



# 中国环境健康项目研究中心

#### **The China Environmental Health Project**

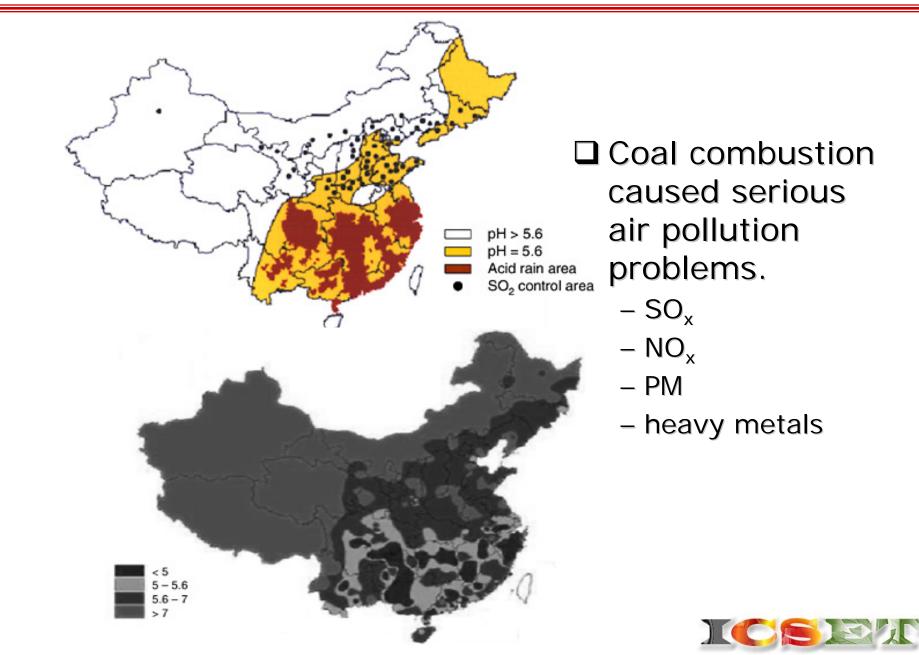


### **Background**

Other 2% □ China is the biggest producer Gasoline and disel and consumer of oil 15% coal around the world. Coke 7% - 2.11 billion tons of coal in production in 2005; Coal 76% - more than 70% to total energy in China from coal combustion.

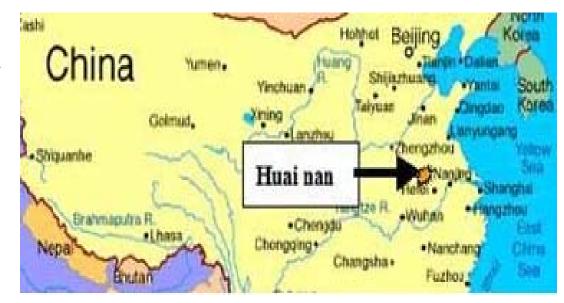


### SOx, NOx and pH value of soil



### Huainan, Energy Base of China

- Huainan City, Anhui Province
  - Energy base of eastern China
  - so called "Fuel Power Three Gorges" in China (2400 MW, 2400 MW, and 1150 MW)
  - Production of 100 million tons of coal in 2005
  - One of two sites on
    Energy Future and
    Air Pollution in urban
    China and the United
    Stats Program



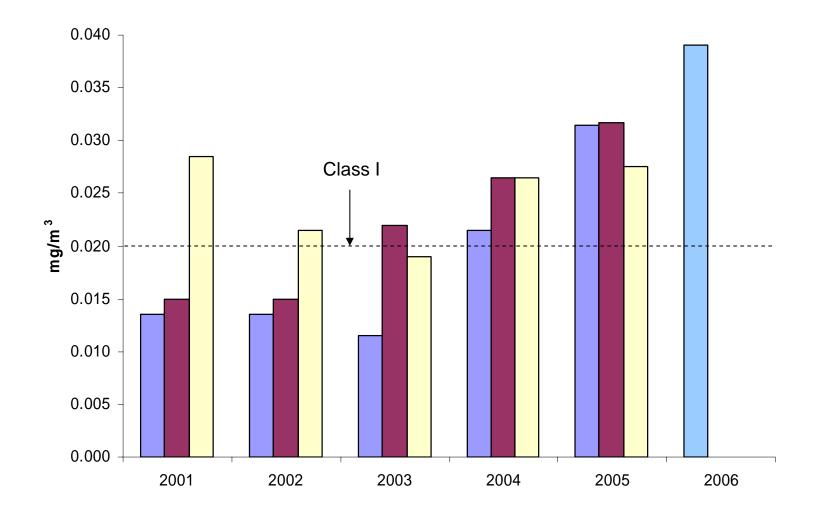


# **Environmental Problems in Huainan**

- Ambient air pollution from coal combustion (11 million tons coal burned in 2004)
- Fly ash stockpile capacity (6.6 million tons fly ash in 2004)
- Sinking area due to coal exploration (130 square kilometer in 2004)

