

**EVENT LCA**  
**-Reduction of Environmental Impacts Throuth Environmental Communication Among Stakeholders-**

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**ABSTRACT**

A number of events aimed at elevation of environmental consciousness have been taken place, because they are expected to share the interests in environment problems and to take actions for environment effectively. Many of them including the Torino Olympic, FIFA World Cup and G8 Hokkaido Toyako Summit adopted carbon offset programs to realize carbon neutral. Evaluation of GHG emissions through an event is needed for carbon offset, but there are several problems to be solved. Especially, the infrastructure for assessment including database and tools are still limited. There is little consensus on the scope of assessment and assessment procedure.

This paper discussed the present problems to be solved in the field of event LCA and provided the results of environmental evaluation of several events like Tokyo marathon, football game, and annual festival in university. Simultaneously, the outlook of event LCA and carbon offset have been examined based on these experiences.

**INTRODUCTION**

A number of events aimed at the elevation of environmental consciousness have been taken place recently. Events with a lot of people are expected as useful opportunity sharing the environmental information and promoting actions for environment. Carbon offset is considered as an effective way to fulfill the above expectations. Many of them including the Torino Olympic, FIFA world cup and Lake Toya summit adopted this to realize carbon neutral.

Table 1 shows the comparison of events which published the amount of CO<sub>2</sub> emission. The scope of analysis and timing the calculated results are released to the public are also shown. The following problems can be raised from this table.

Table1: Examples of environmental assessment for events (B: before the event, D: during the event)

Name	Total amounts of CO <sub>2</sub>	Scope	timing
G8 Hokkaido Toyako Summit [1]	25,000ton (temporary)	transportation, accommodation, energy in the hall	B
2006 FIFA World Cup Germany[2]	92,000ton	stadium, transportation, accommodation	

Olympic Winter Games in Torino[3]	118,516ton	vehicles, electricity, heating	
Tokyo Marathon 2008	5,500ton	public relations, security, management, transportation, meals etc.	B
Fuji rock festival[4]	413ton	transportation	
School festival	25ton	electricity, waste management, meals, transportation, public relations etc.	D

> Quickness of analysis: Hopefully, the temporary result should be informed on the day of the event in order to promote environmental communication.

> Comprehensiveness of analysis: The scope of evaluation should cover as far as possible in order to avoid underestimate the result. Some of big events include thousands items.

The solutions to these above problems are required.

LCA, life cycle assessment is a tool to assess potential environmental impacts of products and services. Since ISO standard of LCA released to the public, a number of LCA case studies were examined by industries and companies. Infrastructure for LCA such as database and software were developed and published. However, most case studies of LCA were applied to product life cycle, in other words, the number of case studies of LCA for events is still limited. Applying LCA infrastructure can be expected for the settlement. We assessed Tokyo marathon 2008 and university festival based on hybrid LCA using both inventory data obtained by input-output analysis and process analysis. The result of LCA for these events were described in this paper.

### **CASE STUDY 1 –Tokyo Marathon 2008-**

#### **Goal of this study**

The aim of this study can be classified to internal and external use.

For internal use: The result will be used for finding out the effective way to reduce total emission of CO<sub>2</sub>. The findings will be practically used in the next time.

For external use: The result of this study will be informed to elevate the peoples' interests in environmental consciousness. Temporary result will be released to the public in the news on the day of the event. Final results also informed to Japanese citizens afterwards.

Table 1 summarizes the outline of this event.

Table 1 the outline of assessed event (Tokyo marathon 2008)

Date	2008. Feb. 17
Sponsor	The Tokyo Metropolitan Government
Venue	Tokyo (starting point: Tokyo Metropolitan City Hall, Finishing point: Tokyo Big Sight)
Visitors	35,031 (including from overseas)
Weather	Fine

### Scope of this study

All of the items covered this study can be classified to concerned parties; sponsors and athletes.

Categories concerned with sponsors (including staff and volunteers): public relations, sub-events, security, management, entry and record, office and waste management

Categories concerned with athletes: transportation, accommodation and meals

More than 2000 items were covered in this study.

Figure 1 shows the summary of scope of this study.

