibid.

⁷¹ Ministry of Land, Infrastructure, Transport and Tourism, "東日本大震災における港湾の被災から復興まで～震災の記録と今後の課題・改善点～", 12 March 2012

⁷² Ibid.

⁷³ Central Japan Railway Company, "中央新幹線", 2011

to Nagoya from the current 95 minutes at 270 kph to just 40 minutes, using the Tokaido Shinkansen route.

The Japanese Government also remains keen to extend the country's existing high-speed railway network, approving the construction of three new extensions by Japan Railway Construction in July 2012. The new extensions include the 211km Hokkaido to Sapporo Shinkansen railway line, scheduled to be completed by 2035, the 125.2km extension of the Hokuriku Shinkansen railway line from Kanazawa to Tsuruga, scheduled for completion by 2024, and a 21km extension between Isahaya and Nagasaki, which has already entered the construction phase, scheduled to be completed by 2022.

Japanese Railways Infrastructure Industry Data

Industry Value	2008	2009	2010	2011	2012 forecast	2015 forecast	2021 Forecast
% of Transport Infrastructure	39.0	35.5	35.4	35.0	33.7	34.2	33.6
Industry Value, JPYbn	1,823.4	1,550.4	1,208.3	1,242.7	1,298.8	1,437.5	1,795.6
Real Growth (%)	42.7	-14.8	-22.1	2.6	4.4	2.0	0.8
% of Total Infrastructure	22.3	20.2	19.3	19.3	18.9	19.6	20.2
% of Total Construction	6.1	5.3	4.6	4.6	4.6	4.9	5.5

Source: Business Monitor International 2012

5.4. Housing and Urban Development

The Government's programme for housing is composed mainly of (a) provision of subsidies for residential construction by local governments and (b) long-term and low-interest home loans through the Japan Housing Finance Agency. The programme's four targets are:

- to develop good-quality residential stock and pass it down to future generations
- to develop good living environments
- to develop housing market conditions that suit diversified housing needs
- to secure a stable supply of housing for those who require special consideration on housing assurance.

For FY2013, 264 billion yen has been allocated to the Japan Housing Finance Agency and 491 billion yen to the Urban Renaissance Agency through the Fiscal Investment and Loan Program.⁷⁴

⁷⁴ Ministry of Finance, "Fiscal Investment and Loan Program (FILP) Plan: 2013", 29 January, 2013

6. Private Sector

6.1. Overview

In 2012, private sector investment in construction was valued at 26 trillion yen, accounting for 59% of the total market value.⁷⁵ Building construction totalled 24.2 trillion yen (14.4 trillion yen being residential and 9.8 trillion yen being non-residential) and civil engineering works amounted to 20.1 trillion yen.⁷⁶

6.2. Residential Market

Like most markets, the residential construction market suffered during the economic downturn in 2008 and 2009. Recent data hints at the possible end of the downturn in Japan's property market. With improving business sentiment, the recent devaluing of the Japanese yen, expectations that interest rates and land prices will rise, and the impending consumption tax hike in April 2014, home buyers and property investors have returned to the real estate market, with signs of recovery spreading outside of the three metropolitan areas of Tokyo, Osaka and Nagoya. Approximately 300,000 potential home buyers visited housing exhibitions in January 2013, a three percent increase from the previous year, according to the Federation of Home Constructors.

Nevertheless, many high-end residential building products continued to enjoy good market prospects. The Government launched a "200-year residence" plan in 2007. As a result, high quality building products such as doors and wood windows are expected to do well in the Japanese market. To realise the "sustainable society" concept central to the 200-year residence plan, eco-friendly and health-conscious building products also have good sales potential. However, it is important to note that there is still only a niche market for imported residential building products in Japan, and so manufacturers doing business here for the first time may find initial sales are small. Manufacturing companies may want first to consider selling their products through trading companies or export consolidators. Then, once the product is proven to be successful, it may be prudent to develop a relationship with a Japanese agent or distributor.

Housing renovation is another key market, which is expected to grow rapidly over the next decade. As part of 21 National Strategic Projects identified in Japan's National Growth Strategy of 2010 as beneficial to economic development, the Japanese Government aims to double the size of existing housing and remodelling markets, and

⁷⁵ Research Institute of Construction and Economy, "建設経済モデルによる建設投資の見通し(2013 年 4 月)", 22 April, 2013

⁷⁶ Ibid.

to increase the supply of high-quality housing (including energy-efficient housing) by 2020, through measures such as expanding home financing and the housing tax system.⁷⁷ Furthermore, the Government aims to reduce the proportion of housing that is deemed insufficiently earthquake-resistant to 5% by 2020.⁷⁸

6.2.1. New Housing Starts

New housing starts declined sharply both in 2007 and in 2009, with 2009 figures reaching a historical low point of 788,410 units, the first time that the 1 million new units threshold had not been met since recording of these data began in 1964. However, new housing starts began increasing again in 2010. In 2012, new housing starts increased by 5.8% from 2011 totalling 882,797 units, including 311,589 owner-occupied units (35.3%), 318,521 units for rent (36.1%), 246,810 units for sale (28.0%), and 5,877 company-supplied housing units (0.7%).⁷⁹ Private sector finance paid for 86.7% of the new houses built, amounting to 765,704 units.⁸⁰

In 2012, year-on-year starts of single-family detached houses, terraced houses, and collective housing increased respectively by 2.5% to 439,588 units, 10.8% to 97,055 units, and 8.9% to 346,154 units. Year-on-year 2x4 and prefabricated housing starts also increased, by 9.4% to 107,487 units and 4.3% to 132,244 units, respectively.



Source: Ministry of Land, Infrastructure, Transport and Tourism, 2013

⁷⁷ National Policy Unit, "21 National Strategic Projects making steady progress", 28 February 2012

⁷⁸ Cabinet Office, "On the New Growth Strategy", 18 June 2010

⁷⁹ Ministry of Land, Infrastructure, Transport and Tourism, "建築着工統計調査報告 平成24年計", 31 January 2013

⁸⁰ Ibid

6.2.2. Types of Housing and Structure

Single-Family Detached Housing

As of 2008, Japan had 27,450,000 single-family detached houses, accounting for 55.3% of the total housing stock.⁸¹ In 2012, there were 439,588 new housing starts for single-family detached housing, accounting for 49.8% of total new housing starts.⁸²

Leading home builders in the market include Sekisui House, Sekisui Heim, Sumitomo Forestry, Asahi Kasei Homes, Daiwa House, Misawa Home, PanaHome, and Mitsui Home.

Trends in Housing Construction by Leading Home Builders

Home Builders	FY2009		FY2010		FY2011	
	Units	% Δ from previous year	Units	% Δ from previous year	Units	% Δ from previous year
Sekisui House	12,018	- 10.5	13,079	+ 8.8	14,712	+ 12.5
Sekisui Heim	9,480	- 8.0	9,850	+ 3.9	10,490	+ 6.5
Asahi Kasei Homes	8,353	- 11.3	8,690	+ 4.0	9,785	+ 12.6
Sumitomo Forestry	8,580	- 7.7	8,721	+ 1.6	9,007	+ 3.3
Daiwa House	8,609	+ 0.3	8,133	- 5.5	8,323	+ 2.3
Misawa Home	6,321	- 18.5	5,981	- 5.4	6,361	+ 6.4
PanaHome	4,928	- 15.9	5,205	+ 5.6	5,690	+ 9.3
Mitsui Home	3,138	- 10.4	3,115	- 0.7	3,208	+ 3.0
TOTAL	61,427	- 9.8	62,774	+ 2.2	67,576	+ 7.6

Source: IR Reports from Companies 2012

In FY2009, seven out of the top eight home builders recorded a decline in the number of newly built houses.⁸³ However in FY2010, the number of houses built by five of these firms recovered and in FY2011, all top eight home builders recovered. While market leader Sekisui House Ltd. experienced a 10.5% dip in the number of houses built in FY2009, it saw an 8.8% increase in FY2010 and a further 12.5% in FY2011. It actively offers new housing plans to cope with the diversification of family structures and lifestyles, including a "Casa Figlia" plan intended for a family of a single woman and her parents.

Furthermore, in 2011 home builders like Misawa Homes, Panahome, Daiwa House and Toyota House began to offer specially reduced prices to eligible earthquake victims, with reductions varying in the 1-3 million yen range. The discounts were made possible partly by reducing the number of floor plans available, which shortens the construction period.

Another trend seen among home builders is the increase in offering high-end homes for the wealthy. In May 2013, Asahi Kasei Homes began selling a new model of home under the Hebel Haus Frex

⁸¹ Ministry of Internal Affairs and Communications, "2008 Housing and Land Survey", 1 October 2008

⁸² Ministry of Land, Infrastructure, Transport and Tourism, "建築着工統計調査報告 平成24年計", 31 January 2013

⁸³ Fuji-Keizai

Residence brand, where the houses are custom and tailor-made to each customer, allowing decorative details such as European kitchens and marble stairs.

Traditionally, when a home builder offers a model for sale, buyers have limited choices of materials and designs. With its latest high-end offerings, however, Asahi Kasei Homes allow buyers to choose every aspect, setting up a team of five architects to make these homes a reality. The houses include large amounts of open space, as the two-story structure uses sturdy design techniques typically applied to three-story homes, which means fewer reinforcing pillars are required. A model home was built in a quiet residential neighbourhood in the luxury central suburb of Setagaya Ward in Tokyo, and Asahi Kasei Homes aims to sell 100 houses annually.

Similarly, in April 2013, Daiwa House introduced the Skye line of homes, which are four to five stories high and exclusively offered in the Tokyo area. According to Daiwa House, the tall designs allow buyers to benefit from a large indoor space, while being in the crowded Tokyo metropolitan area. The sense of space and luxury is enhanced by ceilings that are 260cm high, 20cm higher than average. On average, the price per 3.3 sq. metres is 825,000 yen, approximately 10% higher than the standard for the company. While the homes can run to the hundreds of millions of yen, Daiwa House anticipates receiving 100 orders a year, confident that demand will increase as more seniors plan their inheritance tax strategies.

Sumitomo Forestry has also joined this trend and built five luxury model homes in the major metropolitan areas of Tokyo, Nagoya, and Osaka in FY2012. Strong in upscale wooden homes, Sumitomo Forestry's luxury model homes focus on the materials used, such as expensive wood for the floors or large amounts of precious varieties of wood from around the world.

A Sumitomo Forestry house costs on average 34 million yen, however last fiscal year orders for homes starting from 60 million yen increased more than 15% on the year nationwide. Furthermore, in the three metropolitan areas, the figure soared more than 30%. Recognising this trend, the company formed a team specialising in high-end housing, with around 10 architects who work on the specific needs of each customer.

Collective Housing

In Japan collective housing includes, first and foremost, condominiums (called "mansions" in Japan), usually built with the aim of selling to end-users. In general, these mansions meet higher quality standards in terms of the construction materials used. Another type of collective housing is the tenement house that contains more than two dwellings per building. Each tenant has a private entrance to the building. A third type of collective housing

comprises apartments that contain more than two dwelling units per building where tenants share the entranceways, hallways and stairs.

Leading condominium developers in the market include Mitsui Fudosan Residential, Mitsubishi Jisho, Daikyo, Nomura Real Estate, Sumitomo Fudosan, Tokyu Fudosan, Cosmos Initia, Takara Leben, and Tokyo Jisho.

Trends in Condominium Construction by Leading Developers

Condominium Developers	FY2009		FY2010		FY2011	
	Units	% Δ from previous year	Units	% Δ from previous year	Units	% Δ from previous year
<i>Mitsubishi Jisho</i>	7,024	+ 35.0	6,161	- 12.3	5,482	- 11.0
<i>Mitsui Fudosan Residential</i>	5,480	- 5.2	6,380	+ 16.4	5,316	- 16.7
<i>Daikyo</i>	5,435	- 16.5	4,462	- 17.9	4,153	- 6.9
<i>Sumitomo Fudosan</i>	4,222	+ 5.3	4,841	+ 14.7	4,119	- 14.9
<i>Nomura Real Estate</i>	4,111	+ 21.3	5,077	+ 23.5	4,028	- 20.7
<i>Tokyu Fudosan</i>	2,719	- 13.4	3,343	+ 22.9	3,026	- 9.5
<i>Takara Leben</i>	1,519	+ 22.9	1,723	+ 13.4	1,852	+ 7.5
<i>Tokyo Jisho</i>	2,963	+ 53.9	1,664	- 43.8	1,309	- 21.3
<i>Cosmos Initia</i>	3,224	+ 16.8	2,224	- 31.0	1,091	- 50.9
TOTAL	36,697	+ 8.1	36,868	+ 0.5	30,376	- 17.6

Source: IR Reports from Companies 2012

While six out of the top nine condominium developers experienced losses in market share in FY2008, most regained their losses in FY2009 and FY2010. In FY2011, however, all but one of the top nine developers experienced losses in market share again.

Structure

In 2012, a total of 882,797 new housing starts were registered with a total surface area of 78,413,220m².⁸⁴ Wooden structures were by far the most popular and had a share of 55.1% of the market (or 486,756 units) for new housing starts in 2012, followed by reinforced concrete, steel frames, steel-frames and reinforced concrete, block concrete, and others.⁸⁵

New Housing Starts by Structure for 2012

Type of Structure	Units	Total Floor Area (m ²)
<i>Wooden</i>	486,756	49,491,726
<i>Reinforced concrete</i>	243,719	16,899,840
<i>Steel frames</i>	145,370	11,497,242
<i>Steel-frames and reinforced concrete</i>	5,523	393,050
<i>Block concrete</i>	816	67,492
<i>Others</i>	613	63,870
TOTAL	882,797	78,413,220

Source: Ministry of Land, Infrastructure, Transport and Tourism 2013

⁸⁴ Ministry of Land, Infrastructure, Transport and Tourism, “住宅着工統計”, 31 January 2013

⁸⁵ Ibid.

6.2.3. Housing Renovation Market

The “average” lifespan for a Japanese home used to be only 26 years, but the houses of today can last at least twice as long, thus creating a strong demand for products and services related to home renovation. Such renovation allows individuals to create a living environment suited to their lifestyle at that time and has begun to take root as a sub-culture, unaffected by changes in housing starts. As a result, many housing companies have been reorganising themselves to focus on the home renovation market.

In 2012, the housing renovation market was estimated to be valued at 6.2 trillion yen, and the market value for 2013 is forecast to reach 6.3 trillion yen.⁸⁶ Rapid expansion is expected to continue throughout the next decade such that the market will be worth approximately 7.6 trillion yen by 2020.⁸⁷

In order to encourage renovation, efforts are being made to promote “Refonet”, a website run by the Center for Housing Renovation and Dispute Settlement Support, offering diversified information related to renovation, maintenance and home maintenance records.

This is a very promising market segment for EU companies to explore, as Europe is respected in Japan for its refurbishment of ancient city centres and historical houses still in use today.

Leading remodelling companies in the market include Sumitomo Real Estate Group, Sekisui Kagaku Kogyo, Sekisui House Group, Daiwa House Group, Misawa Home Group, Sumitomo Forestry Home tech, Asahi Kasei Reform, Panahome, and Mitsui Home Group.

6.3. Non-Residential Market

This market comprises commercial buildings, such as office buildings, lodging facilities, shops, factories and power plants, warehouses and distribution facilities, educational and cultural facilities, medical care and welfare facilities, amusement facilities, stores, factories, warehouses, schools and hospitals. In FY2010, all but three segments showed a sharp decrease following the Lehmann shock and similarly in FY2011. Nonetheless, FY2012 experienced growth of 14.3% compared to the previous year, with the total market value reaching 3.868 trillion yen.⁸⁸

⁸⁶ Yano Research Institute, “住宅リフォーム市場に関する調査結果 2013”, 5 June, 2013

⁸⁷ Ibid.

⁸⁸ Ministry of Land, Infrastructure, Transport and Tourism, “建設工事受注動態統計調査報告（平成24年度計分）”, 10 May 2013

Value of Non-Residential Construction

(unit: million yen)

Category	FY2010		FY2011		FY2012	
	Value	% Δ from previous year	Value	% Δ from previous year	Value	% Δ from previous year
Offices	866,917	-35.7	701,511	- 19.1	949,911	+ 35.4
Lodging Facilities	68,215	-56.0	72,799	+ 6.7	102,035	+ 40.2
Shops	306,107	-45.5	315,441	+ 3.0	442,725	+ 40.4
Factories & Power Plants	532,532	5.0	717,436	+ 34.7	690,694	- 3.7
Warehouses & Distribution Facilities	194,408	21.5	289,892	+ 49.1	357,159	+ 23.2
Educational & Cultural Facilities	349,803	-39.5	406,369	+ 16.2	462,641	+ 13.8
Medical Care & Welfare Facilities	837,000	98.9	696,520	- 16.8	674,470	- 3.2
Amusement Facilities	64,656	-22.6	59,573	- 7.9	43,369	- 27.2
Others	147,151	-10.7	125,872	- 14.5	145,437	+ 15.5
TOTAL	3,366,789	-15.4	3,385,413	- 0.6	3,868,441	+ 14.3

Source: Ministry of Land, Infrastructure, Transport and Tourism 2013

6.4. Real Estate Market

The recovery of Japan's real estate market, which stagnated following the collapse of the economic bubble, has been striking. Underlying factors include the fusion of real estate and finance as exemplified by the emergence of REIT (Real Estate Investment Trusts), ongoing deregulation, and the recovery of corporate operating results, all aided by low interest rates. Although land prices have been rising, the situation is different from the bubble economy years (1987 - 1991) when prices rose nationwide.

The industry outlook is that the office market in urban centres will continue to improve at a steady pace. The condominium market, however, which has continued to boom for several years, is likely to face an increasingly tough future, given that the inventory of available units has increased recently and prospects for improvement in the personal income environment appear slim.

The largest companies, which boast solid business bases in central Tokyo plus strong urban development capabilities, probably will not suffer serious setbacks even if the business environment deteriorates further, and are expected to be able to maintain comparatively stable earnings capacity and their ability to generate cash flow as the excessive concentration of economic activity in Tokyo progresses.

Firms that have restored their financial basis have stepped up efforts to support office IT environments and enhance earthquake resistance. New building tenants include many sectors that have benefited from recent deregulation. These firms invested in land in conjunction with capital investment (plants, stores, headquarters and branch offices, etc.)

Land where profitability can be improved has increased, due to easing of building-to-land ratio regulations, construction technology

improvements, the possibility of adding more floors through construction of high-rise buildings and redevelopment of buildings amongst others. This has caused a rush to build skyscrapers in all major Japanese cities.

6.5. Architects

Japan has the second largest architectural design market in the world, estimated to be worth around €3.33 billion a year. Japan's eagerness to experience a taste of the western world and competition among real estate companies and building owners has resulted in a strong interest in foreign architecture and design. This could create opportunities for foreign architectural design firms and specialty design companies to do business in Japan.

With Japan's ageing population, the need for new hospitals and retirement housing is increasing. There is potential for foreign firms to become more involved in designing facilities similar to assisted-living developments in other countries. Other large-scale projects could present opportunities for foreign architecture and design firms as well. Large-scale projects in Japan, which have used or are using foreign firms, include: Roppongi Hills, the Tokyo Midtown Project and a large train station development project, all in Tokyo. There are also projects as far south as Okinawa, which are using foreign firms.

However, even though interest in foreign design and architecture has increased in Japan, differences in procedures, codes and geographical requirements, not to mention the language barrier, make it difficult for foreign firms to break into the Japanese market, though it is possible. Foreign design firms are often required to form joint ventures with Japanese firms in order to do business in Japan.

Architects practicing in Japan are governed by Kenchikushi Law. The Ministry of Land, Infrastructure, Transport and Tourism in Japan interprets the word "Kenchikushi" to mean "licensed architects and/or building engineers." The word actually refers to building engineers who engage not only in the fields of architectural design and supervision, but also construction, administration, education and other related fields. Hence, "Kenchikushi" does not refer specifically to the architect as a practicing professional. Under Japan's legal regulations, construction companies are permitted to establish Kenchikushi offices within their companies. There is no legal distinction between a proper Kenchikushi office (architect's office) and the in-house Kenchikushi office of a construction company. Hence, such construction companies can design buildings and supervise all construction.

