

Thanat Poonpratin 2012: Carbon Footprint of the Department of Chemical Engineering at Kasetsart University. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Thumrongrut Mungcharoen, Ph.D. 158 pages.

This research assesses the Carbon Footprint of the Department of Chemical Engineering at Kasetsart University using Organizational Carbon Footprint assessment guidelines including the Corporate Carbon Footprint assessment guideline of Thailand (2011), The Greenhouse Protocol (2004), ISO 14064 Part 1 (2006) and ISO/DTR 14069 (2011). The Greenhouse Gases (GHGs) emissions are defined into 3 scopes as follows: 1- direct emissions of the organization, 2- indirect emission from the purchased electricity and 3- all other indirect emissions. The GHGs emissions are expressed in carbon dioxide equivalents composting of the six types of GHGs specified in the Kyoto Protocol.

It is found that, during the 2010 academic year, the Department of Chemical Engineering had a Carbon Footprint of 826.13 tons CO₂eq/year or 1.85 tons CO₂eq/person/year. It can be classified to the contribution of types 1, 2 and 3 as 34.47, 548.10 and 243.56 tons CO₂eq/year or 4%, 66% and 30%, respectively. Given the Department of Chemical Engineering's target of reducing its Carbon Footprint by 5% within 5 years based on the United Nations Framework Convention on Climate Change for developed countries, the appropriate measures are the replacement of the old 33 air-conditioners and the existing 1,042 36-watt fluorescent bulbs. The measures would decrease the GHGs emissions by 31.25 and 19.58 tons CO₂eq/year, respectively or by 6.2% of the 2010 baseline data. To evaluate the economic return on investment using the Simple Payback method, it is found that the payback periods are less than 6 years for the air-conditioners replacement and less than 4 years for the 36-watt fluorescent bulbs replacement. Moreover, several measures to reduce GHGs of the department in all 3 scopes are also suggested.

Student's signature

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