



Thermal insulation - a key to improved energy efficiency and reduced CO2 emissions in Japan

Recommendation:

The European Business Council in Japan (EBC) urges the government of Japan to improve insulation regulations to promote energy efficiency in residential and commercial buildings and fulfill its international commitment to cut carbon emissions.

In particular, the government should align its regulation with OECD countries in similar climate zones by establishing mandatory U values (heat transmission coefficient – W/m². C) for windows significantly under 2, preferably under 1.2, as is common in many European countries. U values for walls should, furthermore, be mandated as U = 0.35 for the completed wall.

The low insulation standards of commercial buildings must also be acutely addressed, as they currently high-rise office buildings having single glazed windows and facades, resulting in a U value of around 6 W/m².

Background

The efficient use of energy is essential in fighting global warming. Whilst average consumption and CO₂ emission per capita in Japan is lower than OECD average¹, Japan is almost certain to fail its targets under the Kyoto protocol according to the Ministry of Environment. GHG emissions in 2006 were 6% over 1990 levels, rather than 6% under as targeted for 2012².

Regardless of the CO₂ targets, however, Japan has a pressing incentive to improve its energy efficiency as 80% of the country's energy is imported³. While increased nuclear power can partially help Japan reaching its commitments under the Kyoto agreement, improved energy efficiency remains crucial.

Over 30% of the energy in Japan is consumed by commercial and residential buildings, and the *consumption in buildings is growing faster* than in other industries and transport⁴. By addressing the acute need for improved energy efficiency in new buildings and the standing building stock, Japan can make progress on both its international commitments and reduce its dependence on imported energy.

Energy efficient buildings play a crucial role in the plans to cut CO2 emissions in the European Union. In Germany, plans to reduce CO2 emissions, for instance through improved heating and insulation of residential and non-residential buildings, account for over 15% of the savings, or 41 million tons of CO2 by 2020.⁵

Germany's thermal building regulations already mandate a higher performance for both new construction, and renovation of existing buildings, and these regulations are set to be improved upon. At the same time has Japan no mandatory rules and seemingly no plan to control the surge in energy consumption created by energy inefficient buildings.

The EBC defies strongly the opinion voiced in Japan that energy efficiency in buildings entails large costs or the sacrificing of economic growth – significant efficiency improvements can be realised by using products and technologies which are available today⁶. Quite contrarily, using better building methods and products already available in the market offer in most cases better return on investment than any financial product available on the market. The costs involved in improved insulation and thermal performance are in fact investments – ‘the only by-product of energy efficiency is wealth’⁷.

Better regulation

The Japanese government has for long realised the importance of energy efficient technologies in fields ranging from automotive to solar panels, heavy industry, and in particular electrical appliances. Prime Minister Fukuda has in the run up to the G8 Summit in Hokkaido in July 2008 correctly pointed to the importance of promoting technological solutions to global climate change. It is therefore particularly surprising to see the lack of government policies to promote energy efficiency in the sector with largest consumption and hence the potential for greatest positive saving effect. Space heating and cooling account for around 25% of energy use in both commercial and residential buildings in Japan⁸ but the Government has no apparent plan to improve the obvious inefficiencies of the new and standing stock of buildings. Energy used in commercial buildings in Japan (offices, healthcare and educational facilities, retail establishments and warehouses) represents 8% of world energy consumption in such facilities⁵.

Schemes such as CASBEE, the Energy Efficiency Standard for houses, and the PAL/CEC assessment for larger office buildings are heading in the right direction, but key components of these schemes are still yet to be made mandatory across the country, and often do not even approach generally accepted international standards and practices. Though the CASBEE assessment tool, and the Energy Saving Law provide a common language, measurement methods and platform for communication amongst stakeholders, residential and commercial buildings continue to be constructed with low insulation performance compared to standard practice in many other OECD nations with similar climates.

