

INTERNATIONAL ENERGY WORKSHOP
Part IV: Individual Poll Responses, Carbon Emission
Reduction Cases

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Organization/Project: BN200; Brookhaven National Laboratory, 200\$/tC scenario

Country/Region: USA (USA)

Reference (including date) of most recent report: MARKAL-MAKRO runs submitted to CHALLENGE, October 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	22.0	28.1	36.1
2. Real GNP (or GDP) Index 1990 = 100	100.0	122.0	148.1	179.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2011.5	2088.5	2275.5	2647.6
4. Total Production	1719.5	1533.2	1690.8	1881.2
5. Oil Consumption	761.2	661.2	755.4	855.1
6. Oil Production	437.7	117.7	200.8	131.4
7. Oil Exports - Imports	-323.5	-543.5	-554.6	-723.7
8. Natural Gas Consumption	481.7	467.0	479.1	469.8
9. Natural Gas Production	445.5	395.0	388.8	366.9
10. Gas Exports - Imports	-36.2	-72.0	-90.3	-102.9
11. Coal Consumption	480.2	510.4	411.6	457.4
12. Coal Production	547.8	570.6	471.8	517.6
13. Coal Exports - Imports	67.6	60.2	60.2	60.2
14. Renewables, Electric	105.4	276.6	475.5	679.6
15. Nuclear Energy	146.0	135.6	111.8	138.3
16. Renewables, Nonelectric	37.1	37.7	42.1	47.4
17. Electricity Generation Terawatt Hours (TWh)	3009.7	2699.4	3093.0	3596.1
18. Carbon Emissions Million Tons (MtC)	1400.1	976.8	987.5	1060.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1: Based on the Reference Case, Annual Energy Outlook, US-DOE, 1992;

14-16: Calculated as fossil fuel equivalents (heat rate = 10,240 Btu/kWhr).

Organization/Project: CN100; High Growth, No Nuclear, \$100 Tax Case (with CO2 removal/storage options)

Country/Region: Netherlands (NLAND)

Reference (including date) of most recent report: ECN-PS Submission for IEA ETSAP, Annex IV, September 1993

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	22.7	26.0	33.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	124.0	154.0	188.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	68.5	69.4	74.4	77.5
4. Total Production	62.7	50.6	31.8	24.8
5. Oil Consumption	23.2	24.8	27.1	28.9
6. Oil Production	4.0	0.0	0.0	0.0
7. Oil Exports - Imports	-19.2	-24.8	-27.1	-28.9
8. Natural Gas Consumption	34.4	33.2	33.9	29.3
9. Natural Gas Production	58.2	50.6	31.8	24.8
10. Gas Exports - Imports	23.8	17.4	-2.1	-4.5
11. Coal Consumption	8.8	9.2	11.0	14.8
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-8.8	-9.2	-11.0	-14.8
14. Renewables, Electric	0.2	0.4	1.7	2.6
15. Nuclear Energy	1.4	1.4	0.0	0.0
16. Renewables, Nonelectric	0.1	0.4	0.7	1.9
17. Electricity Generation Terawatt Hours (TWh)	78.5	87.3	99.3	113.9
18. Carbon Emissions Million Tons (MtC)	44.0	43.8	41.4	37.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	100.0	100.0

Notes:

14 - Includes import hydro-electricity;

15 - Includes import nuclear electricity: 0.7 mtoe in 1990/2000;

17 - Includes imports: 1990 9.5 TWh; 2000 7.8 TWh; 2010/20 2.5 TWh.

Organization/Project: CN200; High Growth, ECN-PS, IEA-ETSAP/Annex IV, No Nuclear, 200\$/tC case (with CO2 removal Netherlands)

Country/Region: Netherlands (NLAND)

Reference (including date) of most recent report: Submitted to CHALLENGE, September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	22.7	26.0	33.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	124.0	154.0	188.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	68.5	69.3	73.8	77.4
4. Total Production	62.7	50.6	31.8	24.5
5. Oil Consumption	23.2	24.9	27.2	28.7
6. Oil Production	4.0	0.0	0.0	0.0
7. Oil Exports - Imports	-19.2	-24.9	-27.2	-28.7
8. Natural Gas Consumption	34.4	33.2	34.9	28.5
9. Natural Gas Production	58.2	50.6	31.8	24.5
10. Gas Exports - Imports	23.8	17.4	-3.1	-4.0
11. Coal Consumption	8.8	8.9	9.2	15.2
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-8.8	-8.9	-9.2	-15.2
14. Renewables, Electric	0.2	0.4	1.7	2.6
15. Nuclear Energy	1.4	1.4	0.0	0.0
16. Renewables, Nonelectric	0.1	0.5	0.8	2.4
17. Electricity Generation Terawatt Hours (TWh)	78.5	87.3	99.1	116.4
18. Carbon Emissions Million Tons (MtC)	44.0	43.6	40.2	36.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

14 - Includes import hydro-electricity;

15 - Includes import nuclear electricity: 0.7 mtoe in 1990/2000;

17 - Includes imports: 1990 9.5 TWh; 2000 7.8 TWh; 2010/20 2.5 TWh.

Organization/Project: CU200; Chalmers University of Technology, US\$200/tC
carbon tax

Country/Region: Sweden (SWEDN)

Reference (including date) of most recent report: Markal-Macro Studies for
Sweden, May 1995

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	25.0	30.0	34.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	120.0	145.0	178.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	56.0	60.0	66.0	70.0
4. Total Production				
5. Oil Consumption	16.0	17.0	22.0	29.0
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-16.0	-17.0	-22.0	-29.0
8. Natural Gas Consumption	1.0	1.0	2.0	1.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-1.0	-1.0	-2.0	-1.0
11. Coal Consumption	3.0	1.0	1.0	1.0
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-3.0	-1.0	-1.0	-1.0
14. Renewables, Electric	14.0	14.0	14.0	15.0
15. Nuclear Energy	15.0	15.0	15.0	14.0
16. Renewables, Nonelectric	7.0	8.0	9.0	9.0
17. Electricity Generation Terawatt Hours (TWh)	139.0	137.0	140.0	135.0
18. Carbon Emissions Million Tons (MtC)	17.0	17.0	21.0	27.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: CU400; Chalmers University of Technology, US\$400/tC
carbon tax

Country/Region: Sweden (SWEDN)

Reference (including date) of most recent report: Markal-Macro Studies for
Sweden, May 1995

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	25.0	30.0	34.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	118.0	142.0	174.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	56.0	57.0	62.0	68.0
4. Total Production				
5. Oil Consumption	16.0	13.0	15.0	19.0
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-16.0	-13.0	-15.0	-19.0
8. Natural Gas Consumption	1.0	1.0	2.0	2.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-1.0	-1.0	-2.0	-2.0
11. Coal Consumption	3.0	1.0	1.0	1.0
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-3.0	-1.0	-1.0	-1.0
14. Renewables, Electric	14.0	14.0	15.0	17.0
15. Nuclear Energy	15.0	15.0	15.0	14.0
16. Renewables, Nonelectric	7.0	9.0	11.0	11.0
17. Electricity Generation Terawatt Hours (TWh)	139.0	138.0	140.0	145.0
18. Carbon Emissions Million Tons (MtC)	17.0	13.0	15.0	19.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	400.0	400.0	400.0

Organization/Project: CUM20; Chalmers University of Technology, CO2
reduced by 20%

Country/Region: Sweden (SWEDN)

Reference (including date) of most recent report: Submitted to CHALLENGE,
April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel				
2. Real GNP (or GDP) Index 1990 = 100	100.0	125.0	154.0	189.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	51.1	51.9	54.7	55.9
4. Total Production				
5. Oil Consumption	14.1	13.2	9.8	9.2
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-14.1	-13.2	-13.2	-9.2
8. Natural Gas Consumption	0.6	2.0	4.6	6.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-0.6	-2.0	-4.6	-6.0
11. Coal Consumption	1.9	0.6	0.4	0.2
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-1.9	-0.6	-0.4	-0.2
14. Renewables, Electric	14.1	14.1	14.7	15.1
15. Nuclear Energy	14.3	14.8	14.8	14.8
16. Renewables, Nonelectric	6.0	7.2	10.3	10.7
17. Electricity Generation Terawatt Hours (TWh)	140.0	143.0	148.0	147.0
18. Carbon Emissions Million Tons (MtC)	14.7	14.7	13.3	13.3
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	215.0	233.0	540.0

Organization/Project: CUM20; Chalmers University of Technology, CO2
reduced by 20%

Country/Region: Sweden (SWEDN)

Reference (including date) of most recent report: Markal-Macro Studies for
Sweden, May 1995

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	25.0	30.0	34.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	120.0	144.0	172.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	56.0	59.0	60.0	63.0
4. Total Production				
5. Oil Consumption	16.0	15.0	14.0	14.0
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-16.0	-15.0	-14.0	-14.0
8. Natural Gas Consumption	1.0	1.0	2.0	1.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-1.0	-1.0	-2.0	-1.0
11. Coal Consumption	3.0	1.0	1.0	1.0
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-3.0	-1.0	-1.0	-1.0
14. Renewables, Electric	14.0	14.0	15.0	18.0
15. Nuclear Energy	14.0	15.0	14.0	14.0
16. Renewables, Nonelectric	7.0	9.0	11.0	11.0
17. Electricity Generation Terawatt Hours (TWh)	139.0	138.0	136.0	136.0
18. Carbon Emissions Million Tons (MtC)	17.0	15.0	14.0	14.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	102.0	312.0	505.0	986.0

Organization/Project: CUM50; Chalmers University of Technology, CO2
reduced by 50%

Country/Region: Sweden (SWEDN)

Reference (including date) of most recent report: Markal-Macro Studies for
Sweden, May 1995

