Prospects for a World Powered Predominately by Solar and Wind Energy

Walter Kohn
2011
Global Energy Use 2010

- Oil: 36%
- Gas: 23%
- Coal: 27%
- Other: 14%
Figure 11.1  World oil production by source in the Reference Scenario

- Natural gas liquids
- Non-conventional oil
- Crude oil - additional EOR
- Crude oil - fields yet to be found
- Crude oil - fields yet to be developed
- Crude oil - currently producing fields
World Population: 1950-2050

Source: U.S. Census Bureau, International Data Base, December 2008 Update.
“We have met the enemy and he is us”

Pogo quote of 1971
Fig. 4. Global oil production per person
Fig. 5  The energy transition from (Oil/Natural Gas) to (Solar/Wind). We define the transition year as the year (2021) in which solar/wind energy begins to exceed oil/natural gas energy, and becomes the world’s dominant energy source. E represents annual rates of energy production, in units of oil/gas production in 2010.
Moscone Center’s Solar roof panels
World’s largest solar project planned for Saharan Desert
Solar concentration designs for the Sahara
Solar tower with circles of concentrators and desalination basins
One of the world’s largest wind farms off the Danish Coast.
Installed wind capacity, annual generation and capacity factors, Denmark 1977-2009

- Capacity (MW)
- Generation (TWh/y)
- Share of total generation (%)
Sea-based transmission backbone (green) and land-based transmission nodes (red), 6000MW capacity and ~350 miles long between Newark, NJ and Norfolk, VA.