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SUSTAINABLE ENERGY

Spring 2005

HOMEWORK #2: ENERGY RESOURCES AND DEPLETION □

1. □ It has been suggested that the U.S. should meet all of its energy needs from purely domestic fuel sources. This proposition is presented in Cassidy, John. "Pump Dreams." *The New Yorker* (October 11, 2004). Discuss the feasibility of this proposal.

2. □ It is proposed to permit exploration for oil in the Arctic National Wildlife Reserve (ANWR), which is near currently operating oil production facilities on the north coast of Alaska, including the inlet to the Alaskan oil pipeline (operated cooperatively by Phillips 66 and BP). What are the arguments for and against this proposal? Propose a method for answering the proposal. [Note, this proposal is popular in Alaska, where the annual payment to individuals from oil revenues have declined from approximately \$1000 to \$650 annually.]

3. □ From material presented in class it is clear that the ratio of fuel Resources-to-Production (R/P) rates are substantially greater than 100 years for many fuels. Why is there widespread concern that we shall soon run out of energy?

4. □ Obtain an analytic result that can be used for calculating the time required to consume a finite fuel resource. Currently it is of size, M_0 , which is currently being produced at a rate, P_0 . The rate of consumption is growing exponentially at a relative rate, α , and new fuel resource deposits are being discovered at a rate, $F_0 \cdot e^{-\mu t}$.