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	25.0	30.0	34.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	119.0	144.0	170.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	56.0	59.0	60.0	60.0
4. Total Production				
5. Oil Consumption	16.0	15.0	14.0	12.0
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-16.0	-15.0	-14.0	-12.0
8. Natural Gas Consumption	1.0	2.0	1.0	0.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-1.0	-2.0	-1.0	0.0
11. Coal Consumption	3.0	1.0	1.0	1.0
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-3.0	-1.0	-1.0	-1.0
14. Renewables, Electric	14.0	14.0	15.0	18.0
15. Nuclear Energy	15.0	15.0	14.0	14.0
16. Renewables, Nonelectric	7.0	9.0	11.0	11.0
17. Electricity Generation Terawatt Hours (TWh)	139.0	138.0	135.0	133.0
18. Carbon Emissions Million Tons (MtC)	17.0	15.0	14.0	11.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	102.0	328.0	1046.0	2110.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: USA (USA)

Reference (including date) of most recent report: Based on the Global 2100
"Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	126.0	152.0	183.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1938.0	1921.0	1960.0	2123.0
4. Total Production				
5. Oil Consumption	825.0	709.0	781.0	1025.0
6. Oil Production	409.0	401.0	344.0	275.0
7. Oil Exports - Imports	-416.0	-307.0	-437.0	-750.0
8. Natural Gas Consumption	433.0	415.0	350.0	276.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	465.0	465.0	355.0	272.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	72.0	72.0	72.0	72.0
15. Nuclear Energy	143.0	143.0	143.0	96.0
16. Renewables, Nonelectric	0.0	117.0	260.0	382.0
17. Electricity Generation Terawatt Hours (TWh)	2808.0	2759.0	2884.0	3263.0
18. Carbon Emissions Million Tons (MtC)	1430.0	1321.0	1231.0	1310.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: OECD excluding USA (OECD)

Reference (including date) of most recent report: Based on the Global 2100
 "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
 and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.0	156.0	190.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2067.0	2016.0	2071.0	2269.0
4. Total Production				
5. Oil Consumption	944.0	595.0	454.0	530.0
6. Oil Production	319.0	372.0	358.0	315.0
7. Oil Exports - Imports	-624.0	-222.0	-96.0	-215.0
8. Natural Gas Consumption	319.0	436.0	471.0	459.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	377.0	374.0	308.0	243.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	197.0	240.0	284.0	331.0
15. Nuclear Energy	229.0	254.0	278.0	393.0
16. Renewables, Nonelectric	0.0	117.0	274.0	312.0
17. Electricity Generation Terawatt Hours (TWh)	3844.0	3487.0	3474.0	3950.0
18. Carbon Emissions Million Tons (MtC)	1375.0	1144.0	978.0	968.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: Eastern Europe and former Soviet Union (A1)

Reference (including date) of most recent report: Based on the Global 2100
"Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	106.0	137.0	173.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1838.0	1599.0	1717.0	1953.0
4. Total Production				
5. Oil Consumption	530.0	461.0	384.0	394.0
6. Oil Production	655.0	555.0	454.0	441.0
7. Oil Exports - Imports	125.0	94.0	70.0	47.0
8. Natural Gas Consumption	644.0	699.0	713.0	810.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	499.0	236.0	358.0	336.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	78.0	104.0	130.0	156.0
15. Nuclear Energy	87.0	100.0	93.0	136.0
16. Renewables, Nonelectric	0.0	0.0	39.0	122.0
17. Electricity Generation Terawatt Hours (TWh)	2024.0	1839.0	2118.0	2799.0
18. Carbon Emissions Million Tons (MtC)	1338.0	1041.0	1109.0	1152.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: China (A2)

Reference (including date) of most recent report: Based on the Global 2100
 "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
 and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	160.0	254.0	386.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	692.0	822.0	1084.0	1477.0
4. Total Production				
5. Oil Consumption	122.0	78.0	77.0	141.0
6. Oil Production	135.0	91.0	91.0	154.0
7. Oil Exports - Imports	13.0	13.0	13.0	13.0
8. Natural Gas Consumption	12.0	58.0	101.0	120.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	517.0	550.0	534.0	637.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	41.0	60.0	86.0	124.0
15. Nuclear Energy	0.0	12.0	25.0	49.0
16. Renewables, Nonelectric	0.0	65.0	260.0	402.0
17. Electricity Generation Terawatt Hours (TWh)	618.0	852.0	1307.0	2059.0
18. Carbon Emissions Million Tons (MtC)	641.0	664.0	673.0	849.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: Developing Countries excluding China (DC)

Reference (including date) of most recent report: Based on the Global 2100
 "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
 and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	143.0	202.0	282.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1662.0	1948.0	2342.0	2918.0
4. Total Production				
5. Oil Consumption	733.0	939.0	881.0	821.0
6. Oil Production	1635.0	1362.0	1330.0	1726.0
7. Oil Exports - Imports	902.0	422.0	449.0	905.0
8. Natural Gas Consumption	303.0	477.0	511.0	899.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	408.0	206.0	336.0	330.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	184.0	232.0	292.0	368.0
15. Nuclear Energy	33.0	46.0	62.0	115.0
16. Renewables, Nonelectric	0.0	48.0	260.0	385.0
17. Electricity Generation Terawatt Hours (TWh)	1908.0	2077.0	2707.0	3956.0
18. Carbon Emissions Million Tons (MtC)	1218.0	1287.0	1391.0	1561.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: World (A8)

Reference (including date) of most recent report: Based on the Global 2100
 "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
 and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.0	164.0	209.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	8197.0	8306.0	9174.0	10740.0
4. Total Production				
5. Oil Consumption	3153.0	2781.0	2577.0	2911.0
6. Oil Production	3153.0	2781.0	2577.0	2911.0
7. Oil Exports - Imports	0.0	0.0	0.0	0.0
8. Natural Gas Consumption	1713.0	2086.0	2147.0	2565.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	2266.0	1830.0	1891.0	1817.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	572.0	707.0	864.0	1051.0
15. Nuclear Energy	493.0	554.0	602.0	789.0
16. Renewables, Nonelectric	0.0	347.0	1093.0	1603.0
17. Electricity Generation Terawatt Hours (TWh)	11202.0	11013.0	12490.0	16027.0
18. Carbon Emissions Million Tons (MtC)	6002.0	5457.0	5383.0	5840.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CW200; Global 2100, \$200/tC Tax Case

Country/Region: 4. OECD (A4)

Reference (including date) of most recent report: Based on the Global 2100
"Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne
and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	127.0	155.0	188.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	4004.0	3937.0	4031.0	4392.0
4. Total Production				
5. Oil Consumption	1769.0	1303.0	1235.0	1556.0
6. Oil Production	728.0	774.0	702.0	591.0
7. Oil Exports - Imports	-1041.0	-529.0	-533.0	-965.0
8. Natural Gas Consumption	753.0	852.0	821.0	735.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	842.0	839.0	663.0	514.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	269.0	312.0	356.0	403.0
15. Nuclear Energy	372.0	397.0	421.0	489.0
16. Renewables, Nonelectric	0.0	235.0	534.0	695.0
17. Electricity Generation Terawatt Hours (TWh)	6652.0	6246.0	6358.0	7213.0
18. Carbon Emissions Million Tons (MtC)	2805.0	2465.0	2209.0	2278.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (USA)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	126.0	151.0	181.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1938.0	1926.0	1922.0	2029.0
4. Total Production				
5. Oil Consumption	825.0	713.0	743.0	888.0
6. Oil Production	409.0	401.0	344.0	275.0
7. Oil Exports - Imports	-416.0	-312.0	-399.0	-613.0
8. Natural Gas Consumption	433.0	415.0	350.0	276.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	465.0	465.0	355.0	272.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	72.0	72.0	72.0	72.0
15. Nuclear Energy	143.0	143.0	143.0	96.0
16. Renewables, Nonelectric	0.0	117.0	260.0	425.0
17. Electricity Generation Terawatt Hours (TWh)	2808.0	2759.0	2884.0	3131.0
18. Carbon Emissions Million Tons (MtC)	1430.0	1325.0	1199.0	1194.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	148.0	244.0	397.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (OECD)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.0	157.0	191.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2067.0	2145.0	2222.0	2388.0
4. Total Production				
5. Oil Consumption	944.0	790.0	645.0	717.0
6. Oil Production	319.0	372.0	358.0	315.0
7. Oil Exports - Imports	-624.0	-417.0	-286.0	-401.0
8. Natural Gas Consumption	319.0	436.0	471.0	459.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	377.0	374.0	308.0	243.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	197.0	240.0	284.0	331.0
15. Nuclear Energy	229.0	252.0	278.0	397.0
16. Renewables, Nonelectric	0.0	53.0	235.0	241.0
17. Electricity Generation Terawatt Hours (TWh)	3844.0	3575.0	3607.0	3856.0
18. Carbon Emissions Million Tons (MtC)	1375.0	1310.0	1139.0	1126.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	43.0	72.0	119.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (A1)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	107.0	138.0	173.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1838.0	1670.0	1788.0	1966.0
4. Total Production				
5. Oil Consumption	530.0	461.0	410.0	429.0
6. Oil Production	655.0	555.0	481.0	476.0
7. Oil Exports - Imports	125.0	94.0	70.0	47.0
8. Natural Gas Consumption	644.0	699.0	699.0	789.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	499.0	307.0	427.0	336.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	78.0	104.0	130.0	156.0
15. Nuclear Energy	87.0	100.0	93.0	136.0
16. Renewables, Nonelectric	0.0	0.0	29.0	120.0
17. Electricity Generation Terawatt Hours (TWh)	2024.0	1880.0	2108.0	2750.0
18. Carbon Emissions Million Tons (MtC)	1338.0	1114.0	1194.0	1170.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	90.0	139.0	233.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (A2)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993. "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993. "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	162.0	258.0	392.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	692.0	868.0	1152.0	1567.0
4. Total Production				
5. Oil Consumption	122.0	137.0	167.0	201.0
6. Oil Production	135.0	150.0	180.0	214.0
7. Oil Exports - Imports	13.0	13.0	13.0	13.0
8. Natural Gas Consumption	12.0	58.0	101.0	120.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	517.0	582.0	614.0	726.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	41.0	60.0	86.0	124.0
15. Nuclear Energy	0.0	10.0	25.0	49.0
16. Renewables, Nonelectric	0.0	22.0	159.0	346.0
17. Electricity Generation Terawatt Hours (TWh)	618.0	961.0	1528.0	2276.0
18. Carbon Emissions Million Tons (MtC)	641.0	747.0	831.0	986.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	37.0	59.0	97.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (DC)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	146.0	208.0	288.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1662.0	2116.0	2598.0	3205.0
4. Total Production				
5. Oil Consumption	733.0	935.0	1175.0	1103.0
6. Oil Production	1635.0	1558.0	1777.0	2057.0
7. Oil Exports - Imports	902.0	622.0	602.0	954.0
8. Natural Gas Consumption	303.0	477.0	511.0	899.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	408.0	429.0	492.0	390.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	184.0	232.0	292.0	368.0
15. Nuclear Energy	33.0	42.0	62.0	115.0
16. Renewables, Nonelectric	0.0	0.0	65.0	330.0
17. Electricity Generation Terawatt Hours (TWh)	1908.0	2260.0	3101.0	4401.0
18. Carbon Emissions Million Tons (MtC)	1218.0	1513.0	1801.0	1862.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	28.0	45.0	74.0