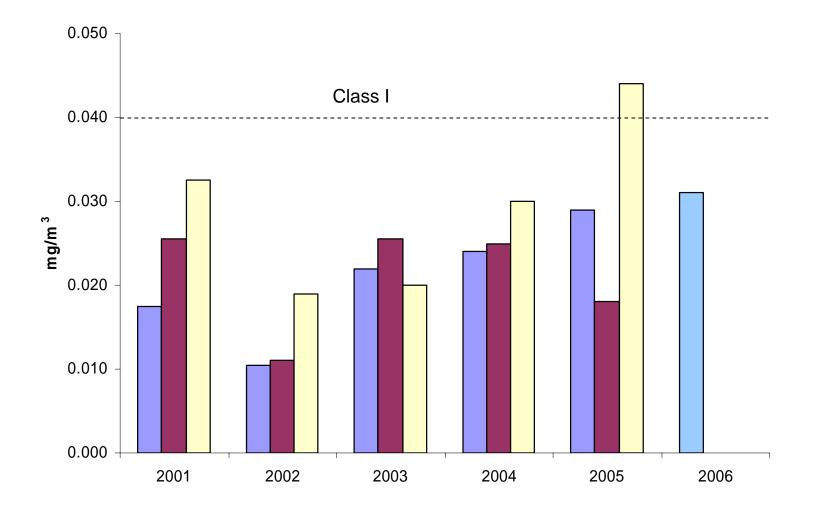


#### **Annual Average SO<sub>2</sub> Concentrations**



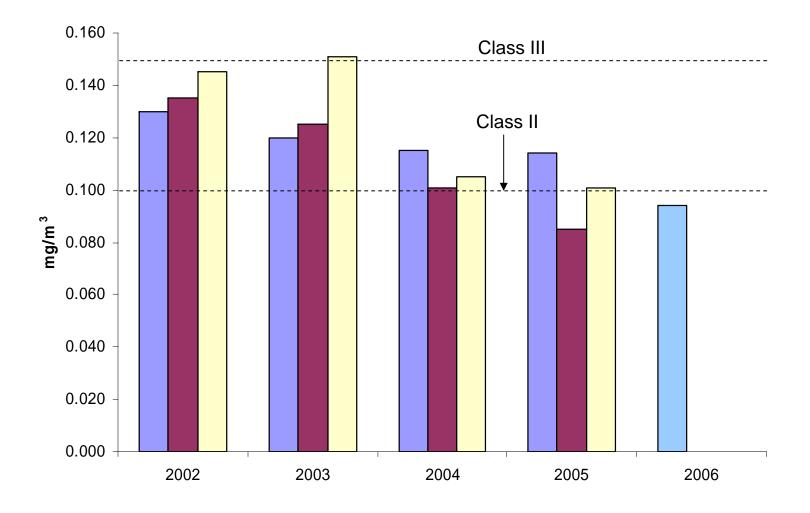


### **Annual Average NO<sub>2</sub> Concentrations**



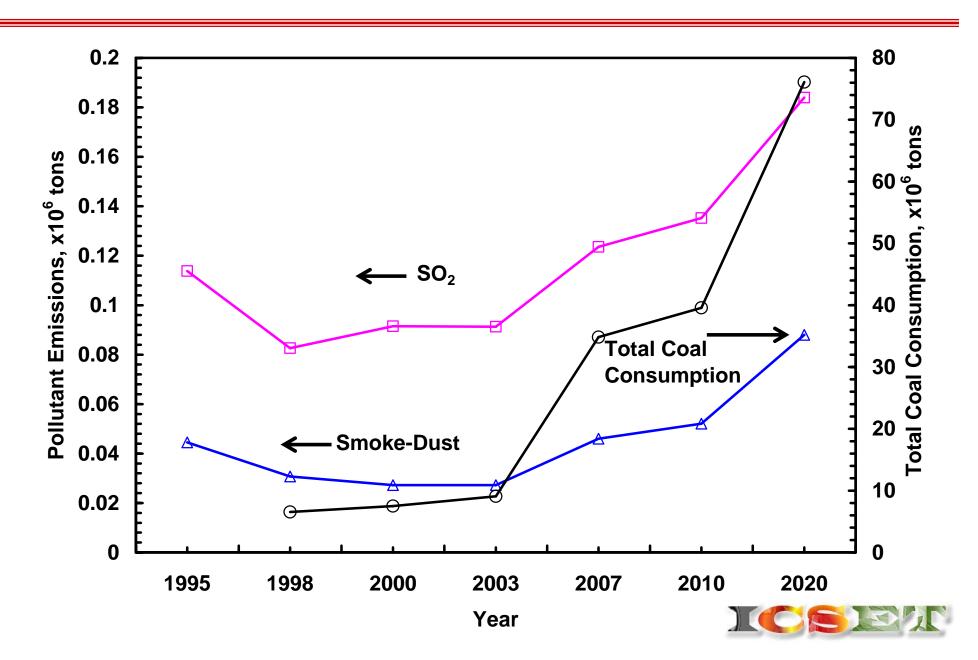


### **Annual Average PM<sub>10</sub> Concentrations**





### **Pollution Emissions in Huainan**



## **Project Objectives**

- Improve Huainan's monitoring system for SO<sub>x</sub>, NO<sub>x</sub>, PM<sub>10</sub> and other air toxins resulting from coal-fired power and chemical plants
- Train and educate Chinese scholars in the latest environmental technologies;
- Reduce the coal-burning related health problems
- Ensure quality of life and residence through cooperation between WKU and Chinese partners



## **Participant: ICSET**

- Institute for Combustion Science and Environmental Technology (ICSET): extensive experience in the study of coal combustion, waster material incineration and pollutant emissions;
  - funding from government agencies: DOE, USDA, NASA, DOD, EPA and NSF