7. Technology Trends and Recent Landmark Projects

Construction technology innovation is becoming an increasingly important factor for the growth of many large Japanese firms. These firms need to be able not only to identify new construction technologies, but also purchase them under reasonable financial conditions, and implement them smoothly at construction sites. Major factors that contribute to the development of innovative construction technology in Japan are:

- Strategic alliances
- Effective information gathering capability
- Reputation through innovation, and
- Technology fusion

7.1. Construction Automation and Robots

Generally speaking, the introduction of robots on construction sites is lagging far behind the level achieved in the manufacturing industry. This is mainly due to the fact that construction sites move each time, building structures are big and heavy and most operations have to be performed outdoors. However, one of the major management issues that the Japanese construction sector is facing is the ongoing decrease in the availability of specialised workers and the ageing of the labour force. Enhanced use of modern technology will have to make up for this labour shortage.

Until recently, all fabrication of building structures was undertaken locally on the construction site and automation of such an operation was extremely difficult. However, since innovative methods like the new onsite factory were introduced, building structures can be manufactured using automated machines and robots. Moreover, the building structures can then be assembled using different types of robots. When using such systems, storage and transportation of many types of robots are necessary. Detailed lease schemes for robots and operators need to be developed. By introducing robots in the construction industry, the development of new construction management system software will also become very important. For European companies, this area surely represents business opportunities, although it should be borne in mind that Japanese localisation of both the hardware and software will be essential to long-term success.

Effective infill systems have also been welcomed by Japan's traditional construction market. In the early stages of building

construction, the primary beams, pillars and structures are constructed locally on the construction site. The infill unit for the interior structures is standardised as well and then inserted into the fundamental structures.

7.2. Natural disaster Resistant Safe Buildings

Japan is earthquake-prone, meaning that earthquake-resistant approved materials are an important feature for the construction sector in general. Therefore, there is a latent and constant demand for improved earthquake-resistant materials and technologies. However, these exact product features can also be a major market entrance hindrance for European companies, which seldom have cause to develop earthquake- and fire-resistant construction and building materials in their standard ranges of products and services.

In Japan, a lot of research is done on Earthquake Resistance Reinforcement Methods using a wide variety of new building materials. Some of the research results in outstanding earthquake resistance by either affixing new materials to or using new materials to encase structures that have sustained earthquake damage, or by applying new materials to existing reinforced concrete (RC) portions of old, dilapidated structures. These methods have rapidly gained widespread acceptance in recent years because of their ease-of-use and low cost features, while eliminating dust and noise pollution. Also because they can be applied while a building is still occupied, the need to move occupants during construction is eliminated. New materials include carbon fibre sheets and aramid fibre sheets, to name just two.

Another popular construction method, applied by Maeda Corporation, is the Rapid Construction Method for High Seismic-Resistance Bridge Piers (REED Construction). This is a structural shaping and construction method for reinforced-concrete complex-structure bridge piers that uses studded I-beam steel (that can withstand tension) and a prefabricated high-durability form (that can withstand compression). As a result, this method enables fast-paced construction through repetition of simple tasks, improved earthquake resistance through the use of highly rigid I-beam steel, and enhanced appearance and durability through the use of pre-cast forms.

In the housing industry, Misawa Homes has started sales of its quake-damping Misawa Governance system for Earthquake Oscillation control (MGEO), designed for use in wooden residential homes. The MGEO system uses panels made from metal with damping rubber. The kinetic energy of the earthquake is converted into heat energy and absorbed, reducing the shaking by as much as half. This technology is also effective against the strong winds of a typhoon. The success of Japanese construction companies in developing and improving earthquake resistance in buildings was

amply demonstrated during the March 2011 disaster, when despite the M9.0 earthquake, very few houses and buildings were completely destroyed and very few casualties were directly linked to the tremour.

7.3. Barrier-free Technology for Elderly and Handicapped People

As the number of elderly people in Japan is increasing rapidly, the Japanese welfare-related market will continue to grow accordingly. Although becoming less common, the task of caring for elders or the physically handicapped is still often carried out by family members in the home. It was traditionally considered to be the duty of the eldest son or daughter, together with his/her partner, to care of the parents, and the elderly often prefer to be taken care of by a family member than to receive care at an elder care facility.

Daiwa House is an example of a major Japanese housing construction company using barrier-free housing design technology. The Daiwa House home was developed in collaboration with experts in healthcare, welfare and construction and includes support technology that enables the elderly and disabled to lead independent lives while reducing the burden on nurses and carers.

Daiwa House's barrier-free housing for the elderly and disabled was based on research that

- measured changes in the physical functions of the elderly
- determined housing design specifications that enable welfare equipment to be used as housing equipment
- developed housing design ideas that include support technology for welfare equipment
- selected welfare apparatus adapted to the physical condition of specific users
- developed technology enabling rehabilitation and fitness maintenance to be included in the house design
- examined the effect of social trends on future housing.

7.4. Crime Protection and Burglar-proof Technology

Japan is a comparatively safe society by European standards and, until recently, people were relatively unconcerned about security and personal safety. However, the rise in incidents of lock-picking, child abduction and assault (particularly of women) in recent years, has rapidly increased awareness of crime in Japan. Locks with special crime-prevention features have enjoyed brisk sales. Condominiums have sought a higher level of safety by installing locks varying from

electric and electronic non-contact keys, to biometric devices that identify residents from their fingerprints or irises.

7.5. Recent Landmark Projects

7.5.1. Shibuya Hikarie

A new 34-floor glass tower commercial complex called Shibuya Hikarie opened in April 2012 near Shibuya station in Tokyo. The building is connected directly to the railway station complex. The top level of the building consists of business offices, the middle level has event halls, art galleries and a theatre with 2,000 seats, while the first to fifth floors constitute a shopping mall called ShinQs with close to 200 shops, targeting career women in their late 20s to 40s. The three basements floors are food sections. This multipurpose building concept is becoming more common in newly constructed high-rise buildings in Tokyo.

The 100-billion yen Hikarie construction project replaces a Shibuya icon, the Tokyu Bunkakaikan theatre complex and planetarium, which had operated for about 50 years. More projects to renovate the complicated mazelike structure of Shibuya Station and its surroundings will follow over the next decade. They include the renewal of the 78-year-old Tokyu department store buildings that are incorporated into the station, as well as the relocation of Tokyu Corp.'s Shibuya Station underground, which will be connected to the Fukutoshin Metro Line. The Shibuya project is just one of many redevelopment projects in Tokyo, including in the Marunouchi, Nihonbashi and Odaiba districts.



7.5.2. Tokyo Sky Tree

Tokyo Sky Tree, originally referred to as New Tokyo Tower, is a broadcasting tower in Sumida ward, Tokyo. Completed in March 2011 and 634m high, it is now the tallest man-made structure in Japan. It features two panoramic viewing platforms, one at 350m and one at 450m above ground level. Level one mainly contains shops and restaurants, while the flooring on the second level is completely made of glass, giving a feeling of walking on clouds.

The original Tokyo Tower (333 m) is not sufficiently tall anymore to guarantee complete broadcasting coverage, since the recent construction of many high rise buildings in the central part of the metropolis blocks broadcasting waves. This, combined with the switch to Digital Terrestrial Television Broadcasting, required the construction of the new tower.

The completed Sky Tree structure is the highlight of a massive commercial development around Oshiage Station, managed by Tobu Tower Sky Tree Co. Ltd. The tower is designed to have graceful curves similar to samurai swords and traditional Japanese buildings, so that it does not detract from the surrounding scenery. The base of the tower has a structure similar to a "tripod", but from a height of about 350 m and above, the tower's structure is cylindrical to withstand very strong winds.

The tower also has state-of-the-art seismic proofing including a central shaft (made of reinforced concrete) based on design concepts derived from five-tier pagodas that have withstood earthquakes for centuries. The construction reached its highest point of 634 meters on 18 March 2011, exactly one week after the Great Eastern Japan Earthquake, with no damage suffered to the structure whatsoever.



Sky Tree Tower © <http://www.tokyo-skytree.jp>

7.5.3. JR Tokai Maglev Underground

The proposed route map for the high-speed magnetic-levitation trains that Central Japan Railway Co. (JR Tokai) plans to begin operating in 2025 has recently been unveiled. About 80% of the route, which runs in almost a straight line between Tokyo and Nagoya, is underground, passing far below urban areas and through many mountain tunnels. In contrast, at present, only 13% of the track for the Tokaido Shinkansen bullet train between Tokyo and Shin-Osaka stations is underground.

To cut tunnels through the southern Japan Alps, JR Tokai is expediting a drilling study that will involve the first-ever horizontal digging on both sides of the Alps, as well as the longest tunnels of their kind, at 3km each. In metropolitan Tokyo, where land prices are high, the trains will run 40 meters below ground.

The purpose of going deep is to cut the costs and hassle of acquiring land. By staying at least 40 meters underground and adhering to other specific conditions, the project qualifies as deep-underground use, allowing the right to use land without coordinating with landowners or actually acquiring property.

Building the high-speed maglev route will cost an estimated 5.1 trillion yen, and JR Tokai plans to pay for it out of an operating cash flow of about 400 billion yen annually after starting operations.

JR Tokai is also working to limit the number of stations. The maglev will accelerate to 500km/h, far faster than the roughly 300km/h possible on wheels. Its weakness is station stops, as it will take a few minutes longer to accelerate again to cruising speed.

7.5.4. Toranomom Tunnel Link to Bay Front Area

The Tokyo Metropolitan Government is building a tunnel that will directly link the Toranomom area of the city with the bay area. Once complete, congestion is expected to stop spilling over into neighbouring districts. Construction has begun several hundred meters south of the Toranomom road intersection. The 40m-wide, four-lane tunnel will pass underneath Hibiya Dori, a major thoroughfare, and railway tracks before coming up for air at Kaigan Dori near Tsukiji Market. The plan includes the construction of three high-rise buildings in Toranomom. One will be a 250m, 51-story skyscraper with offices, condominiums and international conference halls. Sidewalks more than 10m wide will line the new road and hopefully attract pedestrians that the tenant merchants can turn into customers.

8. Sustainability Initiatives in Japan

8.1. Overview

Sustainability initiatives in construction in Japan have been influenced by the geographic characteristics of the country. Japan is an island nation with a high population density and limited natural resources including domestic fossil fuels. In the 1970's, the oil supply shock caused the Japanese Government to take an interest in sustainability initiatives, especially in the construction sector. In 1979, a "Law Concerning the Rational Use of Energy (Energy Conservation Law)" was passed in order to reduce energy consumption.

Japan has since created additional energy conservation laws which regulate energy consumption by factories and commercial buildings as well as residential buildings. Furthermore, in addition to energy issues, Japan has been one of the leading countries to address carbon emissions. Since the Kyoto Protocol was adopted, the Government has committed to a 6% reduction of greenhouse gas emissions by 2012 from the 1990 level.

To achieve these goals, the Japanese Government has implemented policies related to energy conservation and greenhouse gas reduction in the built environment.

8.2. Energy Efficiency Standards for Houses and Buildings

Based on the Energy Conservation Law enacted in 1979, a set of "Building Owner's Judgement Standards (Energy Conservation Judgement Standards)" and "Housing Design and Construction Guidelines" were formulated in 1980, obliging those who intend to construct or modify buildings (construction clients), and building owners to take appropriate measures to insulate exterior walls and windows to prevent heat loss, and to implement energy saving measures ensuring the efficient use of energy in building facilities such as air conditioners, mechanical ventilation systems, lighting, water heaters and elevators. The guidelines have been strengthened several times since their establishment in 1980, including in the areas of housing in 1992, non-residential buildings in 1993, and again both housing and non-residential buildings in 1999.

As a result of the 1993 amendment, the Energy Conservation Law was reinforced, designating buildings with a floor space of 2,000m² or more, excluding residences, as "specified buildings". When specified buildings are either constructed, extended or reconstructed, if their energy saving performance is found to be fall substantially short of the requirements, an enforcement notice will be issued or, alternatively, the details of the shortfall will be made public Since the

amendment of the Energy Conservation Law in 2002, those intending to construct specified buildings are required to submit a notice of their proposed measures for efficient use of energy (an energy-saving plan) prior to commencing construction.

Additional changes, such as including residences in the category of specified buildings, were made in the 2005 amendment of the Energy Conservation Law. Moreover, submission of the energy-saving plan became mandatory prior to any large-scale improvement of equipment, in addition to the existing requirement introduced in the 2002 amendment. Furthermore, those who file an energy-saving plan are now required to submit periodic reports on maintenance and conservation in respect of the matters notified. Alongside the 2005 amendment of the Energy Conservation Law, the Energy Conservation Judgement Standards were also further strengthened to include condominium facilities such as elevators and lighting equipment.

Under the most recent revision of the Energy Conservation Law in May 2008, the scope of the specified buildings was extended to include residences and other buildings with a floor space of 300m² or more, resulting in a substantial increase in the number of buildings subject to the reporting requirement. Furthermore, residential construction companies that construct 150 or more houses for sale per annum are obligated to make energy saving efforts. In order to expand the regulatory coverage in the building sector, buildings with a total non-residence floor space of “2,000m² or more” and “300m² or more to less than 2,000m²” are designated as “Type 1 Specified Buildings” and “Type 2 Specified Buildings”.

When the competent authority finds energy-saving measures for “Type 1 Specified Buildings” to fall significantly short of the requirements, the authority will issue instructions for improvements. If the construction client or owner neglects to take action based on the authority’s instruction, the authority will publish the name of the construction client/owner in question or order them to follow the instruction. Similarly, when the competent authority finds energy-saving measures for “Type 2 Specified Buildings” to fall significantly short of the requirements, the authority will issue advice on the improvements to be made.

8.3. Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)

In Japan, the sustainable design and construction movement is a bottom-up process, with none of the top-down mandatory sustainable design and construction regulations found in many European countries. One of the notable sustainable design and construction initiatives was a joint industrial/government/academic

project that was initiated with the support of the Ministry of Land, Infrastructure, Transport and Tourism's Housing Bureau in April 2001, which led to the establishment of a new organisation, the Japan GreenBuild Council (JaGBC)/Japan Sustainable Building Consortium (JSBC), with a secretariat administered by the Institute for Building Environment and Energy Conversation (IBEC). These organisations worked together on research towards the development of a "Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)".

Framework

CASBEE is an assessment and rating method for the environmental performance of a built environment. The assessment tools were developed based on the following principles:

1. Evaluating a built environment through its entire lifecycle
2. Evaluating a built environment from the two aspects of environmental quality (Q) and environmental load (L)
3. Evaluating a built environment according to "Built Environment Efficiency (BEE)," an assessment index, which was newly developed based on the idea of eco efficiency.

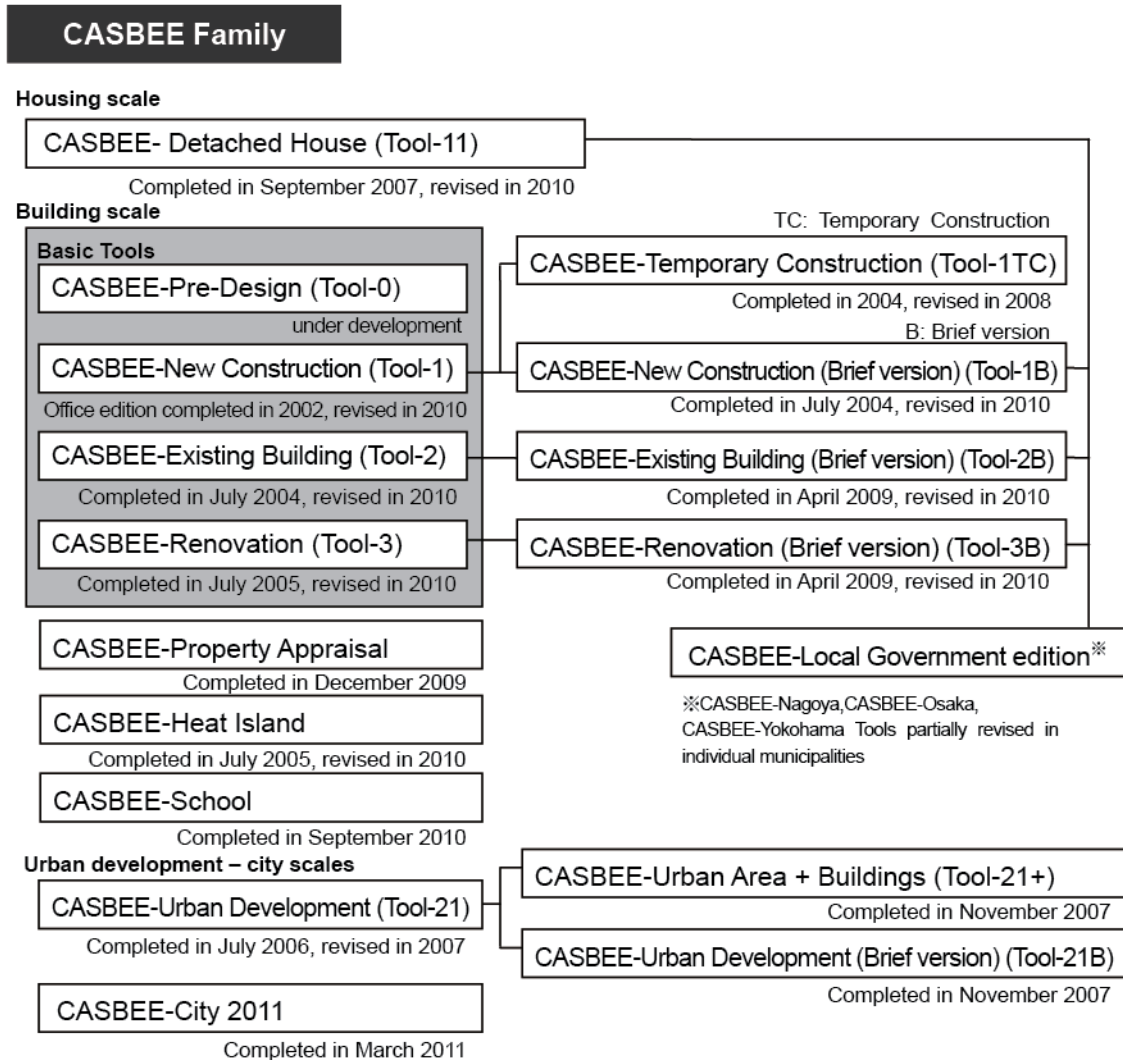
The CASBEE rating system is ranked into five grades:

- Superior (S);
- Very Good (A);
- Good (B+);
- Slightly Poor (B-);
- Poor (C);

with each grade represented by a certain BEE value.

Initially, CASBEE consisted only of environmental performance assessment tools which were used for individual buildings. CASBEE has since been expanded in scope to cover a wide variety of building assessment tools tailored to different needs (construction – houses and buildings, urban – town and city development, etc.), all of which make up the "CASBEE Family".

Structure of the CASBEE Family



Source: Structure of the CASBEE Family (2011)

Further information on the CASBEE assessment method and assessment tools can be obtained from the CASBEE website.⁸⁹

Utilisation by Japanese Local Governments

As of March 2013, 24 local municipal governments across Japan had introduced the use of CASBEE or created incentive programmes to help promote its adoption.⁹⁰ In 2004, Nagoya city introduced “CASBEE Nagoya” as their sustainable building reporting system, while the city of Osaka similarly adopted “CASBEE Osaka”, requiring owners planning new buildings or rebuilding existing buildings to

⁸⁹ <http://www.ibec.or.jp/CASBEE/english/index.htm>

⁹⁰ Japan GreenBuild Council (JaGBC) / Japan Sustainable Building Consortium (JSBC), “Dissemination of CASBEE in Japan”, 25 April, 2013

submit a planning document assessing the environmental performance of the building. These cities subsidise highly rated projects.

