

Appendix 1:

KOMATSU: Application of JEPIX 2003

1. Introduction

Although Japanese Environmental Accounting Guideline enables quantitative expression of environmental cost, its economical effect and environmental performance, those figures can be interpreted in various ways and hence there could be still some difficulty in evaluation or assessment of the data. One of the most important reasons for it would be that different types of environmental impacts are not comparable to each other. JEPIX contributes to mitigation of this difficulty by providing a single-score unit for several types of environmental impacts and ultimately makes it possible to express the environmental performance of a company with a single figure.

Komatsu, one of the largest manufacturers in Japan engages in manufacturing and selling of construction and mining equipment, electronics products, industrial machinery & vehicles and environment-related systems.

2. Application of environmental accounting guideline

To achieve more efficient environmental management Komatsu has adopted the *Environmental Accounting Guideline* and has been disclosing its results through their environmental reports since 1999. In 2000 they began to apply this Guideline also to their subsidiaries in foreign countries and the results have been disclosed in their environmental reports.

The *Environmental Accounting Guideline* was published by the Ministry of Environment Japan originally in 1999 as an interim report and thereafter has been twice revised. Since the Ministry of Environment published this *Guideline*, many Japanese companies have adopted environmental accounting (half-automatically). According to the survey of the Ministry in the year 2001, 491 companies had then practiced environmental accounting in Japan and 367 of them had disclosed its results mainly through their environmental reports. It is sure that the Guideline has highly contributed to the prevalence of environmental accounting in Japan.

The *Guideline* introduces three structural elements; environmental conservation cost, environmental conservation benefit and economic benefit associated with environmental conservation activities. Environmental conservation cost consists of investments and expense related to the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster and other activities and these are measured in monetary value. Environmental conservation benefit is the benefits which are obtained from the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities and these are measured in physical units, such as kg and ton etc. Economic benefit associated with environmental conservation activities is the benefits to a company's profit as a result of carrying forward with environmental conservation activities and these are measured in

monetary value. The basic idea of the *Guideline* is to classify and compare these three elements each other so that more efficient environmental management will be accomplished. Komatsu became able to grasp quantitatively the cost and effect of environmental conservation by introducing the *Guideline*. It has been made clear that both the investment and expense for environmental conservation has declined in comparison with those of last year, especially the investment of inland.

Although the (financial or economic) situation of the environmental conservation can be made fairly clear by application of the *Guideline*, there are so many (financial as well as physical) figures available that it is still possible to interpret them in various ways and to reach different conclusions. Another reason for the difficulty would be the vagueness which lies in the definition of each structural element of the *Guideline*, especially in definition of “environmental conservation related” cost.

Most importantly, the impacts on environment take place in many different ways so as to be measured in different measures; for example, emission of green house gas, contamination of water, production of solid waste and so on. This fact makes it difficult to compare the environmental impacts to each other in a rational manner, and this difficulty has not been well overcome in the *Guideline*. To eliminate or mitigate this difficulty, Komatsu decided to apply JEPIX from the year 2003, which makes it possible to compare and assess different types of environmental impacts with a consistent unit in a holistic way.

3. Application of JEPIX

JEPIX is a set of index which makes different types of environmental impacts comparable and ultimately makes it possible to express the environmental impact caused from activity of a company with a single figure. Here some features of JEPIX will be briefly stated.

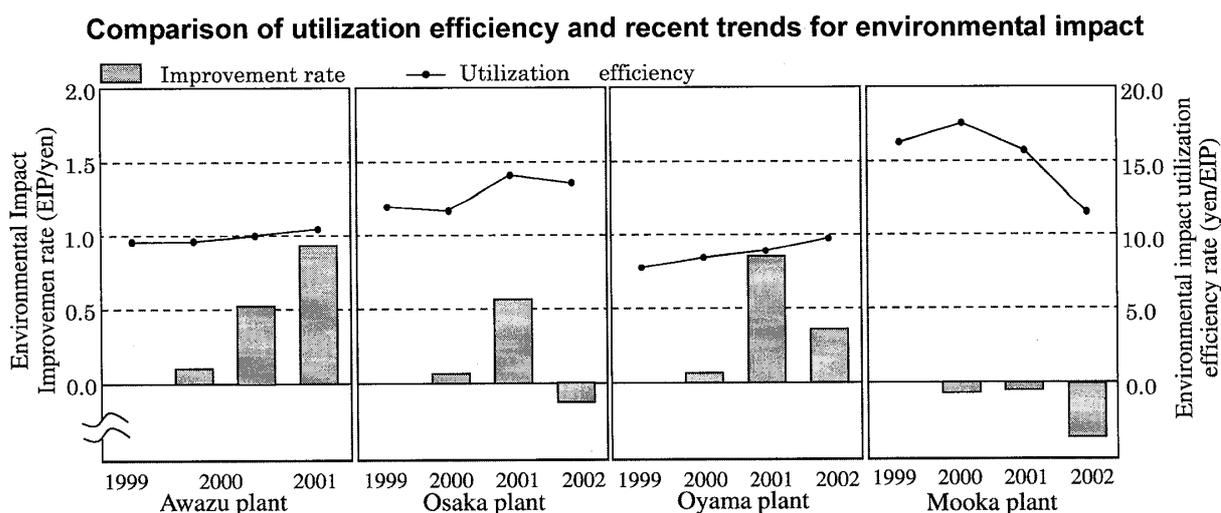
Firstly JEPIX project was inspired by the EcoScarcity theory which was originally founded and advocated by Ruedi Müller-Wenk in his outstanding work (*Die ökologische Buchhaltung*, Campus, 1978) and has been published also as BUWAL SRU 133. One of the most important principles of this theory is to establish a single-score index which shall indicate priorities of action.