  - funding from organizations: EPRI, ICCI
  - funding from industrial: power industries and others

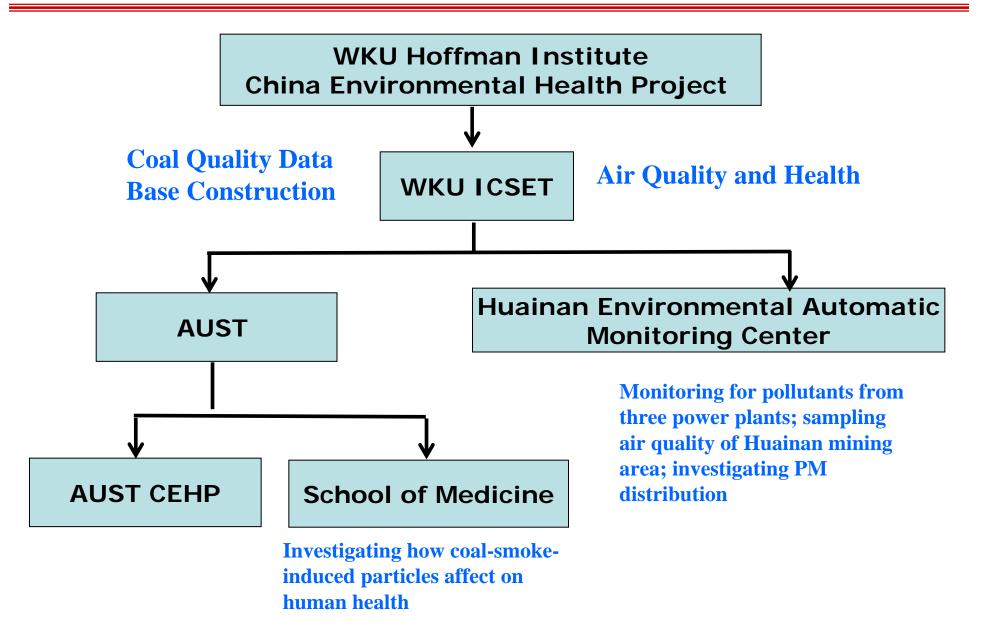


# **ICSET Work Scope**

- Provide state-of-the-art technologies to train Chinese scholars and students about sampling and analysis of various pollutants;
- □ Ensure all measurement results and data quality.
- Hold a related workshop for Chinese scholars.
- Co-sponsor short course on the health impacts of coal in China.



## **Project Structure and Scope**



## **Participant: AUST**

- Anhui University of Science and Technology (AUST): located in Huainai, accomplished significant achievements in cleaner coal technology and protection from occupational disease:
  - Huainan Environmental Protection Agency will cooperate with Research Center of Environmental Science and Engineering of AUST, School of Medicine of AUST;
  - Huainan Environmental Automatic Monitoring Center (HEAM) will provide database and partial equipment for AUST research.



