

**ROGER RAUFER, Ph.D., P.E.**

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**CONSULTING ENGINEER**  
**Energy/Environmental Management**

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**EDUCATION**

<u>Degree</u>	<u>Major</u>	<u>University</u>	<u>Date</u>
Ph.D.	Energy Management & Policy	University of Pennsylvania	1984
M.A.	Political Science	University of Illinois at Chicago	1980
M.S.	Environmental Engineering	University of Cincinnati	1974
B.S.	Chemical Engineering	Ohio University	1971

**Independent Consulting Engineer: 1990 – Present**

**Other Affiliations:**

- IFP (Institut Français du Pétrole) Energies Nouvelles [IFPEN], Rueil-Malmaison, France, 1989-Present.
- University of Pennsylvania, Philadelphia, PA, 1981-2001; 2007-Present.
- United Nations, New York, NY, 2001-2005.
- PMC, Inc., Philadelphia, PA, 1985-1990.
- ETA Engineering, Inc., Westmont, IL, 1974-1982.

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**SELECTED WORK EXPERIENCE**

1990- Environmental Management in the People's Republic of China

2011 For: United Nations; China's Ministry of Commerce

Assisted the U.N./Chinese government in developing a program to reduce air pollution in three target cities (Qingdao, Huhhot, and Guiyang) in an economically efficient manner; follow-up air pollution projects in five cities (Beijing, Guangzhou, Xi'an, Benxi and Guiyang); landfill gas GEF project in Anshan; programmatic GEF project on energy efficiency in industrial and building sectors; environmental planning in small and medium-sized cities (Liuzhou, Taiyuan, Guiyang, Meishan, and Sanmenxia); concession approach for wind resource development; development of 'green poverty alleviation' scheme through carbon trading; GEF/World Bank SO<sub>2</sub> emissions trading project in Shanxi and Shandong Provinces.

2007- Hong Kong Emissions Trading

2010 For: HK Exchanges and Clearing Ltd.; CLSA; Civic Exchange; Anemone Green Capital

Advised Hong Kong Stock Exchange concerning potential markets in 'emissions-related products,' including Kyoto Protocol flexibility mechanisms, EU Emissions Trading Scheme, U.S. SO<sub>2</sub> and NO<sub>x</sub> credits/allowances, renewable energy certificates, and white tags/certificates (for energy efficiency markets). Co-authored report on emissions markets for CLSA, and advised their clients in more than a dozen cities in North America, Asia and Europe; report chapter for Civic Exchange concerning emissions trading and GHG control in Asia; and private-sector projects with Anemone Green Capital, Ltd.

1982- Emissions Trading For Acid Rain Controls

1989 For: U.S. Environmental Protection Agency

Conducted five analyses for U.S. EPA, addressing various implementation aspects of utilizing economic mechanisms for controlling acid rain. This research identified problems that led to the shift from emission reduction credits to emission allowances in the Clean Air Act Amendments of 1990.

1987- Air Quality Permits For Cogeneration Facilities

1998 For: Intercontinental Energy Corporation;  
O'Brien Environmental Energy, Inc.;  
Grays Ferry Cogeneration Partnership, etc.

Successful Prevention of Significant Deterioration (PSD) permit for a 300 MW natural gas fired, combined cycle cogeneration plant in New Jersey for private power firm, including

Best Available Control Technology (BACT) and dispersion modeling. This facility was part of what was then the largest single independent power financing (\$600 million) in U.S. history.

Successful multi-unit "netting transaction" permit for \$167 million combustion turbine/auxiliary boiler cogeneration facility for urban steam loop in Pennsylvania (and significant permit revisions when turbine vendor was changed and selective catalytic reduction system added). Other permits for wood gasification facility, two digester gas projects, etc.

1980 Twin Cities/St. Cloud Regional Study  
For: National Commission on Air Quality

Directed one of five regional studies for the National Commission on Air Quality. The four volume, 1100 page report was prepared in 8-1/2 months, and was subsequently used by the U.S. Congress for proposed control technology and policy amendments to the Clean Air Act.

