C U R R I C U L U M V I T A E

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BIOGRAPHY

Born February 1, 1955 in Graz, Austria; Austrian citizen. (For further biographical details see *Who's Who in the World,* 15th Edition, 1998, Marquis Who's Who, New Providence, USA, pp. 530.)

EDUCATION

Masters Degree (1985) in engineering (regional development planning) and Doctorate Degree (Ph.D) in technical sciences (1989) from Technical University Vienna, Austria. Habilitation and *venia legendi* in system science of environment and technology (1999) Mining University, Leoben, Austria.

LANGUAGES

English: fluently spoken and written (working language for over 20 years); *French:* fluently spoken, written texts require final editing; *Dutch, Italian, Spanish:* comprehension of written texts. Mother tongue is *German.*

CURRENT POSITIONS

Senior Research Scholar, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria (1986–present, part-time since 2003).

Professor in the Field of Energy and Technology, School of Forestry and Environmental Studies, Yale University, USA (part-time, since 2003).

Editorial Board member of the Journals *Industrial Ecology*, and *Technological Forecasting and Social Change* (1995–present).

Lecturer (*Univ. Dozent* since 1999) at the Mining University, Leoben, Austria. (1997–present), Guest Professor (energy) at the Technical University, Graz, Austria (2004–present).

Areas of Interest: long-term technology development, its social, economic and environmental impacts, in particular in the areas of energy, transport, and communication systems; conceptual and mathematical models of technical change; quantitative methods and models of energy and minerals resource assessment and development strategies

Areas of Current Research: assessment of strategies, technological options and economic policy instruments for long-term environmental compatibility; development of long-term energy and greenhouse gas (GHG) emission scenarios with both macroeconomic and systems engineering type models; comparative studies of technology diffusion; modeling of endogenized technological change and its driving forces at the micro and macro level; asessment of past and future impacts of technical change on the environment in agriculture, industry, and services.

EMPLOYMENT RECORD

2003– Professor in the Field of Energy and Technology, School of Forestry and Environmental Studies, Yale University, New Haven, USA (part-time).

Teaching (energy systems analysis, and a seminar on technological change and the environment) and research with focus on interplay between technological and environmental change.

1986– Senior Research Scholar, Environmentally Compatible Energy Strategies and Transitions to New Technologies Projects, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria (part-time since 2003).

Assessment (technological, economic, and diffusion potential) of greenhouse gas (GHG) mitigation options, economic policy instruments for their implementation, and GHG accounting frameworks and emission allocation criteria. Integrated assessment of climate change impacts. Development of long-term energy and environment scenarios using both macroeconomic and systems engineering (optimization) models in a joint study with the World Energy Council (WEC) and for the Intergovernmental Panel on Climate Change (IPCC). Coordination of international research network on technology and environment interactions. Study of long-term trends in energy efficiency improvements and their driving forces. Analysis of long-term technological change, its relationship to economic growth, and its impact on efficiencies, productivity, working time and time allocation. Emphasis on empirical analysis in areas of transport, energy and manufacturing. Modeling of endogenized technological change with stochastic, non-convex optimization models. Work on diffusion models and on taxonomic principles for classification of technological change. Development of computer algorithms and models for process and product innovation diffusion and substitution models.

1985 Research Assistant, International Gas Study Project, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria.

Large scale energy modeling to assess costs of SO_2 and NO_x emission reductions and assessment of transport and distribution costs for gas and district heating networks based on population density distribution models.

1984 Intern, Mining and Non-Ferrous Metals Division, World Bank, Washington D.C., USA.

Development of PC based information system and short-run marginal production cost model of 100 largest copper producers worldwide.

1978–1983 Research Assistant, Energy Systems Program, and Resources and Environment Area, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria.

Comparative analysis of coal mining technologies in the USA and the USSR, their economics and resource impacts, including statistical analysis and modeling of the influence of deposit geology, resource depletion and economies of scale on coal extraction costs. Survey work on status of process information systems and development of computerized mapping procedures to link process data bases. Comparative assessment of resource requirements, impacts and costs of various energy chains and of monoenergetic energy supply scenarios at country level. Evaluation of various centralized versus decentralized solar electricity generating schemes at regional level. Technology assessment of nuclear and coal based energy technologies and development of energy technology process data base.

OTHER PROFESSIONAL ACTIVITIES AND CONSULTING

Elected Foreign Member, Russian Academy of Natural Sciences. Since 1997.

International *Journal of Industrial Ecology*: Editorial Board member. 1996–present.

International Journal *Technological Forecasting and Social Change*: Editorial Advisory Board member. 1995–present.

Mining University, Leoben, Austria. 1997–present. Lecturer (since 1999 *Univ. Dozent*), technology and environment for curricula of mining engineering, petroleum engineering, and industrial engineering.