# AUST Work Plan (2007-2008)

- Monitoring air quality (SOx,NOx,PM<sub>10</sub>) and other gas species of the city every 30-minute at five different local stations surrounding the city and three power; Utilizing the air emission data to establish the air quality model using BENMAP software.
- Investigating the effect of PM on the public health of residence of Huainan city. Two representative hospitals and communities will be selected.
- Setting up new classes and workshop at AUST and community.

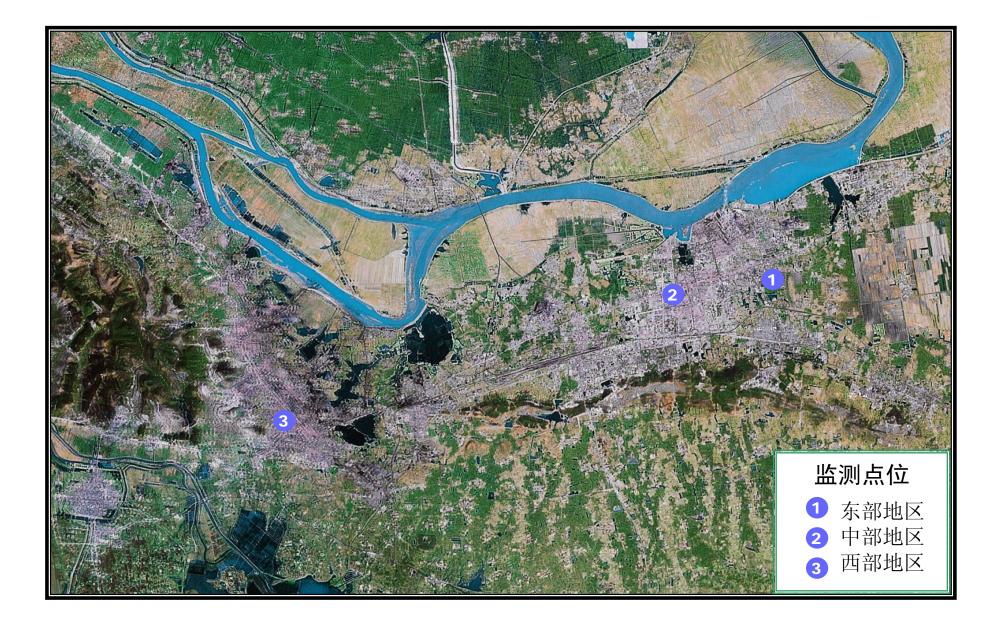


# **Expected Results**

- Obtain accurate data on the coal-burn caused pollutant in Huainan;
- Provide fundamental understanding and important information of ground-level air pollution for local policy makers;
- Share with Chinese partners US regulatory environmental and compliance policies, such as self-reporting, emissions trading and tax-related incentives, coupled with tough enforcement.
- Allow public aware of public health problems, further improve public health problems caused by coal consumption.
- Adopt the new type of monitoring in Huainan in the near future.



#### 淮南市环境空气自动监测点位图



### Huainan City Map with Major Power Plants Indicated



FT.PP: Fengtai Power Plant;TJA.PP: Tianjia'an Power Plant;

PW.PP: Pengwei Power Plant;

LH.PP: Luohe Power Plant.

