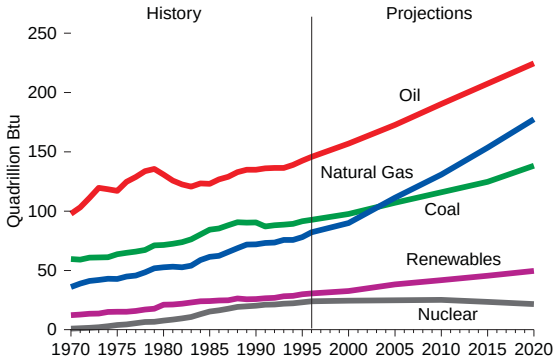
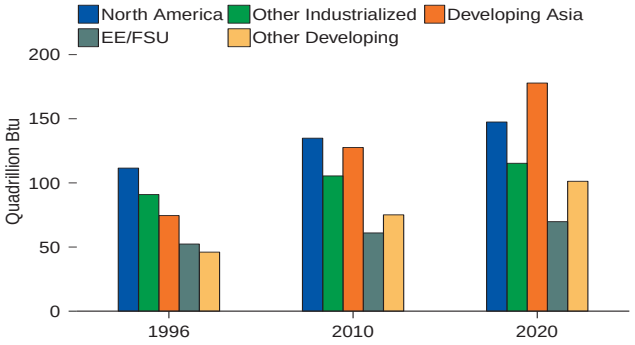
Figure . World Energy Consumption by Fuel Type



- In the IEO99 reference case, world energy consumption is projected to increase by about 65 percent between 1996 and 2020, reaching 612 quadrillion British thermal units (Btu).
- Every energy source except nuclear power grows over the 1996-2020 time period. Oil's key role in the transportation sector keeps it the dominant energy source.
- Natural gas is expected to be the fastest-growing primary energy source. It is increasingly used for new electricity generation, since gas-fired plants tend to run more less costly to build and are more efficient than other means of generation.

Figure . World Energy Consumption by Region



- Projections in the IEO99 are about 4 percent lower than in last year's outlook by 2020. The downward revision is largely the result of economic problems in Asia and Russia.
- The Asian economic crisis—which began in the spring of 1997 and persisted throughout 1998—slows growth in this region. Still, energy demand in developing Asia doubles by 2020.
- The prolonged collapse of the Russian economy has resulted in a further delay in the projected recovery of the former Soviet Union (FSU). Energy use in the FSU in 2020 remains 15 percent below its 1990 level.

World Energy Consumption and Carbon Emissions 6

Fuel egion	Energy Consumption							Car on Emissions			
	uadrillion Btu			Million Tons of il E uivalent			Annual ercent Change 1996-2020	Million Metric Tons			
	1996	2010	2020	1996	2010	2020		1990	1996	2010	2020
y Fuel											
il	145.	190.4	224.6	3,6 2	4, 9	5,659	1.8	2,490	2,485	3,242	3,823
Natural as	82.2	130.8	1 .5	2,0 2	3,296	4,4 2	3.3	1,009	1,152	1,833	2,483
Coal	92.8	116.0	138.3	2,338	2,922	3,486	1.	2,28	2,345	2,942	3,510
Nuclear	24.1	25.2	21.	60	635	548	-0.4				
ene a les	30.	41.9	49.	3	1,055	1,251	2.0				
Total	3 5.5	504.2	611.8	9,461	12, 05	15,41	2.1	5, 86	5,983	8,018	9,81
y Region											
North America	111.6	134.9	14 .5	2,811	3,399	3, 1	1.2	1,550	1,68	2,0 9	2,314
Western Europe	64.0	4.6	81.5	1,613	1,880	2,053	1.0	936	904	1,021	1,114
Industrial Asia	26.9	30.9	33.9	6 8	8	853	1.0	364	389	435	4 9
EE/FSU	52.4	61.0	69.8	1,319	1,538	1, 58	1.2	1,290	842	935	1,024
Developing Asia	4.5	12 .6	1 .9	1,8 9	3,21	4,483	3.	1,065	1,4 4	2,426	3,3
Middle East	1 .3	2 .0	34.	436	681	8 4	2.9	229	283	434	555
Africa	11.1	15.5	18.9	2 9	391	4	2.3	1 8	198	2 0	325
Central South America	1 .	32.6	4 .	446	821	1,201	4.2	1 4	206	418	629

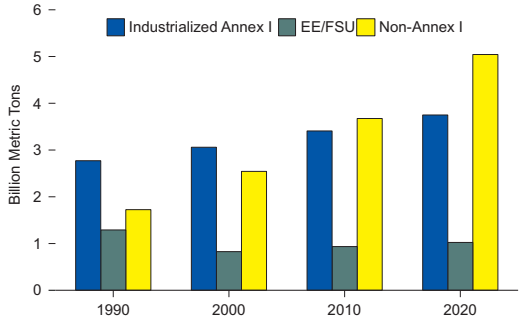
Sources: 1996: Energy Information Administration EIA , *International Energy Annual 1996* Washington, DC, Fe ruary 1998 . ro ections: EIA, World Energy ro ection System 1999 . Note: Totals may not e ual sum of components due to independent rounding. EE/FSU Eastern Europe and the Former Soviet Union.

