



Dr.-Ing. Dr.-Ing. hc Louis Diaz
born 1946

Pioneer in waste management. Specialist for waste technologies in developing countries and initiator of a scientific journal "Waste Management"

Education

- B.S., Mechanical Engineering, San Jose State University
- M.S., Mechanical Engineering,
- Ph.D., Environmental Engineering, University of California, Berkeley
- University of California, Berkeley
- Public Health, Odor Emission Evaluation

Employment

- 1975 to Present: Principal, CalRecovery, Inc.
- 1980 to 1981: Instructor, San Francisco State University
- 1972 to 1977: Research Engineer/Instructor, University of California, Berkeley

Founding an own engineering company 1977: CalRecovery

Professional Activities

- Planning in waste management in the United States and internationally
- Preparation of solid and hazardous waste management plans and guidelines
- Composting Projects
- Waste Processing Design and Analyses
- Design of entire systems and sub-systems for the separation and recovery of secondary materials and/or fuel from wastes
- Development of various computer models
- Recycling
- Collection and Waste Processing
- International activities in more than 50 countries

- Waste Characterization and Toxicity
- Risk assessment
- Landfilling
- Marketing
- Technical Assistance
- Energy from Biomass
- Health Care Wastes
- Waste-to-Energy
- Wastepaper Processing.
- Landfill Mining and Reclamation.
- Technology Transfer and Training. Publications

Projects Undertaken

- **Planning.** For numerous public and private entities in the United States and internationally, Dr. Diaz has provided planning assistance such as the evaluation of existing systems and conditions; the preparation of solid and hazardous waste management plans and guidelines; short- and long-range planning; and the preparation of environmental action plans.
- **Composting.** Dr. Diaz has conducted numerous projects involving the stabilization of organic residues through composting. These projects have ranged from research and development studies to ascertain the compostability of residues such as limed sludge, water hyacinths, bio solids, green waste, and oil sludges to the design and/or evaluation of full-scale composting facilities. Due to his involvement in composting since the early 1970s, Dr. Diaz has visited and evaluated most major composting facilities in the United States, Europe, Asia, and South America. His work in composting has also dealt with the marketability of the finished product, as well as the evaluation of the characteristics of composts made from yard debris, sludge, and MSW.
- **Waste Processing Design and Analyses.** Dr. Diaz has participated in the design, test, or evaluation of a variety of pieces of equipment used for processing waste streams and biomass. This includes screens, air classifiers, shredders, and densifiers. He has also been involved in the design of entire systems and sub-systems for the separation and recovery of secondary materials and/or fuel from wastes. This experience has led to the development of various computer models to simulate the performance of individual pieces of equipment as well as the entire resource recovery system. Some of the materials that have been processed include mixed municipal solid waste; fractions of MSW such as paper, plastics, metals, and glass; composted organic matter; construction and demolition (C&D) debris; and mixed waste removed from landfills (landfill mining).
- **Recycling.** Dr. Diaz has been involved in materials recovery and recycling since the early 1970s. He has participated in projects designed to evaluate the performance of recycling systems. He has also taken part in the design,

operation, and evaluation of specialized systems to process source-separated materials such as plastics and wastepaper. Involvement in waste and energy management in the industrialized nations, as well as in the lesser developed countries, has allowed him a sound understanding of the applications of various techniques that take advantage of mechanical processes, labor-intensive processes, and a combination of the two. He has also carried out recycling projects in other countries in order to assess the effectiveness of the recycling methods, as well as to improve the efficiency of recovery and the working conditions of the laborers.

- **Collection and Waste Processing.** Dr. Diaz's experience includes design and analysis of collection systems and/or processing technologies, including recycling, composting, mechanical processing, and anaerobic digestion. He also has conducted expert and third-party reviews of technical and financial aspects of various waste collection and processing alternatives for both private and public clients. Previously, Dr. Diaz also managed the CalRecovery effort to assist the City of San Jose, California in the procurement of private services to collect garbage, recyclables, and green waste, as well as to secure processing capacity (the Recycling Plus! program). This work involved cost estimation, formulation of incentive guarantees for vendor performance, preparation of RFPs, evaluation of proposals, participation in contract negotiation, and development of contract terms and conditions.
- **International.** Dr. Diaz has provided expert advice in environmental protection and in the development of non-conventional sources of energy to several international agencies such as The World Bank, Asian Development Bank, U.S. Agency for International Development, the Peace Corps, and the United Nations (UNIDO, WHO, PAHO). Dr. Diaz has participated in waste and energy management projects in the following countries:

American Samoa	Georgia
Austria	Guatemala
Argentina	Guernsey, Channel Islands
Australia	India
Bangladesh	Italy
Barbados	Kazakhstan
Bolivia	Korea (South)
Brazil	Mauritius
Canada	Mexico
Chile	Mongolia
Colombia	Morocco
Costa Rica	New Zealand
Dominican Republic	Paraguay
Ecuador	People's Republic of China
Egypt	Peru