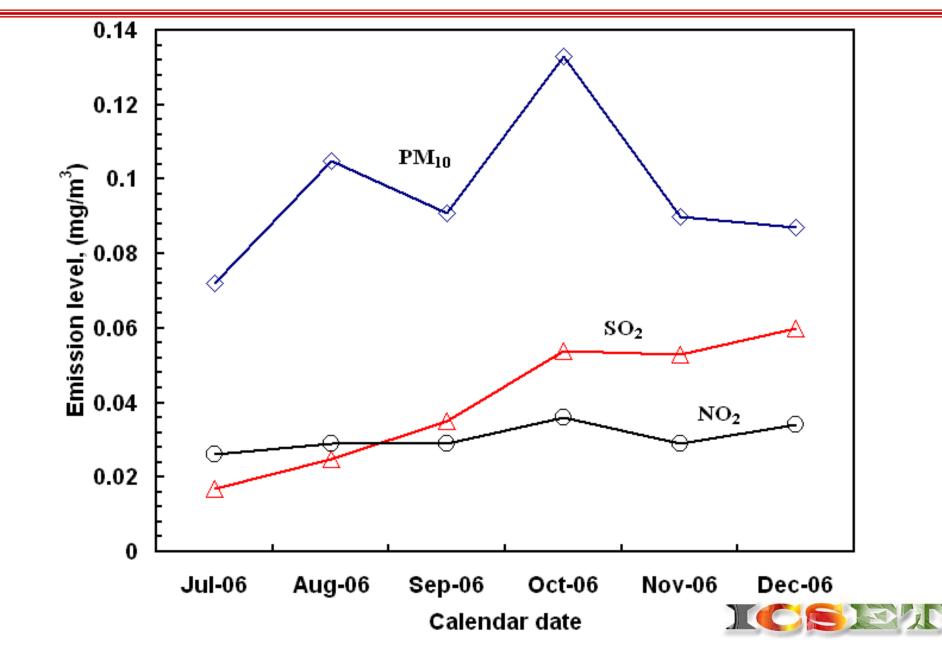


### **Huainan Auto Environmental Monitoring System**





### **Measured Emission levels of SO2, NO2 and PM in 2006**



#### **Emission Levels of SO2, NO2** and PM in 2007

环境空气质量变化趋势图 (2006年10月~2007年9月)

0.140<sup>mg/m<sup>3</sup></sup> ┣━ 可吸入颗粒物 ━━━ 二氧化硫 ━━━ 二氧化氮 0.120 0.100 0.080 0.060 0.040 0.020 0.000 时间

2007年3月

2006年10月 2006年11月 2006年12月

2007年1月

2007年2月

2007年4月

2007年6月

2007年5月

2007年8月

2007年9月

2007年7月

#### Tianjia'an Power Plant



Department of Environmental Science and Engineering, Anhui University of Science and Technology

### **CEHP Project Report From AUST Network**



进行了讨论和落实。 潘伟平博士还与课题组成员一道前往田家庵电厂、平圩电厂参观和调研,落实项 目研究所需要的采样事宜。



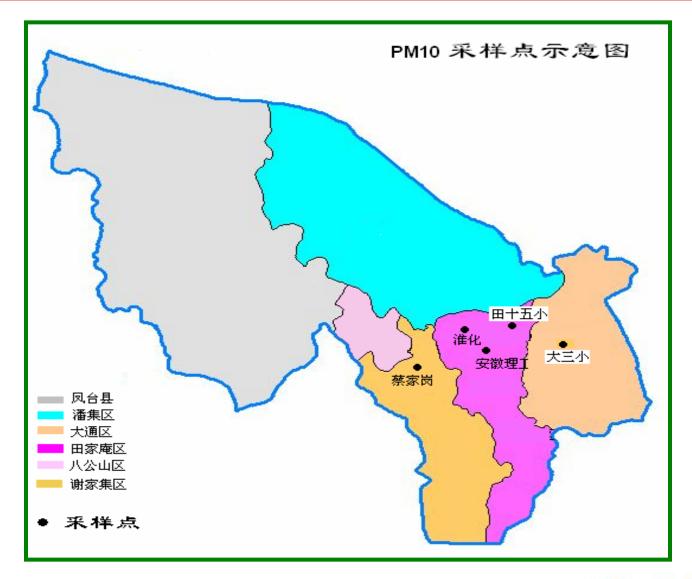
#### Main working of 2007

#### Sampling on Site



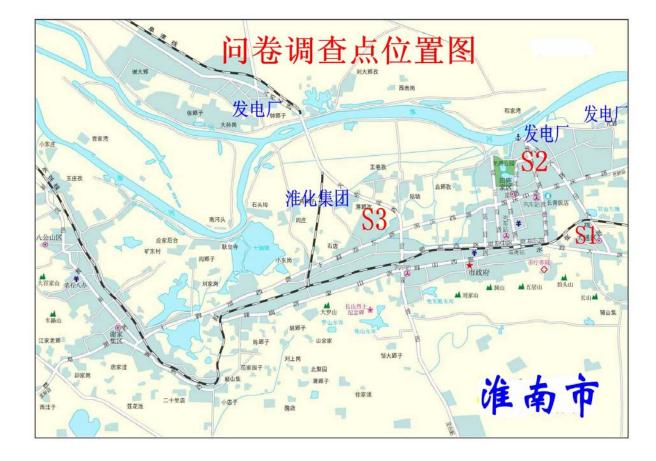
Department of Environmental Science and Engineering, Anhui University of Science and Technology