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (A8)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	129.0	166.0	210.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	8197.0	8725.0	9683.0	11154.0
4. Total Production				
5. Oil Consumption	3153.0	3036.0	3140.0	3338.0
6. Oil Production	3153.0	3036.0	3140.0	3338.0
7. Oil Exports - Imports				
8. Natural Gas Consumption	1713.0	2086.0	2133.0	2543.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	2266.0	2157.0	2196.0	1966.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	572.0	707.0	864.0	1051.0
15. Nuclear Energy	493.0	548.0	602.0	794.0
16. Renewables, Nonelectric	0.0	192.0	748.0	1461.0
17. Electricity Generation Terawatt Hours (TWh)	11202.0	11435.0	13227.0	16413.0
18. Carbon Emissions Million Tons (MtC)	6002.0	6009.0	6165.0	6337.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Organization/Project: CWRED; Global 2100, Carbon Emission Limits Case

Country/Region: USA (A4)

Reference (including date) of most recent report: "Harmonized Conventional Wisdom" CHALLENGE Scenario, Alan Manne and Leo Schrattenholzer, April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	31.0	37.0	44.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	127.0	155.0	188.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	4004.0	4071.0	4145.0	4417.0
4. Total Production				
5. Oil Consumption	1769.0	1503.0	1388.0	1605.0
6. Oil Production	728.0	774.0	702.0	591.0
7. Oil Exports - Imports	-1041.0	-729.0	-685.0	-1014.0
8. Natural Gas Consumption	753.0	852.0	821.0	735.0
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	842.0	839.0	663.0	514.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	269.0	312.0	356.0	403.0
15. Nuclear Energy	372.0	395.0	421.0	493.0
16. Renewables, Nonelectric	0.0	170.0	495.0	666.0
17. Electricity Generation Terawatt Hours (TWh)	6652.0	6334.0	6491.0	6986.0
18. Carbon Emissions Million Tons (MtC)	2805.0	2635.0	2339.0	2320.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Organization/Project: EB100; VITO and CES/KU Leuven, IEA-ETSAP/Annex IV,
\$100/tC case

Country/Region: Belgium (BELGM)

Reference (including date) of most recent report: Submitted for CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.1	24.3	34.9	38.2
2. Real GNP (or GDP) Index 1990 = 100	100.0	126.0	157.0	186.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	46.1	48.7	49.3	50.7
4. Total Production	0.0	0.4	1.6	2.4
5. Oil Consumption	20.7	22.2	22.6	21.8
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-20.7	-22.2	-22.6	-21.8
8. Natural Gas Consumption	7.0	9.6	10.2	10.7
9. Natural Gas Production	0.0	0.4	1.6	2.4
10. Gas Exports - Imports	-7.0	-9.2	-8.6	-8.3
11. Coal Consumption	9.8	6.6	5.3	5.0
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-9.8	-6.6	-5.3	-5.0
14. Renewables, Electric	0.2	0.5	0.7	0.8
15. Nuclear Energy	9.1	9.4	10.3	11.7
16. Renewables, Nonelectric	0.1	0.4	0.2	0.7
17. Electricity Generation Terawatt Hours (TWh)	62.5	73.2	78.5	85.6
18. Carbon Emissions Million Tons (MtC)	28.5	28.2	27.1	27.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	100.0	100.0

Organization/Project: EB200; VITO and CES/KU Leuven, IEA-ETSAP/Annex IV,
200\$/tC Case

Country/Region: Belgium (BELGM)

Reference (including date) of most recent report: Submission to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.1	24.3	34.9	38.2
2. Real GNP (or GDP) Index 1990 = 100	100.0	126.0	157.0	186.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	46.1	47.8	48.8	49.9
4. Total Production	0.0	0.4	1.6	2.4
5. Oil Consumption	20.7	21.5	21.5	21.1
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-20.7	-21.5	-21.5	-21.1
8. Natural Gas Consumption	7.0	10.7	11.1	11.3
9. Natural Gas Production	0.0	0.4	1.6	2.4
10. Gas Exports - Imports	-7.0	-10.3	-9.5	-8.9
11. Coal Consumption	9.8	5.5	5.2	4.9
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-9.8	-5.5	-5.2	-4.9
14. Renewables, Electric	0.2	0.5	0.7	0.8
15. Nuclear Energy	9.1	9.4	10.3	11.7
16. Renewables, Nonelectric	0.1	0.2	0.1	0.1
17. Electricity Generation Terawatt Hours (TWh)	62.5	70.6	78.8	85.4
18. Carbon Emissions Million Tons (MtC)	28.5	26.8	26.4	25.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: EG100; University of Stuttgart, IER, 100\$/tC
Scenario

Country/Region: Former FRG (FRG)

Reference (including date) of most recent report: Egbert Laege, "CO2
Reduction Strategies for Germany", revised version, submitted to
CHALLENGE, June 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	131.8	173.7	229.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	289.5	280.5	266.6	273.3
4. Total Production	140.1	118.1	114.6	114.3
5. Oil Consumption	112.1	105.5	83.4	85.9
6. Oil Production	3.3	1.0	4.1	4.1
7. Oil Exports - Imports	-108.7	-104.5	-79.3	-81.8
8. Natural Gas Consumption	50.0	54.8	57.2	55.4
9. Natural Gas Production	10.3	9.2	9.6	9.0
10. Gas Exports - Imports	-39.6	-45.6	-47.7	-46.4
11. Coal Consumption	80.0	70.9	71.2	76.2
12. Coal Production	76.2	55.8	46.7	46.1
13. Coal Exports - Imports	-3.8	-15.2	-24.5	-30.1
14. Renewables, Electric	1.5	2.4	3.2	3.4
15. Nuclear Energy	45.4	45.4	48.0	47.6
16. Renewables, Nonelectric	1.9	3.0	3.3	4.5
17. Electricity Generation Terawatt Hours (TWh)	446.7	482.5	486.5	523.2
18. Carbon Emissions Million Tons (MtC)	193.3	182.9	168.7	175.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	50.0	100.0	100.0

Organization/Project: EG100; University of Stuttgart, IER, 100\$/tC scenario

Country/Region: Germany (GRMNY)

Reference (including date) of most recent report: Egbert Laege, "CO2 Reduction Strategies for Germany", submitted to CHALLENGE, November 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	18.7	22.6	27.8	34.1
2. Real GNP (or GDP) Index 1990 = 100	100.0	129.2	161.0	196.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	353.3	308.6	289.5	289.0
4. Total Production	184.6	131.8	113.2	92.7
5. Oil Consumption	125.0	121.1	114.2	113.5
6. Oil Production	3.7	2.4	1.2	0.0
7. Oil Exports - Imports	-121.3	-118.7	-113.0	-113.5
8. Natural Gas Consumption	55.1	55.8	61.4	72.6
9. Natural Gas Production	13.7	11.4	9.0	6.6
10. Gas Exports - Imports	-41.4	-44.3	-52.4	-66.0
11. Coal Consumption	131.5	82.1	61.0	47.7
12. Coal Production	124.9	73.5	55.8	36.4
13. Coal Exports - Imports	-6.6	-8.6	-5.2	-11.4
14. Renewables, Electric	3.4	5.2	6.2	7.1
15. Nuclear Energy	34.6	35.3	36.4	36.4
16. Renewables, Nonelectric	3.0	5.5	7.2	8.8
17. Electricity Generation Terawatt Hours (TWh)	523.0	496.9	507.9	539.5
18. Carbon Emissions Million Tons (MtC)	273.8	222.7	196.1	185.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	50.0	100.0	100.0

Notes:

Item 16: includes renewables with combined heat+electricity production

Organization/Project: EG200; University of Stuttgart, IER, 200\$/tC scenario

Country/Region: Poland (POL)

Reference (including date) of most recent report: Balandynowicz H. W., The Cost of CO₂ Emissions Reduction: Case Study for Poland, 6th IIASA Meeting of the IEW, Laxenburg, 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	132.0	195.0	288.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	100.9	117.9	131.4	146.6
4. Total Production	95.4	83.7	87.0	82.0
5. Oil Consumption	15.4	28.4	33.1	52.9
6. Oil Production	0.2	0.3	0.3	0.3
7. Oil Exports - Imports	-15.3	-28.2	-32.9	-52.6
8. Natural Gas Consumption	9.0	12.4	18.4	19.1
9. Natural Gas Production	2.4	3.9	4.4	5.5
10. Gas Exports - Imports	-6.6	-8.5	-14.0	-13.6
11. Coal Consumption	75.1	74.9	63.6	39.6
12. Coal Production	91.6	77.3	66.1	41.3
13. Coal Exports - Imports	16.4	2.5	2.5	1.6
14. Renewables, Electric	0.3	0.2	0.3	0.4
15. Nuclear Energy	0.0	0.0	8.8	22.4
16. Renewables, Nonelectric	1.0	2.0	7.1	12.1
17. Electricity Generation Terawatt Hours (TWh)	135.7	160.1	208.1	250.1
18. Carbon Emissions Million Tons (MtC)	99.3	111.6	108.6	100.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	200.0	200.0