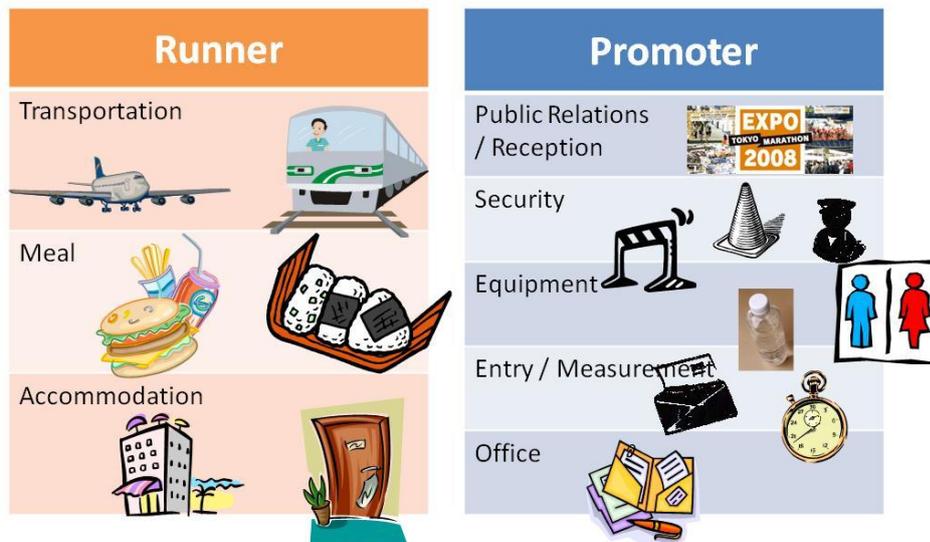


Figure 1 the summary of scope in this study (Tokyo marathon 2008)

### Methods and data sources

All of the fundamental data including the types of items and financial data were obtained from sponsor. Many of them were multiplied by CO<sub>2</sub> emission rate based on input-output analysis [5]. In this event, various attempts for the environment were carried out. The effects of these efforts were evaluated using scenario analysis.

## RESULTS and DISCUSSION

Figure 2 shows the result of LCCO<sub>2</sub> through the event. The total amount of CO<sub>2</sub> emission including direct and indirect emissions was calculated as 4,900 ton. This amount is equal to that emitted by 200 thousand people per one day in Japan.

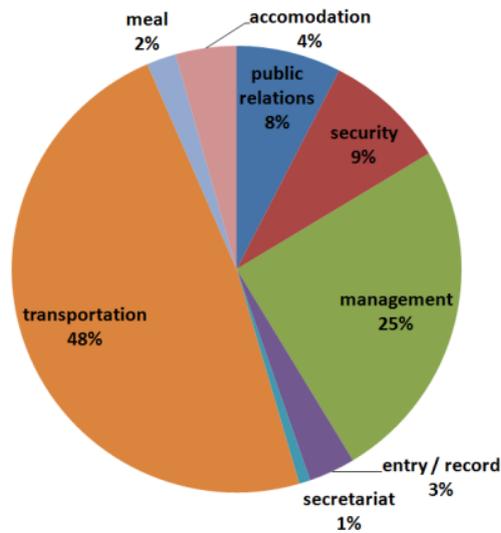


Figure 2: Total CO<sub>2</sub> emission and the contributions of categories

The environmental burdens of transportation occupied a half of total. Figure 3 illustrates the relationship between the contributions of CO<sub>2</sub> emission and the number of athletes. The contribution of flight used by athletes from foreign countries was estimated high, although the number of these people was only 4% of total.

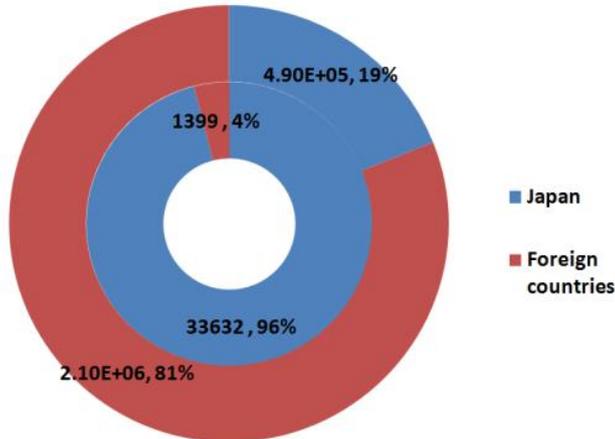


Figure 3: Comparison between CO<sub>2</sub> emissions caused by transportation and the number of athletes

The emission caused by equipments such as the stands, temporary lavatory and fence used in the starting point, the finish point and the marathon course were also estimated high. The commemorative products like T-shirt and medals given to athletes were also important. Environmental burdens related to services like rental, volunteers, guard are also significant. The effects of activities for environment implemented by sponsor were also assessed. These results will be used to reduce CO<sub>2</sub> emission in the next time.

**CASE STUDY 2 –Campus festival -  
Goal of this study**

The aim of this study is used for carbon offset. The staff used the temporary result to explain the contents of carbon offset program to the visitors during the event. The amount of contributions collected by persons concerned was used for afforestation in Hokkaido. Table 3 shows the outline of assessed event.

Table 2 the outline of assessed event (campus festival)

Date	2008. May. 31 – June. 1
Sponsor	Musashi Institute of Technology (former name of Tokyo City University)
Venue	Yokohama
Visitors	9,000
Weather	Fine

**Scope of this study**

All of the items covered this study can be classified to concerned parties; university, promoter and athletes. The scope of this study was raised as follows.

Categories concerned with sponsors (including staff and volunteers): public relations, sub-events, consumption articles, instrument and office

Categories concerned with university: electricity, water, gas and waste management

Categories concerned with athletes: transportation and meals

More than 500 items were covered in this study.

Figure 4 shows the summary of scope of this study.