#### PM10 Sampling Sites Distribution in Huainan City









### **CEHP Project Report From Huainan City Government Network**

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<b>首页  机构简介   政务公开</b>	环保动态   环境质量   污染举报   环保考题   法规标准   环保宣传   生态流动   创模之窗   电子政务
欢迎悠第 位客人	环保动态>>本市环保动态>>播带平博士来准协商中美含作环境健康项目并参与环保活动 🛛 🐠 打印
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進南市环境保护监测站	环境健康项目并参与环保活动
淮南市环境监察支队	www.hahb.gov.cn 2007-6-6 淮南环保版权所有
A THE THE PART OF THE	
油南市环境科学研究所 点面	击重看详细内容 1日至4日,美国西肯塔基大学教授潘伟平博士应邀来到淮南,就中美合作环
环保政务公开	境健康项目研究前期工作进行协商,并参于我市环保工作。 。 8-2日下午 在中教理工士学家论中心上送会议家学生了中美会作环境健康项目
职能职责 领导介绍	6月2日下午,在安徽理工大学实验中心七楼会议室举行了中美合作环境健康项目 的第四次课题组会议,潘伟平博士和董众兵副市长对两国环保学者合作给予较高评
监督规范 通知公告	价,市环保局、科技局、安徽理工大学和医院、企业的其他项目组成员共同协商合作
力事程序 工作情况	事宜。讨论的范围包括出席第11届海峡两岸环境保护学术会议,课题研究每季度进展
下载专区 行政处罚	总结报告的具体要求;组织元素分析仪器使用方法的培训和举行公共健康方面的专题
环境保护专题	研讨会安排,采样方法的培训,组团赴美国访问和举行专题研讨会,环境与健康基本
全业环境行为信息公开	情况的合作调查。
专项行动整治 建设项目审批	6月3日,潘伟平博士在董众兵副市长的陪同下,到我市几座大型企业参观和调
环境影响评价  放射液清查	研,落实项目研究所需要的采样事宜。 6月4日上午,潘伟平教授参加了市级"绿色学校"大通第三小学师生做的环保知
创环保镖范城市室内环境检测	识进座,和师生交流爱护环境和倡导绿色文明理念的感想。随后,潘敖授在理工大副
环境污染举报	教授程学丰的陪同下参观了环保局组织的纪念"6.5"世界环境日环保宣传一条街活
12369 环境信访 网上举报 网上俗词	动,并向市环保局环保宣数工作者介绍美国环境宣传方面的作法。
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环境保护宣传	
《曲南环境》网络反	
六·五世界环境日	
环境保护基本常识	
生活中的环保知识	
100 加入收藏夹中	
合 设置成为首页	
1 网络最近更新	
<b>同站分类导航</b>	
2 欢迎联系我们	
<b>山口 双型联系表</b> 们	
** 发情链报网站 **	



## **Impacts on Public Health**

#### In Huainan

- allergic asthma: up to 2% of the total population;
- chronic bronchitis: 2% of the total population;
- conjunctivitis: 20% of eye illness;
- coryza: 2% of the total population;
- large amounts of people with occupational disease.



#### **CEHP Project Report From AUST Network**



【字体:大中小】 【打印】 【关闭】



#### AMA254 Mercury Analyzer & TRUSPEC CHN Elemental Determinator





#### **CEHP-Related Testimony by Dr. Pan to the U.S.-China Economic and Security Review Commission**

The U.S.-China Economic and Security Review Commission conducted a public hearing on June 14 and 15, 2007 at the **Russell Senate Office Building on Capitol Hill on China's Energy Consumption and Opportunities for U.S.-China Cooperation** Address the Effects of China Energy Use. The hearing examined the trends and impact of China's energy consumption; strategies for addressing these effects; and current and possible future **U.S.-China cooperative programs on energy and the environment.** Drs. Chris Groves and Wei-Ping Pan both attended the hearing on June 15. Dr. Wei-Ping Pan testified on the clean coal work of WKU's China Environmental Health Project as part of Panel XI on **U.S.** China Governmental and Nongovernmental Cooperative Programs in Energy and the Environment before the commission.



### **Professional Outreach for Air Program**

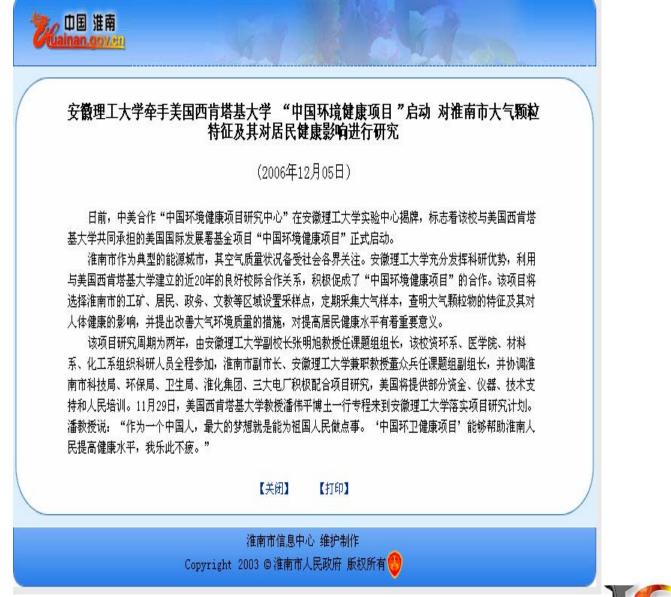
Professors Cheng (AUST) and Pan both attended the 11th Mainland-Taiwan Environmental Protection Academic Conference (MTEPC) which was held in Harbin City, June 2007.