Other cities which have introduced CASBEE also offer a variety of incentives, such as increasing the maximum floor-area ratio of the building if it receives a CASBEE rating of B+ or above. Furthermore, financial support and incentives can be provided for high score buildings. Kawasaki city provides lower-interest home loans for highly-rated projects, while the city of Kitakyushu subsidises residential buildings that are ranked B+ above by CASBEE.

CASBEE Utilisation by Japanese Local Governments

Local Government	Population (x1000)	Floor Area (m2)*2	Enforcement Date	Number of reports (in the fiscal year)								
				2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
<i>Nagoya City</i>	2,261	2,000	Apr. 2004	148	234	211	229	173	100	152	157	1,404
<i>Osaka City</i>	2,670	2,000	Oct. 2004	41	118	97	109	73	54	68	74	634
<i>Yokohama City</i>	3,696	2,000	Jul. 2005	—	93	123	113	102	39	172	178	820
<i>Kyoto City</i>	1,470	2,000	Oct. 2005	—	21	104	93	67	63	67	74	489
<i>Kyoto Pref.</i>	1,160*1	2,000	Apr. 2006	—	—	37	45	33	37	43	40	235
<i>Osaka Pref.</i>	5,349*1	2,000	Apr. 2006	—	—	60	101	115	108	102	89	575
<i>Kobe City</i>	1,542	2,000	Aug. 2006	—	—	68	136	104	67	75	90	540
<i>Hyogo Pref.</i>	4,040*1	2,000	Oct. 2006	—	—	82	163	188	146	165	144	888
<i>Kawasaki City</i>	1,432	5,000	Oct. 2006	—	—	38	47	40	38	52	49	264
<i>Shizuoka Pref.</i>	3,740	2,000	Jul. 2007	—	—	—	120	222	136	163	183	824
<i>Fukuoka City</i>	1,469	5,000	Oct. 2007	—	—	—	18	37	31	30	33	149
<i>Sapporo City</i>	1,900	2,000	Nov. 2007	—	—	—	20	77	32	78	90	297
<i>Kitakyushu City</i>	972	2,000	Nov. 2007	—	—	—	5	18	14	18	25	80
<i>Saitama City</i>	1,241	2,000	Apr. 2009	—	—	—	—	—	44	67	55	166
<i>Saitama Pref.</i>	5,627*1	2,000	Oct. 2009	—	—	—	—	—	43	165	216	424
<i>Aichi Pref.</i>	5,153*1	2,000	Oct. 2009	—	—	—	—	—	80	136	177	393
<i>Kanagawa Pref.</i>	3,932*1	5,000	Apr. 2010	—	—	—	—	—	—	59	73	132
<i>Chiba City</i>	961	2,000	Apr. 2010	—	—	—	—	—	—	11	17	28
<i>Tottori Pref.</i>	587	2,000	Apr. 2010	—	—	—	—	—	—	13	14	27
<i>Niigata City</i>	801	2,000	Apr. 2010	—	—	—	—	—	—	31	38	69
<i>Hiroshima City</i>	1,177	2,000	Apr. 2010	—	—	—	—	—	—	58	62	120
<i>Kumamoto Pref.</i>	1,813	2,000	Oct. 2010	—	—	—	—	—	—	29	84	113
<i>Kashiwa City</i>	405	2,000	Jan. 2011	—	—	—	—	—	—	8	18	26
<i>Sakai City</i>	842	2,000	Aug. 2011	—	—	—	—	—	—	—	11	11
TOTAL				189	466	820	1,199	1,249	1,032	1,762	1,991	8,708

Note:

1: The population is subtracted from the prefecture's if there are cities in the prefecture in the list

2: Minimum floor areas of building which obliged to report

Source: Japan GreenBuild Council (JaGBC) / Japan Sustainable Building Consortium (JSBC) 2013

8.4. Housing Eco Points

As part of its FY2009 stimulus package, the Japanese Government introduced an "Eco-Point" system, which was aimed at encouraging consumer spending while curbing energy use and greenhouse gas emissions. Under this programme, consumers earned eco-points from purchasing designated energy-efficient appliances (e.g. televisions, refrigerators, air-conditioners) during the period 15 May 2009 to 31 March 2011, and in return the eco-points, worth 1 yen per point,

could be redeemed for goods/services such as department store coupons, pre-paid public transportation passes, energy-efficient products, or products that promoted regional economies.⁹¹

Under the “Emergency Economic Countermeasures for Future Growth and Security,” approved by the Cabinet in December 2009, the Eco-point system was extended to reward those who built or renovated eco-friendly houses.⁹²

Points for goods could be earned through:

1. Eco-friendly house renovation

- Improving thermal insulation of windows (installation of inner windows [double-sash windows], replacement of panes [double-paned windows])
- Installing exterior-walls, ceiling or floor heat insulation

*Additional points were given if barrier-free renovation was conducted along with the above renovation.

2. New eco-friendly house construction

- Houses meeting the Top Runner standards (energy-saving standards and something extra [e.g., high-efficiency water heater]) under the Law Concerning the Rational Use of Energy
- Wooden houses meeting energy saving standards

Although the eco-point programme ended in July 2011, the Government reinstated it for housing, aiming to support the reconstruction of areas devastated by the Great East Japan Earthquake.⁹³ The programme was revived with a slightly different mechanism and name in the third supplementary budget for FY2011, with an additional focus on the wider diffusion of earthquake-proof and energy-efficient housing. The closing dates for applications were extended until April 2013 for new constructions, and January 2013 for renovations.

As of March 2013, a total of 1,797,453 applications (1,007,945 for new constructions and 789,508 for renovations) had been accepted since the programme first commenced.⁹⁴

⁹¹ The Japan Times, “Q&A List of goods qualified for Eco-points now out”, 20 June 2009

⁹² Ministry of Economy, Trade and Industry, “Eco-point system for housing”, 15 December 2009

⁹³ Jiji Press, “Japan Starts Revived Housing Eco-Point Program”, 25 January 2012

⁹⁴ Ministry of Land, Infrastructure, Transport and Tourism, “住宅エコポイントの実施状況（平成 25 年 3 月末時点）”, 19 April, 2013

9. Green Building Technologies in Japan

9.1. Overview

The importance of protecting the environment by adopting a 'green' approach to building has become increasingly accepted in Japan. Companies that ignore go-green initiatives have begun to look outdated compared to their more innovative competitors. Japan is one of many nations that have taken steps to set new building standards, and is making rapid improvements in going green in buildings. In Osaka, a city with relatively few green areas, a green-oriented complex called Namba Parks has been created in an area that used to be the location of a baseball stadium. The complex comprises a 30-foot skyscraper, as well as a shopping mall with eight floors of garden space. The area is connected directly to the street and encourages people to enter and enjoy its trees, rocks, cliffs, streams, waterfalls and ponds.

9.2. Smart Houses

In recent years, major Japanese home builders have actively invested in energy-saving housing projects, focusing on energy and electricity efficiency in homes by using residential energy platforms and control systems with the ultimate goal of building a "Smart House". In Japan, the term "Smart House" means a new kind of home that reduces carbon emissions, increases energy efficiency, and utilises renewable energy sources.

In 2009, major home builder Sekisui House and gas provider Osaka Gas launched a joint project aimed at integrating fuel cells, solar cells, lithium-ion storage batteries, and energy storage systems in the residential environment. Similarly in 2011, Daiwa House Industry launched "SMA×Eco Original", an environmentally friendly home fitted with lithium-ion batteries.⁹⁵ In addition to a solar power generation system and thermal ventilation wall, the house also includes unique features such as an exterior misting system that cools the air during hot weather, resulting in a reduced need for air conditioning.⁹⁶ Other companies such as PanaHome, Daikyo, and Honda are also conducting projects to develop the next-generation of energy-saving houses.

⁹⁵ Daiwa House Industry Ltd., "An introduction to the xevo SMA-Eco Original", 10 November 2011

⁹⁶ Ibid.

In 2012, the Japanese Smart House market⁹⁷ was estimated to be worth 1.84 trillion yen.⁹⁸ As a result of the Great East Japan Disaster and rising consumer awareness of renewable energy and energy efficiency, the market is predicted to grow, reaching 3.63 trillion yen by 2020.⁹⁹

9.3. Residential Fuel Cells

Fuel cells (FC) are viewed by many as the most promising, next-generation source of clean and efficient electricity and the Japanese Government is actively promoting FC technology through subsidy programmes. With technological advances, deregulation and increased government assistance, the FC industry is growing very rapidly and industry players are aggressively pursuing research and development initiatives.

Market Size

Since the commercialisation of residential FC systems began in 2009, the Japanese residential FC market has impressively increased from a value of 600 million yen in 2002¹⁰⁰ to 15.4 billion yen in 2011.¹⁰¹ ENE-FARM, the industry wide common brand name given to the residential FC units, is sold to customers on the basis that it will help reduce their CO₂ emissions while concurrently lowering their utility bills. In 2012, it was estimated that over 20,000 additional units were sold, bringing the installed total to over 40,000.¹⁰²

The majority of systems were PEM (polymer electrolyte membrane) fuel cells operating on propane or "town gas", a hydrogen-rich methane common to households in parts of Japan. Cost evolution for the new units has arisen from the use of fewer components, increased economies of scale, and in the case of the PEM fuel cell system a significant reduction in platinum content. This has been achieved while at the same time increasing the durability of the fuel cell systems from 50,000 hours up to 60,000 hours. For PEM fuel cell units, which shut down at night, this equates to an estimated lifetime of between ten and fifteen years. Furthermore, most systems are designed to work interactively with grid power and often include solar photovoltaic (PV) arrays.¹⁰³

Declining costs of the units have also helped boost sales, with prices going down from approximately 8 million yen in 2002 to 2 million yen

⁹⁷ Energy efficient home appliances, residential solar power generation systems, heat pump water heaters, EV/PHV, residential power distribution board, residential fuel cell systems, energy monitors, broadband routers, smart gas meters, smart electricity meters, etc.

⁹⁸ Fuji-Keizai Group, "スマートハウス関連システム・サービスの市場を調査", 19 February, 2013

⁹⁹ Ibid.

¹⁰⁰ Fuji Keizai Group, "分散発電及び関連機器・システム市場の調査を実施", 28 June 2004

¹⁰¹ Fuji Keizai Group, "需要分野別燃料電池システム・主要スタック部品の世界市場を調査", 12 March, 2013

¹⁰² 日経ビジネス, "家庭用燃料電池「エネファーム」の将来性は未知数", 22 October, 2012

¹⁰³ Ibid.

in 2012.¹⁰⁴ The cost target for 2015 is 500,000 to 700,000 yen, with a long term cost goal of about 400,000 yen.¹⁰⁵

The Japanese residential FC market is set to see continued growth with the introduction of residential SOFC (solid oxide fuel cells) systems from 2012, expecting a market value of 84 billion yen by 2015 and 552 billion yen by 2025.¹⁰⁶

Government Support

Since the early 1970's, fuel cells have been on Japan's research agenda. After a 10-year, 18-billion-yen fuel cell research programme concluded in 2002, Japan launched one of the world's most extensive residential fuel cell programmes.¹⁰⁷ Commercial sales of residential FC systems began in 2009 with the support of a government subsidy programme providing up to half the cost of the unit and installation costs.¹⁰⁸ The national programme budget was 8.1 billion yen in 2009, 6.8 billion yen in 2010, 8.7 billion yen in 2011, and 25.1 billion yen for 2012.¹⁰⁹¹¹⁰

To reach the Government's goal of halving Japan's greenhouse gas emissions by 2050, the Ministry for Economy, Trade and Industry (METI) launched a "Cool Earth-Innovative Energy Technology Program" in 2008, which prioritised 21 innovative energy technologies, including fuel cell vehicles, stationary fuel cells, and hydrogen production and storage technologies, for further development.¹¹¹

The Government has also funded SOFC research. During FY2007 and FY2010, 720 million yen was invested in a demonstration project where SOFC units were installed at various locations with differing load environments, including residences.¹¹² The success of these demonstrations has led to the development and production of residential SOFC ENE-FARM units, currently sold through Osaka Gas Co.¹¹³

9.4. Solar Power

Given favourable government support, shortfalls in power generation due to the Fukushima I Nuclear Power Plant accident, the general shift in Japan's future energy policy, and the introduction of the Feed-

¹⁰⁴ スマートジャパン, "業界初、200万円で買えるエネファーム", 21 January, 2013

¹⁰⁵ Fuji Keizai Group, "需要分野別燃料電池システム・主要スタック部品の世界市場を調査", 12 March, 2013

¹⁰⁶ Ibid.

¹⁰⁷ U.S. Department of Energy, "2010 Fuel Cell Technologies Market Report", 13 July 2011

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ The Japan Gas Association, "Strong Sales of Residential Fuel Cells (Ene-Farm)", 19 December, 2012

¹¹¹ Ministry of Economy, Trade and Industry, "Cool Earth-Innovative Energy Technology Program (Summary)", 5 March 2008

¹¹² U.S. Department of Energy, "2010 Fuel Cell Technologies Market Report", 13 July 2011

¹¹³ Ibid.

In Tariff scheme for renewable energy launched in July 2012, the Japanese solar photovoltaic (PV) market continued to rapidly progress in 2012 with the annual installed capacity exceeding 2GW and cumulative installed capacity reaching 6.9GW.¹¹⁴ At 2,000MW, this capacity represented a 54.3% increase compared to the 1,296MW installed in 2011.¹¹⁵ Furthermore, installations surged by 270% during the first quarter of 2013, overtaking Germany and positioning Japan to become the world's largest PV market in terms of revenue.¹¹⁶ While Japan is set to install fewer GW capacity-wise than China in 2013, higher prices of PV systems in Japan will drive it to become the world's largest PV market. During the first quarter of 2013, a total of 1.5GW worth of PV systems were installed in Japan.

The market is largely driven by the residential sector where PV shipments increased by 48.4% from 1,103 MW in 2011 to 1,637 MW in 2012.¹¹⁷ Growth in the residential market can be attributed to declining equipment costs and government subsidies making installation cheaper. Under the national residential PV system subsidy programme, individuals can receive ¥35,000/kW for a system with less than 10kW capacity. Additionally, 875 local governments offer extra subsidies to promote the widespread use of residential PV systems.¹¹⁸

Furthermore, other financial incentives, namely the Feed-in-Tariff scheme introduced in July 2012 has helped stimulate growth in the Japanese PV market. Under this scheme, utilities are obliged to purchase electricity generated by renewable energy sources at the predetermined prices. In the case of electricity generated by PV systems, the purchase price was 42 yen per kWh for both household customers (less than 10kW) and customers other than households (10 kW or more). In March 2013, the FY2013 purchase price for newcomers was set at 38 yen per kWh for household customers (less than 10 kW) and 37.8 yen per kWh for customers other than households.¹¹⁹

Additionally, with the introduction of the FIT scheme, more businesses and public institutions, such as schools, have taken up government programmes and subsidies to install solar power systems, increasing shipments for commercial and public use to 830 MW in 2012.¹²⁰

¹¹⁴ European Photovoltaic Industry Association, "Global Market Outlook for Photovoltaics 2013-2017", May 2013

¹¹⁵ Ibid.

¹¹⁶ IMS Research, "Japan Set to Become World's Largest Solar Revenue Market in 2013 as Installations Boom in Q1", 30 May, 2013

¹¹⁷ Japan Photovoltaic Energy Association, 2013

¹¹⁸ IEA

¹¹⁹ Ministry of Economy, Trade and Industry/Agency for Natural Resources and Energy, "Settlement of FY2013 Purchase Prices for Newcomers and FY2013 Surcharge Rates under the Feed-in Tariff Scheme for Renewable Energy", 29 March, 2013

¹²⁰ Japan Photovoltaic Energy Association, 2013

Historically, growth in Japan's solar power market was in part due to the "Residential PV System Dissemination Program" which ran from 1994 to 2005, where subsidies were provided for the installation of PV systems on rooftops. In 1994 the subsidies covered 50% of the system costs, but this was gradually reduced to 33% in 1999. Towards the end of the programme in 2005, the subsidies were distributed on a per kilowatt basis, declining to ¥20,000/kW. As a result of the subsidy programme, over 250,000 residential PV systems were installed and Japan's cumulative installed solar PV capacity increased from 43.4 MW to 1421.9 MW.¹²¹ After the Government terminated the programme in 2006, residential installation of solar PV systems decreased by 32% and the Japanese solar PV manufacturers' global market share declined to 24.6%. The Japanese Government recognised the decreasing competitiveness of Japanese solar PV makers and therefore reinstated the subsidy programme in 2009, seeing residential installation increase by more than 10% within the first year.¹²²

As of February 2013, a total of 283,332 residential PV systems were approved since the new FIT scheme was introduced in July 2012, accounting for 837MW.¹²³

9.5. Landmark Projects

Obayashi Technical Research Institute Main Building

Aiming to create an environmentally-friendly workplace, construction of the Obayashi Technical Research Institute was completed in September 2010 using a variety of features to reduce CO₂ emissions during operation by 55%, the highest level achieved in Japan. The building was rated as "Superior (S)" on the CASBEE rating system and received a value of 7.6 on the Built Environment Efficiency (BEE) assessment index due to the building's overall reduction in environmental burdens.

Special features of the building include:

- Ecological roof system
- Peri-buffer system (thermal buffer zone established around windows reducing air-conditioning loads)
- Natural displacement ventilation system
- Task/ambient air-conditioning system providing personal air-conditioning by radiative-convective task panels

¹²¹ Solarbuzz, "Japan PV Market 2009", 15 June 2009

¹²² Association for Asian Studies, "A World Leader: Japan's Renewable Energy Technology Industry", 28 March 2010

¹²³ Ministry of Economy, Trade and Industry, "再生可能エネルギー発電設備の導入状況を公表します", 17 May, 2013

- Lighting/air-conditioning control system using IC tags
- Hybrid heat pump system using geothermal and well-water heat
- Medium chilled water latent heat storage system
- BEMS visualisation system

Laketown "Miwa no Mori"

Located in Koshigaya city, Saitama Prefecture, "Laketown Miwa no Mori" is a collection of 132 industrialised housing units developed to reduce CO₂ emissions from ordinary homes by 20% in the district as a whole. The houses built in this district were designed to save energy by using high-efficiency water heaters and air-conditioners, as well as increasing heat insulation efficiency through features such as an exterior thermal ventilation wall. The buildings were rated as "Superior (S)" on the CASBEE rating system and received a value of 4.6 on the BEE assessment index.

Special features of the housing include:

- Exterior thermal ventilation wall
- Externally attached roll-up screens to block summer sunlight
- Wind status / heat environment simulation
- Wind direction analysis for each housing unit
- Eco Navigator (energy simulation/monitoring software)
- Heat exhaust system

Yokohama Dia Building

The Yokohama Dia Building is an advanced office and shopping complex located in Yokohama city. The building features approximately 1,500 m² of solar panels, one of the largest in scale in Japan. It is also equipped with automatic controlled blinds and lighting control systems to reduce the thermal load on the building for energy saving. The building was rated as "Superior (S)" on the CASBEE rating system and received a value of 3.0 on the BEE assessment index.

Special features of the building include:

- Solar power system integrated with building materials

- Solar tracking system with automatic control blinds
- Interior materials with low VOC discharge

Nissan Advanced Technology Centre

The Nissan Advanced Technology Centre was created as a research and development hub for innovative technologies. The building has a theatre-like open layout with features such as a stepped workplace facing green hills and balcony gardens. A variety of environmental management systems have been utilised, resulting in an energy-efficient and eco-friendly building. The building was rated as "Superior (S)" on the CASBEE rating system and received a value of 4.7 on the BEE assessment index.

Special features of the building include:

- Step-structured office space facing green hills
- Thermal environment data for stepped workplace
- Outdoor balcony gardens (Green Cubes)
- Louver decks placed over top light glass providing natural lighting for the office
- Roof watering systems
- Solar power canopy
- See-through utility room for air conditioning system
- Rooftop greenery and courtyard biotope area
- Green embankments with recycled concrete debris (70% for pavement subgrade, 30% for green embankment fillers)

10. Building Materials

10.1. Classic Construction Materials

According to the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), in FY2011 demand for the six major building materials (cement, fresh concrete, aggregate/crushed rock, wood, steel products, and asphalt) increased by 2.0% compared to the previous year.¹²⁴ Use of these materials increased by 3.8% in the building sector and declined by 0.2% in the civil engineering sector.¹²⁵ However with new housing starts increasing and construction investment from both the public and private sector forecast to increase, demand for materials was also expected to increase in FY2012.

