



## Assessment of Carbon Dioxide Reduction Efficiency Using the Regional Carbon Neutral Model—A Case Study in University Campus, Taiwan

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### ABSTRACT

A regional carbon neutral model was built to assess the balance of carbon dioxide (CO<sub>2</sub>) absorption by plants and emission by power usage in Tajen University, in the south of Taiwan, in order to test a carbon neutral model on a small-scale carbon neutral effect and its correlation to a large-scale forest carbon neutral effect. The number of plants was measured to estimate the CO<sub>2</sub> fixation volume on the Tajen University campus. The results showed that the total CO<sub>2</sub> absorption volume by plants was 34,800 tons during a 40-year plant life period on the campus. This absorption capacity was over the baseline of the green building standard in Taiwan, which is 31,800 tons. The plants on the Tajen University campus could absorb approximately 870 tons of CO<sub>2</sub> per year. However, this was lower than the estimated yearly CO<sub>2</sub> emission volume of 6721 tons which was emitted from power and diesel fuel usage in the campus. In order to reach a balance, it will be necessary to plant more trees and reduce energy usage on the campus in order to increase CO<sub>2</sub> absorption, and it will additionally be necessary to implement energy conservation policies to reach the goal of regional carbon neutrality.

### KEYWORDS

Greenhouse Gas, Plant, Carbon Dioxide, Carbon Neutral

### Cite this paper

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### References

- [1] H. J. D. Boeck, C. M. H. M. Lemmens, B. Gielen, H. Bossuyt, S. Malchair, M. Carnol, R. Merckx, R. Ceulemans and I. Nijs, " Combined Effects of Climate Warming and Plant Diversity Loss on above and below Ground Grassland Productivity," *Environmental and Experimental Botany*, Vol. 60, No. 1, 2007, pp. 95-104. doi:10.1016/j.envexpbot.2006.07.001
- [2] B. D. Nogués, M. B. Araújo, M. P. Errea and J. P. Martínez-Rica, " Exposure of Global Mountain Systems to Climate Warming during the 21st Century," *Global Environmental Change*, Vol. 17, No. 3-4, 2007, pp. 420- 428.
- [3] L. R. Welp, J. T. Randerson and H. P. Liu, " The Sensitivity of Carbon Fluxes to Spring Warming and Summer Drought Depends on Plant Functional Type in Boreal Forest Ecosystems," *Agricultural and Forest Meteorology*, Vol. 147, No. 3-4, 2007, pp. 172-185. doi:10.1016/j.agrformet.2007.07.010
- [4] V. A. Frolkis, I. L. Karol and A. A. Kiselev, " Global Warming Potential, Global Warming Commitment and Other Indexes as Characteristics of the Effects of Greenhouse Gases on Earth' s Climate," *Ecological Indicators*. Vol. 2, No. 1-2, 2002, pp. 109-121. doi:10.1016/S1470-160X(02)00047-X
- [5] A. Smith, " Global Warming Damage and the Benefits of Mitigation," *Fuel and Energy Abstracts*. Vol. 37, No. 3, 1996, pp. 221. doi:10.1016/0140-6701(96)89126-0
- [6] Beier, B. A. Emmett, J. Pe?uelas, I. K. Schmidt, A. Tietema, M. Estiarte, P. Gundersen, L. Llorens, T.

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Riis- Nielsen, A. Sowerby and A. Gorissen, " Carbon and Nitrogen Cycles in European Ecosystems Respond Differently to Global Warming," *Science of the Total Environment*, Vol. 407, No. 1, 2008, pp. 692-697. doi:10.1016/j.scitotenv.2008.10.001

- [7] Intergovernmental Panel on Climate Change (IPCC), " Climate Change 2007: Synthesis Report— Summary for Policymakers," the 8th Session of Working Group II of the IPCC, Brussels, April 2007, pp. 2-3.
- [8] T. Beer, T. Grant, D. Williams and H. Watson, " Fuel- cycle Greenhouse Gas Emissions from Alternative Fuels in Australian Heavy Vehicles," *Atmospheric Environment*, Vol. 36, No. 4, 2002, pp. 753-763. doi:10.1016/S1352-2310(01)00514-3
- [9] H. Hayami and M. Nakamura, " Greenhouse Gas Emissions in Canada and Japan: Sector-specific Estimates and Managerial and Economic Implications," *Journal of Environmental Management*. Vol. 85, No. 2, 2007, pp. 371-392. doi:10.1016/j.jenvman.2006.10.002
- [10] F. Georgios and C. Paul, " Global Warming and Carbon Dioxide through Sciences," *Environment International*, Vol. 35, No. 2, 2009, pp. 390-401. doi:10.1016/j.envint.2008.07.007
- [11] Intergovernmental Panel on Climate Change (IPCC), " Second Assessment Synthesis of Scientific Technical Information relevant to interpreting Article 2 of the UN Framework Convention on Climate Change," Geneva, Intergovernmental Panel on Climate Change, 1995.
- [12] World Meteorological Organization (WMO), " WMO Greenhouse Gas Bulletin 2007: Atmospheric Carbon Dioxide Levels Reach New Highs," Geneva, 2007.
- [13] K. Cha, S. Lim and T. Hur, " Eco-Efficiency Approach for Global Warming in the Context of Kyoto Mechanism," *Ecological Economics*, Vol. 67, No. 2, 2008, pp. 274-280. doi:10.1016/j.ecolecon.2007.09.016
- [14] J. Guo and C. Zhou, " Greenhouse Gas Emissions and Mitigation Measures in Chinese