



"Gheorghe Asachi" Technical University of Iasi, Romania



Book Review

SUSTAINABLE RESOURCE DEVELOPMENT

Gary M. Zatzman

Scrivener Publishing, 100 Cummings Center, Suite 541J, Beverly, MA 01915-6106
ISBN 978-1-118-29039-2, 504 pages

The interest for environment, energy and sustainable development connected efforts to implement sustainable technologies with zero waste. Moreover, energy resources, which cause no environmental impact, must be investigated by a society that search sustainable resources and is concerned with decoupling economic growth from excessive consumption of resources.

The book is a valuable source of information, for the understanding of sustainability in energy resource development. The ways for accomplishing zero net waste are explored by the author who tried to identify the principal obstacles in achieving the sustainability in generation and distribution of electric power from different sources. The author also examines the possibility of replacing fossil fuel sources with natural gas and illustrated the scale on which applications of natural gas have developed for replacement for refined petroleum in North America and Eurasia.

The book is structured into 7 chapters and is addressed to a large audience from engineering to scientists, who are interested in energy resource development.

Chapter 1 - *A True Sustainability Criterion and Its Implications* presents the importance of sustainability as a criterion for development (nature of the problem currently facing human habitat is illustrated and various man-mode activities are summarized; the importance of the first criterion); author affirms that *"at the end, anything that is natural is sustainable"* and debate the decision taking process which involve asking *"yes or no"* questions. The chapter also provides some application of the criterion, current practices in petroleum engineering

including different problems of current operations and problems in technological development.

Development of a sustainable model which provides the basis of the direction of sustainable technology is illustrated and discussed. In this chapter author also discusses about the infringement of natural characteristic time and analogies with physical phenomena, intangible cause to tangible consequence; mass and energy balance; the current energy model; the tool needed for sustainable petroleum operations; some conditions for sustainability. The author affirms that sustainability indicators can be used to measure the state or degree of sustainability in petroleum operations. Environmental, community, policy and technological criteria for sustainable development are illustrated and the synthesized, and natural pathways of organic compounds as energy sources are compared with the selected criteria.

Chapter 2 - *"Alternative" and Conventional Energy Sources: trail mix, tom mix or global mixup?* - started with a brief history of energy sources, production, consumption and emissions. An Earth Catalog of all energy sources and also a catalog of alternatives to fossil fuels (ocean thermal, tidal energy, biomass, wind, nuclear energy, hydrogen energy, geothermal energy) are presented and discussed. The advantages and disadvantages, the impact to human and environment are discussed separately for each type of energy. Global efficiency is calculated and presented for solar energy (most abundant energy source available), biomass (one of the most sustainable source of energy) and nuclear power (one of the most efficient technologies). The chapter also includes discussions about global warming and impact of energy technology and policy;

boundary between renewable and non-renewable. The author considers that “*a holistic approach in energy development that leads to zero waste*” can be “*the basis for any technology development*”.

Chapter 3 – *Electricity and Sustainability* includes various data regarding sources of supply energy in US sectors. US electric power industry generation and electricity distribution together the regulations are discussed. In addition, a history (divided into periods) of the US Electric Power Industry (1882-1991) is presented.

Chapter 4 – *The Zero-Waste Concept and Its Applications* starts with a presentation of petroleum refining. The major steps of conventional refining process are discussed; the details of oil refining process and various types of catalyst used are also included. A model of zero-waste approach to refining processes “*Olympic green supply chain*” which include the *five zero* of waste emissions (zero emissions, zero waste of resources, zero waste in activities, zero use of toxic, zero waste in product life cycle) is presented and discussed. The author provides in this chapter information about refinery emissions, primary wastes from oil refining process, pollution prevention options for different activities, catalysts and materials, chemical used in refining. Some techniques applied in oil refining (no-flaring, solid- liquid separation, liquid-liquid separation, gas-gas separation) are addressed and discussed.

The chapter includes applications of zero waste principle: a schematic design of anaerobic digestion is illustrated and estimation of biogas and ammonia production is presented; and a solar aquatic process is also described.

A document from US Environmental Protection Agency (US EPA) published in 1997 which presents comments of EPA handling of the Regulation of Refinery Wastes was also included in this chapter.

Chapter 5 – *Natural Gas* examines natural gas pricing, markets, risk management and supply, natural gas in Eurasia. The author also discusses about nature as the new old model: “*natural paths are to be preferred over engineering paths*”. Two documents are appended to this chapter: one which offers information about Canadian gas exports and imports; another one addressing the unnatural history of a “*natural monopoly*” subject (the development of US natural gas sector is described).

Chapter 6 is focusing on *OPEC – The Organization of Petroleum Exporting Countries*. This chapter starts with a brief history of *OPEC* organization, which was founded in 1960. Forwards, the author discusses about *OPECs* choices during the Bush administration and instrumentality for economic independence.

The book is ending with Chapter 7 – *Concluding Remarks* followed by an Appendix (*The Economics of Information and the Intentions of Professor Joseph Stiglitz*).

**Cristina Ghinea
Maria Gavrilescu**

*Department of Environmental Engineering
and Management
“Gheorghe Asachi” Technical University of
Iasi, Romania*