

Greek economic crisis leads to air pollution crisis

December 19 2013



This photo shows hte smoky conditions in Thessaloniki. Credit: Arian Saffari / USC

In the midst of a winter cold snap, a study from researchers in the United States and Greece reveals an overlooked side effect of economic crisis – dangerous air quality caused by burning cheaper fuel for warmth.

The researchers, led by Constantinos Sioutas of the USC Viterbi School



of Engineering, show that the concentration of fine air particles in one of Greece's economically hardest hit areas has risen 30 percent since the financial crisis began, leading to potential long-term health effects.

These <u>fine particles</u> – measuring less than 2.5 microns in diameter (approximately 1/30th the diameter of a <u>human hair</u>) – are especially dangerous because they can lodge deep into the tissue of lungs, according to the EPA.

"People need to stay warm, but face decreasing employment and rising fuel costs," explained Sioutas, senior author of the study in the journal *Environmental Science & Technology* and Fred Champion Professor in Civil and Environmental Engineering at the USC Viterbi School. "The problem is economic hardship has compelled residents to burn low quality fuel, such as wood and waste materials, that pollutes the air."

Unemployment in Greece climbed above 27 percent in 2013. Meanwhile, heating oil prices have nearly tripled in Greece during the Greek <u>financial crisis</u> of the last few years – driven in part by a fuel tax hike. Cold Greeks, it would appear (according to the <u>air quality</u>), have turned to wood as a major fuel source.

In their study, the researchers collected air samples that supported anecdotal evidence of Greek residents burning of wood and trash for heating. Taken over two-month stretches in Winter 2012 and again in Winter 2013, the samples reveal a dramatic increase in airborne fine particles since the beginning of the <u>economic crisis</u>.

The concentration of these particles, which has been linked to increased risk for heart disease and respiratory problems, rose from 26 to 36 micrograms per square meter over the study period, the researchers found. The EPA standard in the United States is an average of 20 micrograms per square meter over a 24-hour period. Worse yet, the



concentrations of carcinogenic organic compounds such as polycyclic aromatic hydrocarbons (PAH) increased five-fold during the study period, the researchers found.

The concentration of the particulates was highest in the evening, presumably when more people were burning fuel for warmth, the study found. An analysis of the air samples also showed a two-to-five-fold increase in the airborne concentrations of organic compounds such as levoglucosan, mannosan and galactosan, which indicate the burning of biomass. The presence of these compounds has been strongly correlated in past research to oxidative stress in human cells, which is linked to inflammation, aging and the development of age-related diseases.

"Wood's cheap, but it's having a major negative impact on air quality," Sioutas said. The authors recommend active involvement of public authorities and local agencies to implement effective air pollution control strategies. They suggest increasing natural gas distribution in residential areas as a practical long-term solution. Catalytic domestic wood burners and increasing the energy efficiency of existing buildings might be additional possible solutions, according to the report.

Provided by University of Southern California

Citation: Greek economic crisis leads to air pollution crisis (2013, December 19) retrieved 30 April 2024 from <u>https://phys.org/news/2013-12-greek-economic-crisis-air-pollution.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.