1973- Dispersion Modeling Analyses and EIAs of Cogeneration/Power Facilities  
2001 For: Numerous Clients

Directed more than three dozen atmospheric dispersion modeling analyses for utilities, chemical process plants, refineries, industrial firms and mobile/area sources. Also conducted analyses of environmental impacts for numerous cogeneration facilities and utility fuel conversions, including coal, natural gas, oil, and waste fuels. Numerous BACT determinations and expert testimony.

1985- Solid Waste Disposal Facilities  
1988 For: Streets Department, City of Philadelphia

Member of design team for proposed 5700 ton/day refuse derived fuel (RDF) project, focusing on pollution control systems. Also consultant concerning environmental issues for a 2250 ton/day mass-burn resource recovery facility, including permit requirements, risk assessment and environmental impact statement.

1990- International Environmental Technical Support  
2011 For: U.S. AID, United Nations, etc.

Economic benefits analysis for lead and particulate control programs, and lead smelter action plan, under Cairo Air Improvement Project (CAIP); Transboundary air pollution modeling and combustion technology in Ulaan Baatar, Mongolia; Poland, Romania and Ukraine site visits for development of EcoLinks information initiative for CEE/NIS

countries; Complex terrain dispersion modeling of combustion turbines in Ecuador, and power sector pollution control projects; Sustainable development indicators for energy (IAEA) and power sector (UN ESCAP); Urban energy integration in Asian cities (UN ESCAP); etc.

### **TEACHING EXPERIENCE**

- Institut Français du Pétrole Energies Nouvelles, Rueil-Malmaison, France, 1989-Present.
  - *Executive MBA in Energy and Globalization*; joint program with Sciences Po (Institut d'Études Politiques de Paris), Paris; Lecturer, 2011.
  - *Executive MBA in Energy Management*; joint program with BI Norwegian School of Management and the Nanyang Business School of Singapore's Nanyang Technological University; Lecturer, 2010, 2011.
  - *ENSPM Formation Industrie Training*, Oil and Gas Management Executive Sessions, Lecturer, 1991-Present;
  - *Ecole Nationale Supérieure du Pétrole et des Moteurs (ENSPM)*, Lecturer, 1989-Present.
- University of Pennsylvania, Philadelphia, PA, 1981-Present.
  - *Wharton School, Initiative for Global Environmental Leadership*: Senior Fellow, 2007-Present; retained as consultant in its establishment, 2007.
  - *Masters of Environmental Studies Program*: Lecturer, 2007-2009.
  - *City and Regional Planning*: Adjunct Professor (Prof., 1998-2001; Assoc., 1987-1998; Asst., 1984-1987).
  - *Systems Engineering*: Adjunct Professor (Prof., 1999-2002; Assoc., 1993-1996).
  - *Center for Energy & the Environment*: Associate Director, Environmental Studies, 1988-1994.
  - *International Executive Training Program in Energy Planning and Policy*: Director, 1994; Lecturer, 1986-1992.
  - *Energy Center*: Research Associate, 1981-1984.
- University of the West Indies, Kingston, Jamaica; Visiting Lecturer in Energy Management, 1984.
- CARICOM Energy Management Training Course, Antigua; Lecturer, 1984.
- University of Edinburgh, Scotland; Visiting Faculty, Electrical Engineering Dept., 1985.
- Sultan Ahmad Shah Training Institute, Bangi Selangor, Malaysia; Lecturer, 1987.