England
Germany
South Africa
Spain
Switzerland
Thailand
Tonga

Republic of the Philippines
Saudi Arabia
Trinidad & Tobago
Uruguay
Venezuela
Zimbabwe

- **Waste Characterization and Toxicity.** Dr. Diaz has participated in a number of aspects related to waste characterization and analytical techniques. He has participated in more than forty waste characterization studies conducted throughout the United States and in other countries. He has participated in the planning, coordinated the process, supervised the training of sorters, developed safety and immunization procedures for sorters, reviewed the data collected, and prepared final reports. The studies have also included proximate and ultimate analyses, heating value, trace element analyses, and concentrations of herbicides, pesticides, dioxins, and asbestos. Some of the waste streams have included mixed municipal solid waste, construction and demolition debris, selected recyclable streams, and health care wastes. The waste characterization analyses have been used to plan waste collection systems, to design recycling programs, and to calculate present and potential diversion of materials from land disposal. The waste characterization analyses have also included the measurement and analyses of the quantities of waste (disposed, recycled, and generated), of hazardous constituents, and of chemical and thermal properties. He has assessed the solid, liquid, and gaseous discharges from several industries, including pulp and paper, plastics manufacturing, and petroleum refining. Dr. Diaz also has participated in projects associated with the analysis of the fate of wastes and the change in their characteristics due to mechanical processing, controlled biological processing, and to the physical, biological, and chemical processes that take place inside the disposal sites. Dr. Diaz recently completed a risk assessment for the treatment and disposal of healthcare wastes and evaluated the impact of treatment and disposal technologies on human health and on the environment.
- **Landfilling.** Dr. Diaz has participated in the evaluation, upgrade, design, and closure of several disposal sites in developing countries. He recently participated in various aspects of planning for the closure and post-closure care of two disposal sites and in the design of a new sanitary landfill serving Mexico City. He has made presentations in Asia, Latin America, and the Caribbean regarding the various elements of designing and implementing sanitary landfills in developing countries. He is a member of the International Solid Waste Association's (ISWA) Working Group on Sanitary Landfills and participated in the development of a course on the design and implementation of sanitary

landfills for developing countries. In addition, Dr. Diaz is the principal author of the document entitled *Manual for the Design of Sanitary Landfills in Developing Countries*, prepared for The World Bank.

- **Marketing.** Dr. Diaz has carried out numerous market analyses for waste-derived materials, including compost, paper, plastics, and metals. These analyses have involved not only the evaluation of potential markets, but also development of specifications, and the procurement of letters of intent from buyers. Marketing analyses have been conducted throughout the United States, Europe, Southeast Asia, and South America.
- **Technical Assistance.** Dr. Diaz frequently is called upon to provide technical assistance to a number of public and private entities in the United States. He has also provided expert advice to international agencies, foreign governments, the Council of European Communities, and industrial concerns in other countries. The scope of services have included technical and economic evaluation of waste management processes; development of human resources; review and evaluation of proposals and contract documents; evaluation and/or preparation of bid documents; and presentations at seminars.
- **Energy from Biomass.** Dr. Diaz carried out a variety of projects in the field of energy production from biomass. These studies have covered several types of biomass, including MSW, sludge, wood, and agricultural residues and have been conducted both in the United States and in other countries. Some of these projects involved the following technologies: anaerobic digestion of agricultural residues, sludge, and fractions of MSW; gasification of wood, charcoal, and rice hulls for irrigation and refrigeration; and the production of RDF and dRDF for generation of steam and electricity. These projects have generally included the technical and economic evaluation of the feasibility to implement the processes, the performance of pilot tests, as well as the assessment of potential negative environmental impacts.
- **Hazardous Wastes.** Dr. Diaz has dealt with toxic and hazardous wastes since 1974. Since then, his involvement has covered several technical, economic, environmental, and institutional issues related to the management of toxic wastes. Some of the projects in which Dr. Diaz has been involved include: the removal of lead from industrial wastewaters; recovery, processing, and re-use of waste hydrocarbons; detoxification of oily sludges through biotreatment; and the preparation of hazardous waste management plans.
- **Health Care Wastes.** Dr. Diaz has conducted several projects that included various aspects of dealing with health care wastes. Specifically, the projects have involved the identification of the generators of the waste, quantities and types of waste generated, as well as the existing means of collecting and disposing of the wastes. The work has also included education of the staff in health care facilities and the establishment of practices leading toward the improvement of storage, collection, and final disposition of the wastes. In addition, Dr. Diaz has directed tours of health care facilities in the United

States, at the request of several members of Ministries of Health from other countries. He also participates in training courses organized by the International Solid Waste Association and other entities dealing with various aspects of managing health care wastes in low- and middle-income countries.