Trends in Major Building Materials

Category		FY2010		FY2011		FY2012 estimate	
		Volume	% Δ from previous year	Volume	% Δ from previous year	Volume	% Δ from previous year
Cement	(10,000 tonnes)	4,161	-2.6	4,265	+ 2.5	4,600	+ 7.9
Fresh Concrete	(10,000m ³)	8,528	-0.9	8,796	+ 3.1	9,500	+ 8.0
Aggregate & Crushed Rock	(10,000m ³)	35,458	-2.2	34,856	-1.7	38,100	+ 9.3
Wood	(10,000m ³)	950	+ 2.4	922	-2.9	1000	+ 8.5
Steel Products	(10,000 tonnes)	2,971	+ 4.5	3,097	+ 4.2	3,300	+ 6.6
Asphalt	(10,000 tonnes)	180	-21.7	174	-3.3	195	+ 12.1

Source: Ministry of Land, Infrastructure, Transport and Tourism 2012

Cement, Fresh Concrete

In FY2011, demand for cement increased by 2.5% to 42.65 million tonnes and for fresh concrete by 3.1% to 87.96 million metres cubed (m³). Demand for cement was expected to increase by 7.9% to 46 million tonnes and for fresh concrete by 8% to 95 million m³ in FY2012.

Aggregate and Crushed Rock

In FY 2011, demand for aggregate decreased by 1.5% to 233.94 million m³ and for crushed rock by 2.1% to 114.62 million metres cubed (m³). In FY2012, demand for aggregate was expected to rise by 9.4% to 256 million m³ and for crushed rock by 9.1% to 125 million m³.

¹²⁴ MLIT, “平成 23 年度主要建設資材需要見通し”, August 2011

¹²⁵ Ibid.

Wood

In FY2011, demand for wood decreased by 3% to 9.22 million m³.¹²⁶ Demand for wood was forecast to increase by 8.5% to 10 million m³ in FY2012.

Ordinary Steel Products, Shape Steel, Light Steel Bars

Demand for ordinary steel products increased in FY2011 by 4.2% to 19.24 million tonnes, of which shape steel increased by 4.8% to 3.97 million tonnes and light steel bars by 4.2% to 7.76 million tonnes. In FY2012, demand for ordinary steel products was estimated to rise by 6.5% to 20.5 million tonnes, of which shape steel was expected to increase by 5.7% to 4.2 million tonnes and light steel bars by 7% to 8.3 million tonnes.

Asphalt

In FY2011, demand for asphalt declined by 3.2% to 1.74 million tonnes. Demand was expected to increase by 12.1% to 1.95 million tonnes in FY2012.

10.2. Green Building and Eco-Friendly Materials

Although the overall market for thermal insulation products experienced a decline in demand from 2000, which coincided with the decline in new housing starts, demand increased rapidly by 2010, due mainly to the Eco-Housing Point scheme and introduction of the Long-term Quality Housing Certification System, which even caused a supply shortage towards the end of 2010.¹²⁷ During the March-June period of 2011, the demand for thermal insulation products further increased due to the urgent construction of temporary housing after the Great East Japan earthquake, and it was expected to continue to increase from 2012 onwards with the commencement of fully-fledged reconstruction efforts in the disaster affected regions.

Glass Wool / Rockwool

Traditionally, inorganic thermal insulation materials such as glass wool and rockwool have been used predominantly in wooden buildings and buildings with large surface areas, due to their superior cost-performance ratio compared to other thermal insulation materials. Currently in Japan, glass wool is the most commonly used thermal insulation material, followed by rockwool which is chosen for its high heat and fire resistance and sound insulating properties.

¹²⁶ Does not include shipments from Iwate prefecture, Miyagi prefecture and Fukushima prefecture for FY2010 and FY2011 due to the Great East Japan Disaster.

¹²⁷ Fuji-Keizai Group, "2011 年 エコ・セーフティー住宅建材・機器市場の将来展望", 30 August 2011

Coinciding with the decline in new housing starts, which reached a historical low in 2007, glass wool and rockwool also experienced a decline in demand. However, the demand for both glass wool and rockwool in the residential market increased in 2011 by 0.9% to 87.8 billion yen and 4.2% to 9.9 billion yen respectively.¹²⁸

Glass Wool & Rockwool - Market Size

(unit: tonnes / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Glass Wool								
Sales Volume	115,700	133,420	134,000	138,000	145,000	142,000	142,000	149,000
Sales Value	73,400	87,000	87,800	90,300	94,800	92,000	92,000	96,600
Rockwool								
Sales Volume	75,900	80,600	83,800	88,000	92,000	90,100	90,100	92,800
Sales Value	8,900	9,500	9,900	10,400	10,800	10,500	10,500	10,800
TOTAL								
Sales Volume	191,600	214,000	217,800	226,000	237,000	232,100	232,100	241,800
Sales Value	82,300	96,500	97,700	100,700	105,600	102,500	102,500	107,400

Source: Fuji Keizai 2013

In Japan, glass wool is used predominantly in residential construction, whereas rockwool is used more in non-residential construction. In residential buildings, glass wool and rockwool are commonly used in newly constructed wooden housing, followed by newly constructed collective housing, and are less commonly used in housing renovations.

Glass Wool Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (tonne)	Share
New Constructions		
Detached Housing – Custom Built	70,000	50.7%
Detached Housing – For Sale	30,500	22.1%
Detached Housing – Subtotal	100,500	72.8%
Collective Housing – For Sale	9,700	7.0%
Collective Housing – For Rent	21,000	15.2%
Collective Housing – Subtotal	30,700	22.2%
Subtotal	131,200	95.1%
Existing Buildings		
Detached Housing – Custom Built	3,000	2.2%
Detached Housing – For Sale	1,500	1.1%
Detached Housing – Subtotal	4,500	3.3%
Collective Housing – For Sale	300	0.2%
Collective Housing – For Rent	1,000	0.7%
Collective Housing – Subtotal	1,300	0.9%
Subtotal	5,800	4.2%
TOTAL	138,000	100.0%

Source: Fuji Keizai 2013

¹²⁸ Fuji-Keizai Group, “2013 年版 住設建材マーケティング便覧”, March 2013

Rockwool
Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (tonne)	Share
New Constructions		
Detached Housing – Custom Built	48,000	54.5%
Detached Housing – For Sale	15,000	17.0%
Detached Housing – Subtotal	63,000	71.6%
Collective Housing – For Sale	6,200	7.0%
Collective Housing – For Rent	13,800	15.7%
Collective Housing – Subtotal	20,000	22.7%
Subtotal	83,000	94.3%
Existing Buildings		
Detached Housing – Custom Built	3,000	3.4%
Detached Housing – For Sale	1,000	1.1%
Detached Housing – Subtotal	4,000	4.5%
Collective Housing – For Sale	100	0.1%
Collective Housing – For Rent	900	1.0%
Collective Housing – Subtotal	1,000	1.1%
Subtotal	5,000	5.7%
TOTAL	88,000	100.0%

Source: Fuji Keizai 2013

Although glass wool and rockwool are considered to have a high cost-performance ratio, they may not necessarily meet Japan's Next-Generation Energy Conservation Standards. The demand for energy-efficient and environmentally friendly building materials is continuing to increase, thereby creating an opportunity for makers of glass wool and rockwool products that can offer higher-insulation efficiency than the materials currently available in the Japanese market.

Polyurethane Foam (PUF) / Extruded Polystyrene Foam (XPS)

Although less popular than inorganic thermal insulation materials like glass wool and rockwool, foamed plastic insulation materials, such as Polyurethane Foam (PUF) and Extruded Polystyrene Foam (XPS) are still used in Japan. While PUF is considered to have an average cost-performance ratio, it is still used for different purposes based on its characteristics. Similarly, XPS is considered in Japan to have excellent thermal insulation properties despite its higher costs.

With the decline in new housing starts, XPS experienced a decline in demand from 2005, while the decline in demand for PUF caught up in 2007. While demand for both XPS and PUF increased in 2010 for reasons already mentioned, in 2011 demand for both XPS and PUF slightly decreased by 1.9% to 25.5 billion yen and 0.9% to 21.5 billion yen, respectively.¹²⁹

¹²⁹ Fuji-Keizai Group, "2013 年版 住設建材マーケティング便覧", March 2013

Polyurethane Foam & Extruded Polystyrene Foam - Market Size

(unit: tonnes / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Polyurethane Foam								
Sales Volume	45,000	49,400	49,000	49,000	51,000	48,490	47,400	49,800
Sales Value	23,600	26,000	25,500	25,500	26,500	25,000	24,500	25,700
Extruded Polystyrene Foam								
Sales Volume	28,200	34,400	34,300	35,000	36,400	35,000	34,000	35,400
Sales Value	16,400	21,700	21,500	21,800	22,800	21,900	21,200	22,000
TOTAL								
Sales Volume	73,200	83,800	83,300	84,000	87,400	83,400	81,400	85,200
Sales Value	40,000	47,700	47,000	47,300	49,300	46,900	45,700	47,700

Source: Fuji Keizai 2013

Both XPS and PUF are used in residential construction. PUF is mainly used in the detached housing market, and is found in just 30% of the collective housing market, while XPS is generally used in reinforced concrete structures and mainly in the collective housing market. XPS is also used in the non-residential sector for general construction, insulated tatami flooring mats, and in refrigerated warehouses.

Polyurethane Foam Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (tonne)	Share
New Constructions		
Detached Housing – Custom Built	11,500	23.5%
Detached Housing – For Sale	5,000	10.2%
Detached Housing – Subtotal	16,500	33.7%
Collective Housing – For Sale	13,800	28.2%
Collective Housing – For Rent	16,300	33.3%
Collective Housing – Subtotal	30,100	61.4%
Subtotal	46,600	95.1%
Existing Buildings		
Detached Housing – Custom Built	1,500	3.1%
Detached Housing – For Sale	500	1.0%
Detached Housing – Subtotal	2,000	4.1%
Collective Housing – For Sale	200	0.4%
Collective Housing – For Rent	200	0.4%
Collective Housing – Subtotal	400	0.8%
Subtotal	2,400	4.9%
TOTAL	49,000	100%

Source: Fuji Keizai 2013

**Extruded Polystyrene Foam
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (tonne)	Share
New Constructions		
Detached Housing – Custom Built	16,000	45.7%
Detached Housing – For Sale	6,500	18.6%
Detached Housing – Subtotal	22,500	64.3%
Collective Housing – For Sale	3,800	10.9%
Collective Housing – For Rent	6,900	19.7%
Collective Housing – Subtotal	10,700	30.6%
Subtotal	33,200	94.9%
Existing Buildings		
Detached Housing – Custom Built	1,000	2.9%
Detached Housing – For Sale	500	1.4%
Detached Housing – Subtotal	1,500	4.3%
Collective Housing – For Sale	200	0.6%
Collective Housing – For Rent	100	0.3%
Collective Housing – Subtotal	300	0.9%
Subtotal	1,800	5.1%
TOTAL	35,000	100

Source: Fuji Keizai 2013

Though XPS is already considered to have excellent thermal insulation properties, increasing demand for energy-efficient and environmentally friendly building materials is expected to continue, thereby creating an opportunity for makers of XPS products that can offer even higher insulation efficiency to the Japanese market. Furthermore, as the use of hexabromocyclododecane (HBCD) in Japan may be regulated in the near future, the development of XPS using an alternative flame retardant could provide manufacturers with the opportunity to enter and lead the Japanese market.

Vapour Barrier Films

Traditionally, vapour barrier films were predominantly used in Japan's colder regions of Hokkaido and Tohoku. However, with the recent trend to incorporate power-saving measures and energy-saving standards in the residential sector, sales of vapour barrier films expanded in 2010 and 2011 in terms of geographic location as well as value and this trend is expected to continue.

Vapour Barrier Film - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011 Estimate	2012 Forecast	2015 Forecast	2020 Forecast
Vapor Barrier Film						
Sales Volume	40,000	50,000	60,000	70,000	100,000	130,000
Sales Value	6,000	7,500	9,000	10,500	15,000	19,500

Source: Fuji Keizai 2011

Vapour Barrier Film – Breakdown of Usage/Purpose (2010)

Usage/Purpose	Sales Volume (thousand windows)	%
Residential		
New Construction – Detached Housing	50,000	100.0%
Renovation, Others	▲	0.0%
TOTAL	50,000	100.0%

Note:
▲ De-minimis

Source: Fuji Keizai 2011

High Reflective Coatings (HRC)

With the support of government and local government subsidies, as well as designation as a key product under the Law on Promoting Green Purchasing, demand for high reflective coatings has been increasing from the late 2000's. In 2011, demand for high reflective coatings increased threefold from 2008 to 10.3 billion yen and is anticipated to continue increasing as a means to save energy during the summer, which has become a key issue due to the problem of power shortages since the Great East Japan earthquake in 2011.¹³⁰

High Reflective Coatings - Market Size

(unit: tonnes / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	6,400	7,900	10,100	12,400	14,500	15,800	17,000	18,300
Sales Value	6,600	8,100	10,300	12,600	14,700	16,000	17,200	18,500

Source: Fuji Keizai 2013

When looking at the breakdown of usage, HRCs are mainly used in the non-residential sector for factories, warehouses, office buildings, commercial facilities, roads, etc. HRCs are also used in the residential market for both detached houses and collective housing, mainly for roofs and external walls, as well as balconies, glass and car parks. While usage of HRCs for newly constructed detached houses remains low, major producers of HRCs and leading home builders have begun to collaborate, aiming to further disseminate the use of HRCs for both newly constructed detached houses as well as existing houses.

¹³⁰ Fuji-Keizai Group, "2013 年版 住設建材マーケティング便覧", March 2013

High Reflective Coatings Breakdown of Usage/Purpose in Residential Market (2012 Estimate)

Usage/Purpose	Sales Volume (tonne)	Share
New Constructions		
Detached Housing – Custom Built	modicum	-
Detached Housing – For Sale		
Detached Housing – Subtotal		
Collective Housing – For Sale		
Collective Housing – For Rent		
Collective Housing – Subtotal		
Subtotal		
Existing Buildings		
Detached Housing – Custom Built	2,000	40.0%
Detached Housing – For Sale	1,000	20.0%
Detached Housing – Subtotal	3,000	60.0%
Collective Housing – For Sale	800	16.0%
Collective Housing – For Rent	1,200	24.0%
Collective Housing – Subtotal	2,000	40.0%
Subtotal	5,000	100.0%
TOTAL	5,000	100.0%

Source: Fuji Keizai 2013

Aluminium & Resin Sashes

Sales of window sashes runs in parallel to the number of new housing starts. There has been a shift from using aluminium sashes to resin sashes for inner windows, and the market demand for resin sashes is expected to grow.

Aluminium & Resin Sash - Market Size (unit: thousand windows / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Aluminium Sash (Total)								
Sales Volume	10,500	11,000	11,200	11,560	12,100	11,400	10,800	10,800
Sales Value	368,000	385,000	393,000	406,000	426,300	400,700	377,000	377,000
Adiabatic Sash (Aluminium + Resin)								
Sales Volume	2,000	2,500	2,600	2,800	3,000	3,100	3,200	3,300
Sales Value	86,000	107,600	111,900	119,800	128,200	132,000	135,900	140,000
Resin Sash								
Sales Volume	1,090	1,490	1,420	1,480	1,500	1,400	1,300	1,300
Sales Value	29,100	39,700	37,700	39,200	39,600	36,800	34,200	34,200
TOTAL								
Sales Volume	11,590	12,490	12,620	13,040	13,600	12,800	12,100	12,100
Sales Value	397,100	424,700	430,700	445,200	465,900	437,500	411,200	411,200

Source: Fuji Keizai 2013

Resin sashes for exterior windows and aluminium sashes are predominantly used in newly constructed detached housing in Japan, whereas resin sashes for inner windows are used mainly in housing renovations.

Aluminium Sash (Total)
Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (thousand windows)	Share
New Constructions		
Detached Housing – Custom Built	4,400	38.1%
Detached Housing – For Sale	1,800	15.6%
Detached Housing – Subtotal	6,200	53.6%
Collective Housing – For Sale	1,100	9.5%
Collective Housing – For Rent	2,400	20.8%
Collective Housing – Subtotal	3,500	30.3%
Subtotal	9,700	83.9%
Existing Buildings		
Detached Housing – Custom Built	800	6.9%
Detached Housing – For Sale	400	3.5%
Detached Housing – Subtotal	1,200	10.4%
Collective Housing – For Sale	300	2.6%
Collective Housing – For Rent	360	3.1%
Collective Housing – Subtotal	660	5.7%
Subtotal	1,860	16.1%
TOTAL	11,560	100%

Source: Fuji Keizai 2013

Adiabatic Sash (Aluminium + Resin)
Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (thousand windows)	Share
New Constructions		
Detached Housing – Custom Built	1,400	50.0%
Detached Housing – For Sale	900	32.1%
Detached Housing – Subtotal	2,300	82.1%
Collective Housing – For Sale	modicum	-
Collective Housing – For Rent	modicum	-
Collective Housing – Subtotal	modicum	-
Subtotal	2,300	82.1%
Existing Buildings		
Detached Housing – Custom Built	300	10.7%
Detached Housing – For Sale	200	7.1%
Detached Housing – Subtotal	500	17.9%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	Modicum	-
Collective Housing – Subtotal	Modicum	-
Subtotal	500	17.9%
TOTAL	2,800	100%

Source: Fuji Keizai 2013

**Resin Sash
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand windows)	Share
New Constructions		
Detached Housing – Custom Built	400	27.0%
Detached Housing – For Sale	150	10.1%
Detached Housing – Subtotal	550	37.2%
Collective Housing – For Sale	130	8.8%
Collective Housing – For Rent	20	1.4%
Collective Housing – Subtotal	150	10.1%
Subtotal	700	47.3%
Existing Buildings		
Detached Housing – Custom Built	400	27.0%
Detached Housing – For Sale	250	16.9%
Detached Housing – Subtotal	650	43.9%
Collective Housing – For Sale	100	6.8%
Collective Housing – For Rent	30	2.0%
Collective Housing – Subtotal	130	8.8%
Subtotal	780	52.7%
TOTAL	1,480	100%

Source: Fuji Keizai 2013

Double Glazed Glass

Double glazed glass is already widely used in Japan. The diffusion rate of double glazed glass in newly constructed detached housing has increased from 57.9% in 1999 to 93% in 2010, while the diffusion rate of double glazed glass in newly constructed collective housing increased from 18% in 1999 to 62% in 2010. This usage is expected to continue to grow along with the number of new housing starts. The use of triple glazing in Japan is uncommon at present.

Double Glazed Glass - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	9,400	11,100	12,100	12,600	13,200	12,400	11,700	11,800
Sales Value	53,000	62,000	67,500	70,200	73,300	68,200	64,200	64,200

Source: Fuji Keizai 2013

**Double Glazed Glass
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	5,200	41.3%
Detached Housing – For Sale	2,100	16.7%
Detached Housing – Subtotal	7,300	57.9%
Collective Housing – For Sale	1,800	14.3%
Collective Housing – For Rent	1,200	9.5%
Collective Housing – Subtotal	3,000	23.8%
Subtotal	10,300	81.7%
Existing Buildings		
Detached Housing – Custom Built	1,300	10.3%
Detached Housing – For Sale	600	4.8%
Detached Housing – Subtotal	1,900	15.1%
Collective Housing – For Sale	400	3.2%
Collective Housing – For Rent	Modicum	-
Collective Housing – Subtotal	400	3.2%
Subtotal	2,300	18.3%
TOTAL	12,600	100%

Source: Fuji Keizai 2013

Sun Control Window Films

While sun control window films were traditionally used for factories and in the non-residential market, the demand for residential purposes has increased as part of the energy-saving measures adopted after the disaster in 2011. This trend for energy-saving is not expected to weaken in the imminent future, hence increased demand for sun control window films for both residential and non-residential purposes is probable.