Carbon Emissions in the Industriali ed nne l Countries and EE FS and and the Effects of the yoto Protocol in

Country/ egion	Million Metric Tons			ercent Change	
	1990 Emissions	2010 Baseline ro ection	2010 yoto Target	From 1990	From 2010 Baseline
Annex I Industrialized Countries	2, 2	3,408	2,586	-	-24
United States	1,346	1, 90	1,252	-	-30
Western Europe	936	1,021	862	-8	-16
Transitional EE/FSU [a]	1,290	935	1,309	1	40
FSU	991	666	990	0	49
EE	299	2 0	320		18
Total	**4 6**	**4 344**	**3 5**	**4**	

[a] Annex I countries in the EE/FSU currently account for 86 percent of the region s total emissions.

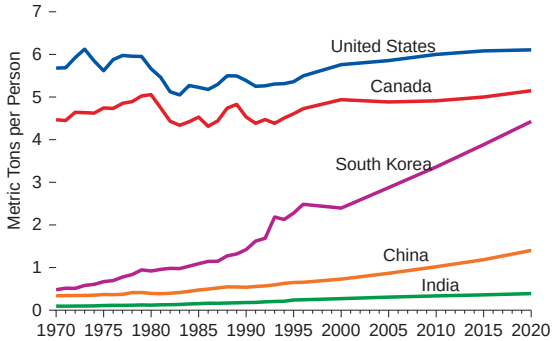
Figure 3. World Carbon Emissions by Region



- In the IEO99 reference case, carbon emissions exceed their 1990 levels by 39 percent in 2010 and by 70 percent in 2020. Total emissions are expected to reach 8.0 billion metric tons by 2010 and 9.8 billion metric tons in 2020.

- Emissions grow most quickly in the developing countries where long-term, fast-paced economic and energy growth and continued heavy dependence on fossil fuels are projected. By 2010 their emissions are expected to surpass those of the industrialized countries.

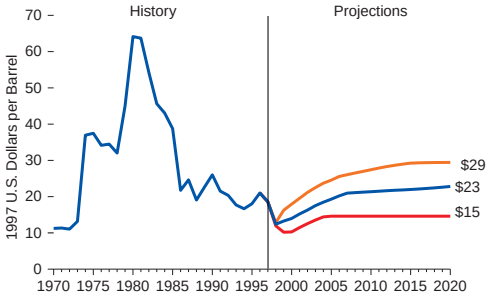
Figure 4. Carbon Emissions per Capita for Selected Countries



- The United States and Canada have the highest per capita emissions levels over the projection period at 6.1 and 5.1 metric tons per person, respectively, in 2020—although the growth rate of per capita emissions in both countries is expected to remain fairly flat after 2000.

- In South Korea, per capita emissions grew by 6.5 percent annually between 1970 and 1996, reaching 2.5 metric tons per person in 1996. Were per capita emissions in China and India to grow over the projection period at the same rate as in Korea over the past 26 years, world emissions could exceed current projections by 3.4 billion metric tons.

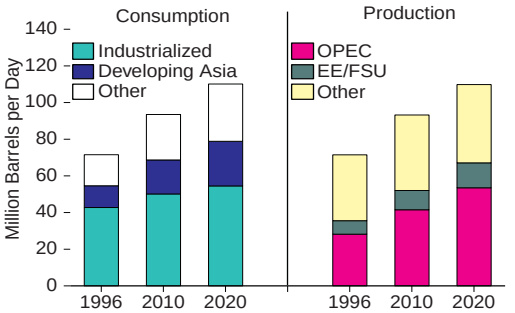
Figure 5. World Oil Prices in Three Cases



- A marked slowdown in world oil demand growth accompanied by burgeoning world oil supplies—resulting primarily from the Asian economic recession—drove oil prices to historic lows in 1998.

- Short-term price movements have not affected long-term price projections 5 to 10 years out. Oil prices are expected to reach $23 per barrel (constant 1997 U.S. dollars) in 2020.

Figure 6. World Oil Consumption and Production by Region



- Oil is expected to remain the world's dominant energy source, reaching 110 million barrels per day by 2020. In the industrialized world, most of the growth in oil use is projected for transportation. In the developing world oil use also increases for transportation, but also for other end uses as well.

- OPEC's share of world oil supply is projected to increase significantly over the forecast horizon, but competitive forces are expected to remain strong enough to forestall efforts to increase prices substantially.

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DOE/EIA-X027
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International Energy Outlook 1999

With Projections to 2020

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