### **CEHP Project Report From Huainan City Government Network**





### **CEHP Project Report From Huainan City Daily News**









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安徽理工大学完美宣传部主办 安徽理工大学现代教育技术中心技术支持 新闻热线。(0554)6688447 6688451 电子信箱。xib\*aust.edu.cm 写即件时语将•改为@







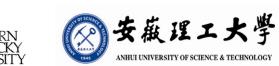






安徽理工大学党委宣传部主办 安徽理工大学现代教育技术中心技术支持 新闻热线: (0554) 6668447 6668451 电子信箱: xcb\*sust.edu.cn 写解件时请将×改为0







# **Presentations for 2008**

#### Abstract for 12th Mainland-Taiwan Environmental Protection Academic Conference

**1. 淮南三大燃煤电厂汞排放特征实验研究.** 汪桂林,高良敏,程学丰,张明旭,潘伟平.

2.**淮南市大气颗粒物中汞的分布特征.** 晏海峰,高良敏,程学丰,张明旭,潘伟平.

3. **燃煤电厂煤中重金属迁移规律研究** 刘玉玲,高良敏,程学丰,张明旭,潘伟平.

4. 淮南市秋季大气PM10污染特征及其与气象因素关系的研究 程学丰,张明旭,孙瑛

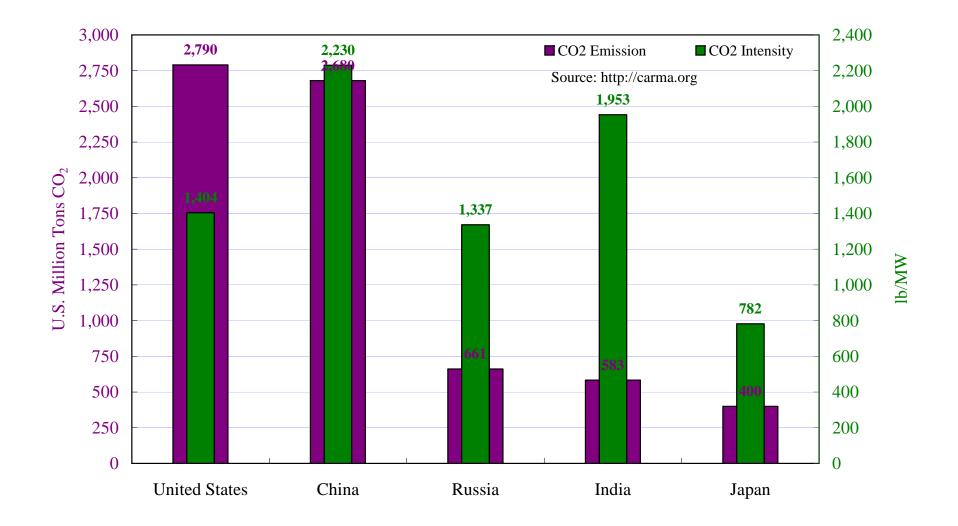


# **AUST Work Plan (2008-2009)**

- 1. Monitoring coal-fired related emissions (mercury in the gas phase)
- 2. Developing a database for the information
- 3. Data analysis for decision-makers
- 4. Study of carbon dioxide sequestration from coal-fired combustion system in U.S. and China