Organization/Project: EG200; University of Stuttgart, IER, 200\$/tC scenario

Country/Region: Germany (GRMNY)

Reference (including date) of most recent report: Egbert Laege, "CO2 Reduction Strategies for Germany", submitted to CHALLENGE, November 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	18.7	22.6	27.8	34.1
2. Real GNP (or GDP) Index 1990 = 100	100.0	129.2	161.0	196.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	353.3	307.0	287.3	286.3
4. Total Production	184.6	129.8	113.5	93.8
5. Oil Consumption	125.0	121.5	112.8	112.5
6. Oil Production	3.7	2.4	1.2	0.0
7. Oil Exports - Imports	-121.3	-119.2	-111.7	-112.5
8. Natural Gas Consumption	55.1	57.9	62.6	75.2
9. Natural Gas Production	13.7	11.4	9.0	6.6
10. Gas Exports - Imports	-41.4	-46.5	-53.6	-68.6
11. Coal Consumption	131.5	79.9	58.6	42.2
12. Coal Production	124.9	73.5	55.8	36.4
13. Coal Exports - Imports	-6.6	-6.5	-2.8	-5.8
14. Renewables, Electric	3.4	5.2	6.5	8.0
15. Nuclear Energy	34.6	35.3	36.4	36.4
16. Renewables, Nonelectric	3.0	5.4	7.3	8.9
17. Electricity Generation Terawatt Hours (TWh)	523.0	495.3	504.0	534.8
18. Carbon Emissions Million Tons (MtC)	273.8	219.9	192.6	179.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	200.0	200.0

Notes:

Item 16: includes renewables with combined heat+electricity production

Organization/Project: EG200; University of Stuttgart, IER, 200\$/tC scenario

Country/Region: Austria (OST)

Reference (including date) of most recent report: Balandynowicz H. W., The Cost of CO₂ Emissions Reduction: Case Study for Austria, Stuttgart University, 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.7	140.0	158.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	26.7	28.7	29.5	29.4
4. Total Production	9.4	11.4	11.9	11.4
5. Oil Consumption	10.7	12.3	10.9	10.3
6. Oil Production	1.3	2.3	2.2	2.1
7. Oil Exports - Imports	-9.4	-10.0	-8.7	-8.3
8. Natural Gas Consumption	5.2	5.4	7.4	8.4
9. Natural Gas Production	0.7	0.9	0.7	0.7
10. Gas Exports - Imports	-4.5	-4.5	-6.7	-7.8
11. Coal Consumption	4.1	3.3	2.8	2.2
12. Coal Production	0.7	0.6	0.6	0.2
13. Coal Exports - Imports	-3.4	-2.8	-2.2	-2.0
14. Renewables, Electric	3.5	4.3	4.8	4.8
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	3.2	3.4	3.7	3.7
17. Electricity Generation Terawatt Hours (TWh)	50.4	60.4	71.9	77.3
18. Carbon Emissions Million Tons (MtC)	15.8	15.9	15.4	14.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	200.0	200.0

Organization/Project: EGM20; University of Stuttgart, IER, 20 % Reduction scenario

Country/Region: Poland (POL)

Reference (including date) of most recent report: Balandynowicz H. W., The Cost of CO2 Emissions Reduction: Case Study for Poland, 6th IIASA Meeting of the IEW, Laxenburg, 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	132.0	195.0	288.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	100.9	118.5	121.5	140.5
4. Total Production	95.4	87.8	72.4	80.5
5. Oil Consumption	15.4	23.4	33.1	42.5
6. Oil Production	0.2	0.3	0.3	0.3
7. Oil Exports - Imports	-15.3	-23.1	-32.9	-42.3
8. Natural Gas Consumption	9.0	14.4	23.1	25.1
9. Natural Gas Production	2.4	3.8	4.4	5.6
10. Gas Exports - Imports	-6.6	-10.7	-18.7	-19.5
11. Coal Consumption	75.1	79.1	51.5	42.8
12. Coal Production	91.6	82.3	53.9	44.5
13. Coal Exports - Imports	16.4	3.1	2.5	1.8
14. Renewables, Electric	0.3	0.2	0.5	0.7
15. Nuclear Energy	0.0	0.0	8.8	22.4
16. Renewables, Nonelectric	1.0	1.4	4.5	7.1
17. Electricity Generation Terawatt Hours (TWh)	135.7	160.8	197.0	248.9
18. Carbon Emissions Million Tons (MtC)	99.3	111.4	99.1	99.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	96.6	424.0	220.4

Organization/Project: EGM20; University of Stuttgart, IER, 20% Reduction scenario

Country/Region: Austria (OST)

Reference (including date) of most recent report: Balandynowicz H. W., The Cost of CO₂ Emissions Reduction: Case Study for Austria, Stuttgart University, 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.7	140.0	158.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	26.7	27.6	26.7	26.9
4. Total Production	9.4	11.1	11.2	11.4
5. Oil Consumption	10.7	11.4	9.6	9.9
6. Oil Production	1.3	2.0	1.6	1.9
7. Oil Exports - Imports	-9.4	-9.4	-8.0	-7.9
8. Natural Gas Consumption	5.2	5.5	6.4	6.9
9. Natural Gas Production	0.7	0.9	0.7	0.7
10. Gas Exports - Imports	-4.5	-4.6	-5.7	-6.2
11. Coal Consumption	4.1	2.5	1.8	1.3
12. Coal Production	0.7	0.0	0.0	0.0
13. Coal Exports - Imports	-3.4	-2.5	-1.8	-1.3
14. Renewables, Electric	3.5	4.5	4.8	4.8
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	3.2	3.7	4.2	4.0
17. Electricity Generation Terawatt Hours (TWh)	50.4	60.1	69.9	75.3
18. Carbon Emissions Million Tons (MtC)	15.8	14.2	12.6	12.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	388.7	462.0	322.7

Organization/Project: EGM50; University of Stuttgart, IER, 50% Carbon
Emission Reduction

Country/Region: Germany (GRMNY)

Reference (including date) of most recent report: Egbert Laege, "CO2
Reduction Strategies for Germany", submitted to CHALLENGE,
November 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	18.7	22.6	27.8	34.1
2. Real GNP (or GDP) Index 1990 = 100	100.0	129.2	161.0	196.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	353.3	308.1	278.6	267.6
4. Total Production	184.6	129.6	115.2	114.9
5. Oil Consumption	125.0	123.6	107.8	89.1
6. Oil Production	3.7	2.4	1.2	0.0
7. Oil Exports - Imports	-121.3	-121.2	-106.7	-89.1
8. Natural Gas Consumption	55.1	55.7	58.9	49.4
9. Natural Gas Production	13.7	11.4	9.0	6.6
10. Gas Exports - Imports	-41.4	-44.3	-49.8	-42.8
11. Coal Consumption	131.5	81.3	57.0	36.6
12. Coal Production	124.9	73.5	55.8	36.4
13. Coal Exports - Imports	-6.6	-7.8	-1.2	-0.2
14. Renewables, Electric	3.4	5.2	7.7	21.6
15. Nuclear Energy	34.6	35.3	36.4	36.4
16. Renewables, Nonelectric	3.0	5.4	7.7	16.4
17. Electricity Generation Terawatt Hours (TWh)	523.0	497.8	481.0	462.3
18. Carbon Emissions Million Tons (MtC)	273.8	222.0	182.4	136.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	60.3	108.8	2517.4

Notes:

Item 16: includes renewables with combined heat+electricity production

Organization/Project: EN100; ENEA, Agency for New Technologies, Energy and Environment

Country/Region: Italy (ITALY)

Reference (including date) of most recent report: MARKAL model, revised case study, March 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	121.9	137.3	144.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	165.4	170.4	161.2	169.7
4. Total Production	31.2	35.2	31.1	26.8
5. Oil Consumption	91.7	72.5	49.6	55.2
6. Oil Production	4.6	5.0	3.0	2.0
7. Oil Exports - Imports	-87.1	-67.5	-46.6	-53.2
8. Natural Gas Consumption	39.1	56.5	63.1	58.5
9. Natural Gas Production	14.0	17.0	14.0	10.0
10. Gas Exports - Imports	-25.1	-39.5	-49.1	-48.5
11. Coal Consumption	14.3	24.9	31.1	38.1
12. Coal Production	0.5	0.0	0.0	0.0
13. Coal Exports - Imports	-13.8	-24.9	-31.1	-38.1
14. Renewables, Electric	9.3	10.5	11.8	12.6
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	2.7	2.3	2.2
17. Electricity Generation Terawatt Hours (TWh)	230.2	241.5	239.0	243.2
18. Carbon Emissions Million Tons (MtC)	120.8	126.6	117.2	127.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	50.0	100.0	100.0

Notes:

The views presented here are those of the individual authors and do not necessarily represent the views of ENEA.