Secondly JEPIX reflects Japanese environmental policies, which means that the priorities derived from applying JEPIX correspond mainly with the (*democratically decided*) environmental policies of Japanese government (partly as well as with some internationally common recommendations/guidelines of those of IPCC etc.). The indices are basically calculated as a ratio between the actual and the target flow of material which indicates the “*distance to the target*”, and the estimation of the target flow is based on the environmental policies of Japanese government. As a result the priorities which are set by the government will automatically be the priorities of each company which adopts JEPIX as a management tool.

Thirdly JEPIX is based on a bottom up approach as contrasted with the *Guideline* which has been discussed above. The *Guideline* was stipulated and published by the Ministry of

Environment and therefore it is close to a top down approach. On the contrary the JEPIX project was initiated by Claude Siegenthaler and developed by the JEPIX team (Nobuyuki Miyazaki, Claude Siegenthaler, Satoshi Kumagai, Eiichi Shinozuka, Ayako Nagayama), which shall be characterized as a voluntary and private organization. Financial support was given by the Japan Science and Technology Corporation as a part of **Eco-Rating Project** for the fiscal years 2001-2003 and also by the Ministry of Education, Culture, Science and Technology Japan as a part of **'21st Century COE (Center of Excellence) Program'** for the fiscal years 2003-2007. In addition to this, support by institutions of great authority, twelve of Japanese leading companies, which are TEPCO (Tokyo Electric Power Company), J-Power (the Electric Power Development Company), Canon, Suntory and etc. have founded the **"JEPIX Forum"** to discuss and analyze the efficient way of its practice.

Komatsu applied JEPIX to four of their inland factories and by making two types of index about eco-efficiency, it has become possible to compare their efficiency and effectiveness in environmental conservation based on a single unit EP. The results are shown in the figure below:



Improvement rate:

*Effect of environmental impact reduction in relation to cost (EIP/yen) for environmental conservation activities, enabling us to measure the extent of environmental impact reduction for each monetary unit of 1 yen for environmental conservation activities.

*This enables us to assess the effectiveness of environmental conservation activities.

Utilization efficiency rate:

*Manufactured value in relation to the degree of environmental impact (yen/EIP), enabling us to measure the amount of monetary value added (manufactured value) in relation to the degree of environmental impact

*This enables us to assess the environmental impact utilization efficiency rate directly related to business activities.

Cost of environmental conservation activities:

costs + investment amounts – depreciation amount

EIP: Environmental Impact Points

(Source) Komatsu Environmental Report 2003, pp.8-9.

4. Conclusion

According to the result Awazu plant has recorded the highest “*improvement rate*” for the fiscal year 2002 which indicates the efficiency of environmental conservation activities, on the other hand Osaka plant has earned the best “*utilization efficiency rate*” which indicates the equivalent value added with the least environmental impact. Therefore it is possible to conclude that Awazu plant has carried out the most efficient environmental conservation and Osaka plant has been the most environmentally friendly plant when expressed in quantitative terms. In addition it is possible to grasp that Oyama plant has been steadily reducing its environmental impact year by year.

Thus by adopting JEPIX it has become possible for the top management to judge easily which factory has created the least/most environmental impact based on a single unit EP and by combing with monetary environmental costs and economical value added further comparison and evaluation has become possible. Komatsu plans to apply this method also to Komatsu Group manufacturing facilities and overseas manufacturing facilities in order to practice ecological business administration on a consolidated basis.