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- Institute of International Education, Washington, D.C.; Consultant, 1989, 1994, 1995.
  - World Bank, The Energy Sector and Environmental Issues in Eastern Europe, Budapest University of Economic Sciences, Hungary; Lecturer, 1993.
  - World Bank, CIS Energy Project Analysis Course, Washington, D.C.; Lecturer, 1994.
  - U.S. Foreign Service Institute; Energy, Environment, and U.S. Economic Interests, National Foreign Affairs Training Center, Arlington, VA; Lecturer, 1994.
  - United Nations DDSMS, Training Seminar on Trends in Environmental Policy, New York; Lecturer, 1994.
  - U.S. Dept. of Energy, National Planning and Policy Workshop for Dept. of Minerals and Energy Affairs, South Africa; Washington; Lecturer, 1998, 1999.
  - UNIDO Training Program on TVE's and Energy Use, Ministry of Agriculture, People's Republic of China; Philadelphia (Systems Engineering Dept., University of Pennsylvania); Lecturer; 1998.
  - UNDP/CICETE Training Workshop on Cost/Benefit Analysis and Economic Fee Mechanisms, Guiyang, People's Republic of China; Co-Director (with P. Coussy, IFP, France); 1998.
  - UNDP/CICETE Training Workshop in Environmental Planning for "City Planning, Management, & Development in the 21<sup>st</sup> Century" project; Liuzhou, P.R. China: Director; 2003.
  - UNDP/UNDESA Workshop on "The Kyoto Protocol: Challenges and Opportunities for Sustainable Development in the Islamic Republic of Iran," Tehran, I.R. Iran; Lecturer; 2003.
  - UNDESA/e7 Workshops on "CDM and Electricity Project Development," Managua, Nicaragua and Guayaquil, Ecuador; Coordinator and Lecturer; 2004.
  - General Electric Oil & Gas University/ENSPM, IFP; "Energy Module," Lecturer; GE Florence Training Center and University of Pisa, Italy, 2005; Abu Dhabi National Oil Company, Abu Dhabi, 2009, 2011; Florence Training Center, Italy, 2010, 2011; Pertamina, Jakarta, Indonesia, 2011.
  - Taiwan National Science Council-funded lecture program, visiting Taiwan Environmental

Protection Administration; National Taiwan University; Feng Chia University; Chaoyang University of Technology; Leader University; and Cheng Kung University; Taiwan R.O.C., Lecturer; 2008.

**PROFESSIONAL HONORS, SOCIETIES AND ORGANIZATIONS**

- Honor Graduate, U.S. Army Chemical School
- Environmental Protection Agency Fellowship Recipient
- Scholarship from Federation of Societies for Paint Technology
- Member, Air and Waste Management Association (AWMA)
  - Member, Technical Committee TT-6  
Energy-Environmental Interactions Committee; Chairman, 1981-82
  - Member, Technical Committee EP-7  
Economics Committee
- Member, American Association for the Advancement of Science
- Member, American Institute of Chemical Engineers

**PROFESSIONAL ENGINEERING (P.E.) REGISTRATION**

- State of Ohio #42452, 1977;
- State of Illinois #62-36558, 1978.

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**PUBLICATIONS****Books**

R.K. Rauffer, *Pollution Markets in a Green Country Town: Urban Environmental Management in Transition*, Westport, CT: Praeger Publishers, (1998).

R.K. Rauffer and S.L. Feldman, *Acid Rain and Emissions Trading: Implementing a Market Approach to Pollution Control*, Totowa, NJ: Rowman & Littlefield, (1987).

**Dissertation/Thesis**

Ph.D. dissertation: *Emissions Trading by Electric Utilities for Acid Deposition Control*, University of Pennsylvania, Philadelphia, PA, (August, 1984).

M.S. thesis: *Six Proposed Standard Methods of Ambient Particulate Sampling*, University of Cincinnati, (June, 1974). [Three of the standard methods were subsequently published in *Methods of Air Sampling and Analysis*, 2nd Edition, M. Katz, Ed., APHA Intersociety Comm., (1977)].

**Journals, Book Chapters, etc.**

R. Rauffer and S. Iyer, "Emissions Trading," *Handbook of Climate Change Mitigation*, Chen, W.Y. et al., Eds., Springer, (forthcoming 2012).

R. Rauffer, "Emissions Trading in China," *L'Hydrocarbure*, 249:15-17, (Janvier, 2011)

R. Rauffer and S. Li, "Emissions Trading in China: A Conceptual 'Leapfrog' Approach?," *Energy*, 34: 904-912, (July, 2009).

R. Rauffer, "Carbon Markets and Emissions Trading in Asia," *Climate Change Negotiations: Can Asia Change the Game?*, C. Loh, A. Stevenson and S. Tay (Eds.), Civic Exchange and Singapore Institute of International Affairs, Hong Kong, (November, 2008).