17. Gross domestic production + imports: 252 TWh in 1990.

17. Import of electricity, mainly from France, 35 TWh in 1990, 13 TWh in 2000, 13 TWh in 2010 and 9.6 TWh in 2020.

18. Inclusive of estimated process emission of clinker (5.8 Mt) and glass (0.4 Mt).

Organization/Project: EN200; ENEA, Agency for New Technologies, Energy and Environment, 200\$/tC case

Country/Region: Italy (ITALY)

Reference (including date) of most recent report: MARKAL model revised case study, March 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	121.9	137.3	144.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	165.4	169.8	157.6	165.1
4. Total Production	31.2	35.2	31.2	27.0
5. Oil Consumption	91.7	72.3	49.6	54.9
6. Oil Production	4.6	5.0	3.0	2.0
7. Oil Exports - Imports	-87.1	-67.3	-46.6	-52.9
8. Natural Gas Consumption	39.1	56.5	64.0	62.6
9. Natural Gas Production	14.0	17.0	14.0	10.0
10. Gas Exports - Imports	-25.1	-39.5	-50.0	-52.6
11. Coal Consumption	14.3	24.3	26.2	28.8
12. Coal Production	0.5	0.0	0.0	0.0
13. Coal Exports - Imports	-13.8	-24.9	-26.2	-28.8
14. Renewables, Electric	9.3	10.5	11.8	12.6
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	2.7	2.6	2.4
17. Electricity Generation Terawatt Hours (TWh)	230.2	240.5	234.8	238.3
18. Carbon Emissions Million Tons (MtC)	120.8	125.8	112.6	119.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	200.0	200.0

Notes:

The views presented here are those of the individual authors and do not necessarily represent the views of ENEA.

17. Gross domestic production + imports: 252 TWh in 1990.

17. Import of electricity, mainly from France, 35 TWh in 1990, 13 TWh in 2000, 13 TWh in 2010 and 13 TWh in 2020.

18. Inclusive of estimated process emission of clinker (5.8 Mt) and glass (0.4 Mt).

Organization/Project: ENSTB; ENEA, Agency for New Technologies, Energy and Environment, stabilization

Country/Region: Italy (ITALY)

Reference (including date) of most recent report: MARKAL model revised case study, submitted to CHALLENGE, March 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	121.9	137.3	144.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	165.4	168.1	160.7	166.4
4. Total Production	31.2	36.4	30.7	28.2
5. Oil Consumption	91.7	73.5	49.5	54.9
6. Oil Production	4.6	5.0	3.0	2.0
7. Oil Exports - Imports	-87.1	-68.5	-46.5	-52.9
8. Natural Gas Consumption	39.1	60.3	64.0	62.6
9. Natural Gas Production	14.0	17.0	14.0	10.0
10. Gas Exports - Imports	-25.1	-43.3	-50.0	-52.6
11. Coal Consumption	14.3	16.6	33.3	29.8
12. Coal Production	0.5	0.0	0.0	0.0
13. Coal Exports - Imports	-13.8	-16.6	-33.3	-29.8
14. Renewables, Electric	9.3	11.7	13.0	13.8
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	2.7	0.7	2.4
17. Electricity Generation Terawatt Hours (TWh)	230.2	238.3	237.6	238.9
18. Carbon Emissions Million Tons (MtC)	120.8	120.8	120.8	120.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	230.0	100.0	195.5

Notes:

The views presented here are those of the individual authors and do not necessarily represent the views of ENEA.

17. Gross domestic production + imports: 252 TWh in 1990.

17. Import of electricity, mainly from France, 35 TWh in 1990, 13 TWh in 2000, 0 TWh in 2010 and 9.6 TWh in 2020.

18. Inclusive of estimated process emission of clinker (5.8 Mt) and glass (0.4 Mt).

19. Average over ten years.

Organization/Project: EPM00; IER, University of Stuttgart, 20% CO2 reduction in relation to 1988

Country/Region: Poland (POL)

Reference (including date) of most recent report: Balandynowicz, H.W. et al., "CO2 Reduction Strategies for Poland", submitted to CHALLENGE, 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	132.0	195.0	288.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	101.2	115.4	114.7	139.7
4. Total Production	98.5	85.5	73.3	81.6
5. Oil Consumption	15.4	28.4	33.1	52.9
6. Oil Production	0.2	0.3	0.3	0.3
7. Oil Exports - Imports	-15.2	-28.1	-32.9	-52.6
8. Natural Gas Consumption	8.9	9.3	12.7	13.6
9. Natural Gas Production	2.4	5.1	4.6	5.5
10. Gas Exports - Imports	-6.6	-4.2	-8.1	-8.1
11. Coal Consumption	75.5	75.9	57.2	45.4
12. Coal Production	94.6	78.3	56.8	48.1
13. Coal Exports - Imports	19.1	2.5	-0.4	2.7
14. Renewables, Electric	0.2	0.8	2.0	4.0
15. Nuclear Energy	0.0	0.0	8.8	22.4
16. Renewables, Nonelectric	1.2	1.1	0.8	0.9
17. Electricity Generation Terawatt Hours (TWh)	136.3	156.8	180.7	228.6
18. Carbon Emissions Million Tons (MtC)	99.2	111.4	99.1	99.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon		10.5	344.1	97.3

Notes:

1 toe = 10.0 Gcal = 41.868 GJ net heating value.

Data for the year 1990 adjusted according to the official statistical reports.

Organization/Project: EPM20; IER, University of Stuttgart, 20% CO2 reduction

Country/Region: Poland (POL)

Reference (including date) of most recent report: Balandynowicz, H.W. et al., "CO2 Reduction Strategies for Poland", submitted to CHALLENGE, 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	132.0	195.0	288.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	101.2	105.2	107.2	129.5
4. Total Production	98.5	58.7	49.2	59.4
5. Oil Consumption	15.4	38.8	50.6	52.9
6. Oil Production	0.2	0.3	0.3	0.3
7. Oil Exports - Imports	-15.2	-38.5	-50.3	-52.6
8. Natural Gas Consumption	8.9	13.0	17.2	25.3
9. Natural Gas Production	2.4	4.9	4.3	5.1
10. Gas Exports - Imports	-6.6	-8.1	-12.8	-20.2
11. Coal Consumption	75.5	51.6	27.3	24.5
12. Coal Production	94.6	51.7	32.5	27.2
13. Coal Exports - Imports	19.1	0.1	5.2	2.7
14. Renewables, Electric	0.2	1.3	2.1	3.1
15. Nuclear Energy	0.0	0.0	8.8	22.4
16. Renewables, Nonelectric	1.2	0.6	1.3	1.3
17. Electricity Generation Terawatt Hours (TWh)	136.3	136.1	174.0	223.2
18. Carbon Emissions Million Tons (MtC)	99.2	89.2	79.3	79.3
19. Marginal Reduction Costs 1990 \$ per ton of carbon		768.2	1435.1	300.3

Notes:

1 toe = 10.0 Gcal = 41.868 GJ net heating value.

Data for the year 1990 adjusted according to the official statistical reports.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: USA (USA)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	127.8	155.2	193.8
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1689.9	1534.7	1645.4	1795.9
4. Total Production	1444.8	1111.3	1103.8	1224.6
5. Oil Consumption	667.9	718.7	771.2	755.3
6. Oil Production	385.5	292.5	230.6	186.1
7. Oil Exports - Imports	-282.4	-426.2	-540.6	-569.2
8. Natural Gas Consumption	416.0	364.3	336.9	370.5
9. Natural Gas Production	390.0	332.3	304.7	335.6
10. Gas Exports - Imports	-26.0	-32.0	-32.3	-34.9
11. Coal Consumption	435.7	218.4	150.2	128.9
12. Coal Production	499.0	253.2	181.5	161.7
13. Coal Exports - Imports	63.3	34.8	31.3	32.8
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.1	1.1
17. Electricity Generation Terawatt Hours (TWh)	2778.5	2998.1	3427.7	4124.1
18. Carbon Emissions Million Tons (MtC)	1350.3	1128.7	1027.9	1022.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: JAPAN (JAPAN)

