

Needs and Opportunities for Alternative Energy Technologies

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The U.S. needs for alternative energies to the dominant fossil fuels are driven by two concerns: air pollution and global warming; and the over-reliance on imported oil -50% today. However, energy and fossil fuel use are projected to increase e.g., the DOE-EIA projects an increase from 94 quadrillion Btus (quads) in 1997 to about 120 quads in 2020. Petroleum consumption is forecast to grow even more rapidly over this period, from 36 to 48 quads. Alternative energy technologies can play a much greater role. The choices among these depend a lot on factors such as: transportation fuel choice i.e., liquid or gas (hydrogen); effect of electricity industry deregulation; the use of distributed energy sources; the usefulness of methane hydrates; the cost of carbon dioxide sequestration; and particularly on the rate of adoption of efficiency improvements. For example, if all the known and soon to be demonstrated efficiency improvements were in full use today, the annual energy use in the US would be halved! Because of the time-scale to replace technologies, this will not occur quickly and therefore alternative energy sources are an important part of the total solution. Laying aside the cleaner use of fossil fuels and nuclear power, which is an important source of electricity and contributor to minimizing greenhouse gases but raises social issues, the alternatives are the renewable energies. Hydropower is important today, but increases may be limited. In the near term the major new opportunities will likely be in bioenergy and wind power, because they are already economic and widely available. Later, solar energy can become important, when costs come down. Policies and regulations will be important to optimizing the path forward.