Sun Control Window Film - Market Size

(unit: million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Value	4,330	5,590	7,740	6,230	6,750	6,750	6,800	6,900

Source: Fuji Keizai 2013

**Sun Control Window Film
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Value (million yen)	Share
New Constructions		
Detached Housing – Custom Built	modicum	-
Detached Housing – For Sale		
Detached Housing – Subtotal		
Collective Housing – For Sale		
Collective Housing – For Rent		
Collective Housing – Subtotal		
Subtotal		
Existing Buildings		
Detached Housing – Custom Built	140	46.7%
Detached Housing – For Sale	60	20.0%
Detached Housing – Subtotal	200	66.7%
Collective Housing – For Sale	70	23.3%
Collective Housing – For Rent	30	10.0%
Collective Housing – Subtotal	100	33.3%
Subtotal	300	100%
TOTAL	300	100%

Source: Fuji Keizai 2013

10.3. Roofing & Exterior Materials

The overall market for roofing and exterior materials experienced steady growth from 2009, reaching 284.2 billion yen in 2011. Ceramic siding material is the leading product in demand in the roofing and exterior materials market, and demand for metal siding material also increased after the 2011 disaster, as demand for earthquake-resistant building materials surged. While the market size for resin siding materials remains small, it has continued to grow over the past few years. Slate tiles have also shown signs of strong growth, with the product type-based configuration changing. Traditionally, by sales volume, organic coated slate tiles were the dominant type of tiles, but recently, the market share of non-organic coated slate tiles has increased. Major makers have also invested in non-organic coated slate tiles, predicting an increase in terms of sales value. Autoclaved Lightweight Concrete (ALC) tiles have stayed at relatively the same level, while facing tiles and Polyvinyl Chloride (PVC) guttering are showing signs of slight growth.

Roofing & Exterior Materials - Market Size

(unit: million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Ceramic Siding Material								
Sales Value	164,000	179,000	184,400	193,000	203,000	199,300	194,800	195,800
Metal Siding Material								
Sales Value	13,000	13,100	14,500	15,100	16,300	16,200	15,800	16,000
Resin Siding Material								
Sales Value	690	750	830	900	1,040	1,040	1,010	1,010
Facing Tiles								
Sales Value	7,300	7,650	7,550	7,650	7,850	7,500	7,050	6,600
Autoclaved Lightweight Concrete (ALC)								
Sales Value	17,400	17,400	17,400	17,400	18,300	17,400	16,300	16,100
Slate Tiles								
Sales Value	25,400	27,900	29,100	30,800	33,100	33,100	32,900	33,600
PVC (Polyvinyl Chloride) Gutters								
Sales Value	29,800	30,200	30,400	31,000	32,000	30,000	28,100	28,100
TOTAL								
Sales Value	257,590	276,000	284,180	295,850	311,590	304,540	295,960	297,210

Source: Fuji Keizai 2013

As there are many products affected by the number of new housing starts, the overall market for roofing and exterior materials is expected to continue to show growth in the coming years. In particular, the three kinds of siding materials (ceramic, metal, resin) and slate tiles are predicted to show strong signs of growth, especially in the disaster-hit area of Tohoku, where reconstruction efforts are still continuing.

Ceramic Siding Material

In 2011, the ceramic siding materials market was estimated to reach 184.4 billion yen. Corresponding to the increase in new housing starts, demand for ceramic siding materials has been increasing from 2009. Over 90% of ceramic siding materials were used for single-family detached housing. Furthermore, almost 100% of ceramic siding materials were used for new construction projects with only a minute amount being used in renovations.

Ceramic Siding Material - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Under 15mm								
Sales Volume	48,000	52,000	53,000	56,000	59,300	58,500	57,000	57,500
Sales Value	63,000	68,000	68,900	72,500	76,500	75,300	74,300	74,800
Over 15mm								
Sales Volume	51,000	56,000	58,500	61,200	64,500	63,500	62,000	62,500
Sales Value	101,000	111,000	115,500	120,500	126,500	124,000	120,500	121,000
TOTAL								
Sales Volume	99,000	108,000	111,500	117,200	123,800	122,000	119,000	120,000
Sales Value	164,000	179,000	184,400	193,000	203,000	199,300	194,800	195,800

Source: Fuji Keizai 2013

Ceramic Siding Material - Under 15mm Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	22,500	40.2%
Detached Housing – For Sale	26,400	47.1%
Detached Housing – Subtotal	48,900	87.3%
Collective Housing – For Sale	modicum	-
Collective Housing – For Rent	6,700	12%
Collective Housing – Subtotal	6,700	12%
Subtotal	55,600	99.3%
Existing Buildings		
Detached Housing – Custom Built	200	0.4%
Detached Housing – For Sale	200	0.4%
Detached Housing – Subtotal	400	0.7%
Collective Housing – For Sale	0	0.0%
Collective Housing – For Rent	modicum	-
Collective Housing – Subtotal	modicum	-
Subtotal	400	0.7%
TOTAL	56,000	100%

Source: Fuji Keizai 2013

**Ceramic Siding Material - Over 15mm
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	23,500	38.4%
Detached Housing – For Sale	30,500	49.8%
Detached Housing – Subtotal	54,000	88.2%
Collective Housing – For Sale	modicum	0.0%
Collective Housing – For Rent	7,100	11.6%
Collective Housing – Subtotal	7,100	11.6%
Subtotal	61,100	99.8%
Existing Buildings		
Detached Housing – Custom Built	modicum	-
Detached Housing – For Sale	100	0.2%
Detached Housing – Subtotal	100	0.2%
Collective Housing – For Sale	0	0.0%
Collective Housing – For Rent	modicum	-
Collective Housing – Subtotal	modicum	-
Subtotal	100	0.2%
TOTAL	62,000	100%

Source: Fuji Keizai 2013

Metal Siding Material

In 2011, the metal siding materials market was estimated to reach 14.5 billion yen. With its high heat insulation property and its strong resistance to frost damage, metal siding material is predominantly used in the northern areas of Japan. Furthermore, due to its light weight and flexibility that can withstand earthquakes, demand for metal siding materials has increased. With these contributing factors, demand for metal siding materials is expected to continue to show growth.

Metal Siding Material - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	13,000	13,100	14,500	15,100	16,300	16,200	15,800	16,000
Sales Value	13,000	13,100	14,500	15,100	16,300	16,200	15,800	16,000

Source: Fuji Keizai 2013

After the 2011 disaster, metal siding material was widely used for reconstruction. However, with its above-mentioned light weight and earthquake resistance, demand for metal siding materials for renovations have increased to approximately 65% of the market. Additionally, it is estimated that more will be used in newly constructed housing, especially for housing built on small land areas with a limited floor space.

**Metal Siding Material
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	2,600	17.2%
Detached Housing – For Sale	1,100	7.3%
Detached Housing – Subtotal	3,700	24.5%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	1,500	9.9%
Collective Housing – Subtotal	1,500	9.9%
Subtotal	5,200	34.4%
Existing Buildings		
Detached Housing – Custom Built	5,500	36.4%
Detached Housing – For Sale	2,500	16.6%
Detached Housing – Subtotal	8,000	53.0%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	-	12.6%
Collective Housing – Subtotal	1,900	12.6%
Subtotal	9,900	65.6%
TOTAL	15,100	100%

Source: Fuji Keizai 2013

Resin Siding Material

In 2011, the resin siding material market was estimated to reach 830 million yen. It is highly durable and can withstand frost damage and salt damage, and it is mainly used in the colder northern areas of Japan. Resin siding material is predominantly used in existing housing, however in comparison to ceramic siding and metal siding materials, it only holds a relatively small portion of the market share.

Until 2009, many domestic makers pulled out of the Japanese market and with the decrease in new housing starts at that time, the market for resin siding material shrank significantly. Nevertheless, by 2010 the market had shown signs of recovery. This growth can be attributed to an increase in new housing starts as well as a tendency for domestic makers to strengthen sales of this product.

Resin Siding Material - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	460	500	550	650	750	750	730	730
Sales Value	690	750	830	900	1,040	1,040	1,010	1,010

Source: Fuji Keizai 2013

About 65% of resin siding material is used in existing buildings, and with its high durability and lightness in weight, demand for renovation purposes has increased as well. Although resin siding material is mainly used for newly constructed housing in areas that are subjected to frost damage and salt damage as explained above, ceramic siding materials hold a substantial share of the market. However, the increase in new housing starts has contributed slightly to growth in the resin siding material market.

**Resin Siding Material
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	140	21.5%
Detached Housing – For Sale	70	10.8%
Detached Housing – Subtotal	210	32.3%
Collective Housing – For Sale	5	0.8%
Collective Housing – For Rent	5	0.8%
Collective Housing – Subtotal	10	1.5%
Subtotal	220	33.8%
Existing Buildings		
Detached Housing – Custom Built	270	41.5%
Detached Housing – For Sale	130	20.0%
Detached Housing – Subtotal	400	61.5%
Collective Housing – For Sale	15	2.3%
Collective Housing – For Rent	15	2.3%
Collective Housing – Subtotal	30	4.6%
Subtotal	430	66.2%
TOTAL	650	100%

Source: Fuji Keizai 2013

Facing Tiles

In 2011, the facing tile market was estimated to reach 7.6 billion yen. Around 75% of the facing tile market is used for newly constructed housing. The use of facing tiles for existing homes has not progressed due to the constraints of construction.

Facing Tiles - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	3,300	3,50	3,400	3,450	3,550	3,40	3,200	3,000
Sales Value	7,300	7,650	7,550	7,650	7,850	7,500	7,050	6,600

Source: Fuji Keizai 2013

Facing Tiles
Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	2,100	60.9%
Detached Housing – For Sale	500	14.5%
Detached Housing – Subtotal	2,600	75.4%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	Modicum	-
Collective Housing – Subtotal	Modicum	-
Subtotal	2,600	75.4%
Existing Buildings		
Detached Housing – Custom Built	850	24.6%
Detached Housing – For Sale	Modicum	-
Detached Housing – Subtotal	850	24.6%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	Modicum	-
Collective Housing – Subtotal	Modicum	-
Subtotal	850	24.6%
TOTAL	3,450	100%

Source: Fuji Keizai 2013

Autoclaved Lightweight Concrete (ALC)

In 2011, the ALC market was estimated to reach 17.4 billion yen. Some 90% of ALC is used in newly constructed housing, while use for existing buildings remains low. About 65% is used in detached housing and its use is expected to increase.

Autoclaved Lightweight Concrete (ALC) - Market Size
(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
35 ~ 37mm								
Sales Volume	3,550	3,550	3,550	3,550	3,750	3,550	3,300	3,250
Sales Value	12,800	12,800	12,800	12,800	13,500	12,800	11,900	11,700
50mm								
Sales Volume	1,050	1,050	1,050	1,050	1,100	1,050	1,000	1,000
Sales Value	4,600	4,600	4,600	4,600	4,800	4,600	4,400	4,400
TOTAL								
Sales Volume	4,600	4,600	4,600	4,600	4,850	4,600	4,300	4,250
Sales Value	17,400	17,400	17,400	17,400	18,300	17,400	16,300	16,100

Source: Fuji Keizai 2013

**Autoclaved Lightweight Concrete (ALC)
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	1,880	40.9%
Detached Housing – For Sale	890	19.3%
Detached Housing – Subtotal	2,770	60.2%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	1,390	30.2%
Collective Housing – Subtotal	1,390	30.2%
Subtotal	4,160	90.4%
Existing Buildings		
Detached Housing – Custom Built	150	3.3%
Detached Housing – For Sale	110	2.4%
Detached Housing – Subtotal	260	5.7%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	180	3.9%
Collective Housing – Subtotal	180	3.9%
Subtotal	440	9.6%
TOTAL	4,600	100%

Source: Fuji Keizai 2013

Slate Tiles

In 2011, the slate tile market was estimated to reach 29.1 billion yen. Around 90% of slate tiles are used in newly constructed housing and they are not used much for existing buildings.

Slate Tiles - Market Size

(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Organic Coating								
Sales Volume	10,200	11,100	11,200	11,100	11,100	9,800	8,500	7,800
Sales Value	12,000	13,000	13,200	13,100	13,100	11,600	10,100	9,300
Inorganic Coating								
Sales Volume	5,200	5,800	6,200	6,900	7,800	8,400	8,900	9,500
Sales Value	13,400	14,900	15,900	17,700	20,000	21,500	22,800	24,300
TOTAL								
Sales Volume	15,400	16,900	17,400	18,000	18,900	18,200	17,400	17,300
Sales Value	25,400	27,900	29,100	30,800	33,100	33,100	32,900	33,600

Source: Fuji Keizai 2013

Slate Tiles
Breakdown of Usage/Purpose (2012 Estimate)

Usage/Purpose	Sales Volume (thousand m ²)	Share
New Constructions		
Detached Housing – Custom Built	8,100	45.0%
Detached Housing – For Sale	4,500	25.0%
Detached Housing – Subtotal	12,600	70.0%
Collective Housing – For Sale	250	1.4%
Collective Housing – For Rent	3,600	20.0%
Collective Housing – Subtotal	3,850	21.4%
Subtotal	16,450	91.4%
Existing Buildings		
Detached Housing – Custom Built	850	4.7%
Detached Housing – For Sale	400	2.2%
Detached Housing – Subtotal	1,250	6.9%
Collective Housing – For Sale	Modicum	-
Collective Housing – For Rent	300	1.7%
Collective Housing – Subtotal	300	1.7%
Subtotal	1,550	8.6%
TOTAL	18,000	100%

Source: Fuji Keizai 2013

PVC (Polyvinyl Chloride) Gutters

In 2011, the PVC gutter market was estimated to reach 30.4 billion yen. Some 95% of PVC guttering is used in detached housing and not as much in collective housing as these types of buildings do not have roofs requiring guttering.

PVC (Polyvinyl Chloride) Gutters - Market Size
(unit: thousand m² / million yen)

	2009	2010	2011	2012 Estimate	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Sales Volume	27,000	27,500	27,800	28,400	29,400	27,700	26,000	26,000
Sales Value	29,800	30,200	30,400	31,000	32,000	30,000	28,100	28,100

Source: Fuji Keizai 2013

**PVC (Polyvinyl Chloride) Gutters
Breakdown of Usage/Purpose (2012 Estimate)**

Usage/Purpose	Sales Volume (thousand m ²)	Share
<i>New Constructions</i>		
Detached Housing – Custom Built	15,000	52.8%
Detached Housing – For Sale	6,400	22.5%
Detached Housing – <i>Subtotal</i>	21,400	75.4%
Collective Housing – For Sale	0	0.0%
Collective Housing – For Rent	1,000	3.5%
Collective Housing – <i>Subtotal</i>	1,000	3.5%
<i>Subtotal</i>	22,400	78.9%
<i>Existing Buildings</i>		
Detached Housing – Custom Built	4,300	15.1%
Detached Housing – For Sale	1,300	4.6%
Detached Housing – <i>Subtotal</i>	5,600	19.7%
Collective Housing – For Sale	0	0.0%
Collective Housing – For Rent	400	1.4%
Collective Housing – <i>Subtotal</i>	400	1.4%
<i>Subtotal</i>	6,000	21.1%
TOTAL	28,400	100%

Source: Fuji Keizai 2013

11. Distribution System & Profit Margin Structure

11.1. Overview

The distribution system in Japan has been under intense pressure to change due to the following factors:

- Limited economic growth coupled with a rapidly ageing population
- Migration of the Japanese manufacturing sector to offshore locations
- A growing renovation market
- Significant changes in building regulations
- Greater acceptance of western housing styles, systems and building products
- Increased global competition, as all regions exporting to Japan migrate up the value chain to produce and sell more finished wood products.

The rate of change will only accelerate and there is a need to monitor these changes and transfer them to business and take due account of them on a regular basis.

11.2. Traditional Distribution flow

In the traditional distribution channel, large Japanese trading companies are the major players in the importing and distribution of building materials and products. They supply products and long-term financing through the multi-layered distribution chain to the hundreds of thousands of small builders who construct most of the housing in Japan. This system can create difficulties for imported products that are not handled in the traditional manner. The following table shows the traditional distribution flow chart below with indications of respective profit margins.

Distribution Flow	Margin Setting
Manufacturer	30%
↓ ↓	↑ ↑
Trading Company	35%
↓ ↓	↑ ↑
National Wholesaler	45%
↓ ↓	↑ ↑
Regional Wholesaler	60%
↓ ↓	↑ ↑
Retailer	75%
↓ ↓	↑ ↑
Builder	90%
↓ ↓	↑ ↑
(End-User)	100%

Note: first of all the retail price is calculated. The manufacturing or import price is taken as 30% of the retail price. The layers between vary from 10% to 15%, except for the price of the trading house that is usually 5%.

11.3. Direct Distribution Flow

The traditional distribution flow is quite expensive and inefficient, hence other distribution systems have emerged in the past 10 years in order to decrease costs by eliminating some of the layers, as follows.

Building Material Manufacturer ➡ National Wholesaler ➡ House Builders

In this case the national wholesaler sells directly to house builders, eliminating regional wholesalers and retailers.

Distribution Flow	Margin Setting
Manufacturer	30
↓ ↓	↑ ↑
National Wholesaler	45
↓ ↓	↑ ↑
Builder	60
↓ ↓	↑ ↑
(End-User)	70

Building Material Manufacturer ➡ Regional Wholesaler ➡ House Builders

In this case, manufacturers sell directly to regional wholesalers, who sell directly to house builders, eliminating national wholesalers and retailers.

Distribution Flow	Margin Setting
Manufacturer	30%
↓ ↓	↑ ↑
Regional Wholesaler	45%
↓ ↓	↑ ↑
Builder	60%
↓ ↓	↑ ↑
(End-User)	70%

Very similar to the last 2 flows is the “manufacture ➡ Purchasing Office or Agent ➡ Home Centre” flow that is most common for the Do-It-Yourself (DIY) and Home Centres market.

Building Material Manufacturer ➡ House Builders

This flow is most common for the 2x4 housing market and secondary wood products. House builders aim to lower their costs and hence the prices they pay for building materials in a market where costs have generally risen, competition has become more fierce and customers have become more critical about quality and price.

Distribution Flow	Margin Setting
Manufacturer	30%
↓ ↓	↑ ↑
Builder	50%
↓ ↓	↑ ↑
(End-User)	70%

12. Legal and Regulatory Issues

12.1. Japanese Building Regulations for Import Products

12.1.1. Overview

Building products exported to Japan are generally subject to regulation under Japanese law. Most building products must, therefore, obtain some form of approval before they can be used in construction. The approval process is often complex because it depends on the type of product, where the product will be used and a range of other factors. Therefore, only basic information is given below. Other documents, available from the Japanese Government and other organisations, will provide more detailed information.

12.1.2. Building Standards Laws in Japan

Generally, all building construction activities, including the use of building products and materials, must conform to the Building Standard Law of Japan (BSL). Building laws and regulations are the responsibility of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The Housing Bureau of the MLIT is in charge of the enforcement of building laws and regulations.¹³¹

Because of the nature of Japan's geography, climate and population, the regulatory requirements for earthquake resistance, fire safety and indoor air quality are generally more stringent than those of other countries. The BSL regulates the construction of buildings from inception and planning to demolition and applies throughout all regions of Japan. The BSL contains, amongst others:

- General Provisions (for example, enforcement provisions)
- Building code provisions
- Planning code provisions
- Details on the building code provisions of the BSL that have some similarities with the Building Codes of other countries

There are many other mandatory regulations concerning building construction in Japan, for example, the Fire Services Law, the Gas Utility Industry Law and the Water Works Law. Generally, the relevant clauses of these laws are quoted in the BSL but builders should not rely exclusively on the BSL. They should ensure they

¹³¹ For further details on the MLIT see: <http://www.mlit.go.jp/english/index.html>

obtain advice and further information on specific requirements of other Japanese laws and regulations as necessary.