Reference (including date) of most recent report: GREEN runs contributed to CHALLENGE by Joaquim Oliveira Martins, July 1993. OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	142.9	182.5	242.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	427.1	494.1	707.9	924.7
4. Total Production	131.6	134.8	387.9	610.8
5. Oil Consumption	233.1	280.2	267.1	247.3
6. Oil Production	0.5	0.5	0.5	0.5
7. Oil Exports - Imports	-232.6	-279.7	-266.6	-246.8
8. Natural Gas Consumption	38.7	52.1	23.5	27.1
9. Natural Gas Production	1.9	1.5	1.0	1.5
10. Gas Exports - Imports	-36.8	-50.6	-22.5	-25.7
11. Coal Consumption	87.4	77.2	78.6	100.5
12. Coal Production	61.2	48.2	47.7	59.1
13. Coal Exports - Imports	-26.2	-29.0	-31.0	-41.4
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.1	0.5
17. Electricity Generation Terawatt Hours (TWh)	706.0	777.1	1550.7	2349.4
18. Carbon Emissions Million Tons (MtC)	333.1	353.9	312.5	329.7
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: EEC (EEC)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.3	143.6	169.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1089.2	1032.1	1084.7	1152.0
4. Total Production	628.6	531.9	562.0	628.2
5. Oil Consumption	485.5	482.0	490.9	451.2
6. Oil Production	135.8	115.1	93.5	73.3
7. Oil Exports - Imports	-349.8	-366.9	-397.4	-377.9
8. Natural Gas Consumption	200.4	214.0	209.9	240.4
9. Natural Gas Production	134.5	117.4	114.8	124.7
10. Gas Exports - Imports	-65.9	-96.6	-95.1	-115.7
11. Coal Consumption	241.9	141.8	112.2	108.5
12. Coal Production	196.9	105.0	82.0	78.4
13. Coal Exports - Imports	-45.0	-36.8	-30.1	-30.1
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.1	0.9
17. Electricity Generation Terawatt Hours (TWh)	1535.6	1625.9	1791.4	2098.5
18. Carbon Emissions Million Tons (MtC)	823.4	716.8	655.1	647.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: ROECD (ROECD)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.3	143.9	170.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	512.0	498.2	528.8	562.0
4. Total Production	600.8	572.2	589.0	647.8
5. Oil Consumption	171.8	176.6	192.5	188.0
6. Oil Production	127.9	118.7	111.9	103.2
7. Oil Exports - Imports	-43.9	-57.8	-80.6	-84.7
8. Natural Gas Consumption	72.1	67.9	71.9	83.2
9. Natural Gas Production	129.5	115.5	117.2	129.5
10. Gas Exports - Imports	57.4	47.6	45.3	46.3
11. Coal Consumption	87.7	38.4	27.3	24.4
12. Coal Production	163.0	122.8	122.8	148.7
13. Coal Exports - Imports	75.3	84.3	95.5	124.3
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.1
17. Electricity Generation Terawatt Hours (TWh)	929.4	964.3	993.8	1084.4
18. Carbon Emissions Million Tons (MtC)	295.6	242.3	231.5	233.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: ENX (ENX)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	130.8	171.7	254.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	693.3	657.0	794.4	1013.7
4. Total Production	2204.8	2223.3	3135.7	3989.3
5. Oil Consumption	467.0	454.9	557.8	684.4
6. Oil Production	1819.7	1804.9	2756.3	3517.4
7. Oil Exports - Imports	1352.7	1350.0	2198.5	2833.1
8. Natural Gas Consumption	121.1	129.8	148.7	205.7
9. Natural Gas Production	240.0	305.7	262.7	323.2
10. Gas Exports - Imports	119.0	175.9	113.9	117.5
11. Coal Consumption	72.4	30.9	24.7	25.4
12. Coal Production	112.2	71.2	53.5	50.4
13. Coal Exports - Imports	39.8	40.3	28.8	25.0
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.1
17. Electricity Generation Terawatt Hours (TWh)	589.9	632.2	793.8	1117.7
18. Carbon Emissions Million Tons (MtC)	423.6	399.8	440.4	556.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: A2 (A2)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	153.9	225.4	357.3
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	662.8	502.3	556.2	629.2
4. Total Production	681.5	496.9	483.3	507.0
5. Oil Consumption	130.9	188.4	261.7	304.3
6. Oil Production	149.0	171.8	173.8	157.4
7. Oil Exports - Imports	18.1	-16.6	-87.9	-146.9
8. Natural Gas Consumption	13.9	17.0	24.3	37.7
9. Natural Gas Production	13.8	17.1	24.4	37.6
10. Gas Exports - Imports	-0.1	0.1	0.1	-0.1
11. Coal Consumption	491.9	272.9	240.1	246.0
12. Coal Production	492.6	283.9	255.0	270.8
13. Coal Exports - Imports	0.7	11.1	14.9	24.8
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.1
17. Electricity Generation Terawatt Hours (TWh)	497.6	382.4	488.3	689.3
18. Carbon Emissions Million Tons (MtC)	600.6	418.2	423.7	469.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: USSR (USSR)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	146.2	184.9	245.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1608.9	920.9	926.0	1067.0
4. Total Production	1767.0	1298.2	1292.9	1436.4
5. Oil Consumption	578.5	306.6	295.2	305.1
6. Oil Production	575.5	540.7	481.8	400.2
7. Oil Exports - Imports	-3.0	234.1	186.6	95.0
8. Natural Gas Consumption	546.3	325.4	342.2	415.7
9. Natural Gas Production	674.7	450.6	504.7	666.9
10. Gas Exports - Imports	128.4	125.2	162.5	251.2
11. Coal Consumption	380.5	193.0	186.2	219.2
12. Coal Production	413.1	210.9	204.0	242.3
13. Coal Exports - Imports	32.7	17.9	17.8	23.1
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	1631.1	1407.6	1396.8	1715.6
18. Carbon Emissions Million Tons (MtC)	1059.5	588.1	579.0	658.3
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: INDIA (INDIA)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	156.1	230.6	368.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	179.0	156.6	179.0	210.4
4. Total Production	152.2	125.5	124.8	132.4
5. Oil Consumption	55.5	60.7	79.3	96.6
6. Oil Production	29.0	30.2	24.8	18.8
7. Oil Exports - Imports	-26.5	-30.4	-54.5	-77.8
8. Natural Gas Consumption	4.7	5.1	6.8	8.4
9. Natural Gas Production	4.6	5.3	6.6	8.6
10. Gas Exports - Imports	-0.1	0.1	-0.2	0.2
11. Coal Consumption	104.3	66.2	60.0	62.5
12. Coal Production	104.1	65.5	60.5	62.2
13. Coal Exports - Imports	-0.2	-0.8	0.5	-0.3
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	213.1	248.6	341.3	455.7
18. Carbon Emissions Million Tons (MtC)	151.2	117.5	120.4	135.7
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: EEUR (EEUR)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	134.2	165.9	212.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	432.6	324.9	347.4	386.2
4. Total Production	350.7	229.2	221.4	229.5
5. Oil Consumption	98.1	103.5	125.5	135.9
6. Oil Production	11.4	9.4	8.0	6.5
7. Oil Exports - Imports	-86.6	-94.1	-117.5	-129.5
8. Natural Gas Consumption	66.6	67.0	80.6	97.1
9. Natural Gas Production	51.5	50.9	59.5	56.8
10. Gas Exports - Imports	-15.1	-16.1	-21.1	-40.2
11. Coal Consumption	244.6	128.2	110.7	114.7
12. Coal Production	264.3	142.6	123.2	127.8
13. Coal Exports - Imports	19.7	14.4	12.6	13.1
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	484.8	440.9	451.0	551.6
18. Carbon Emissions Million Tons (MtC)	359.4	248.3	244.1	263.5
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: DAE (DAE)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	152.2	219.8	341.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	155.3	167.6	214.1	286.9
4. Total Production	39.4	42.2	55.7	91.8
5. Oil Consumption	94.3	105.0	137.1	169.4
6. Oil Production	1.5	1.5	1.5	1.5
7. Oil Exports - Imports	-92.8	-103.5	-135.6	-167.9
8. Natural Gas Consumption	4.2	5.7	6.4	9.5
9. Natural Gas Production	3.3	3.3	4.6	7.2
10. Gas Exports - Imports	-1.0	-2.4	-1.8	-2.3
11. Coal Consumption	38.2	32.9	37.2	47.0
12. Coal Production	16.1	13.4	16.1	22.1
13. Coal Exports - Imports	-22.1	-19.5	-21.0	-24.9
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	208.3	228.1	281.0	384.9
18. Carbon Emissions Million Tons (MtC)	108.2	114.6	131.3	163.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: BRAZI (BRAZI)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	154.6	225.4	353.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	184.1	207.1	267.5	330.0
4. Total Production	74.1	92.8	101.1	114.7
5. Oil Consumption	129.8	135.8	178.0	217.1
6. Oil Production	27.2	30.2	23.8	16.8
7. Oil Exports - Imports	-102.5	-105.6	-154.3	-200.3
8. Natural Gas Consumption	10.9	11.6	15.3	19.0
9. Natural Gas Production	5.5	4.1	4.8	6.2
10. Gas Exports - Imports	-5.4	-7.5	-10.5	-12.9
11. Coal Consumption	4.7	3.8	4.3	6.6
12. Coal Production	2.7	2.7	2.7	4.5
13. Coal Exports - Imports	-2.0	-1.1	-1.6	-2.2
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	170.9	222.6	318.5	400.5
18. Carbon Emissions Million Tons (MtC)	96.3	103.2	123.4	152.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: ROW12 (ROW12)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	139.4	184.6	255.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	431.1	406.6	494.4	584.7
4. Total Production	845.1	858.2	746.8	662.8
5. Oil Consumption	196.5	219.4	279.4	310.0
6. Oil Production	607.7	672.1	529.4	374.7
7. Oil Exports - Imports	411.2	452.7	250.1	64.8
8. Natural Gas Consumption	39.8	50.2	66.3	96.5
9. Natural Gas Production	48.7	56.9	74.6	109.3
10. Gas Exports - Imports	8.8	6.7	8.3	12.8
11. Coal Consumption	128.3	60.3	46.9	42.4
12. Coal Production	122.3	52.4	41.0	43.0
13. Coal Exports - Imports	-6.0	-7.8	-5.9	0.6
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.0	0.2
17. Electricity Generation Terawatt Hours (TWh)	555.9	560.7	785.1	1042.0
18. Carbon Emissions Million Tons (MtC)	310.3	272.7	293.2	329.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: GR200; GREEN, 200\$/tC Tax case

Country/Region: A8 (A8)

Reference (including date) of most recent report: OECD GREEN model, July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	17.7	23.2	31.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	132.6	166.4	219.7
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	8065.4	6902.2	7745.8	8942.6
4. Total Production	8920.5	7716.4	8804.4	10275.5
5. Oil Consumption	3308.9	3231.8	3635.6	3864.5
6. Oil Production	3870.7	3787.8	4435.7	4856.4
7. Oil Exports - Imports	561.9	556.0	800.1	991.9
8. Natural Gas Consumption	1534.9	1310.2	1332.8	1610.7
9. Natural Gas Production	1698.2	1460.6	1479.5	1807.0
10. Gas Exports - Imports	163.2	150.4	146.7	196.2
11. Coal Consumption	2317.4	1264.0	1078.2	1126.1
12. Coal Production	2447.5	1371.8	1190.0	1270.8
13. Coal Exports - Imports	130.1	107.8	111.8	144.8
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric	0.0	0.0	0.3	3.1
17. Electricity Generation Terawatt Hours (TWh)	10301.1	10488.5	12619.5	16013.6
18. Carbon Emissions Million Tons (MtC)	5911.4	4704.1	4582.6	4960.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

1. For 1990, the price corresponds to the spot price BRENT (fob) from energy prices and taxes, IEA.

Organization/Project: ISRED; Yuri Sinyak, ECS, IIASA, Scenario P2
(preferable, with carbon tax)

Country/Region: Eastern Europe (EEUR)

