

Preface



INRESC '98

This volume of the Journal of Petroleum Science and Engineering is devoted to the papers presented at the 2nd International Non-Renewable Energy Sources Congress (INRESC '98) held in Tehran, Iran on December 12–16, 1998. The first congress of this series (INRESC '93) was also held in Tehran on December 26–30, 1993. Non-renewable energy sources, which include natural gas, petroleum and coal, are the primary sources for all of technological activities of the present day. These sources are the driving force behind economic development. They provide the major fraction of consumable energy and feedstock to industrial sectors, commercial organizations, as well as household entities. At the same time, they are the cause of many environmental problems confronted by our population and industrial centers.

Economic growth and climate changes are directly related to the per capita consumption of non-renewable energy sources. Non-renewable energy use is responsible for about three quarters of global carbon dioxide emissions, one-fifth of methane and a significant quantity of nitrous oxide (N_2O). It also produces other nitrogen oxides (NO_x), hydrocarbons, and carbon monoxide that, though not actual greenhouse gases, influence chemical cycles in the atmosphere that produce or destroy greenhouse gases, such as stratospheric ozone.

Almost all of the carbon dioxide due to non-renewable energy usage has occurred over the last century. It was not until the 1800s that coal, oil and natural gas were unearthed and burned in large quantities in the newly invented factories and machines of the Industrial Revolution. Industrialization brought about profound changes in human life style. It also created or worsened many environmental problems, including climate change. Non-renewable energy use currently accounts for about three quarters of our emissions of greenhouse gases. Coal dominated the energy scene in Europe and North America during the 19th and early 20th centuries. Coal was found in large deposits near the early industrial centers of Europe and North America.

The fuel mix was later shifted towards oil and gas. Although large petroleum deposits were located early in the 20th century, oil use did not expand greatly until the post World War II economic expansion. Natural gas, in limited use since the 1800s, started to supply an increasing share of the world's energy by the 1970s. Among the renewable energy sources, hydroelectric power, utilized for the past 100 years, and nuclear power, introduced in the 1950s, together now supply about 15% of the global demand for internationally traded energy. Solar and wind power are used in both traditional as well as high-technology applications, but they satisfy only a small fraction of overall fuel needs. The fuel mix in developing countries includes a higher percentage of biomass fuels and, in some cases, coals.

This series of congresses is charged to answer some of the scientific, technical and economical problems associated with the appropriate production and utilization of non-renewable energy sources. We

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