CO_2 Emissions Reduction Efforts by Fujitsu Microelectronics Europe

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This paper describes efforts being made by Fujitsu Microelectronics Europe (FME) to reduce CO_2 emissions, which is the major objective defined in the environmental program of the Fujitsu Group. By moving its headquarters to a new office building, FME has cut electricity consumption by 13% and cut heating gas consumption by 59%. FME's electricity consumption no longer adds to global CO_2 emissions because green electricity is now purchased from a hydroelectric power plant, which provides 100% renewable energy that is absolutely emission-free.

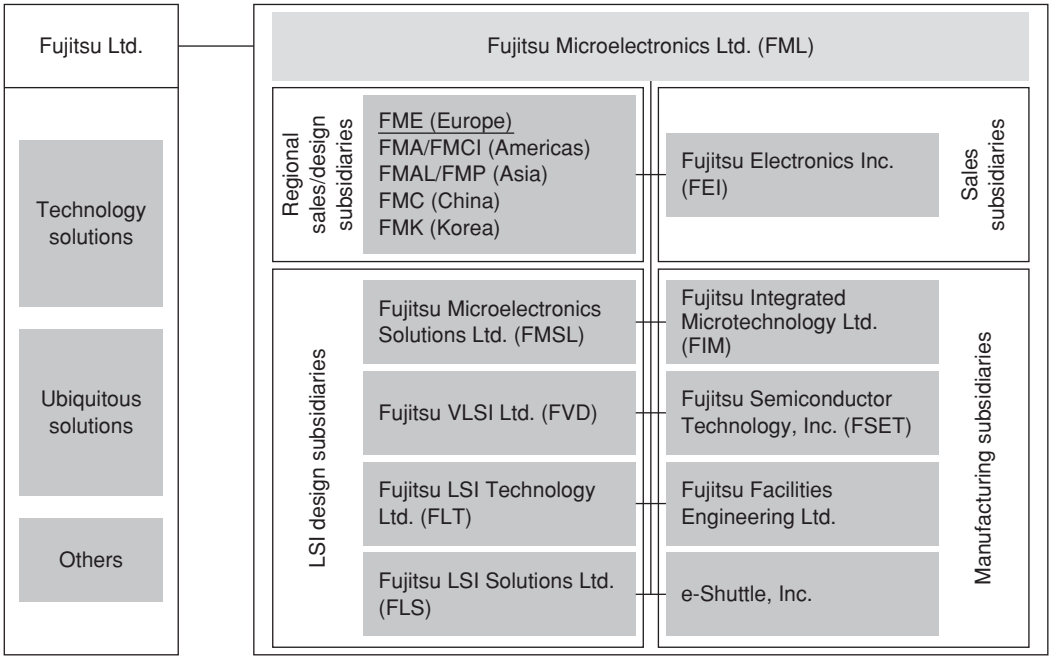
1. Introduction

1.1 Global warming and countermeasures

Recent studies indicate that the increase in greenhouse gases, most notably CO_2, is the main factor responsible for the observed global warming. The main source of greenhouse gases produced by human activity is the combustion of solid, liquid, and gaseous forms of fossil fuels. The Fujitsu Group has embarked on an environmental program[1] whose major objective is to reduce CO_2 emissions. Possible approaches to CO_2 emission reduction as a countermeasure against global warming include reducing energy consumption through efficiency improvements and switching to energy supplies that are not based on fossil fuels. Interest in energy from renewable sources will boom when their cost efficiency attains parity with other competing energy sources.[2] Germany, where Fujitsu Microelectronics Europe GmbH (FME)[3] is located, is well on the way to meeting its ambitious targets for expanding the use of renewable energy sources.

1.2 Fujitsu Microelectronics Europe

FME is an overseas subsidiary company of Fujitsu Microelectronics Ltd.[4] (**Figure 1**), Tokyo, one of the top 20 world-wide semiconductor manufacturers, who first established a European sales presence in 1980 in Frankfurt, Germany. Today FME's customers in Europe, the Middle East, and Africa (known as the EMEA market) are served by offices in Germany, France, Italy, Great Britain, and Hungary with a total of 350 employees. The customers are supported by European-based development centers, technical services, sales functions, and a distribution center. FME supplies a wide range of semiconductor products to the EMEA market with the focus on five market segments: automotive, application specific integrated circuits and customer owned tooling (ASIC & COT), communications, multimedia, and industrial. The core products of the product portfolio are ASICs, communications ICs, graphics display controllers, microcontroller units, and multimedia ICs. FME has been certified according to ISO14001 since March 2006 in integrated certification of the Fujitsu Group. Ever since it started working towards ISO14001 certification, FME has put even more focus on environmental aspects. Global warming is still the most press-