Reference (including date) of most recent report: TEPCO Study, May 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel				
2. Real GNP (or GDP) Index 1990 = 100	100.0	90.0	130.0	184.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	336.0	273.0		279.0
4. Total Production	238.7	163.0		167.0
5. Oil Consumption	78.8	66.0		52.0
6. Oil Production	10.8	4.0		2.0
7. Oil Exports - Imports	-68.0	-62.0		-50.0
8. Natural Gas Consumption	66.4	66.0		99.0
9. Natural Gas Production	30.7	13.0		31.0
10. Gas Exports - Imports	-35.7	-53.0		-68.0
11. Coal Consumption	159.4	110.0		70.0
12. Coal Production	165.8	116.0		76.0
13. Coal Exports - Imports	6.4	6.0		6.0
14. Renewables, Electric	12.6	9.0		10.0
15. Nuclear Energy	15.0	13.0		39.0
16. Renewables, Nonelectric	3.8	8.0		9.0
17. Electricity Generation Terawatt Hours (TWh)	442.0	369.0		530.0
18. Carbon Emissions Million Tons (MtC)	310.0	238.0		195.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	0.0	100.0	200.0

Organization/Project: ISRED; Yuri Sinyak, ECS, IIASA, Scenario P2
(preferable, with carbon tax)

Country/Region: Former Soviet Union (USSR)

Reference (including date) of most recent report: TEPCO Study, May 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel				
2. Real GNP (or GDP) Index 1990 = 100	100.0	60.0	96.0	150.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1395.0	1070.0		1231.0
4. Total Production	1636.5	1289.0		1496.0
5. Oil Consumption	401.5	248.0		170.0
6. Oil Production	531.5	350.0		272.0
7. Oil Exports - Imports	130.0	102.0		102.0
8. Natural Gas Consumption	575.5	497.0		764.0
9. Natural Gas Production	673.5	608.0		907.0
10. Gas Exports - Imports	98.0	111.0		143.0
11. Coal Consumption	279.8	195.0		108.0
12. Coal Production	293.3	210.0		128.0
13. Coal Exports - Imports	13.5	15.0		20.0
14. Renewables, Electric	56.0	54.0		77.0
15. Nuclear Energy	47.2	41.0		59.0
16. Renewables, Nonelectric	35.0	35.0		53.0
17. Electricity Generation Terawatt Hours (TWh)	1727.0	1437.0		2252.0
18. Carbon Emissions Million Tons (MtC)	1013.0	777.0		760.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	0.0	100.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: USA (USA)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	126.7	154.9	188.8
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1926.6	1830.5	1993.4	2231.3
4. Total Production				
5. Oil Consumption	768.5	1042.3	945.2	998.7
6. Oil Production	413.6	339.4	263.1	263.4
7. Oil Exports - Imports	-354.9	-702.9	-682.1	-735.3
8. Natural Gas Consumption	477.0	410.4	280.2	190.9
9. Natural Gas Production	446.5	410.4	280.2	190.9
10. Gas Exports - Imports	-30.5	0.0	0.0	0.0
11. Coal Consumption	467.4	82.2	210.6	82.2
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	71.3	71.3	71.3	71.3
15. Nuclear Energy	142.4	106.8	71.3	60.2
16. Renewables, Nonelectric	0.0	117.5	415.7	829.0
17. Electricity Generation Terawatt Hours (TWh)	2808.0	2904.8	3137.3	3722.7
18. Carbon Emissions Million Tons (MtC)	1418.0	1232.8	1206.4	1067.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: JAPAN (JAPAN)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	144.8	186.1	243.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	426.5	487.8	634.2	790.1
4. Total Production				
5. Oil Consumption	239.9	276.7	309.0	355.9
6. Oil Production	0.2	0.3	0.3	0.6
7. Oil Exports - Imports	-239.7	-276.4	-308.7	-355.2
8. Natural Gas Consumption	44.7	79.0	47.3	28.3
9. Natural Gas Production	2.3	2.0	1.4	0.8
10. Gas Exports - Imports	-42.3	-77.0	-45.9	-27.5
11. Coal Consumption	74.5	52.9	21.6	9.4
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	22.6	22.6	22.6	22.6
15. Nuclear Energy	44.9	33.6	22.6	36.0
16. Renewables, Nonelectric	0.0	23.5	211.3	338.8
17. Electricity Generation Terawatt Hours (TWh)	808.0	913.2	1201.5	1577.1
18. Carbon Emissions Million Tons (MtC)	306.0	359.8	336.7	352.8
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: EEC (EEC)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.3	143.3	166.7
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1200.4	1295.9	1497.9	1688.0
4. Total Production				
5. Oil Consumption	531.1	765.4	799.6	671.2
6. Oil Production	117.5	95.9	75.6	72.4
7. Oil Exports - Imports	-413.6	-669.5	-724.0	-598.8
8. Natural Gas Consumption	213.9	194.7	116.6	69.8
9. Natural Gas Production	136.3	118.7	89.9	62.0
10. Gas Exports - Imports	-77.6	-75.9	-26.6	-7.8
11. Coal Consumption	278.7	147.1	39.7	159.8
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	37.6	37.6	37.6	37.6
15. Nuclear Energy	139.1	104.3	69.6	59.5
16. Renewables, Nonelectric	0.0	47.0	434.7	690.6
17. Electricity Generation Terawatt Hours (TWh)	1703.0	2102.4	2625.8	3197.0
18. Carbon Emissions Million Tons (MtC)	864.0	961.9	835.1	822.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: ROECD (ROECD)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.8	145.0	168.3
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	561.7	619.9	673.5	746.5
4. Total Production				
5. Oil Consumption	192.7	74.8	41.4	56.7
6. Oil Production	199.8	228.1	203.5	163.2
7. Oil Exports - Imports	7.1	153.2	162.1	106.6
8. Natural Gas Consumption	86.9	265.5	315.1	357.3
9. Natural Gas Production	133.9	312.5	344.6	404.3
10. Gas Exports - Imports	47.0	47.0	29.5	47.0
11. Coal Consumption	94.0	54.0	54.0	54.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	147.1	147.1	147.1	147.1
15. Nuclear Energy	40.9	30.8	20.4	35.0
16. Renewables, Nonelectric	0.0	47.0	94.0	94.0
17. Electricity Generation Terawatt Hours (TWh)	1120.0	1301.8	1451.6	1659.1
18. Carbon Emissions Million Tons (MtC)	313.0	248.9	249.6	287.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: ENX (ENX)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.2	186.5	255.3
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	679.2	720.3	873.5	1112.4
4. Total Production				
5. Oil Consumption	357.2	249.7	295.0	363.1
6. Oil Production	1553.3	1510.3	1551.0	1819.8
7. Oil Exports - Imports	1196.2	1260.6	1256.1	1456.7
8. Natural Gas Consumption	202.1	403.4	511.6	656.0
9. Natural Gas Production	272.6	473.9	582.1	726.5
10. Gas Exports - Imports	70.5	70.5	70.5	70.5
11. Coal Consumption	51.8	0.0	0.0	0.0
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	65.1	65.1	65.1	65.1
15. Nuclear Energy	3.1	2.4	1.5	25.6
16. Renewables, Nonelectric	0.0	0.0	0.0	0.0
17. Electricity Generation Terawatt Hours (TWh)	776.0	1010.5	1388.1	1959.0
18. Carbon Emissions Million Tons (MtC)	472.0	404.2	505.9	648.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: A2 (A2)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	121.6	199.9	296.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	662.8	675.9	819.0	1127.7
4. Total Production				
5. Oil Consumption	108.1	79.1	103.0	176.2
6. Oil Production	136.3	174.6	169.3	164.9
7. Oil Exports - Imports	28.2	95.4	66.3	-11.3
8. Natural Gas Consumption	14.1	134.6	195.3	170.2
9. Natural Gas Production	14.1	134.6	195.3	170.2
10. Gas Exports - Imports	0.0	0.0	0.0	0.0
11. Coal Consumption	504.5	366.6	366.6	366.6
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	36.2	36.8	37.5	38.5
15. Nuclear Energy	0.0	0.0	0.0	24.7
16. Renewables, Nonelectric	0.0	58.8	117.5	353.2
17. Electricity Generation Terawatt Hours (TWh)	587.0	828.1	1152.9	1794.2
18. Carbon Emissions Million Tons (MtC)	624.0	528.2	584.0	631.5
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: USSR (USSR)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	131.4	159.6	194.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1365.4	1180.2	1187.2	1283.6
4. Total Production				
5. Oil Consumption	418.3	155.9	7.6	26.3
6. Oil Production	561.7	551.8	484.0	399.4
7. Oil Exports - Imports	143.4	395.8	476.4	373.0
8. Natural Gas Consumption	547.5	661.8	689.6	755.3
9. Natural Gas Production	643.9	758.1	786.0	851.7
10. Gas Exports - Imports	96.3	96.3	96.3	96.3
11. Coal Consumption	272.4	155.1	155.1	155.1
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	70.8	70.8	70.8	70.8
15. Nuclear Energy	56.4	42.3	28.2	38.8
16. Renewables, Nonelectric	0.0	94.0	235.0	235.0
17. Electricity Generation Terawatt Hours (TWh)	1632.0	1801.4	1947.6	2277.9
18. Carbon Emissions Million Tons (MtC)	959.0	626.6	517.0	571.3
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: INDIA (INDIA)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	148.8	234.7	359.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	188.6	192.4	249.8	354.5
4. Total Production				
5. Oil Consumption	56.4	2.1	0.0	30.0
6. Oil Production	32.9	28.7	23.5	24.8
7. Oil Exports - Imports	-23.5	26.6	23.5	-5.3
8. Natural Gas Consumption	9.4	41.7	58.7	35.1
9. Natural Gas Production	11.8	35.9	35.0	25.9
10. Gas Exports - Imports	2.3	-5.8	-23.7	-9.3
11. Coal Consumption	100.8	68.3	51.8	68.2
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	19.9	20.2	20.8	21.1
15. Nuclear Energy	2.1	1.5	1.2	25.3
16. Renewables, Nonelectric	0.0	58.8	117.5	175.1
17. Electricity Generation Terawatt Hours (TWh)	271.0	293.5	384.2	591.5
18. Carbon Emissions Million Tons (MtC)	158.0	96.0	87.2	115.7
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: EEUR (EEUR)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	120.9	151.9	183.7
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	332.4	284.1	271.9	282.7
4. Total Production				
5. Oil Consumption	86.9	71.2	63.1	56.2
6. Oil Production	18.8	15.6	11.9	12.4
7. Oil Exports - Imports	-68.2	-55.5	-51.2	-43.9
8. Natural Gas Consumption	61.1	43.0	53.9	32.2
9. Natural Gas Production	30.5	20.3	13.3	8.5
10. Gas Exports - Imports	-30.5	-22.7	-40.6	-23.7
11. Coal Consumption	157.0	146.3	135.3	124.6
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	12.4	12.4	12.4	12.4
15. Nuclear Energy	14.9	11.3	7.6	28.3
16. Renewables, Nonelectric	0.0	0.0	0.0	30.4
17. Electricity Generation Terawatt Hours (TWh)	423.0	389.8	395.5	451.7
18. Carbon Emissions Million Tons (MtC)	271.0	253.9	242.2	212.7
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: DAE (DAE)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	151.4	229.0	343.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	209.4	210.9	260.9	380.1
4. Total Production				
5. Oil Consumption	122.4	127.9	164.8	109.0
6. Oil Production	0.2	0.3	0.3	0.6
7. Oil Exports - Imports	-122.2	-127.6	-164.4	-108.4
8. Natural Gas Consumption	11.8	34.5	61.0	146.4
9. Natural Gas Production	2.3	2.0	1.4	0.8
10. Gas Exports - Imports	-9.4	-32.4	-59.6	-145.6
11. Coal Consumption	41.0	20.8	14.1	14.1
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	9.5	9.5	9.5	9.5
15. Nuclear Energy	24.8	18.6	12.5	30.8
16. Renewables, Nonelectric	0.0	0.0	0.0	71.0
17. Electricity Generation Terawatt Hours (TWh)	276.0	297.2	396.6	633.2
18. Carbon Emissions Million Tons (MtC)	154.0	156.7	196.6	199.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: BRAZI (BRAZI)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	154.7	233.4	351.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	141.4	167.6	206.1	255.6
4. Total Production				
5. Oil Consumption	63.5	28.9	0.0	10.0
6. Oil Production	32.9	30.6	24.0	17.3
7. Oil Exports - Imports	-30.5	1.8	24.0	7.3
8. Natural Gas Consumption	4.9	7.4	17.0	20.4
9. Natural Gas Production	0.2	7.4	17.0	20.4
10. Gas Exports - Imports	-4.7	0.0	0.0	0.0
11. Coal Consumption	8.6	7.1	4.7	7.1
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	63.8	65.1	66.3	67.8
15. Nuclear Energy	0.6	0.3	0.3	25.0
16. Renewables, Nonelectric	0.0	58.8	117.5	126.5
17. Electricity Generation Terawatt Hours (TWh)	220.0	253.2	308.3	413.4
18. Carbon Emissions Million Tons (MtC)	64.0	37.3	16.0	28.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: ROW12 (ROW12)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	141.7	191.6	259.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	344.0	361.0	406.9	506.8
4. Total Production				
5. Oil Consumption	148.1	131.6	113.5	122.0
6. Oil Production	16.5	30.0	35.6	36.6
7. Oil Exports - Imports	-131.6	-101.6	-78.0	-85.4
8. Natural Gas Consumption	68.2	90.9	95.5	86.7
9. Natural Gas Production	56.4	90.9	95.5	86.7
10. Gas Exports - Imports	-11.8	0.0	0.0	0.0
11. Coal Consumption	91.2	42.3	42.3	42.3
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	35.1	35.7	36.7	37.3
15. Nuclear Energy	1.5	1.2	0.9	25.0
16. Renewables, Nonelectric	0.0	58.8	117.5	193.2
17. Electricity Generation Terawatt Hours (TWh)	418.0	533.2	630.9	833.8
18. Carbon Emissions Million Tons (MtC)	260.0	216.0	203.3	205.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: A4 (A4)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.4	155.2	188.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	4115.2	4234.1	4799.0	5455.9
4. Total Production				
5. Oil Consumption	1732.2	2159.2	2095.3	2082.4
6. Oil Production	731.1	663.6	542.6	499.6
7. Oil Exports - Imports	-1001.1	-1495.6	-1552.7	-1582.8
8. Natural Gas Consumption	822.5	949.5	759.2	646.3
9. Natural Gas Production	719.1	843.6	716.2	658.1
10. Gas Exports - Imports	-103.4	-105.9	-43.0	11.8
11. Coal Consumption	914.6	336.3	326.0	305.5
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	278.6	278.6	278.6	278.6
15. Nuclear Energy	367.3	275.6	183.9	190.6
16. Renewables, Nonelectric	0.0	235.0	1155.8	1952.3
17. Electricity Generation Terawatt Hours (TWh)	6439.0	7222.3	8416.3	10155.9
18. Carbon Emissions Million Tons (MtC)	2901.0	2803.4	2627.7	2529.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IT200; 12RT, 200\$/tC Tax case