R.K. Rauffer, "Sustainable Urban Energy Systems in China," *New York University Environmental Law Journal*, 15:1, (Spring, 2007).

C. Loh and R. Rauffer, "The Emissions Game: How Markets Can Help Save the Planet," *CLSA Quarterly*, 1:4, (February, 2007).

R.K. Raufer, "Notes from the Field: Air Pollution Engineering as Cultural Experience," in *Smoke and Mirrors: The Politics and Culture of Air Pollution*, E.M. DuPuis, Ed., NYU Press, NY, (2004).

R.K. Raufer, L.T. Xu, and S.J. Wang, "Yet Another Market Transition?: Moving Towards Market-Oriented Governmental Support of Wind Power in China," *Journal of International Economic Law*, 24:3, (Fall, 2003).

R.K. Raufer and S.J. Wang, "Navigating the Policy Path for Support of Wind Power in China," *China Environmental Series #6*, Woodrow Wilson Intern. Center for Scholars, Wash., DC. (at [http://wilsoncenter.org/index.cfm?topic\\_id=1421&fuseaction=topics.publications&group\\_id=36102](http://wilsoncenter.org/index.cfm?topic_id=1421&fuseaction=topics.publications&group_id=36102))

R.K. Raufer and S.J. Wang, "Wind Resource Concession Approach in China," *IEEE Power Engineering Review*, 22:9, (September, 2002).

Shao, M., Zhang, Y. and Raufer, R., "Control Strategies for Vehicular NO<sub>x</sub> Emissions in Guangzhou, China," *Natural Resources Forum*, 25:2, (May, 2001).

R.K. Raufer, "Next Steps in Controlling Pollution," in *Planning for a New Century: The Regional Agenda*, J. Barnett, Ed., Washington, DC: Island Press, (2000).

R.K. Raufer and C. Wagner, "Atmospheric Dispersion Modeling," Section 1.8 in *Air Pollution*, D. Liu and B. Liptak, Eds., Lewis Publ., N.Y., (2000).

R. K. Raufer and Wang Weili, "Air Quality Management in Chinese Cities: The Policy Setting for Future Controls," *Sinosphere* (see <http://www.chinaenvironment.net/>), 2:4, (Fall, 1999).

A. Farrell, R. Carter, and R. Raufer, "The NO<sub>x</sub> Budget: Market-Based Control of Tropospheric Ozone in the Northeastern United States," *Resource and Energy Economics*, 21, (1999).

R.K. Raufer, "Particulate and Lead Pollution Control in Cairo: Benefits Valuation and Cost-Effective Control Strategies," *Natural Resources Forum*, 21:3, (August, 1997).

R.K. Raufer and C. Wagner, "Atmospheric Dispersion Modeling," Section 5.8 in *The Environmental Engineers' Handbook*, 2nd ed., D. Liu, ed., Lewis Publ., N.Y., (June, 1997).

R.K. Raufer, "Market-Based Pollution Control Regulation: Implementing Economic Theory in the Real World," *Environmental Policy & Law*, 26:4, (June, 1996).

R.K. Raufer, "Market-Based Environmental Development," *Natural Resources Forum*, 16:2, (May, 1992).

R.K. Raufer, S.L. Feldman and J.A. Jaksch, "Emissions Trading and Acid Deposition Control: The Need for ERC Leasing," *Journal of the Air Pollution Control Association*, 36:5, (May, 1986).

R.K. Raufer and S.L. Feldman, "Emissions Trading and What It May Mean for Acid Deposition Control," *Public Utilities Fortnightly*, 114:4 (August 16, 1984).

R.K. Raufer and R.A. Flessner, "Off-Site Emergency Planning Exercises in Illinois," *Nuclear Engineering International*, 29:351, (February, 1984).

R.K. Raufer, L.G. Hill and M.E. Samsa, "Emission Fees and TERA: An Evaluation of Policy Alternatives in the Twin Cities," *Journal of the Air Pollution Control Association*, 31:8, (August, 1981).

R.K. Raufer and J.J. Yates, "The Environmental Impact of Non-Conventional Energy Sources," Chapter 4 in *Perspectives on Energy and the Environment*, L. Theodore and A. Buonicore, Eds., CRC Press (1980)

R.K. Raufer and K.G. Croke, "The Hazardous Waste Manifest System: Preview of Things to Come," *Pollution Engineering*, 83:2 (February, 1979).