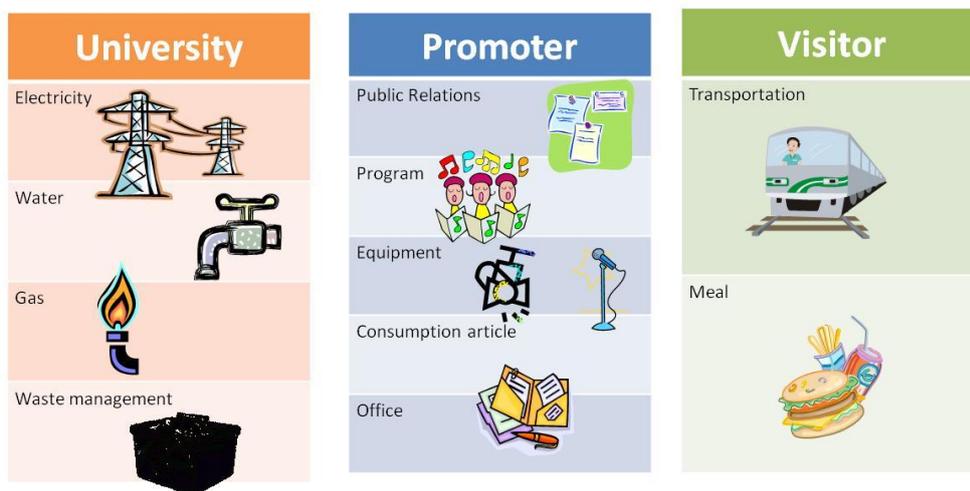


Figure 4 the summary of scope in this study (campus festival)

**Methods and data sources**

All of the fundamental data including the types of items and financial data were

obtained from promoter of this event. Most of them were multiplied by CO<sub>2</sub> intensities based on process analysis published in research papers. In this event, various attempts for the environment were carried out. The effects of these efforts were evaluated using scenario analysis.

## RESULTS and DISCUSSION

Figure 5 shows the result of LCCO<sub>2</sub> through the event. The total amount of CO<sub>2</sub> emission including direct and indirect emissions was calculated as 25.5 ton.

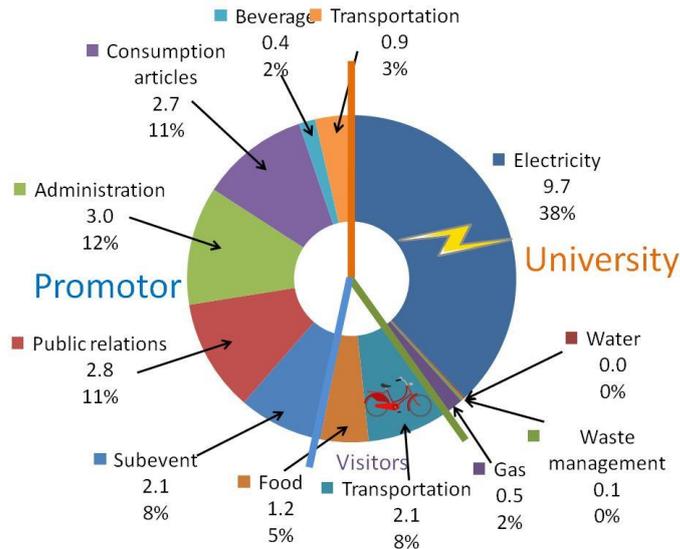


Figure 5: Total CO<sub>2</sub> emission and the contributions of categories (campus festival)

The environmental burdens of electricity in school occupied 40 percent of total. The contributions of school building and gymnastic hall are estimated high. The emissions by promoter are also high. Taking the contributions of consumption articles, public relations and administration into account in the calculation are important to avoid underestimation of total emission of CO<sub>2</sub>. The emission caused by transportation was estimated low, because most of visitors came from near place and they use transportation device comparatively lower CO<sub>2</sub> emission such as bicycle, subway and walk.

## CONCLUSION

A LCA for large-scale sports event and campus festival were carried out using hybrid approach. This approach enabled us to obtain the calculated result quickly. Temporary result was broadcasted on the day of the event. Final result was obtained with the fixed data provided by sponsor and this was also informed to the Japanese citizens. Through this process, it became possible to share environmental communication among various stakeholders like athletes, sponsor, and audience effectively.

Event LCA enables us to see environmental impacts through the life cycle including the preparation and end of event. Most of the conventional studies for evaluating potential environmental burdens cover only limited items like electricity and transportation. These items are important to take into account, but there are various of items used in the event like

distributions, instrument, security services, creation. Through these case studies, it was found that the inclusions of these above items might be important to recognize total emission of event from the view point of life cycle.

### **OUTLOOK**

The result of Tokyo marathon has not been used for carbon offset, because this was not the first priority for concerned parties. In the case of the festival in university held in summer 2008, the result of LCA was used for carbon offset. This was explained by student to guests. The amount funded by visitors was used for afforestation in Hokkaido. These activities can also be considered as high effects of environmental education.

### **REFERENCES**

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