Math, Geography

Below are three tables, the first giving data on past and current oil supplies and demand, the second on the world's proven oil and natural gas reserves, and the third on future prospective demand. Examine the tables and answer the questions below. Note: OECD stands for: Organization for Economic Cooperation and Development; OPEC stands for: Organization of the Petroleum Exporting Countries

Table 1: World Oil Balance, 2001-2005

(Million Barrels Per Day)

	2001	2002	2003	2004				2005		
		Annual Average		Quarter				Annual Average	Quarter	
				First	Second	Third	Fourth		First	Second
Supply[1]										
OECD										
United States	8.96	9.00	8.80	8.82	8.72	8.58	8.69	8.70	8.72	8.80
Other OECD	14.35	14.41	14.43	14.43	14.22	13.67	13.90	14.05	13.92	13.72
Total OECD	23.30	23.41	23.22	23.25	22.94	22.25	22.59	22.76	22.64	22.52
Non-OECD										
OPEC	30.87	28.99	30.72	32.23	32.22	33.61	33.62	32.92	33.74	33.91
Former USSR	8.75	9.41	10.39	10.97	11.20	11.47	11.58	11.31	11.53	11.60
Other Non-OECD	14.80	15.12	15.31	15.82	15.95	16.16	16.23	16.04	16.26	16.46
Total Non-OECD	54.43	53.52	56.43	59.02	59.37	61.23	61.43	60.27	61.52	61.96
Total World Supply	**77.73**	**76.93**	**79.65**	**82.26**	**82.31**	**83.48**	**84.02**	**83.02**	**84.16**	**84.48**
Demand										
OECD										
United States	19.65	19.76	20.03	20.60	20.54	20.82	20.97	20.73	20.63	NA
Other OECD	28.32	28.19	28.62	29.55	27.64	28.32	29.48	28.75	29.74	NA
Total OECD	47.96	47.95	48.65	50.15	48.19	49.14	50.45	49.48	50.37	NA
Non-OECD										
China	4.92	5.16	5.55	6.33	6.84	6.38	6.55	6.52	6.83	NA
Former USSR	4.00	4.10	4.18	4.21	3.87	4.05	4.60	4.18	4.39	NA
Other Non-OECD	20.77	21.15	21.51	21.87	22.24	22.19	22.78	22.27	22.59	NA
Total Non-OECD	29.69	30.41	31.24	32.40	32.95	32.61	33.93	32.97	33.80	NA
Total World Demand	**77.66**	**78.36**	**79.89**	**82.55**	**81.13**	**81.75**	**84.38**	**82.46**	**84.18**	**NA**

[1] Supply includes production of crude oil (including lease condensate), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, refinery processing gain, alcohol, and liquids produced from coal and other soucres.

Table 2: World Proved[1] Reserves of Oil and Natural Gas, Most Recent Estimates

Below are oil and natural gas proven reserves as estimated by various organizations. One is not more valid than another.

	Oil (Billion Barrels)	**Oil** (Billion Barrels)	**Oil** (Billion Barrels)	**Natural Gas** (Trillion Cubic Feet)	**Natural Gas** (Trillion Cubic Feet)	**Natural Gas** (Trillion Cubic Feet)	**Natural Gas** (Trillion Cubic Feet)
Country/Region	***BP Statistical Review* Year-End 2004**	***Oil & Gas Journal* January 1, 2005**	***World Oil* Year-End 2003**	***BP Statistical Review* Year-End 2004**	**CEDIGAZ January 1, 2005**	***Oil & Gas Journal* January 1, 2005**	***World Oil* Year-End 2003**
North America	60.955	215.291	41.445	260.491	259.639	260.494	268.853
Central & South America	101.165	100.595	75.160	250.595	243.956	250.520	240.937
Western Europe	17.372	16.255	16.382	178.305	217.929	182.487	170.054
Eastern Europe & Former USSR	121.871	79.190	89.013	2,081.433	2,043.750	1,964.160	2,693.227
Middle East	733.859	729.341	686.345	2,570.793	2,589.649	2,522.125	2,539.650
Africa	112.233	100.784	104.644	496.430	498.860	476.509	443.200
Asia & Oceania	41.100	36.246	37.703	501.517	504.793	383.913	449.910
World Total	**1,188.556**	**1,277.702**	**1,050.691**	**6,339.563**	**6,358.575**	**6,040.208**	**6,805.830**

[1] Proved reserves are estimated quantities that analysis of geologic and engineering data demonstrates with reasonable certainty are recoverable

Table 3: Projected Petroleum Demand through 2006
(Million barrels per day)

	2005				2006				Year	
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	2005	2006
Demand										
OECD										
U.S. (50 States)	20.6	20.5	20.9	21.3	21.1	20.9	21.3	21.3	20.8	21.2
U.S. Territories	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Canada	2.3	2.2	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3
Europe	15.5	15.3	15.6	15.8	15.7	15.5	15.7	15.9	15.6	15.7
Japan	6	5	5.2	5.6	6	4.9	5.2	5.6	5.4	5.4
Other OECD	5.5	5.2	5.2	5.4	5.4	5.3	5.4	5.5	5.3	5.4
Total OECD	50.4	48.6	49.7	50.9	51	49.2	50.4	51.1	49.9	50.4
Non-OECD										
Former Soviet Union	4.4	3.9	4.1	4.7	4.5	4	4.2	4.8	4.3	4.4
Europe	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7
China	6.8	7	7	7.3	7.3	7.5	7.5	7.8	7	7.5
Other Asia	8.2	8.5	8.3	8.9	8.4	8.8	8.6	9.2	8.5	8.7
Other Non-OECD	13.7	13.7	14	14	14.1	14.2	14.4	14.4	13.8	14.3
Total Non-OECD	33.8	33.9	34	35.5	35.1	35.1	35.4	36.8	34.3	35.6
Total World Demand	84.2	82.4	83.7	86.4	86	84.3	85.7	87.9	84.2	86

Questions for Further Discussion

1. Examine Table 1. For how many of the last four years has demand exceeded supply? What is the average amount of oil the OECD countries supply to the world? What is the average amount these countries demand?

2. Examine "Total World Demand" in Table 1. Based on these numbers, what would you expect world demand to be for the end of 2005? How does your prediction compare with that in Table 3?

3. Find the approximate number of barrels of oil the world demanded for the entire year in 2004. If the world used the same amount each year, how many years would we need to use up all proven reserves (use any one of the oil predictions in Table 2)?

4. Find the average percentage of increase in demand from 2001 to 2004 in Table 1. How many years would we need to use up all proven reserves if demand increased by this percentage each year?

5. According to Table 3, which two countries are expected to most greatly increase their oil consumption from the beginning of 2005?

6. Judging from the data, how urgent would you say is the need to reduce our dependence on oil?

Data from: http://www.eia.doe.gov/emeu/ipsr/t21.xls; http://www.eia.doe.gov/emeu/international/reserves.xls; http://www.eia.doe.gov/emeu/steo/pub/3tab.html