FMA: Fujitsu Microelectronics America, Inc.
FMCI: Fujitsu Microelectronics Canada Inc.
FMAL: Fujitsu Microelectronics Asia PTE. Ltd.
FMP: Fujitsu Microelectronics Pacific Asia Ltd.
FMC: Fujitsu Microelectronics (Shanghai) Co., Ltd.
FMK: Fujitsu Microelectronics Korea Ltd.

Figure 1
Organization of Fujitsu Microelectronics Ltd.

ing issue we are facing.

1.3 FME's Environmental Policy

FME has its own environmental policy[5] to assure continuous improvement of the environment. Its philosophy and principles are given below.

1) Philosophy

Fujitsu Microelectronics Europe GmbH recognizes that environmental protection is a business issue of vital importance. The principles for ecological action are specified in the so-called Environmental Policy, based on Fujitsu Japan's Environmental Policy.[6]

2) Principles

- We strive to reduce the environmental impacts of our products throughout the product lifecycle.
- We are committed to conserving energy and natural resources, and practice a 3R approach (reduce, reuse, recycle) to create best-of-class eco-friendly products.
- We seek to reduce risks to human health and the environment from the use of harmful chemical substances or waste.
- Through our IT products and solutions, we help customers reduce the environmental impact of their activities and improve environmental efficiency.
- We disclose environment-related information on our business activities, products and services, and we utilize the resulting feedback to critique ourselves in order to further improve our environmental programs.
- We encourage our employees to work to improve the environment, bearing in mind the impact of their business activities and their civic responsibilities.

Figure 2
New office building.

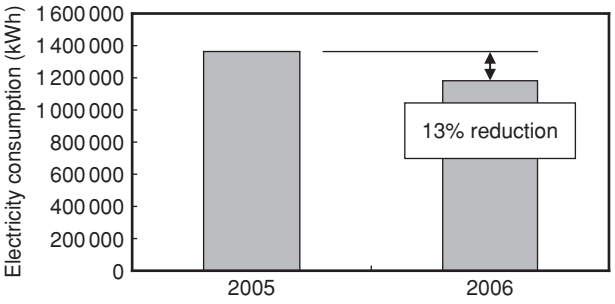


Figure 3
Reduction in electricity consumption.

- Our company is committed to keep existing environmental laws and regulations as well as conditions in connection with agreements and this we also expect from our third party Partners.
- By providing relevant information we want to ensure the confidence of the public, our neighborhood, our customers and suppliers by informing them about our Environmental Policy.
- The environmental awareness of employees of all levels shall be fostered by corresponding training measures.
- Our target is to continuously improve the environmental protection of our locations.
- All necessary steps will be taken to avoid emergency cases by ensuring all employees' attentiveness.
- We are pursuing activities to realize a sustainable management that fulfills our corporate social responsibilities and satisfies the expectations of all our stake holders.

2. FME's contribution to reducing global warming

FME has only offices and one warehouse, so it has only a minor environmental impact. Its biggest contribution to global warming comes from CO_2 emissions related to FME's energy consumption, so it focused on this issue and tried to reduce the energy consumption as much as possible. The main forms of energy used are electricity and heating gas. These are the two big sources emitting CO_2 to the atmosphere. A major proportion of FME's activities is LSI design. The workstations used for such LSI simulations are high-performance computers and often run 24 hours a day. The majority of the servers are located in FME's headquarters in Langen, which is the hub of the European data network, so the Langen site has higher electricity consumption per square meter than FME's other branch offices.

2.1 Electricity

FME used the move to a new office building (**Figure 2**) in December 2005 to lower electricity consumption. Information technology (IT) equipment was replaced with more energy-efficient equipment and the IT infrastructure was reorganized. The electricity consumption in the previous building was 1 363 827 kWh in 2005. This was reduced by 13% to 1 182 974 kWh after the move to the new building in 2006 (**Figure 3**). One of FME's most successful green steps has been arranging a new electricity supply for the facilities at its headquarters and its warehouse.