R.K. Raufer, A.O. Courtney and K.E. Noll, "Air Monitoring Network Design to Meet PSD Requirements," *Power Engineering*, 83:2 (February, 1979).

K. G. Croke and R.K. Raufer, "Management of Toxic Chemical Spills," *Journal of the Air Pollution Control Assoc.*, 28:1 (January, 1978).

K.E. Noll, T.L. Miller, J.E. Norco and R.K. Raufer, "An Objective Air Monitoring Site Selection Methodology for Large Point Sources," *Atmospheric Environment*, Vol. 11, No. 11, (November, 1977).

### **Selected Technical Reports**

Raufe, R., *International Experience with SO<sub>2</sub> Emissions Trading Mechanisms*, Report submitted to the GEF/World Bank, China Thermal Power Efficiency Project, Beijing, (Sept. 2011).

C. Loh and R. Raufer, *The Emissions Game: How Markets Can Help Save the Planet*, CLSA-U Blue Books Series, Hong Kong, (January, 2007); at: <http://www.civic-exchange.org/publications/2007/ET.pdf>

R.K. Raufer, L.T. Xu and S.J. Wang, *Steps Towards a Wind Resource Concession Approach in China*, UNDP/UNDESA Project CPR/97/005, New York, NY, (June, 2003).

R.K. Raufer, Y.H. Zhuang, and X.Y. Tang, (Eds.), *Urban Air Pollution Control in China: A Sector Review Report*, UNDP and CICETE, China Science & Technology Press, Beijing, (October, 2000).

R.K. Raufer, *An Information Initiative for EcoLinks*, submitted to Academy for Educational Development and U.S. AID, Washington, DC, (September, 1999).

R.K. Raufer, "Appendix B: Environmental Externalities," in M. Bernstein et al., *Developing Countries & Global Climate Change: Electric Power Options for Growth*, Pew Center on Global Climate Change, Washington, DC (June, 1999).

R.K. Raufer, *Economic Estimation of Environmental Externality Values for the RAND/Battelle Project on the Future of Power Generation in Developing Countries*, prepared for RAND, Santa Monica, CA (February, 1999).

R.K. Raufer, *Economics Component: Cairo Air Improvement Project*, U.S. Agency for International Development, Cairo, Egypt (June, 1995).

R.K. Raufer et al., *Trends in Environmental Impact Assessment of Energy Projects*, United Nations Publ.# ST/TCD/EB/3, New York (1994).

R.K. Raufer, *Floating Bubbles, Instantaneous Caps, and Shoulder Trades: Issues in the Implementation of Emissions Trading by Electric Utilities Under Acid Rain Controls*, prepared for Regulatory Innovations Staff, U.S. EPA (May, 1989).

R.K. Raufer, et al., *Environmental Assessment of a Refuse Derived Fuel Solid Waste Disposal System for the City of Philadelphia*, Public Management Consultants, Inc. and Metcalf & Eddy (April, 1986).

R.K. Raufer, et al., "Environmental Assessment Summary", Section 8 in *Final Report on the Implementation of a Refuse Derived Fuel Solid Waste Disposal System For the City of Philadelphia*, Metcalf & Eddy (April, 1986).

R.K. Raufer, E.C. Bodmer, M.G. Willingham and R. S. Goldstein, *Tax and Financial Implications of ERC Leasing by Electric Utilities*, prepared for Regulatory Reform Staff, U.S. EPA (November, 1985).

R.K. Raufer and S.L. Feldman, *Analysis of the Potential for ERC Leasing Transactions Under Various Acid Deposition Control Requirements*, prepared for Regulatory Reform Staff, U.S. EPA

(January, 1984).

D.W. Kathan and R.K. Raufar, *The Impact of Acid Deposition Controls on the Economy Energy Market: Utility Concerns and Potential Analytical Approaches*, prepared for Office of Policy Analysis, U.S. EPA (January, 1984).