The BSL covers almost all building construction activities undertaken in Japan, including the use of building products. The exact type of requirement applicable to a building product in Japan varies as follows:

- If the product is intended for a structural purpose, then structural resistance and durability (resistance against corrosion, deterioration, abrasion etc.), requirements will apply;
- If the product is intended for exterior usage, then fire resistance and durability (damp-proofing etc.) requirements will apply;
- If the product is intended for interior usage in specific rooms, then fire resistance and indoor air quality (limitation of harmful emissions etc.) requirements will apply.

The extent of the BSL requirements to be met by a particular building product may vary depending on where in the building the product will be used and also on the size, use and location of the building. Other factors may also be relevant, for example:

- The external fire resistance requirements may vary according to the zone specified by planning requirements where the building will be built;
- The internal fire resistance requirements may vary according to the use of the space in which the product will be placed.

The BSL can be changed at any time, hence applicants should take all necessary steps to ensure that they have obtained the most up-to-date version. Information about building products intended for use in Japan must be provided as required under Japanese laws and regulations and each product's performance must be demonstrated as prescribed, even if that product is widely accepted in other countries.

The BSL is supported by:

- *An Enforcement Order* (Cabinet order), which provides technical criteria and other requirements necessary to implement the BSL.
- *An Enforcement Regulation* (Ministry Order), which provides the administrative rules, procedures and instruction to ensure compliance with the BSL and the Enforcement Order.

- *Notifications*, which detail the technical criteria, verification methods, etc., in relation to specific issues relating to the BSL.

12.1.3. Ministry approval and performance evaluation

Approval scheme

Under the BSL, the granting of ministry approval for a construction method or building material is based on performance evaluation.

Performance evaluation tasks are delegated by MLIT to specific organisations that are considered to have high levels of technical testing expertise as well as a fair and unbiased testing framework.

Each of these Japanese organisations is called a *Designated Performance Evaluation Body* (DPEB) while those overseas are called *Recognised Performance Evaluation Bodies* (RPEB).

Once a DPEB or a RPEB has conducted a performance evaluation, the applicant is able to submit the performance evaluation report to MLIT as an attachment to the application for ministerial approval. In turn, MLIT will consider the application for approval based upon the evaluation.

Product evaluation process

Application forms and work manuals for performance evaluation are usually available from the DPEB and RPEB websites. Since all DPEBs and RPEBs use common work manuals, application processes and testing methods are fairly similar in DPEB and RPEB organisations.

In the evaluation process, comprehensive information about the building product should be given and the product's performance will ordinarily need to be demonstrated in the prescribed way. A detailed description of the product will ordinarily be required, addressing details such as tolerance and composition and identifying the material properties of every component forming part of the product.

Performance Evaluation Body

Each body has a designated work area (Japan and/or overseas) and list of items it can evaluate. The list of items and the organisations permitted to evaluate them is subject to change and it is essential that all relevant information is up-to-date when seeking evaluation from a particular body for a particular item.

12.1.4. Japan Industrial Standard (JIS) and Japan Agricultural Standard (JAS)

Japanese Standards

Japanese standards that apply to building materials are classified into two categories, namely the Japanese Industrial Standards (JIS) for manufactured products and Japanese Agricultural Standards (JAS) for forest products, etc. Most building products are covered by JIS except for timber, plywood and structural panels which are covered by JAS. However, particle board is standardised by the JIS.

As JIS and JAS are used mostly in the Japanese market, obtaining JIS/JAS certification for imported building products may sometimes be a more commercially-oriented option than obtaining ministry approval from MLIT. Japan's Ministry of Economy, Trade and Industry (METI)¹³² is responsible for JIS and the Ministry of Agriculture, Forestry and Fisheries (MAFF)¹³³ is responsible for JAS.

JIS and JAS Approval Procedure

Any entity (for example, an overseas manufacturer or a Japanese importer) who wants to affix any of the JIS Marks on its products will need to acquire JIS certification after selecting an appropriate "Accredited Certification Body." To be granted certification, a quality management system audit including a document review, onsite audit and product tests is generally required.

If certification is granted, in order to maintain the certification, the entity will need to successfully pass the Certification Maintenance Surveillance implemented by the Accredited Certification Body.¹³⁴

Similar to the JIS scheme, any entity that wants to affix any of the JAS Marks on its products will need to acquire JAS certification from a "Registered Certifying Body."¹³⁵

Reciprocal Certification

As of February 2012, a CE standard for wood products has been recognised in Japan. This simplifies exports of construction timber to Japan from European sawmills.

Previously, European producers of 2"x4" products for structural usage needed a JAS certificate (Japan Agriculture Standard). From February 6, 2012, the European standard 14081-1 for design strength values for structural lumber has been recognised in Japan. CE stamped

¹³² <http://www.jisc.go.jp/eng/index.html>

¹³³ <http://www.maff.go.jp/e/index.html>

¹³⁴ For further details on JIS scheme see: <http://www.jisc.go.jp/eng/index.html>

¹³⁵ For details on JAS scheme see: <http://www.maff.go.jp/e/index.html>

2"x4" products can thus be used in the same way as JAS certified products. Pine and spruce are included in the first step but other species will be added later. Recognised certifying bodies are the NTI (Norwegian Institute of Wood Technology) and SP (SP Technical Research Institute of Sweden). Other certifying bodies will be able to apply at a later stage.

Effect of approvals for building products

The BSL covers Japan nationwide. A building product with JIS or JAS approval can be used for parts of buildings throughout Japan according to the relevant "deemed-to-satisfy solutions" or "ordinary verification methods" described below in 12.1.5. A building product with ministry approval for a certain performance level can be used for building parts that require that same level of performance nationally.

12.2. Building Permission and Inspection System

12.2.1. Building Approval Procedures

Building confirmation and inspection

Under the BSL, a building owner is required to obtain a building confirmation for the building plan before starting construction work. A building confirmation will generally be given only if the building plan conforms to current Japanese provisions related to building laws and regulations. A building confirmation can be issued by a local government building official or a private building inspector from Japan's Designated Confirmation and Inspection Body.

Once construction has started, the project must undergo inspections at certain stages, depending on factors such as the building size, structure and intended use. All buildings must undergo completion inspections by the relevant building official or private building inspector when construction is finished. Unless the building passes the final inspection, the owner is not allowed to use or occupy the building.

Approval options for building

The BSL has a performance hierarchy which stipulates several compliance paths. To obtain a building confirmation, it must be demonstrated that every part of the building plan conforms to the building regulations in accordance with one or a combination of the three paths shown in the figure below. These paths include:

- a. "Deemed to satisfy solution"
- b. "Ordinary verification method;" and
- c. "Advanced verification method"

In the BSL, the following types of phrases are commonly used to explain the requirements for conformance:

"The construction of (part of building) ... shall conform to technical criteria specified by Cabinet Order... and shall use construction methods established by the Minister of Land, Infrastructure and Transport or shall be approved by the Minister."

The 'construction methods established by the Minister' are generally treated as deemed-to-satisfy solutions and/or ordinary verification methods.

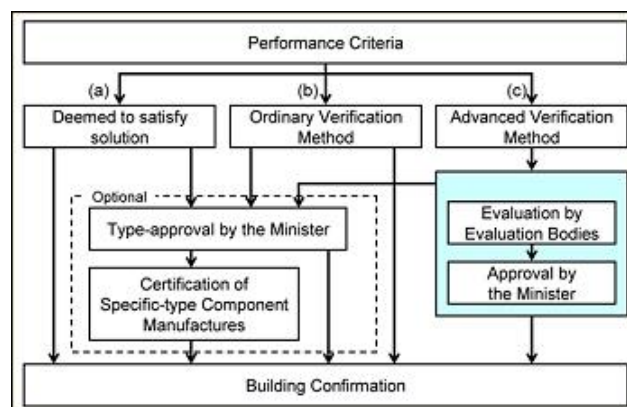
Details of construction methods including component sizes or calculation methods are usually prescribed in the Notifications. However, in relation to building materials, these Notifications also make reference to Japan Industrial Standards and Japan Agricultural Standards explained above in section 12.1.4.

On the other hand, 'be approved by the Minister' when used in this context generally means obtaining ministry approval based on a performance evaluation by a certified Evaluation Body. The performance evaluation corresponds to the 'advanced verification methods' (ministry approval will be explained later in Section 12.1.6).

In other words, each part of a building must be composed of the building materials approved by JIS or JAS and constructed according to the methods prescribed in Notifications or must be approved by the Minister.

A building confirmation will only be issued if it is demonstrated that the building as a whole integrally conforms to the BSL.

Performance Criteria



Type-approval

Even if all the components of a building are already "approved," every building must still obtain a building confirmation prior to the start of construction and must pass inspections during its construction to ensure that the building conforms to the BSL integrally.

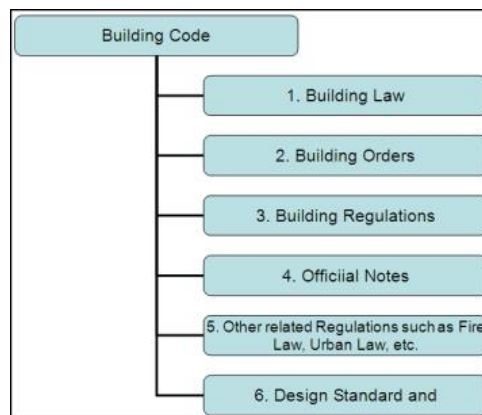
However, for mass-produced buildings such as prefabricated houses, where the combination of the building components used is always identical, obtaining approval under a type-approval scheme may be an option.

For mass produced buildings that have already obtained "type conformance approval" from a "Designated/Approved Certification Agency," the screening process during building confirmation and inspection will be simplified.

12.2.2. The Building Standard Law

The Building Standard Law and related laws and regulations are summarised as follows

Outline of Building Code



12.2.3. Building Code

The articles in the Japanese Building Code specify the following:

- Design loads
- Combination rule of loads
- Materials that can be used for structure
- Allowable stresses for each materials and
- Basic procedure for proportioning the structural members

12.2.4. The Licensed Engineer

In order to carry out the design of building, a Licensed Engineer, as defined in the Licensed Engineers Law, is required. Only a Licensed Engineer can take responsibility for a structural design and for structural calculations, and any engineering drawings must be based on the results obtained.

12.2.5. Building Quality Assessment

This is done by a Designated Qualifying Examination Body and consists of the following steps:

1. Building Confirmation
2. Interim Inspections
3. Final Inspection

Building Confirmation

The Building Standards Law requires that documents relating to design must be submitted to the Qualifying Examination Body to ensure conformity with the Building Code. This procedure is called the "Building Confirmation".

Interim Inspection

An Interim Inspection is carried out at the stage when the structural elements can be seen and before the building is completed. Therefore, the actual structure must comply exactly with the document based on the Construction Debrief Report.

Final Inspection

The structural elements are inspected based on the Construction Debrief Report. Once the construction passes this inspection, an Inspection Certificate is delivered as proof that the building has complied with the Building Standard Law.

12.2.6. Construction Debrief Report

The main items of this report are:

- Concrete strength examination result
- Reinforcement mill sheet
- Bar arrangement photograph, etc.

Practical Example in case of building a warehouse

Warehouse Construction: Data as of: January 2007

Estimated Investment Value: JPY 227,605,000 City: Tokyo

1. Initial consultation with local authority	Duration	Costs
Construction company (CC) must have clearance at the initial consultation phase with at least 14 different departments at the prefecture level. The process due to stricter requirements of compliance with construction regulations takes now around 24 days. The purpose of this consultation is to avoid the risk of resubmitting the application for the actual building permit which if submitted wrongly, or some parts require alteration, will take another 2-3 months. Closer scrutiny is paid to the structural component of the drawings and plans. The rules require an engineer to resubmit an entire construction plan even to change a peg or location of windows. Agency: Local Authority	24 days	no charge
2. Obtain consent of neighborhood*	Duration	Costs
Obtaining neighborhood consent can be carried out simultaneously with the previous procedures. The initial step is to post a sign with specific information about the planned construction on the plot. Thereafter, CC must obtain the endorsement of all neighbors (companies) stating that they do not object to the construction of the warehouse. * Takes place simultaneously with another procedure.	30 days	no charge
3. Obtain building permit from Building Department of Government of Tokyo	Duration	Costs
After the initial consultation with the local authority, the company must submit a building permit application. The local authority examines the application and issues the building permit. Normally, architects submit the application on behalf of their clients. The Fire Office is also involved in the permit examination process. The application must be amended when any changes are made after the building permit is obtained. In addition, a change permit must be obtained prior to final inspection by local authorities. After the falsification of structural calculation of buildings by former Architect Aneha became public knowledge in November 2005, many Japanese local authorities and private inspection companies have had to spend extra time checking structural design documents in new applications. This situation is still very much true in many parts of Japan. The is also a spill-over effect on site inspections by privatized control institutions, and it is likely that the Japanese government will introduce more frequent and thorough inspection procedures in building construction in the near future. Building permit review and approval procedure became very stringent since the new Building regulation as of June 20, 2007. As of June 2007 any projects exceeding 1,000 sq.m. will require a peer review process by independent authorized structural engineers/agency. The engineers are generally hired by the Building Department to undertake this review. However, the amount of work and backlog on one hand and the number of available professionals on the other hand willing to work extra hours on the weekends has caused delays. The peer review may take about 30 days in addition to 50 days of building permit review period. In simpler case the case may take on average 70 days. Agency: Building Department of Government of Tokyo	70 days	JPY 144,000

4. Request and obtain Workmen's Compensation Insurance Proof from Labor Control Office*	Duration	Costs
The Labor Control Office verifies worker compensation insurance for all companies annually. No cost is incurred for obtaining confirmation. Once a contractor obtains confirmation and insurance, it is valid for a year for any project of the contractor's company. Application for worker compensation insurance is made with the local labor control office. The applicant must comply with the registration criteria. A worker compensation insurance fee must be paid within 50 days after the application is filed. Worker compensation insurance is valid for a year, and it must be extended every year between April 1 and May 20. The insurance cost is 2.05% of the company's total personnel costs (1.25% paid by employer, 0.8% paid by employee). Agency: Labor Control Office * Takes place simultaneously with another procedure.	60 days	no charge
5. Erect statutory construction notice sign board site	Duration	Costs
The construction notice signboard should include the following information: (a) construction company registry certificate number; (b) proof of worker compensation insurance; (c) building permit number; (d) name of client, designer, contractor, project name, address, the person in charge, and the like.	1 day	JPY 50,000
6. Submit construction method plan to local authority and obtain approval	Duration	Costs
The construction method plan is submitted to the local authority for a crosscheck with the project drawings and to fill out the necessary application form. Agency: Local Authority	7 days	no charge
7. Submit project safety and health, and resources recycling plan to local authority, and obtain approval	Duration	Costs
Design drawings, construction schedule, method statement, and building permit are required for this application. The application must be submitted 7 days before construction work starts. Agency: Local Authority	7 days	no charge
8. Receive intermediate inspection by Japan Building center and obtain permit	Duration	Costs
The Japan Building Center (a privatized building control institution) and the Fire Office inspect structural conditions and conduct new building position surveys when the construction is half-completed. Inspection usually takes a day, and construction work can continue if there are no serious irregularities. However, if there are any mistakes, the construction work is suspended until proper measures are taken. An intermediate building permit is issued within 2 to 3 weeks. Agency: Japan Building Center	24 days	JPY 211,000
9. Request and receive connection to water and sewage services	Duration	Costs
The installation cost is included in water and sewerage charges. Agency: Tokyo Water Company	21 days	no charge
10. Request and receive connection to fixed telephone line*	Duration	Costs
The installation cost is included in telephone charges. Agency: Nippon Telegraph and Telephone Corp. (NTT) * Takes place simultaneously with another procedure.	14 days	no charge

11. Request final inspection from local authority	Duration	Costs
CC requests the inspection. After the completion of the inspection, the certificate is issued within 3 business days. If there are any outstanding issues pointed out by inspectors, remedial work must be completed and the building re-inspected before the completion certificate is issued. The completion certificate is required to start occupying and using the building. This certificate is distinct from the land and building registration with the local authorities, and can be issued by the local authorities or by any of the authorized institutions at a very similar cost. Agency: Local Authority	1 day	JPY 220,000
12. Receive final inspection from local authority	Duration	Costs
CC receives an inspection (after requesting one), and this inspection takes no more than a day. Agency: Local Authority	1 day	no charge
13. Obtain completion certificate	Duration	Costs
The overall time it takes in practice to obtain the completion certificate is around 2.5 weeks.	18 days	no charge
14. Register the building with the land and building registry	Duration	Costs
The building registration has two parts. First, the description of the building should be registered (usually through a notary public). This part cannot be done by CC or its lawyer. No formal registration cost is required. Second, proof of building ownership should be registered. It takes about 10 to 14 days for the registration to be completed. The cost of proof of building ownership registration varies depending on the value of the building (0.2% of the building's taxable value). Agency: Land and Building Registry	12 days	JPY 455,210

13. Contracting Procedures

13.1. Public Sector Projects

Information about Japanese Government procurement can be found on the dedicated website of the Japan External Trade Organisation - JETRO.¹³⁶

13.1.1. Open and competitive bidding procedure

In this procedure, the organisation ordering the construction project places a public advertisement describing the project that is open to competitive bidding, and considers all those who respond as wishing to participate in the bidding process. The contract is eventually concluded with the company that bids the lowest price.

In this type of general competitive bidding, the qualifications of those who want to participate in the bidding process are examined ahead of time, and only those who meet the specified criteria are eligible to participate. The WTO Agreement on Government Procurement (GPA) requires that this method be used for construction projects ordered by the national government, institutions affiliated with the national government, prefectural governments, and designated city governments. It is used for:

- Many large-scale projects
- All contracts worth more than 660 million yen that are issued by the national government; or
- All contracts worth more than 2.22 billion yen that are issued by:
 - institutions affiliated with the national government
 - prefectural government
 - designated cities

¹³⁶ <http://www.jetro.go.jp/en/database/procurement/procurement.html>

Eligibility to bid for open competitive public works projects is based on a number of factors, including the following:

- The point score assigned to the company on the basis of the Business Evaluation must be above a certain threshold;
- The company must have experience with the same type of construction project;
- The company must have qualified technical personnel available for the project.

13.1.2. Highly competitive selective bidding procedure

a) Public-Invitation Designated Competitive Bidding

Under this contracting system, the institution ordering the work confirms a company's intent to participate in bidding on a particular public works project, and requires all confirmed participants to submit simple technical documents, which it then uses to ascertain whether each has the technological capabilities needed for the particular project.

It is usually used for:

- Projects with a contract value of 200-660 million yen by the Ministry of Land, Infrastructure, Transport and Tourism;
- Projects that require more specialised construction technologies than those for which "Project Interest Registration Designated Competitive Bidding" is used.

b) Project Interest Registration Designated Competitive Bidding

When undergoing their qualification assessment, construction companies register the types, sizes, and locations of construction projects in which they are interested. The institution ordering construction work takes this information into consideration and requests registered firms to provide technical documents, after which it selects a contractor based on an assessment of the technical documents submitted.

- Used primarily for projects with a contract value of 100-200 million yen by the Ministry of Land, Infrastructure, Transport and Tourism.

13.1.3. Designated competitive bidding

Under this system, the institution ordering construction work conducts a preliminary qualification assessment of companies that wish to place bids, and creates a list of qualified companies. Before

ordering a particular project, the ordering institution then selects several qualified companies on that list that meet certain standards in terms of such criteria as the grade of the construction project, technical capabilities, and geographical conditions.

This system is usually used for:

- Small-scale projects with a contract value of less than 100 million yen.
- Projects ordered by clients without staff qualified to review the bids submitted in an open and competitive bidding procedure, and by clients who require a construction firm with some specialised construction technology.

13.1.4. Negotiated contract system

Under this system, clients do not use a competitive bidding process to select a contractor, but select a particular company to perform the work needed.

This system is used primarily:

- for projects that must be done by a particular firm due to the fact that the project requires specialised technologies, equipment, or machinery; or
- when severe time constraints make it impractical to carry out the competitive bidding process.

