

for four years and graduates, the length of time before being allowed to take the exam is usually graduation plus 5 or 6 years of experience.”

2. *Oral Exams* (p. 24). Arizona requires an oral examination and several other states do also. The Arizona oral exam covers the Arizona law and the operation of the State Board of Technical Registration. Under this section the applicant should be warned to obtain the state rules and study them carefully before the exam.

3. Throughout the booklet (for example, pp. 26 and 27) the author uses “he” a great deal. It should be noted that both men and women become registered. The text should be rewritten with this in mind.

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### **World Energy—Looking Ahead to 2020**

(Report by the Conservation Commission of the World Energy Conference 1978)

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The World Energy Conference, since its inception in 1924, has assembled and published estimates of world (exclusive of the Eastern Bloc) energy resources. In 1975, the Conference established a Conservation Commission to consider energy supply and demand for the 1985 to 2020 time period. International Study Groups were formed to provide information on the supply of conventional resources such as oil, gas, coal, hydraulic, and nuclear fission; unconventional resources such as solar, geothermal, and nuclear fusion; and possible conservation measures. These Study Group reports were subjected to the scrutiny of Review Boards to provide the Commission with a broad base of expert opinion. This book represents the Conservation Commission's conclusions concerning primary energy resource availability, demand projections, conservation potential, and possible energy supply strategies.

The major conclusion of the Commission concerning

energy demand should come as little surprise. Energy demand is expected to climb as technological and economic development spread to an increasingly larger fraction of the world's populace. While the ratio of energy per unit income will likely decrease in the industrialized world either naturally or by political measures, it will increase substantially in the developing nations. On the supply side, oil and gas production is projected to peak near the end of the century, with its market share decreasing from a present level near 70% to less than 30% in 2020. Consequently, coal, nuclear, and solar sources will be called upon to provide world energy needs. The supply projections show significant increases in coal production (to meet 20% of 2020 demand); dramatic growth of fission power capacity to between 3200 and 5500 GW(electric) (to meet 30% of 2020 demand); and immediate breakthroughs in solar, including solar-electric, technology (to meet 10% of 2020 demand). Conservation is noted as a key element of future energy policy, but the Commission feels that projected demand cannot be met solely through more efficient use of currently available resources. It is stressed that energy strategy should focus on maximum production of conventional coal, oil, gas, and fissile resources; significant development of nonconventional oil and gas resources; and timely development of renewable resources such as hydraulic, solar, geothermal, biomass, and fusion. Receiving strong emphasis is the need for urgent action to conserve and develop energy resources, lest the world find itself locked into an “energy-constrained future” in which “those who can least afford it are likely to be the first to suffer.” The Commission makes specific recommendations for decision makers and notes that a pessimistic policy leading to oversupply is certainly to be preferred to an optimistic policy leading to shortage.

The book begins with a Digest (executive summary) and is followed by chapters on Energy Resources; Energy Conservation; Research, Development, and Demonstration; Energy Demand; and Supply Strategies. Although the chapters are written by different authors, the book does not suffer as style and format are consistent. Prefacing the results of a large study by a summary is a common practice that is very helpful to the reader. However, in this case, one must be aware that the first chapter is a summary of chapters that are themselves summaries drawn from the Study Group reports and Report Review Boards. For more detail one must consult the Study Group reports, which have also been published. Of particular interest might be the nuclear report, *Nuclear Resources* by J. S. Foster of Montreal Engineering Co., Ltd.

The book is excellent as a concise source of energy resource estimates and projections of world supply and demand for the midterm future and should definitely be on the bookshelf of an energy generalist.

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