R.K. Raufar and S.L. Feldman, *Emissions Trading by Electric Utilities: I. A Literature Review Identifying Institutional and Implementation Concerns* (January, 1983). II. Survey Results (May, 1983). prepared for Energy Policy Division, Office of Policy Analysis, U.S. EPA.

R.K. Raufar et. al., *The Twin Cities/St. Cloud Regional Air Quality Study*, National Commission on Air Quality, Washington, DC (November, 1980):

Volume I	The State Implementation Plan Process
Volume II	Alternative Development Scenarios
Volume III	Alternative Measures for Emission Reduction
Volume IV	Alternative Regulatory Policies

R.K. Raufar and K.G. Croke, *Economic Impact of the Proposed Illinois Special Waste Hauling Regulations (R76-10)*, Illinois Institute for Environmental Quality, Document No. 77/26 (October, 1977).

J.E. Norco and R.K. Raufar, *The Air Quality and Economic Implications of Supplementary Control Systems in Illinois*, Illinois Institute for Environmental Quality, Document No. 75/22 (November, 1975).

J.E. Norco, R.K. Raufar and K.G. Croke, *Cost-Effectiveness of Transportation Control Strategies for Carbon Monoxide*, Illinois Institute for Environmental Quality, Document No. 74/59 (October, 1974).

### **Conference Papers**

R.K. Raufar, "Emissions Trading in China: A Different Approach?" Proc., 7th International Conference of the International Center for Research on Environmental Issues, Universite Paul Cezanne, Aix-en-Provence, France, (June, 2008; Proceedings by Bruylant Publ., Bruxelles, 2010).

R.K. Raufar, "Pollution Control in the U.S. Power Sector: New Requirements, Costs, and Decisions for Electric Utilities," Proc., 7<sup>th</sup> Sino-American Technology and Engineering Conference (Environmental Protection section), Beijing, P.R. China, (October, 2006).

R.K. Raufar and S.J. Wang, "Update on the Wind Resource Concession Approach in China," IEEE

Power Engineering Society Winter Meeting, New York, NY, (January, 2002).

R.K. Rauffer, "Air Pollution Engineering as Cultural Experience," Smoke and Mirrors: Air Pollution as a Social and Political Artifact Workshop, University of California, Santa Cruz, (January, 2002).

R.K. Rauffer, "Economic Tools in Air Pollution Abatement: The Increasing Role of Quantity-Based Mechanisms," International Conference on Engineering and Technological Sciences 2000, Beijing, P.R. China, (October, 2000).

Zhuang, Y., Rauffer, R. and Wang, W., "Air Quality Management Initiatives in the UNDP Air Pollution Control Programme," International Conference on Engineering and Technological Sciences 2000, Beijing, P.R. China, (October, 2000).

R.K. Rauffer, "Air Pollution Control in Chinese Cities: A View from the Trenches," Presented at the WCFIA/BCSIA Joint Research Seminar on International Environmental Affairs, Harvard University, Cambridge, MA, (February, 1998).

A. Farrell, R. Carter and R. Rauffer, "The NOx Budget: Costs, Emission Reductions, and Issues for the Power Sector," 17<sup>th</sup> Annual North American Conf., U.S. Assoc. for Energy Economics, Boston, MA (October, 1996).

R.K. Rauffer, "Market-Based Pollution Control Regulation: Implementing Economic Theory in the Real World," U.N. Interregional Seminar on the Role of Public Administration in Developing Infrastructure and Protecting the Environment, Rio de Janeiro, Brazil, (March, 1996).

R.K. Rauffer, "Come the Revolution: Technology and Economics in an Era of Environmental Change," Keynote Paper, U.N. Meeting on Energy and the Environment in the Development Process, Beijing, PRC, (June, 1991).

R.K. Rauffer, "Will the Market in Emission Allowances Work?," *Energy in the 90's*, B.F. Hobbs, Ed.; Proc., ASCE Energy Div. Specialty Conf., Pittsburgh, PA, (March, 1991).

R.K. Rauffer and M.A. Bernstein, "Impact of U.S. Environmental Regulations on Electric Utilities," 13th Joint Business Conference of the USA/Republic of China Economic Councils, Kona, Hawaii, (November, 1989).