Intergovernmental Panel on Climate Change (IPCC). 1994–present. Lead author Working Group III (framing issues) of the IPCC Fourth Assessment Report (since 2004). Contributing author Working Group I (atmospheric chemistry and greenhouse gases) of the IPCC Third Assessment Report (2001). Lead author IPCC Special Report on Emissions Scenarios (2000). Lead and contributing author Working Group II (energy primer, mitigation options in transportation) of the IPCC Second Assessment Report (1996). Lead Author Working Group III (evaluation of IPCC IS92 emission scenarios) of the IPCC Second Assessment Report (1995).

International Council for Science (ICSU) and Third World Academy of Sciences (TWAS). 2003–2005. Member of ad hoc expert group on sustainability science

Technical University, Graz, Austria. 2004–2005. Guest Professor (Energiesystemanalyse) for curricula of thermodynamics, and energy economics.

Yale University, School of Forestry and Environmental Studies. 2002 (fall semester). Visiting Professor Energy and Technology.

DUXX Graduate School of Business. 2001 (spring semester). Visiting professor for management of technological innovation.

Scientific and Technical Advisory Panel, Global Environmental Facility (GEF). 1997. Consultant on transport sector policies.

United Nations, Department for Policy Coordination and Sustainable Development, New York. 1995–1996. Preparation of document *Energy and the Protection of the Atmosphere.*

International Social Science Council, Human Dimensions of Global Environmental Change Programme (HDP). 1994–1995. Member of Expert Working Group on Industrial Transformation and Energy Use.

General Motors Research and Development Center, Warren, USA. 1994–1995. Consultant for envisioning and alternative futures development project.

Technical University Graz, Austria. 1993. Co-lecturer, post-graduate course on global energy systems for curricula of mechanical engineering (energy technologies, traffic and transport technologies) and engineering economics.

Environmental Policy Division, World Bank, Washington D.C. 1991–1992. Analysis of quantitative implications of different reduction and allocation criteria for control of greenhouse gas (GHG) emissions. Development of an emission inventory of historical (since 1800) and current GHG emissions and of a quantitative model for the analysis of the regional/national impacts of different GHG control criteria and scenarios.

International Centre for Theoretical Physics (ICTP), Trieste, Italy. 1992. Lecturer on scientific aspects of climate change, technologies and economics of mitigation options, greenhouse gas accounting and allocation and its equity implications.

Vienna University, Austria. 1990–1991. Lecturer, graduate course on technology evolution for curricula of sociology of science and philosophy.

Shell International Petroleum Company Limited, London. 1989–1990. Comparative study of transport, communication and energy infrastructures in Western and Eastern Europe and scenarios of usage intensity up to 2010. Analysis of the long-term development of transport systems at the regional and global level and of their energy requirements.

International Council for Science Policy Studies, Paris. 1989. Coauthor of document *Science, Technology and Development* for the Scientific and Technological Policy Division of UNESCO.

Asea Brown Boveri (ABB), Baden, Switzerland. 1989. Lecturer at strategic management seminars.

Austrian Electricity Board (Verbundgesellschaft), Vienna, Austria. 1987–1989. Analysis of changes in energy efficiency and impacts on energy and electricity supply.

Eduard Pestel Institut für Systemanalyse und Prognose, Hannover, FRG. 1988. Assessment of resource availability and supply prospects for natural gas in central Europe.

Milan Vidmar Elektroinstitut, Ljubljana, Yugoslavia. 1986–1988. Development of supply optimization (LP) models and energy scenarios for the Republic of Slovenia.

Chemie Linz AG, Linz, Austria. 1987. Analysis of the structural changes in the European chemical industry and major markets with emphasis on plastics and fertilizers.

International Centre for Theoretical Physics (ICTP), Trieste, Italy. 1987. Lecturer on energy modeling and innovation diffusion models in the ICTP summer course on economics, modeling, planning and management of energy.

Committee on Environmental Implications of Expanded Coal Utilization of the Beijer Institute (Royal Swedish Academy of Sciences) and the USSR Academy of Sciences. 1980–1983. Carrying out studies on the level of coal utilization in global energy scenarios and on classification systems and evolution of world coal resources.

Consorzio per il Sistema Informativo (CSI) of the regional government of Piemonte, Torino, Italy. 1982–1983. Development of a computer based environmental decision support system for the Piemonte region.

Resource Systems Institute of the East-West Center, Honolulu, Hawaii. 1979. Coorganizer of conference on Systems Aspects of Energy and Mineral Resources.

PUBLICATIONS

Author, co-author, and editor of nine books, three special journal issues, more than 60 peer-reviewed articles, book chapters and research reports and additional 30 professional papers.

29 (23 unique) entries, 159 references, and 545 citations in ISI Science, Social Science, and Arts & Humanities Citation Indexes; 25 entries and 319 citations in SCOPUS data base citation index; 32 unique publications indexed in combined ISI and SCOPUS data bases (as of March 2006).

PRIVATE INTERESTS

Architectural history, classical music, viticulture.