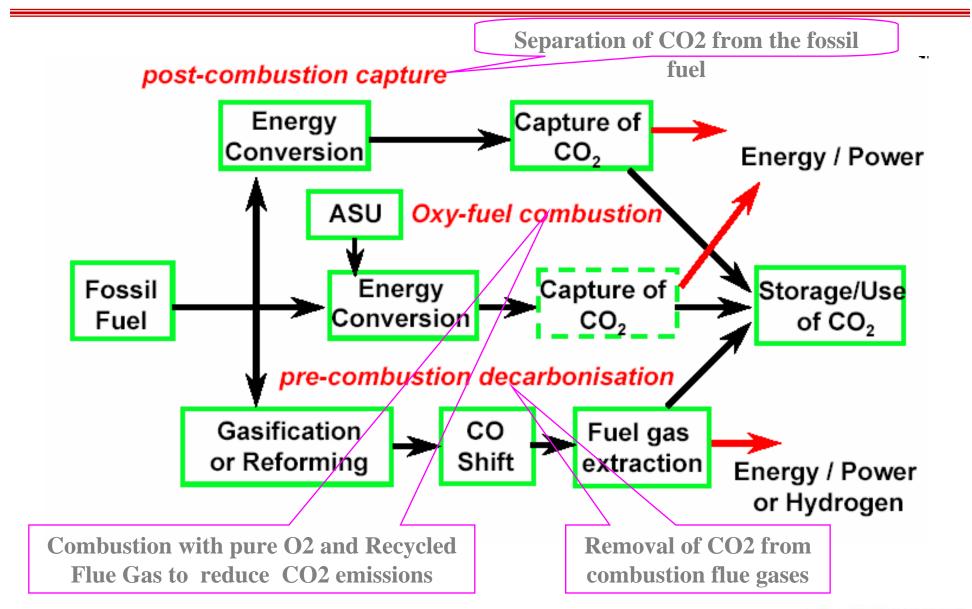


### CO2 emitted by five highest countries at present\_2007



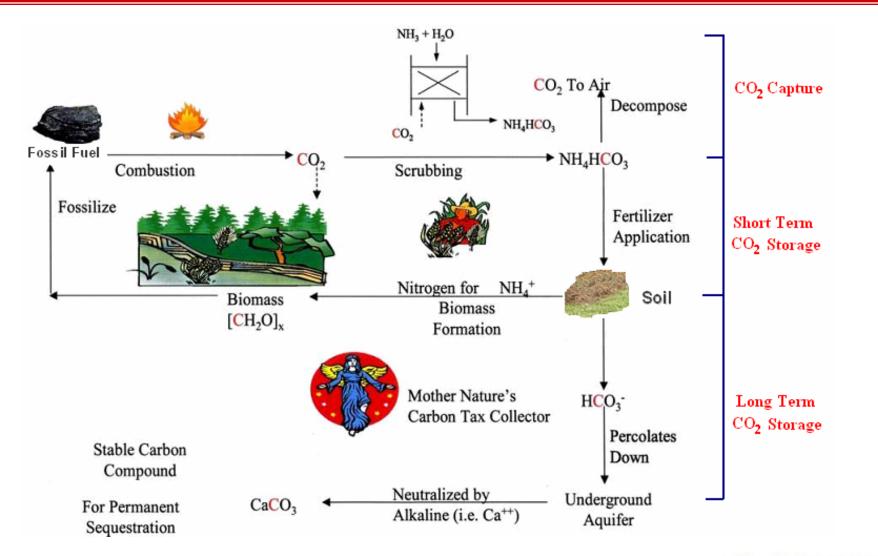


### How to capture CO2



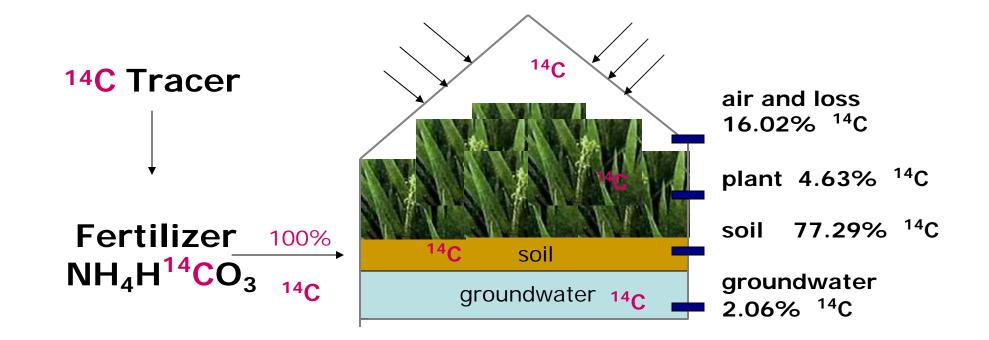


## Natural Carbon Cycle





Development of a Method for Measuring Carbon Balance in the Chemical Sequestration of Carbon Dioxide



#### **Permanent Sequestration:**

 $Mg^{2+} + HCO_3^{-} \rightarrow MgCO_3 + H^+$ 

 $Ca^{2+} + HCO_{3}^{-} \rightarrow CaCO_{3} + H^{+}$ 

