# Chapter 22 Infrastructure Sharing and Renewable Energy Use in Telecommunication Industry for Sustainable Development

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## ABSTRACT

An important factor in green ICT challenges is to reduce the creation and emission of green house gases by all means. This chapter is concentrating on how telecommunication network operators could operate in a very much more environment friendly way by co-existing with their fellow operators by way of sharing infrastructure such as towers and power generators which will reduce the emission of green house gases. The chapter has described the impact and the magnitude of telecom infrastructure on the environment and the ways that can be practised in order to reduce the emission of green house gases.

#### INTRODUCTION

There is currently a worldwide concern about global warming caused specifically by the  $CO_2$  fuelled greenhouse effect and the role that pollution plays in weather and environment. Some scientists say global warming is also intensifying naturally depicted through extreme weather patterns like

typhoons, floods, severe droughts, changes in sea levels and marine biology (Lu, H. 2009).

Telecommunications is an essential component of development in today's context and has one of the highest growth rates in the world. Therefore, "green" movement in the telecom industry is essential to us all. As energy prices soar, telecommunication network operators are even more motivated to scrutinize their expendi-

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tures and evaluate their environmental and social responsibilities. In practice, the energy usage can be calculated into  $CO_2$  emissions. One kilowatthour can be converted into about 0.658 Kg  $CO_2$  emission (In-stat. 2009).

Our main focus in this chapter would be to look at how base stations in the telecommunication networks could be made greener so that environment will be cleaner for the future generations. Aside from the energy usage closely associated with the operation of base station equipment, the use of other resources and materials can also be calculated by the emission of  $CO_2$ . The consumption of raw materials and field-consumption can be converted into  $CO_2$  emission as follows.

- Material usage refers to the energy used to produce the steel and concrete to build the base stations, which can be converted into CO<sub>2</sub> emissions.
- 2. The decrease of forest area brought about by the field consumption of base stations can also be converted into  $CO_2$  emissions. (In-Stat. 2009).

To assume one normal base station can be used for 5 years, the gross emissions would be 211 tons of  $CO_2$ . One-time consumption of raw

material or field occupation can be calculated into  $CO_2$  emissions, and then distributed across a 5-year cycle. As illustrated in Figure 1, the total  $CO_2$  emission volumes can be broken down by operation energy usage (including main equipment, ancillary equipment, and other equipment) and the one-time consumption (raw material and field occupation).

As shown in Table 1 base station sites consume up to 90% of the energy in the network. Hence maximum sharing of land, towers, power and shelters will effect the highest possible reduction in the energy consumption. Thus it will be the best approach to minimize the  $CO_2$  emissions in the telecommunication industry. The following calculation shows the  $CO_2$  emission for a tower built;

Manufacturing 1 tonne of steel produce 0.04 metric tons of CO2 (U.S. Environmental Protection Agency2003).

Average weight of a 70m tower (three leaded) is 17 tones (The Ministry of industry of the Republic of Belarus. 2008).

Total CO2 emission when manufacturing a 60m tower= 0.068metric tones.



Figure 1. Energy usage of each component in the mobile networks (Adopted Source In-Stat)

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