

CURRICULUM VITAE

Arnulf Grübler (Grubler)

Work: IIASA

A-2361 Laxenburg

Austria

tel.: 43(2236)807-470

fax: 43(2236)71313

email: gruebler@iiasa.ac.at

FES, Yale University

06511 New Haven, CT

USA

email : arnulf.grubler@yale.edu

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

Acting Program Leader, *Transitions to New Technologies Program*, 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 (FES), Yale University, New Haven, USA (part-time, since 2003).

Lecturer (Univ. Dozent since 1999) at the Mining University, Leoben, Austria. (1997–present).

Areas of Interest: long-term technology development and technological transitions, and their 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 and mitigation portfolio analysis with integrated assessment models; comparative studies of technological change and diffusion; modeling of endogenous technological change and its driving forces at the micro and macro level; historical analysis of technological transitions, assessment 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 (class on energy systems analysis, and a seminar on energy technology innovation) and research with focus on interplay between technological, social, 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). Acting Program Leader, Transitions to New Technologies Program since 2009.

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 modeling of climate change scenarios and mitigation option portfolios with emphasis on spatially-explicit modeling of socio-economic development. Development of long-term energy and environment scenarios using both macroeconomic and systems engineering (optimization) models in joint studies with the World Energy Council (WEC), the Intergovernmental Panel on Climate Change (IPCC), and the Global Energy Assessment (GEA). Lead Author in major international scientific assessments including the IPCC, GEA, and the International Council for Science (ICSU). Coordination of international research network on technology and environment interactions. Study of long-term trends in energy efficiency improvements and their driving forces. Analysis (empirical, conceptual, modeling) of technology transitions, their relationship to economic growth, and their impact on efficiencies, productivity, and the environment. Emphasis on empirical analysis in areas of transport, energy and manufacturing. Modeling of endogenous 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 SO₂ 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 resource requirements of energy technologies and systems, development of energy technology process information systems.

OTHER PROFESSIONAL ACTIVITIES AND CONSULTING

Academia and Journal Editorship:

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

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

Carbon Management: Editorial Advisory Board member. 2009-present.

International Journal Technological Forecasting and Social Change: Editorial Advisory Board member. 1995–2009.

International Assessments:

Intergovernmental Panel on Climate Change (IPCC, co-recipient of the 2007 Peace Nobel Prize). 1994–present. Review Editor, Chapter 1, Working Group III, IPCC Fifth Assessment Report (2011-2014), Lead Author, Chapter 2, Working Group III (framing issues) IPCC Fourth Assessment Report (2004-2007). Contributing author Working Group I (atmospheric chemistry and greenhouse gases) IPCC Third Assessment Report (1999-2001). Lead author IPCC Special Report on Emissions Scenarios (1998-2000). Lead and contributing author Working Group II (energy primer, mitigation options in transportation) IPCC Second Assessment Report (1994-1996). Lead Author Working Group III (evaluation of IPCC IS92 emission scenarios) IPCC Second Assessment Report (1994-1995).

Global Energy Assessment (GEA). 2008-2012. Convening (Coordinating) Lead Author, Chapter 1 Energy Primer, Chapter 18 Urban Energy Systems, Chapter 24 Policies for the Energy Technology Innovation System (ETIS), Lead Author, Chapter 17 Energy Pathways for Sustainable Development.

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

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.

Teaching (outside Yale):

Mining University, Leoben, Austria. Lecturer, Technology and Environment. 1997-present.

Sungkyunkwan University, Suwon, South Korea. 2009 (fall semester). Guest Professor Energy Systems.

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

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

DUXX Graduate School of Business, Monterrey, Mexico. 2001 (spring semester). Visiting Professor for Management of Technological Innovation.

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

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 Technology Evolution for curricula of sociology of science and philosophy.

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.

Consulting (selection):

United Nations, Department of Economic and Social Affairs (UNDESA). 2010–2011. Member scientific steering committee for 2011 World Economic Survey (WESS): The Great Green Technological Transformation; consultant, co-authoring background paper on Lessons from the History of Technological Change for Clean Energy Scenarios and Policies.

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. Consultant and preparation of document on Energy and the Protection of the Atmosphere.

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

Environmental Policy Division, World Bank, Washington D.C. 1991–1992. Consultant, performing 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.

Shell International Petroleum Company Limited, London. 1989–1990. Consultant, performing a 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. Consultant and coauthor of document on Science, Technology and Development for the Scientific and Technological Policy Division of UNESCO.

Asea Brown Boveri (ABB), Baden, Switzerland. 1989. Consultant and lecturer at strategic management seminars.

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

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

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. Committee member (pro bono), carrying out studies on the level of coal utilization in global energy scenarios and on classification systems and evolution of world coal resources.

PUBLICATIONS

Author, co-author, and editor of twelve books, three special journal issues, more than 100 peer-reviewed articles, book chapters and research reports and additional 30 professional papers in the domains of technological change, technology diffusion, long wave theory, historical transitions in energy and transport systems, long-term future scenarios, climate change, and resource economics (see separate publication list).

42 entries and 1220 citations in ISI Web of Science (Science, Social Science, and Arts & Humanities Citation Indexes), H-index: 15.

45 entries and 1419 citations in SCOPUS (all research fields), H-index: 16.

52 unique publications indexed in combined ISI Web of Science and SCOPUS data bases (as of April 2013).

PRIVATE INTERESTS

Architectural history, classical music, viticulture, sustainable farming/forestry practices.