- **Waste-to-Energy.** Dr. Diaz has participated in several projects involving the recovery of energy from wastes. These projects range from feasibility analyses to test and evaluation of the thermal performance and the emissions from combustion equipment. The breadth and scope of the projects includes the recovery and use of landfill gas, to the use of modular incineration, to the production and use of RDF. Specific projects include: Systems Integration Modeling for the Production of RDF; Analyses of Thermal Drying and Screening on the Quality of RDF; Fuel and Fertilizers from MSW; and Economic Evaluation of Modular Heat Recovery Incinerators.
- **Wastepaper Processing.** Dr. Diaz has been actively involved in various aspects of wastepaper recovery, processing, and reuse. He has participated in several studies to determine the concentration of paper and paper products in the waste stream. In addition, Dr. Diaz has performed a number of studies to determine the marketability of paper products recovered from the waste stream. He has investigated the secondary fiber market in the United States, as well as in South America and Southeast Asia. In one project, Dr. Diaz took part in the development of a fiber recovery system. The system was capable of recovering paper fiber from mixed municipal solid waste. During the test and evaluation of the system, Dr. Diaz also studied the characteristics of the fiber recovered, as well as the various parameters necessary to design a full-scale process.
- **Landfill Mining and Reclamation.** Dr. Diaz has managed or participated in several projects involving landfill mining and reclamation (LFMR). He managed two solid waste planning studies in the Philippines that included evaluation and design of LFMR operations as waste management alternatives. Additionally, he has served as an in-house consultant concerning the quality of soil fraction recovered from LFMR systems and its potential uses and markets. Dr. Diaz also provided technical assistance in the areas of landfill processes that influence LFMR feasibility and in assessing the state-of-the-art of LFMR feasibility of LFMR for a report prepared by CalRecovery for the State of California.
- **Technology Transfer and Training.** Dr. Diaz has presented several lectures at colleges and universities in the fields of waste and energy management. He also developed and taught a graduate-level course in solid waste management at the University of the Philippines in Manila, and was co-instructor of a graduate class in Environmental Planning at San Francisco State University. He participated, with Harvard University, in a technology transfer program on solid and hazardous waste management for developing countries in the Pacific Basin. In addition, he has prepared and presented one-week seminars

in Solid Waste Management to more than 60 professionals from the People's Republic of China. Dr. Diaz has provided assistance in the organization of several specialized training courses and has participated in more than 100 seminars and symposia throughout the world. Dr. Diaz has presented lectures in solid waste management at the following institutions: University of West Indies, Trinidad & Tobago; Pontificia Universidad Católica, Asunción, Paraguay; Spanish Waste Club, Madrid, Spain; University of Padova, Padova, Italy; Universität für Bodenkultur, Vienna, Austria; Bauhaus Universität, Weimar, Germany; Technical University, Braunschweig, Germany; Rutgers University; University of Wisconsin; University of California at Berkeley; San Jose State University; and others in the United States.

Service to Editorial Boards

- Editor-in-Chief, *Waste Management*
- Member, Editorial Board, *Resources Conservation & Recycling*
- Member, Editorial Board, *Compost Science & Utilization*
- Member, Editorial Advisory Board, *Environmental Business Journal*
- Member, Editorial Board, *Residuos*
- Member, Editorial Board, *Waste Management & the Environment*
- Member, Editorial Board, *BioCycle*
- Member, Advisory Board, *Nuclear Engineering and Technology*, Journal of the Korean Nuclear Society
- Member, Editorial Board, *Utilities Policy*
- Member, International Advisory Board, *Journal of Material Cycles and Waste Management*, Official Journal of the Japan Society of Waste Management Experts

Honors

- Visiting Professor, School of Civil Engineering, University of Leeds, UK (2002-2004)
- Chair, Working Group on Developing Countries, IWWG (2004 to present)
- Member, Executive Committee of Advisory Board, College of Engineering, San José State University (1994 to 2004)
- Recipient, Dean College of Engineering Service Award, San Jose State University, 1998
- Recipient, 1982 Engineering Award of Distinction, San Jose State University
- Honored PHD, Bauhaus University Weimar

Member

- American Society of Mechanical Engineers (ASME)
- American Society of Agricultural Engineers (ASAE)
- Soil Conservation Society of America (SCSA)
- Sigma Xi
- Working Group on Developing Countries, International Waste Working

Group (IWWG)

- Institute of Waste Management, South Africa
- National Solid Waste Association of India
- Solid Waste Association of the Philippines
- Board of Directors, ORBIT Association
- Founding Member, IWWG

Publications

Dr. Luis Diaz List of publications is long. He prepared a judge number of publication in journals and presented papers on many conference.

Personal remarks by Werner Bidlingmaier

Luis is one of the great pioneers in waste management. He had the genial capability to combine scientific research and practical work. He was the first who gave "Waste management in developing countries" a platform and prepared methods for waste technologies under this surroundings. He inspired me to go in projects in this countries and to develop technologies and standards on low technology. Luis wrote the first book about Waste Management in developing countries, which became a standard till today.

Founding the Journal "Waste Management" he created the first Journal in waste management with a review system and mad it world wide number one in scientific and practice.

But the most important character of Luis is to be a FRIEND! I am proud that he accepted me as his friend and that we had so many good times together in projects and with private discussions!