R.K. Rauffer, "Environmental Risk Management: Lessons from Philadelphia," PARSS Seminar, Wharton School, University of Pennsylvania, (November, 1988).

R.K. Rauffer, J.A. Jaksch and E.C. Bodmer, "Tax and Financial Implications of ERC Leasing by

Electric Utilities in Illinois," Proc., 79th Annual Meeting of the Air Pollution Control Association, Minneapolis, MN, (June, 1986).

R.K. Raufer, S.L. Feldman and J.A. Jaksch, "The Case for Emission Reduction Credit Leasing," Proc., 78th Annual Meeting of the Air Pollution Control Association, Detroit, MI (June, 1985).

R.K. Raufer, "Energy and the Environment in Developing Countries: An Incremental Approach," Mid-Winter Conference on Conventional Energy and the Environment, Institute of International Education, San Diego, CA (December, 1984).

J.E. Norco and R.K. Raufer, "Experience with an Emissions Trading Program," Proc., 6th Annual Energy-Sources Technology Conference and Exhibition, Houston, TX (January, 1983).

J.E. Norco and R. K. Raufer, "Air Pollution Control Through Economic Incentives: An Overview," Proc., 75th Annual Meeting of the Air Pollution Control Association, New Orleans, LA (November, 1981).

R.K. Chaudhry, R.K. Raufer and L.G. Hill, "Alternative Policies for the Control of Volatile Organic Compounds," Fall, 1981 Annual Meeting, American Institute of Chemical Engineers, New Orleans, LA (November, 1981).

R.K. Raufer and R. K. Chaudhry, "Emission Fees and Regulatory Efficiency," Proc., 74th Annual Meeting of the Air Pollution Control Association, Philadelphia, PA (June, 1981).

D.P. Kuhaneck, M.E. Samsa and R.K. Raufer, "Alternate Energy Scenarios and Air Quality in the Twin Cities," Proc., 74th Annual Meeting of the Air Pollution Control Association, Philadelphia, PA (June, 1981).

R.K. Raufer and K.A. Baugues, "The Development of State Implementation Plans for Lead," Proc., 73rd Annual Meeting of the Air Pollution Control Association, Montreal, Canada (June 1980).

R.K. Raufer, "Air Quality Constraints in the Siting of Coal Fired Power Plants in the Ohio River Valley," Proc., 72nd Annual Meeting of the Air Pollution Control Association, Cincinnati, Ohio (June, 1979).

R.K. Raufer and J.J. Yates, "Alternate Energy Sources: An Environmental Perspective", Proc., 6th National Conference on Energy and the Environment, Pittsburgh, PA (May, 1979).

R. K. Raufer, J. E. Norco and T.D. Worrell, "Monitor Siting for Prevention of Significant Deterioration of Air Quality," *Quality Assurance in Air Pollution Measurement*, (Proc., APCA/ASQC Specialty Conference), New Orleans, LA (March, 1979).

R.K. Raufer, J.E. Norco, R.D. Worrell, R.A. Braun, J.E. Marks and K.E. Noll, "Air Monitoring Network Design for Power Plant Siting," Proc., NATO's 9th International Technical Meeting on Air Pollution Modeling and Its Application, Toronto, Canada (August, 1978).

R.K. Raufer and K.G. Croke, "Economic Impacts of a Hazardous Waste Manifest System," Proc., 5th National Conference on Energy and the Environment, Cincinnati, OH (November, 1977).

R.K. Raufer, D.P. Kuhaneck and J.E. Norco, "The Air Quality and Energy Implications of Restrictive Fuel Oil SO<sub>2</sub> Emission Limitations," Proc., 70th Annual Meeting of the Air Pollution Control Association, Toronto, Canada (June, 1977).

R.K. Raufer, J.E. Norco and J.P. Bradley, "The Prediction of Supplementary Control System Operations by Dispersion Modeling," Proc., 69th Annual Meeting of the Air Pollution Control Association, Portland, OR, (June, 1976).

R. K. Raufer, "The Technology Assessment Act and Air Pollution," Proc., 68th Annual Meeting of the Air Pollution Control Association, Boston, MA (June, 1975).

