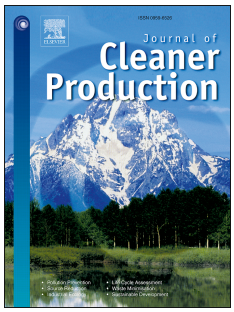
Accepted Manuscript



Assessing air pollution abatement co-benefits of energy efficiency improvement in cement industry: A city level analysis

Shaohui Zhang, Hongtao Ren, Wenji Zhou, Yadong Yu, Tieju Ma, Chuchu Chen

PII: S0959-6526(18)30631-0

DOI: 10.1016/j.jclepro.2018.02.293

Reference: JCLP 12240

To appear in: *Journal of Cleaner Production*

Received Date: 1 November 2017

Revised Date: 22 February 2018

Accepted Date: 26 February 2018

Please cite this article as: Zhang S, Ren H, Zhou W, Yu Y, Ma T, Chen C, Assessing air pollution abatement co-benefits of energy efficiency improvement in cement industry: A city level analysis, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.02.293.

8[The number of words in this manuscript is 6589]

Assessing air pollution abatement co-benefits of energy efficiency improvement in cement industry: a city level analysis

Shaohui Zhang[1], Hongtao Ren [2]*, Wenji Zhou[1], Yadong Yu[2], Tieju Ma[1,2], Chuchu Chen[3]

1 International Institute for Applied Systems Analysis, Schlossplatz 1, A-2361, Laxenburg, Austria
2 School of Business, East China University of Science and Technology, Meilong Road 130, 200237, Shanghai, China
3 College of Materials Science and Engineering, Nanjing Forestry University, 210037, Nanjing, China;

Abstract

China is the world's largest cement producer, contributing to 60% of the global total. Jiangsu province takes the lead of cement production among China's provinces, contributing to 8.4% of the national total cement output. In this study, a geo-graphical information system-based energy model is developed to assess the potential of energy savings and associated mitigation of CO_2 and air pollutant emissions in Jiangsu's cement industry during 2015–2030. Results show that 1) compared to 2015, energy consumption in the baseline scenario will decrease by 54% at the provincial level. Economical energy saving potential for 2030 is around 50 PJ, which equals to 35% of energy use in the baseline in 2030. 2) At the city level, Changzhou, Wuxi, and Xuzhou are top three cities in terms of energy saving potential. 3) The economical CO_2 emission reductions will decrease by 4.4 Mt in 2030, while the emissions of PM and NOx would decline by 30% and 56%, respectively. This study will help policy makers develop integrated policies to support the coordinated development of Jiangsu and can also enhance the effectiveness of the implementation of joint prevention and control of atmospheric pollution to improve regional air quality.

Keywords: co-benefits; GIS-based energy model; energy efficiency; cement industry; emission reduction

Nomenclature

Abbreviations

ECSC Energy conservation supply curves
CSC Conservation Supply Curve
GHG Greenhouse gases
SO_2 Sulfur dioxide
NOx Nitrogen oxides

[2] Corresponding author. Tel.: + 86 021 6425 0013
E-mail addresses: ren@ecust.edu.cn (Hongtao Ren)