2.2 Green electricity

Activities related to renewable energy are actively promoted in Germany, and they have led to

Figure 4
Interviewed by local press.

Figure 5
Green electricity certificate.

various types of renewable energy, such as wind, solar photovoltaic, and water energy, being supplied. According to the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the adoption rate of renewable energy is definitely increasing in Germany. One of its reports[7] shows that the share of renewable energy sources was 8.6% of the total final energy consumption (electricity, heat, and fuel) for 2007. For electricity consumption, in particular, the share of renewables in the gross energy consumption was 14.2%. This percentage is rising rapidly, and Germany has already exceeded the Government's 2010 target of 12.5%.

After evaluating the market, FME's purchasing department found a supplier of green electricity. Since the switchover in January 2008, FME's electricity consumption has not added at all to global CO_2 emissions. FME had to accept only a small increase in cost within the first year, and from 2009 onwards there will be no additional costs to pay. It concluded a contract with the Stadwerke Langen (municipal utility) to pay for electricity supplied by a hydroelectric power plant in Norway. Hydroelectricity comes from 100% renewable energy sources and is absolutely emission-free. According to the certificate FME received, it is saving 467 tons of CO_2 every year. FME was the first company in Langen to use green electricity and was interviewed by the local press (**Figure 4**). It got green electricity certification (**Figure 5**). The certificate shows that "FME covers its electricity demand with 100% renewable energy in 2009 and 2010. This arrangement will save approximately 467 tons of CO_2 a year and hereby decisively reduce the burden".

This year FME received a Fujitsu Group Environmental Award[note)] for its CO_2-free LSI design and for its 100% green electricity office. It received the "Fujitsu Group Environmental Contribution Prize", which the Corporate Environmental Affairs Dept. of Fujitsu Ltd. has been presenting since FY 1996 with a view to raising environmental awareness and promoting efforts in environmental preservation activities

note) Honorable recognition for environmental activities is given by the Fujitsu Group every year.

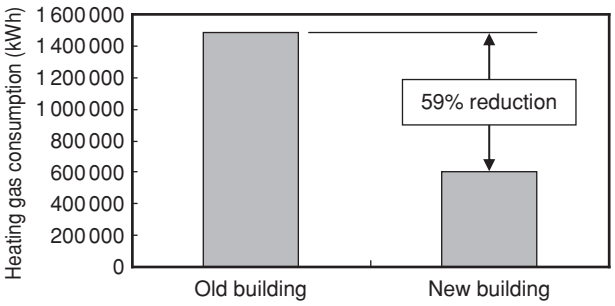


Figure 6
Reduction in heating gas.

targeting all employees in the Company and its domestic and overseas group companies.

2.3 Heating gas

FME was also able to save heating energy by moving to the new modern office building, for two reasons. First, the new building was built according to high energy saving standards. For example: the cooling system uses cooling ceilings to cool the room temperature to as much as 5°C below the outside temperature. The energy consumption for heating in kWh/m^2 is now more than 50% below good practice for office buildings (according to the municipal utility) and 70% below the average for office buildings (according to the German Energy office). Second, compared with the old building, the consumption of heating gas (equivalent value) has dropped from 1 482 654 to 604 020 kWh. This is a reduction of 59%. (**Figure 6**).

2.4 Practical steps

In Europe, FME is making substantial contributions through specific projects. Amongst the green successes are collection and re-use of empty trays, use of multi-use containers that make outer boxes and filling materials obsolete. These efforts, plus the introduction of lead-free solder material and new solder processes, together with organized collection and recycling of products, all help to reduce negative environmental impact.

3. Conclusion

FME has taken steps to reduce its CO_2 emissions to contribute to the efforts of the Fujitsu Group to ease global warming. The outcomes of these activities are summarized below:

1) By moving its headquarters to a new office building, FME has cut electricity consumption by 13% and cut heating gas consumption by 59%.
2) FME's electricity consumption no longer adds to global CO_2 emissions. Green electricity is now purchased from a hydroelectric power plant which provides 100% renewable energy that is absolutely emission-free.

In addition, FME is expecting several benefits from these green activities. First, it expects to improve communications with the local government because its positive image has also had a positive impact on the image of the area where it is located. Second, it expects its employees to value the environment-friendly attitude. This should result in a higher index for employee satisfaction in its next employee satisfaction survey.

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