J. E. Norco, R.K. Raufer and P.A. Roberts. "The Air Quality and Energy Implications of Supplementary Control System Implementation," Proc., 68th Annual Meeting of the Air Pollution Control Association, Boston, MA (June, 1975).

### **Selected Presentations**

"International Experience with SO<sub>2</sub> Emissions Trading Mechanisms," GEF/World Bank China Thermal Power Efficiency Project, Shanxi and Shandong Province Training Workshop, Beijing, (June, 2011).

"The Development of Emissions Trading in the U.S." and "Next Steps for Emissions Trading in China?," College of Environmental Sciences and Engineering, Peking University, Beijing, (June, 2010); "Next Steps..." (June, 2011).

"Next Steps for Emissions Trading in China?," Research Center for Eco-Environmental Sciences, China Academy of Sciences, Beijing; Shenzhen International Technology Promotion Center for Sustainable Development, Shenzhen; K&L Gates, Hong Kong; (June, 2010).

"Energy and Environment in Chinese Cities," Workshop on the Geopolitics of Global Resources, International Relations Program, University of Pennsylvania, Philadelphia, PA (April 2010).

“The Shanghai Cooperation Organization and Energy,” International Assessment and Strategy Center, Philadelphia, PA (October, 2009).

“Energy System Integration in Asian Cities: Promoting Change for Development and Sustainability,” Asia-Pacific Forum on Low Carbon Economy – China, 2009; Beijing, China, (June, 2009).

“A ‘Leapfrog’ Approach for Emissions Trading in China?,” Beijing Energy Network, Beijing, China, (June, 2009).

“A Proposed ‘Leapfrog’ Approach for Pollution Control in Chinese Cities,” Urban Planning Dept. and Environmental Engineering Dept., National Cheng Kung University, Tainan, Taiwan, (May, 2009).

“A Proposed ‘Leapfrog’ Approach for Urban Pollution Control,” Keynote Presentation, International Conference on Development of Sustainable Environment, Leader University, Tainan, Taiwan, (May, 2009).

“Emissions Trading in China: A ‘Leapfrog’ Approach?,” College of Environmental Sciences, Peking University, Beijing, China, (April, 2009).

“A ‘Leapfrog’ Approach for Pollution Control in Chinese Cities?,” City & Regional Planning Department, University of Pennsylvania, Philadelphia, PA, (February, 2009).

“Carbon Markets and Trading in Asia,” Climate Change and Asia: Risks, Opportunities and Policies 2008, Conference sponsored by Singapore Institute of International Affairs and Civic Exchange (Hong Kong), Singapore Management University, Singapore, (May, 2008).

“Emissions Trading in Asia: The View from Hong Kong,” Nikkei University Consortium, Possibilities of Forming Asian GHG Markets in the Post-Kyoto Period, Sophia University, Tokyo, Japan, (April, 2008).

“Sustainable Urban Energy Systems in China,” China Institute for Public Affairs (CIPA) Annual Conference, Columbia University, New York, NY (November, 2007).

“The Emissions Game: How Markets Can Help Save the Planet,” Fourteenth CLSA Investors' Forum, Hong Kong, (September, 2007).

“The Emissions Game: How Markets Can Help Save the Planet,” Fourth CLSA Japan Forum, Tokyo, Japan, (February, 2007).

“Market-based Pollution Control: Hong Kong and the International Marketplace,” Keynote Speaker, Third Energy Forum, Civic Exchange, Hong Kong, (January, 2007).

“Market-based Pollution Control: Hong Kong and the International Marketplace,” Presentation to the Board of Directors, Hong Kong Stock Exchange, Hong Kong, (December, 2006).

“Energy and Sustainable Development,” Keynote Address (in conjunction with Li Shaoyi, UN DESA), Energy and the Road to Sustainable Development Conference, sponsored by Energy Bureau of National Development and Reform Commission of PRC and Macau SAR’s Office for Development of the Energy Sector, Macau, (October, 2006).

“Sustainable Urban Energy Systems in China,” American Chamber of Commerce in Hong Kong, Hong Kong, (October, 2006).

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