13.1.5. Other bidding systems

a) Design-build system

This is a method in which client institutions accept design and other technical proposals at the time of the bidding, and contract both the design and construction work together.

On some projects that require advanced or specialised technological capabilities and for which there is considerable development of construction technologies, it may be better to combine special design and construction technologies developed by separate companies than to use design and construction technologies developed separately.

b) Value engineering (VE) system

There are two types of value engineering (VE) system: a bidding VE system, where technical proposals on construction methods are accepted at the bidding stage; and a post-contract VE system, in which technical proposals on construction methods are accepted at the construction stage.

The VE system can be utilised in conjunction with either open or designated competitive bidding, or a negotiated contract system (such as by the Ministry of Land, Infrastructure, Transport and Tourism, local housing supply corporations, and local public works organisations). There are plans to expand the post-contract VE system by making it applicable to all construction projects using open and competitive bidding and public-invitation designated competitive bidding.

c) Integrated Evaluation Bidding System

In addition to bid price, the client using this system also calls upon bidders to submit technical proposals, which the client then evaluates from various perspectives, including quality, speed, design, and safety, before selecting a winner.

d) Management Technology Application Method

A contracting system wherein some of the various management tasks that were previously performed by both the buyer and the contractor (such as order planning, contract management, construction monitoring, quality management, etc.) are performed by a third-party agent.

e) Private Finance Initiative and Public Private Partnerships

Japan's Private Finance Initiative (PFI) Law was enacted in July 1999, and the Basic Guidelines based on that law were released in March 2000. Under this system, contractors are usually chosen by open competition, and those selected use their own funds and managerial and technological capabilities to construct, maintain, manage, and operate public facilities.

MLIT demonstrated its commitment to future Public Private Partnerships (PPP) in 2010 when it announced that it will earmark an extra 2 trillion yen by 2020 for such projects.

f) Construction Management (CM) Method

In December 2000, MLIT established a CM Method Research Group comprised of academic experts, private sector businesspeople, and local government representatives, thereby continuing an investigation into the possibility of implementing construction management in Japanese public works projects, and an examination of the challenges that would arise from its implementation. The CM Method Guideline was established in February 2002.

13.2. Private Sector Projects

Private-sector clients most often select contractors by means of the mission method (a decision is made after price negotiations with a

single company) or by getting estimates from several companies. The contract systems generally used are the blanket construction-only contract system, the design-build system, and the design-bid-build system, and the predominant method of contract payment is gross price contracting (lump-sum contracting). Examples of Construction Management (CM) and Project Management (PM) contracting have also arisen, but their use remains quite limited.

In addition, electrical power companies have begun to use the VE system, and real estate developers have begun to use direct contracting (in which major real estate developers dispense with general contractors and award contracts directly to specialised contractors).

14. Case studies

14.1. Forbo Flooring B.V. Japan Branch

Forbo Flooring Japan, the Japanese branch of Netherlands-based Forbo Flooring Systems BV, was established in 2007, having been present previously through a representative from 1992. The company supplies Japanese construction projects with commercial grade linoleum and vinyl floor coverings and also supplies residential buildings. Forbo Flooring Systems B.V, is the world's largest supplier of linoleum and the second largest supplier of vinyl flooring.

14.2. Gretsch-Unitas Japan, Ltd. (Germany)

For more than 100 years, Gretsch-Unitas Japan has offered a complete range of construction fittings and security equipment for windows and doors, including BKS (locking technology), FERCO (hardware) and GU Automatic (automatic entrance systems). In Japan, Gretsch-Unitas Japan is represented by MSH KK with offices in Shiba, Tokyo.

14.3. Häfele Japan K.K (Germany)

Häfele offers hardware technology supply solutions including: furniture fittings, architectural hardware and Dialock, an electronic locking system. Häfele is well established in Japan through headquarters in Yokohama with an annex Training Center, plus two showrooms (one at Ozone in Shinjuku, Tokyo and one in Osaka, adjacent to their Osaka sales office). Häfele Japan employs approximately 50 people at present.

14.4. Halfen GmbH (Germany)

Halfen is a supplier of concrete anchoring, façade fixing systems with over 1,300 employees in 14 countries. It offers high quality products for building pre-cast concrete elements in commercial and residential construction as well as civil engineering projects and for transportation and infrastructure buildings. Halfen brands include, "HALFEN," "DEHA" and "FRIMEDA". The Japan Representative Office is located in Akasaka, in central Tokyo.

14.5. Honka Japan Inc. (Finland)

Headquartered in Finland, Honka has 50 years of experience in the advancement of log home manufacturing. HONKA JAPAN was established in 1991, and has headquarters in Aoyama in central Tokyo plus Design Centers in Yamanakako (Yamanashi prefecture) Lake and Nasu Kogen Resort (Tochigi prefecture). The Representative

Director heads up a team of 12 people with a track record of more than 3,000 log houses built in Japan over the past 20 years.

14.6. MAG-ISOVER K.K. (France)

MAG-ISOVER K.K. is the insulation arm of Saint-Gobain, headquartered in France, and offers high-performance products made from glass wool providing insulation, sound absorption and air-tightness. In September 2011, MAG-ISOVER reached an agreement with Mie Prefecture to build a new glass wool plant in Tsu City as its fourth production site in Japan. The plant will be capitalised at 15 billion yen and will hire 100 workers in a bid to significantly boost the company's annual production capacity. MAG-ISOVER Japan's General Manager believes the Japanese market is very appealing, as high-performance insulation materials are still not widely used, yet residential energy conservation standards are set to become much tougher in the near future, which should drive demand for insulation materials. MAG-ISOVER received assistance from the JETRO head office in Osaka and Mie Prefectural authorities on the selection of candidate sites for the new plant.

14.7. Ove Arup & Partners Japan Limited

Arup has more than 20 years of experience in Japan, and is a leader in seismic engineering in the country. Notable structures include the Nicolas G Hayak Centre which adopts a new self mass damper system; Sony City, a massive 20-storey near-cube with base isolation in the basement; the AIG Nagasaki Building and recently the Mode Gakuen Cocoon Tower in Nishi-Shinjuku in Tokyo.

14.8. Permasteelisa Japan K.K. (Italy)

Permasteelisa Group is a worldwide contractor in engineering, project management, manufacturing and installation of architectural envelopes and interior systems. The Group offers particular know-how and expertise in dealing with Special Features Buildings. The Tokyo office is located in the Yotsuya-area.

14.9. Saint-Gobain KK (MAG CO., LTD.) (France)

Saint-Gobain K.K. was established in 1975 as the representative business hub in the Asia-Pacific region of Saint-Gobain group, a glass-products industry leader. Currently, it has about 800 employees working on building/auto/display glass, glass fibre, ceramics, plastics and abrasives as well as providing products and services.

14.10. Schott Nippon K.K. (Germany)

Established in 1966, Schott Nippon KK is one of the oldest European construction-related companies in Japan. It is part of the Schott

multinational, technology-based group, developing and manufacturing specialised glass and materials, components and systems.

14.11. Stone Tech Japan KK (Belgium)

StoneTech's core products include bluestones, which have a very small global output, and European antique paving stones (recycled from old stone pavement). StoneTech Japan imports and sells these products to Japanese construction companies, construction materials suppliers and similar businesses. In order to set up its Japan office in 2010, StoneTech made use of JETRO's Invest Japan Business Support Center (IBSC) in Tokyo for 6 months, utilising free temporary office space, consultations with experts including corporate registration and tax matters, as well as introductions to an administrative scrivener, a certified public accountant and recruiting companies. Stone Tech Japan KK is located in Shinagawa, Tokyo.

15. Appendix

15.1. Trade fairs

nano tech 2014

Time: 29 – 31 January, 2014
Frequency: Annual
Venue: Tokyo Big Sight
Organiser: nano tech executive committee
URL: www.nanotechexpo.jp/

Statistics (2013)

Visitors: 46,846 [including concurrent shows]
Exhibitors: 587

Exhibit Profile:

Materials, IT & electronics, Biotechnology, Environment & energy, Evaluation & measurement, MEMS, Nano fabrication technology.

4th ECO HOUSE & ECO BUILDING EXPO

Time: 26 – 28 February, 2014
Frequency: Annual
Venue: Tokyo Big Sight
Organiser: Reed Exhibitions Japan Ltd.
URL: www.ecohouseexpo.jp/en/

Statistics (2013)

Visitors: 76,328 [including concurrent shows]
Exhibitors: 80 [for ECO HOUSE & ECO BUILDING EXPO]

Exhibit Profile:

Energy Saving Device, Renewable Energy, Building Materials, Others

The 18th Technology Against Earthquake Expo

Time: 6 – 7 February, 2014

Frequency: Annual

Venue: Pacifico Yokohama

Organiser: Earthquake Technology Expo Secretariat
Exhibition Technologies, Inc

URL: www.exhibitiontech.com/etec/

Statistics (2013)

Visitors: 15,045

Exhibitors: 201

Exhibit Profile:

Seismometer, anti-quake diagnosing technology, quake sensors & quake alarm systems, quake-proof & quake alleviating technology/equipment/ materials/storage facilities, tents, shelters, survival food/drinking water, fire extinguishers, pumps, fire engines & fire fighting aircraft, etc.

ARCHITECTURE + CONSTRUCTION MATERIALS 2013

Time: 4 – 7 March, 2014

Frequency: Annual

Venue: Tokyo Big Sight

Organiser: NIKKEI INC.

URL: www.shopbiz.jp/en/ac/

Statistics (2013)

Visitors: 117,416

Exhibitors: 263

Exhibit Profile:

Interior / Exterior decorative materials, Flooring, Roofing / Ceilings, Doors and Opening parts, Supplementary materials, Interior, Landscape / Exterior, Design / Construction related, Facility / Equipment, etc.

EXE-Exterior Exhibition 2014

Time: April, 2014

Frequency: Annual

Venue: Tokyo Big Sight

Organiser: Exterior Exhibition 2014 Executive Committee

URL: www.ex-exhibition.jp

Statistics (2013)

Visitors: 11,842

Exhibitors: 63

Exhibit Profile:

Exterior goods, materials and related services

Asahi Housing Fair 2014/Smart House EXPO 2014

Time: 30 May – 1 June, 2014

Frequency: Annual

Venue: Tokyo Big Sight

Organiser: Asahi Housing Fair Secretariat

URL: www.housingworld.jp/english/

Statistics (2013)

Visitors: 32,263

Exhibitors: 300

Exhibit Profile:

Basic Structures, Roofing Materials, Tiles & Floor Materials, Interiors/Exteriors, Seismic Base Isolations, Seismic Force-Resisting Systems, Thermal Insulation, Universal Design, Barrier- Free, Bath and Sanitary, Assistive Technology, Software, Housing Makers, Builders, Planning / Design Offices, Electronic Manufactures, Energy-Related Companies, Suppliers, etc

BARS 2014 - Builders & Remodelers Show 2014

Time: June, 2014
Frequency: Annual
Venue: Tokyo Big Sight
Organiser: The Remodeling Business Journal
URL: www.the-bars.com/

Statistics (2012)

Visitors: 4,668
Exhibitors: 167

Exhibit Profile:

Housing equipment and facilities, building materials, interior/exterior materials, house remodeling materials and components, security system, and etc.

5th Eco-Friendly Office/Eco-Friendly Factory Expo

Time: July 2014
Frequency: Annual
Venue: Tokyo Big Sight
Organiser: Asahi Housing Fair Secretariat
URL: www.housingworld.jp/english/

Statistics (2013)

Visitors: 27,152
Exhibitors: 355

Exhibit Profile:

Energy-saving products and technologies, energy-saving office equipment, environmental management, CO2 reduction related system/service, renewable energy technologies/services, eco-products and services, consulting, eco building materials, other energy-saving standard acquired products.

Architecture Exhibition NAGOYA 2014 (44th)

Time: October 2014
Frequency: Annual
Venue: Nagoya Trade & Industry Center, Fukiage Hall
Organiser: Aichi Society's of Architects & Building Engineers
Mid-Japan Economist
URL: www.chukei-news.co.jp/kenchiku/

Statistics (2012)

Visitors: 26,100
Exhibitors: 81

Exhibit Profile:

Construction material, facilities & equipment, interior & exterior, imported construction materials, houses, CAD, OA equipment, etc.

6th International Outdoor Living & Building Products EXPO Tokyo (EXTEPO) 2014

Time: October 2014
Frequency: Annual
Venue: Makuhari Messe
Organiser: Reed Exhibitions Japan Ltd.
URL: www.gardex.jp/en/

Statistics (2012)

Visitors: 26,846
Exhibitors: 1,006

Exhibit Profile:

Eco-friendly outdoor living products (LED lights, artificial timber, etc).
General Zone; Gates, Fences, Lights, etc

The 36th Japan Home & Building Show 2014

Time: October 2014
Frequency: Annual
Venue: Tokyo Big Sight
Organiser: Japan Management Association
URL: www.jma.or.jp/jhbs/en/

Statistics (2012)

Visitors: 17,340
Exhibitors: 448

Exhibit Profile:

Building Materials, Household Equipment and Home IT Systems, CAD, Software, Business Support Systems, Products for Living Environment Consciousness and Health Consciousness, Eco-Friendly Products, Security, Tools & Machineries, Earthquake, Fire and Other Disaster Prevention, etc.

15.2. Government Agencies

Ministry of Land, Infrastructure, Transport and Tourism

Central Government Bldg. 3, 2-1-3 Kasumigaseki
Chiyoda-ku, Tokyo 100-8918
Tel: +81-(0)3-5253-8111
URL: <http://www.mlit.go.jp/en/index.html>

15.3. Organisations and Associations

Japan

Japan External Trade Organisation (JETRO)

Ark Mori Building 6F,
1-12-32 Akasaka
Minato-ku, Tokyo 107-6006
Tel: +81-(0)3-3582-5511
URL: <http://www.jetro.go.jp/>

Japanese Standards Association (JAS)

4-1-24 Akasaka
Minato-ku, Tokyo 107-8440
Tel: +81-(0)3-3583-8000 | Fax: +81-(0)3-3583-2014
URL: <http://www.jsa.or.jp/>

Associated General Constructors of Japan, Inc.

Tokyo Kensetsu Kaikan 5F., 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3551-9396

URL: <http://www.zenken-net.or.jp>

Association for Pump System Engineering (APS)

Akasaka Kato Bldg., 2-22-15 Akasaka, Minato-ku, Tokyo 107-0052

Tel: +81-(0)3-5562-0621

URL: <http://www.pump.or.jp/>

The Association of Japan Instrumentation Industry (AJII)

Toranomon Denki Bldg. 5F., 2-8-1 Toranomon, Minato-ku, Tokyo 105-0001

Tel: +81-(0)3-3580-8921

URL: <http://www.keiso.or.jp/>

Association of Nihon Tunnel Construction Sub-Contractors

Broderie Nishi-Shimbashi 9F., 1-9-1 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003

Tel: +81-(0)3-5251-4150

URL: <http://www.tunnel.jp/>

Association of Precise Survey and Applied Technology

Kanzan Bldg. 9F., 4-40-11 Takadanobaba, Shinjuku-ku, Tokyo 169-0075

Tel: +81-(0)3-3362-6840

URL: <http://www.sokugikyo.or.jp/>

Building and Equipment Long-Life Cycle Association (BELCA)

Shiba Excellent Bldg. 4F., 2-1-13 Hamamatsucho, Minato-ku, Tokyo 105-0013

Tel: +81-(0)3-5408-9830

URL: <http://www.belca.or.jp/>

Building Services Council

Kinshi Bldg. 5F., 2-8-1 Shintomi, Chuo-ku, Tokyo 104-0041

Tel: +81-(0)3-3553-6431

Construction Experts Association

Toranomon 4-chome MT Bldg. 2-gokan 6F., 4-2-12 Toranomon, Minato-ku, Tokyo 105-0001

Tel: +81-(0)3-5425-6805

URL: <http://www.kensenren.or.jp/>

Construction Industries Development Foundation

Toranomon 4-chome MT Bldg. 2-gokan, 4-2-12 Toranomon, Minato-ku, Tokyo 105-0001

Tel: +81-(0)3-5473-4570

URL: <http://www.kensetsu-kikin.or.jp/>

Construction Industries Management Society

Tokyo Kensetsu Kaikan 5F., 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032
Tel: +81-(0)3-3551-4832

Construction Industries Transaction Improvement Organisation

Akasaka Long Beach bldg. 3F., 3-21-20 Akasaka, Minato-ku, Tokyo 107-0052

URL: <http://www.tekitori.or.jp>

Construction Industry Information Center (CIIC)

No. 29 Kowa Bldg. 7F., 2-11-24 Tsukiji, Chuo-ku, Tokyo 104-0045

Tel: +81-(0)3-5565-6131

URL: <http://www.ciic.or.jp/>

Diamond Construction Association

Nomoto Bldg. 2F., 4-13-6 Shiba, Minato-ku, Tokyo 108-0014

Tel: +81-(0)3-3454-6990

URL: <http://www.dca.or.jp/>

Electric Power Civil Engineering Association

Ogai Bldg. 4F., 2-8-2 Shibakoen, Minato-ku, Tokyo 105-0011

Tel: +81-(0)3-3432-8905

URL: <http://www.jepoc.or.jp/>

Japan Association of Dam & Weir Equipment Engineering

Edogawabashi Bldg. 3F., 1-47-12 Sekiguchi, Bunkyo-ku, Tokyo 112-0014

Tel: +81-(0)3-3267-0371

URL: <http://www17.ocn.ne.jp/~dam/>

Japan Association of Structure Painting Constructors (JASP)

Kayabacho 2-chome Bldg. 3F., 2-4-5 Nihombashi Kayabacho, Chuo-ku, Tokyo 103-0025

Tel: +81-(0)3-6231-1910

URL: <http://www.jasp.or.jp/>

Japan Bridge Association (JBA)

Nishi-Shimbashi Kowa Bldg. 9F., 1-6-11 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003

Tel: +81-(0)3-3507-5225

URL: <http://www.jasbc.or.jp/>

Japan Bridge Engineering Center (J-BEC)

Otowa NS Bldg., 2-10-2, Otowa, Bunkyo-ku, Tokyo 112-0013

Tel: +81-(0)3-5940-7788

URL: <http://www.jbec.or.jp>

Japan Civil Engineering Contractors Association, Inc. (JCE)

Tokyo Kensetsu Kaikan 6F., 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3552-3201

URL: <http://www.nikkenren.com/archives/doboku/top/index.html>

Japan Compressed Air Construction Industries Association

No. 7 Akagi Bldg. 4F., 1-14-6 Shinkawa, Chuo-ku, Tokyo 104-0033

Tel: +81-(0)3-3551-8669

Japan Concrete Institute (JCI)

Sogo Hanzomon Bldg. 12F., 1-7 Kojimachi, Chiyoda-ku, Tokyo 102-0083

Tel: +81-(0)3-3263-1571

URL: <http://www.jci-net.or.jp/>

Japan Concrete Pumping Association

Hongo Bldg. 6F., 1-16 Kanda Sudacho, Chiyoda-ku, Tokyo 101-0041

Tel: +81-(0)3-3254-0731

URL: <http://www.cc.rim.or.jp/~zenatsu/>

Japan Construction and Carpentry Industries Association

IK Bldg. 1F., 6-20-11 Shimbashi, Minato-ku, Tokyo 105-0004

Tel: +81-(0)3-6435-6208

URL: <http://www.nikkendaikyou.or.jp/>

Japan Construction Cooperative Association (JCAA)

Nishishimbashi Kowa Bldg. 6F., 1-6-11 Nishi-shimbashi, Minato-ku, Tokyo 105-0003

Tel: +81-(0)3-3504-1515

URL: <http://www.kensetsurengou.org/>

Japan Construction Engineers' Association

Hulic Akasaka Bldg. 7F., 3-21-13 Akasaka, Minato-ku, Tokyo 107-0052

Tel: +81-(0)3-3585-4546

URL: <http://www.zenken.com/>

Japan Dam Foundation

Ginza GT Bldg. 7F., 2-14-2 Ginza, Chuo-ku, Tokyo 104-0061

Tel: +81-(0)3-3545-8361

URL: <http://damnet.or.jp/>

Japan Demolition Contractors Association

Anna Takarajima Bldg. 6F., 4-1-3 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3555-2196