The principal/agent problem remains a major obstacle as investors in energy efficient buildings/improved insulation are often not the beneficiaries. Owners and developers find it difficult to pass on to tenants the increased initial costs of more efficient buildings, who find it hard to compare lower running costs with increased rents. Commercial sector energy demand is typically price inelastic in the short term, as energy costs represent a small proportion of overall business running costs, compared to rent and wages for example.

Even in the residential sector, homeowners often find the concept of lower utility bills offsetting increased mortgage repayments for a given building area as having too long term a payback period.

The government has therefore a crucial role to play and the EBC urges the government in particular to:

Establish mandatory U values (heat transmission coefficient – W/m². C) for windows and of under U 2 and doors of under U 3, in line with many other OECD nations with similar climates. A U value for windows of 2.7 – 4.65 in a city with Tokyo's climate (Zone IV) is well below comparable EU standards which in many countries are below 2 and also inferior to many building in Seoul, Shanghai and Beijing.

Establish mandatory U = 0.35 values for the completed wall as a systems, in line with many other OECD nations.

Address the ridiculously low insulation standards of commercial buildings, which despite the introduction of the PAL and CEC assessments, continues to allow high-rise office buildings having only single glazed windows and facades, often resulting in a U value of U=6. Even double glazing with standard, or so called 'low E' grades, achieves only a U value of around 3 . Compared with European values typically around or even below U=2, and in some countries with comparable climates to Kyushu and Hokkaido now tending to a U value of 1, the energy inefficiency is appalling.

About the EBC:

The European Business Council (EBC) is the trade policy arm of the 18 European national chambers of commerce and business associations in Japan. Established in 1972, the EBC works to improve the trade and investment environment for European companies in Japan. The EBC currently represents more than 3,000 local European companies and individuals who are members of their national chambers of commerce. 350 of these companies participate directly in the EBC's 29 sector-based committees.

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References

McKinsey Global Institute *Curbing Global Energy Demand Growth: The Energy Productivity Opportunity* May 2007

Energy Conservation Centre Japan *Japan Energy Conservation Handbook 2007*

METI

International Energy Agency *Key World Energy Statistics 2007*

Simplified comparison of building regulations (various domestic and international sources)

U values (W/m ² .K)	Germany – required performance of building element		Japan (Region IV of VI, eg Tokyo) – U value of additional applied insulation layer - recommended	
	Residential	Typical Office	Apartment constructed from concrete – insulation material requirement if applied internally	House constructed of timber frame – insulation material requirement for cavity fill
Exterior Walls	0.35	0.35	0.91	0.43
Roof	0.30	0.30	0.40	0.22
Windows	1.9	1.9	4.65	4.65
Exterior doors	2.9	2.9	No requirement	No requirement

Lower values provide more insulation

Japanese energy intensity and productivity (source IEA)

2005	Energy consumption per capita (Toe)	CO2 emissions per capita (tonnes)	Energy Productivity (Toe/GDP)
Japan	4.15	9.50	0.15
OECD	4.74	11.02	0.18

Toe = Tonne of Oil Equivalent

Energy Productivity = Consumption of Toe per 000 GDP, 2000 \$ at PPP

Energy Intensity per capita = consumption Toe per capita

Japanese total energy supply and imports (source IEA)

IEA - 2005	TPES (Toe)	Net Imports (Toe)
Japan	530.46	438.98

Toe = Tonne of Oil Equivalent

TPES = Total Primary Energy Supply = Production + imports – exports – marine bunkers +/- stock changes

¹ International Energy Agency *Key World Energy Statistics 2007*

² Ministry of Environment *Greenhouse Gas Emissions in Japan 17 October 2006*

³ *ibid.*

⁴ Greenhouse Gas Inventory Office Japan *Press Release 29 May 2007*

⁵ www.bundesregierung.de, articles 26 April 2007

⁶ Committee on Civil Engineering and Architecture, Science Council of Japan *Policy Recommendations for reducing energy consumption in the building sector May 2007*

⁷ The Economist newspaper *10 May 2008*

⁸ McKinsey Global Institute *Curbing Global Energy Demand Growth: The Energy Productivity Opportunity May 2007*