URL: <http://www.zenkaikouren.or.jp/>

Japan Dredging and Reclamation Engineering Association

Kokusai Sanno Bldg. 8F., 3-3-5 Akasaka, Minato-ku, Tokyo 107-0052

Tel: +81-(0)3-5549-7468

URL: <http://www.umeshunkyo.or.jp/>

Japan Dredging Association

Root Kakigaracho Bldg. 6F., 1-19-9 Nihombashi Kakigaracho, Chuo-ku, Tokyo 103-0014

Tel: +81-(0)3-3661-3561

Japan Earth Moving Construction Association (JEMCA)

Ueno Fuji Bldg. 9F., 5-1-8 Higashi-Ueno, Taito-ku, Tokyo 110-0015

Tel: +81-(0)3-3845-2727

URI: <http://www.jemca.jp/>

Japan Federation of Construction Contractors (JFCC)

Tokyo Kensetsu Kaikan 8F., 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3553-0701

URL: <http://www.nikkenren.com/>

Japan Federation of Framework Construction Contractors Association

Tokyo Kutai Kaikan 2F., 34-7 Kumanochō, Itabashi-ku, Tokyo 173-0025

Tel: +81-(0)3-3972-7221

URL: <http://www.nihonkutai.or.jp/>

Japan Foundations Engineering Association

Wind Hatchobori Bldg. 705, 4-14-7 Hatcho, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3551-7018

URL: <http://www.kisokyo.or.jp/>

Japan Grout Association

Kasuga Bldg. 9F., 1-1-2 Koraku, Bunkyo-ku, Tokyo 112-0004

Tel: +81-(0)3-3816-2681

URL: <http://www.japan-grout.jp/>

Japan Mastic Painting Contractors Association

Toso Kaikan, 19-22 Uguisudani-cho, Shibuya-ku, Tokyo 150-0032

Tel: +81-(0)3-3496-3861

URL: <http://www.mastic.or.jp/>

Japan Microtunnelling Association (JMA)

Nishimura Bldg. 3F., 2-11-18 Tomioka, Koto-ku, Tokyo 135-0047

Tel: +81-(0)3-5639-9230

URL: <http://www.suisinkyo.or.jp/>

Japan Press-in Association (JPA)

Konan YK Bldg. 9F., 2-4-12 Konan, Minato-ku, Tokyo 108-0075

Tel: +81-(0)3-5781-9155

URL: <http://www.atsunyu.gr.jp/>

Japan Small Construction Contractors Association

1-6-12 Nihombashi Kayabacho, Chuo-ku, Tokyo 103-0025

Tel: +81-(0)3-3668-7917

URL: <http://www.zenchuken.or.jp/>

Japan Roofing Contractors Association (JRCA)

Zennoyaku Bldg. 6F., 3-3-4 Uchikanda, Chiyoda-ku, Tokyo 101-0047

Tel: +81-(0)3-5298-3797

URL: <http://www.jrca.or.jp/>

Japan Tilers Association

Tokyo Kara Kaikan 4F., 1-7-9 Fujimi, Chiyoda-ku, Tokyo 102-0071

Tel: +81-(0)3-3265-2887

URL: <http://www.yane.or.jp/>

Japan Steel Constructors Association

Prosper Bldg. 2F., 1-3-3 Iwamotocho, Chiyoda-ku, Tokyo 101-0032

Tel: +81-(0)3-5829-6124

URL: <http://www.tekken-kyo.or.jp/>

Japan Tile Works Association

Kokuho-21 5F., 2-29 Ichigayatamachi, Shinjuku-ku, Tokyo 162-0843

Tel: +81-(0)3-3260-9023

URL: <http://www.nittaren.or.jp/>

Japan Tunneling Association

Tsukiji M Bldg. 6F., 2-11-26 Tsukiji, Chuo-ku, Tokyo 104-0045

Tel: +81-(0)3-3524-1755

URL: <http://www.japan-tunnel.org/>

The Japan Technical Carpenters Association

Dai-2 Higashi Bldg. 9F., 1-14 Kanda Sakumacho, Chiyoda-ku, Tokyo 101-0025

Tel: +81-(0)3-3253-8301

URL: <http://www.h2.dion.ne.jp/~daikusan/>

Japan Sheet-Metal Constructions Association

Bankin Kaikan, 1-3-37 Mita, Minato-ku, Tokyo 108-0073

Tel: +81-(0)3-3453-7698

URL: <http://www7.ocn.ne.jp/~zenban/>

Japan Painting Contractors Association (JPCA)

Toso Kaikan 3F., 19-22 Uguisudanicho, Shibuya-ku, Tokyo 150-0032

Tel: +81-(0)3-3770-9901

URL: <http://www.nittoso.or.jp/>

Japan Road Contractors Association (JRCA)

Tokyo Kensetsu Kaikan 3F., 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3537-3056

URL: <http://www.dohkenkyo.com/>

Japan Prestressed Concrete Contractors Association

Dai-3 Miyako Bldg., 4-6 Tsukudocho, Shinjuku-ku, Tokyo 162-0821

Tel: +81-(0)3-3260-2535

URL: <http://www.pcken.or.jp/>

Land Improvement Construction Association of Japan (LICA)

Nogyo Doboku Kaikan 2F., 5-34-4 Shimbashi, Minato-ku, Tokyo 105-0004

Tel: +81-(0)3-3434-5961

URL: <http://www.dokaikyo.or.jp/>

National Federation of Construction Contractors (NFCC)

Toranomon 4-chome MT Bldg. 2-gokan 6F., 4-2-12 Toranomon, Minato-ku, Tokyo 105-0001

Tel: +81-(0)3-5473-1596

URL: <http://www.kensanren.or.jp>

National Federation of Small Construction Contractors

12-4 Nihombashi Hakozaicho, Chuo-ku, Tokyo 103-0015

Tel: +81-(0)3-5643-1065

URL: <http://www.zenkenren.or.jp/>

National Association of Reinforcement Placing Contractors

Takemoto bldg. 4F., 1-4-11 Kyobashi, Chuo-ku, Tokyo 104-0031

Tel: +81-(0)3-3281-2184

URL: <http://www.zentekkin.or.jp>

National Water Well Association of Japan

Tokyo Kensetsu Kaikan 4F, 2-5-1 Hatchobori, Chuo-ku, Tokyo 104-0032

Tel: +81-(0)3-3551-7524

URL: <http://www.sakusei.or.jp/>

Public Buildings Association, Ltd.

Tonetsu Shinkawa Bldg. 6F., 1-24-8 Shinkawacho, Chuo-ku, Tokyo 104-0033

Tel: +81-(0)3-3523-0381

URL: <http://www.pbaweb.jp/>

Research Institute of Construction and Economy (RICE)

NP-Onarimon Bldg 8F., 3-25-33, Nishi-Shimbashi, Minato-ku, Tokyo 105-0003

Tel: +81-(0)3-3433-5011

URL: <http://www.rice.or.jp>

Scaffolding and Construction Materials Leasing Association

NK Bldg. 7F., 3-6 Kanda-Ogawamachi, Chiyoda-ku, Tokyo 101-0052

Tel; 03-3293-3148

URL: <http://www.keikasetu.or.jp/>

Temporary Construction Industries Association

Masuyama Bldg. 4F., 1-18-1 Nihombashi Kakigaracho, Chuo-ku, Tokyo 103-0014

Tel: +81-(0)3-3667-4816

Urban Renewal Association of Japan (URAJA)

Dai-6 Central Bldg. 3F., 1-19-10 Toranomon, Minato-ku, Tokyo 105-0001

Tel: +81-(0)3-3591-2361

URL: <http://www.uraja.or.jp/>

Europe

JETRO Wien (Austria)

Parkring 12a/8/1, 1010 Vienna, AUSTRIA

TEL:43-1-587-56-28 | FAX:43-1-586-22-93

URL: <http://www.jetro.go.jp/austria/>

JETRO Brussels (Belgium)

Rue de la Loi 82 1040 Brussels, BELGIUM

Tel: +32 2 282 0500 | Fax: +32 2 280 2530

URL: <http://www.jetro.go.jp/belgium/>

JETRO Praha (Czech Republic)

Na Prikope 1096/19,117 19 Praha 1, CZECH REPUBLIC

TEL:420-222-312-978(Japanese)/420-224-814-971(Other languages) | FAX:420-224-813-998

JETRO Copenhagen (Denmark)

Rådhuspladsen 16, 1550 Copenhagen, DENMARK

TEL: 45-8896-8627

JETRO Helsinki (Finland)

Mannerheimintie 12 B 5th floor,00100 Helsinki, FINLAND

TEL:358-9-2516-6399 FAX:358-9-2516-6100

URL: <http://www.jetro.go.jp/finland/>

JETRO Paris (France)

27 rue de Berri, 75008 Paris, FRANCE
TEL:33-1-42-61-27-27 FAX:33-1-42-61-19-46
URL: <http://www.jetro.go.jp/france/>

JETRO Berlin (Germany)

Friedrichstadt Passagen, Quartier 205, Friedrichstr. 70, 10117 Berlin
BUNDESREPUBLIK DEUTSCHLAND
TEL:49-30-2094-5560 FAX:49-30-2094-5561
URL: <http://www.jetro.go.jp/germany/>

JETRO Düsseldorf (Germany)

Immermannstrasse 65C 40210 Düsseldorf, BUNDESREPUBLIK
DEUTSCHLAND
TEL:49-211-136020 FAX:49-211-326411
URL: <http://www.jetro.go.jp/germany/>

JETRO Budapest (Hungary)

1051, Budapest, Bajcsy-Zsilinszky út 12, HUNGARY
TEL:36-1-266-7687 FAX:36-1-266-7688
URL: <http://www.jetro.go.jp/hungary/>

JETRO Milano (Italy)

Via Santa Maria Segreta, 7/9 20123 Milano, ITALIA
TEL:39-02-7211791 FAX:39-02-72023072
URL: <http://www.jetro.go.jp/italy/>

JETRO Amsterdam (Netherlands)

World Trade Center, Amsterdam, Tower-C 4th Floor, Strawinskylaan
447, 1077 XX Amsterdam, THE NETHERLANDS
TEL:31-20-6765075 FAX:31-20-6647597
URL: <http://www.jetro.go.jp/netherlands/>

JETRO Warszawa (Poland)

BTC Office Center 1st floor, Al. Niepodległości 69, 02-626 Warszawa,
POLAND
TEL:48-22-322-7500 FAX:48-22-322-7601
URL: <http://www.jetro.go.jp/poland/>

JETRO Bucharest (Romania)

24th Italiană Street, ArionGreen Bldg, 3rd floor, 2nd district, 020976,
Bucharest, ROMANIA
TEL:40-21-310-6801 FAX:40-21-310-6800

JETRO Madrid (Spain)

Plaza de Carlos Trías Bertrán 7 Edificio Sollube, Planta 2, Oficina 1
28020 Madrid, ESPAÑA
TEL:34-91-391-2100 FAX:34-91-310-3659
URL: <http://www.jetro.go.jp/spain/>

JETRO Stockholm (Sweden)

Wallingatan 11, 111 60 Stockholm, SWEDEN
TEL:46-(0)8-503-20-522

JETRO London (Japan Trade Centre) (United Kingdom)

MidCity Place, 71 High Holborn, London, WC1V6AL, U.K.
TEL:44-20-7421-8300 FAX:44-20-7421-0009
URL: <http://www.jetro.go.jp/uk/>

JETRO Japan Ship Centre (United Kingdom)

Second Floor, Front Unit, 6 Lloyd's Avenue, London, EC3N 3AX
TEL:44-20-7680-9456 FAX:44-20-7680-9416
URL: <http://www.jetro.go.jp/uk/>

15.4. List of EU Embassies in Japan

Embassy of the Republic of Austria

1-1-20 Moto-Azabu, Minato-ku, Tokyo, 106-0046
Tel: +81-(0)3- 3451-8281 | Fax: +81-(0)3-3451-8283
URL: <http://www.bmeia.gv.at/tokio>
E-mail: tokio-ob@bmeia.gv.at

Embassy of the Kingdom of Belgium

Nibancho 5-4, Chiyoda-ku, Tokyo 102-0084
Tel: +81-(0)3-3262-0191 | Fax: +81-(0)3-3262-0651
URL: <http://www.diplomatie.be/tokyo/>
E-mail: tokyo@diplobel.fed.be

Embassy of the Republic of Bulgaria

5-36-3 Yoyogi, Shibuya-ku, Tokyo 151-0053
Tel: + 81-(0)3-3465-1021 | Fax: + 81-(0)3-3465-1031
E-mail: Embassy.Tokyo@mfa.bg

Embassy of Croatia

3-3-10 Hiroo, Shibuya-ku, Tokyo 150-0012
Tel: + 81-(0)3-5469-3014 | Fax: + 81-(0)3-5469-3015
URL: <http://jp.mfa.hr>
E-mail: croemb.tokyo@mvpei.hr

Honorary Consulate-General of the Republic of Cyprus

Hibiya Marine Bldg., 7F., 1-5-1, Yurakucho, Chiyoda-ku, Tokyo 106-0006

Tel: +81-(0)3-3592-0611

Embassy of the Czech Republic

3-11-5 Hiroo, Shibuya-ku Tokyo 150-0012

Tel: +81-(0)3-3400 8122 | Fax: +81-(0)3-3400 8124

URL: <http://www.mzv.cz/tokyo/cz/index.html>

E-mail: tokyo@embassy.mzv.cz

Royal Danish Embassy

29-6 Sarugakucho, Shibuya-ku, Tokyo, 150-0033

Tel: +81-(0)3-3496-3001 | Fax: +81-(0)3-3496-3440

URL: <http://japan.um.dk/>

E-mail: tyoamb@um.dk

Embassy of the Republic of Estonia

2-6-15 Jingumae, Shibuya-ku, Tokyo 150-0001

Tel: +81-(0)3-5412-7281 | Fax: +81-(0)3-5412-7282

URL: <http://www.estemb.or.jp/>

E-mail: Embassy.Tokyo@mfa.ee

Embassy of Finland

3-5-39 Minami-Azabu, Minato-ku, Tokyo, 106-8561

Tel: +81-(0)3-5447-6000 | Fax: +81-(0)3-5447-6042

URL: <http://www.finland.or.jp/>

E-mail: sanomat.tok@formin.fi

Embassy of France

4-11-44 Minami-Azabu, Minato-ku, Tokyo, 106-8514

Tel: +81-(0)3-5798-6000 | Fax: +81-(0)3-5798-6000

URL: <http://www.ambafrance-jp.org/>

Embassy of the Federal Republic of Germany

4-5-10 Minami-Azabu, Minato-ku, Tokyo, 106-0047

Tel: +81-(0)3-5791-7700 | Fax: +81-(0)3-5791-7773

URL: <http://www.tokyo.diplo.de>

Embassy of Greece

3-16-30 Nishi-Azabu, Minato-ku, Tokyo, 106-0031

Tel: +81-(0)3-3403-0871 | Fax: +81-(0)3-3402-4642

URL: <http://www.mfa.gr/tokyo>

E-mail: gremb.tok@mfa.gr

Embassy of the Republic of Hungary

2-17-14 Mita, Minato-ku, Tokyo, 108-0073

Tel: +81-(0)3-3798-8801/4 | Fax: +81-(0)3-3798-8812

URL: <http://www.mfa.gov.hu/kulkepvisolet/JP/en/>

E-mail: mission.tio@kum.hu

Embassy of Ireland

Ireland House, 2-10-7 Kojimachi, Chiyoda-ku, Tokyo, 102-0083

Tel: +81-(0)3-3263-0695 | Fax: +81-(0)3-3265-2275

URL: <http://www.irishembassy.jp/>

Embassy of Italy

2-5-4 Mita, Minato-ku, Tokyo, 108-8302

Tel: +81-(0)3-3453-5291 | Fax: +81-(0)3-3456-2319

URL: <http://www.ambtokyo.esteri.it>

E-mail: ambasciata.tokyo@esteri.it

Embassy of the Republic of Latvia

37-11 Kamiyama-cho, Shibuya-ku, Tokyo 150-0047

Tel: +81-(0)3-3467-6888 | Fax: +81-(0)3- 3467-6897

URL: <http://www.latvia.ie/lv/japan/>

E-mail: embassy.japan@mfa.gov.lv

Embassy of the Republic of Lithuania

3-7-18 Moto-Azabu, Minato-ku, Tokyo 106-0046

Tel: +81-(0)3-3408-5091 | Fax: +81-(0)3-3408-5092

URL: <http://jp.mfa.lt/>

E-mail: amb.jp@mfa.lt

Embassy of the Grand-Duchy of Luxembourg

Luxembourg House 1F 8-9 Yonban-cho, Chiyoda-ku, Tokyo, 102-0081

Tel: +81-(0)3-3265-9621 | Fax: +81-(0)3-3265-9624

URL: <http://tokyo.mae.lu/en/>

E-mail: infotokyo.amb@mae.etat.lu

Honorary Consulate General of the Republic of Malta

c/o Institute for Political Studies in Japan, Room 207, Silkroad Bldg,
1-16-16 Ohara, Setagaya-ku, Tokyo 156-0041

Tel: +81(0)3-3460-2392

Embassy of the Kingdom of the Netherlands

3-6-3 Shiba Koen, Minato-ku, Tokyo, 105-0011

Tel: +81-(0)3-5776-5400 | Fax: +81-(0)3-5776-5535

URL: <http://japan.nlbassade.org/>

E-mail: tok@minbuza.nl

Embassy of the Republic of Poland

2-13-5 Mita, Meguro-ku, Tokyo, 153-0062

Tel: +81 (0)3-5794-7020 | Fax: +81 (0)3-5794-7024

URL: <http://www.tokio.polemb.net/>

E-mail: tokio.amb.sekretariat@msz.gov.pl

Embassy of Portugal

Kamiura Kojimachi Bldg., 3-10-3 Kojimachi, Chiyoda-ku, Tokyo, 102-0083

Tel: +81-(0)3-5212-7322 | Fax: +81-(0)3-5226-0616

URL: <http://www.embaixadadeportugal.jp>

Embassy of Romania

3-16-19, Nishi-Azabu, Minato-ku, Tokyo 106-0031

Tel: +81-(0)-3479-0311 | Fax: +81-(0)3-3479-0312

URL: <http://tokyo.mae.ro>

E-mail: office@ambrom.jp

Embassy of the Slovak Republic

2-11-33, Motoazabu, Minato-ku, Tokyo, 106-0046

Tel: +81-(0)3-3451-2200 | Fax: +81-(0)3-3451-2244

URL: <http://www.tokyo.mfa.sk>

E-mail: emb.tokyo@mzv.sk

Embassy of the Republic of Slovenia

7-14-12 Minamiaoyama, Minato-ku, Tokyo 107-0062

Tel: +81-(0)3-5468-6275 | Fax: +81-(0)3-5468-1182

URL: <http://tokyo.embassy.si/>

E-mail: vto@gov.si

Embassy of Spain

1-3-29 Roppongi, Minato-ku, Tokyo, 106-0032

Tel: +81-(0)3-3583-8531 | Fax: +81-(0)3-3582-8627

URL: <http://www.maec.es/subwebs/Embajadas/Tokio/jp>

E-mail: emb.tokio@maec.es

Embassy of Sweden

1-10-3-100 Roppongi, Minato-ku, Tokyo, 106-0032

Tel: +81-(0)3-5562-5050 | Fax: +81-(0)3-5562-9095

URL: <http://www.sweden.or.jp/>

E-mail: ambassaden.tokyo@foreign.ministry.se

British Embassy

1 Ichibancho, Chiyoda-ku, Tokyo, 102-8381

Tel: +81-(0)3-5211-1100 | Fax: +81-(0)3-5275-3164

URL: <http://ukinjapan.fco.gov.uk/en/>