Country/Region: A8 (A8)

Reference (including date) of most recent report: Alan S. Manne,
"International Trade - the Impact of Unilateral Carbon Emission
Limits", July 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	23.0	22.8	39.3
2. Real GNP (or GDP) Index 1990 = 100	100.0	130.4	163.7	206.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	8038.5	8026.5	9074.4	10759.3
4. Total Production				
5. Oil Consumption	3093.1	3005.6	2842.3	2975.5
6. Oil Production	3083.7	3005.6	2842.3	2975.5
7. Oil Exports - Imports	-9.4	0.0	0.0	0.0
8. Natural Gas Consumption	1741.6	2366.8	2441.8	2548.7
9. Natural Gas Production	1751.0	2366.8	2441.8	2548.7
10. Gas Exports - Imports	9.4	0.0	0.0	0.0
11. Coal Consumption	2141.8	1142.7	1095.8	1083.3
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	591.3	594.1	597.5	601.0
15. Nuclear Energy	470.7	353.3	236.2	414.0
16. Renewables, Nonelectric	0.0	564.0	1860.8	3136.8
17. Electricity Generation Terawatt Hours (TWh)	11042.0	12629.2	15020.3	19110.7
18. Carbon Emissions Million Tons (MtC)	5863.0	5122.2	4979.9	5142.3
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Organization/Project: IW100; Institut fuer Waermetechnik, TU Graz, 100\$/tC
case

Country/Region: Austria (OST)

Reference (including date) of most recent report: Submitted to CHALLENGE,
April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100				
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	29.7	31.2	32.9	34.3
4. Total Production	13.7	13.9	14.2	14.6
5. Oil Consumption	10.2	11.7	12.7	12.8
6. Oil Production	1.3	0.9	0.5	0.2
7. Oil Exports - Imports	-8.9	-10.8	-12.2	-12.5
8. Natural Gas Consumption	4.7	5.1	5.4	5.7
9. Natural Gas Production	1.1	0.8	0.9	0.8
10. Gas Exports - Imports	-3.6	-4.3	-4.5	-4.9
11. Coal Consumption	4.0	2.7	2.3	2.4
12. Coal Production	0.5	0.4	0.4	0.2
13. Coal Exports - Imports	-3.5	-2.2	-2.0	-2.2
14. Renewables, Electric	8.0	8.7	8.9	9.1
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	3.1	3.6	4.3
17. Electricity Generation Terawatt Hours (TWh)	52.8	55.7	59.0	62.6
18. Carbon Emissions Million Tons (MtC)	16.2	15.6	16.2	16.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon		100.0	100.0	100.0

Notes:

14. A thermal efficiency of 0.385 is assumed.

Organization/Project: IW200; Institut fuer Waermetechnik, TU Graz, 200\$/tC
case

Country/Region: Austria (OST)

Reference (including date) of most recent report: Submitted to CHALLENGE,
April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100				
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	29.7	31.2	32.8	34.3
4. Total Production	13.7	14.2	14.8	15.2
5. Oil Consumption	10.2	11.6	11.9	12.6
6. Oil Production	1.3	0.9	0.5	0.2
7. Oil Exports - Imports	-8.9	-10.8	-11.4	-12.4
8. Natural Gas Consumption	4.7	5.2	5.6	5.5
9. Natural Gas Production	1.1	0.9	0.9	0.8
10. Gas Exports - Imports	-3.6	-4.3	-4.7	-4.7
11. Coal Consumption	4.0	2.3	2.2	2.2
12. Coal Production	0.5	0.2	0.2	0.2
13. Coal Exports - Imports	-3.5	-2.0	-2.0	-2.0
14. Renewables, Electric	8.0	9.0	9.5	9.7
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	3.1	3.7	4.3
17. Electricity Generation Terawatt Hours (TWh)	52.8	55.7	59.3	63.1
18. Carbon Emissions Million Tons (MtC)	16.2	15.1	15.4	16.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon		200.0	200.0	200.0

Notes:

14. A thermal efficiency of 0.385 is assumed.

Organization/Project: IWM20; Institut fuer Waermetechnik, TU Graz, 20% CO2
Reduction case

Country/Region: Austria (OST)

Reference (including date) of most recent report: Submitted to CHALLENGE,
April 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100				
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	29.7	31.5	31.9	33.2
4. Total Production	13.7	14.6	15.8	16.7
5. Oil Consumption	10.2	11.3	10.3	10.3
6. Oil Production	1.3	0.9	0.5	0.2
7. Oil Exports - Imports	-8.9	-10.4	-9.8	-10.1
8. Natural Gas Consumption	4.7	5.1	6.1	6.3
9. Natural Gas Production	1.1	0.8	0.9	0.8
10. Gas Exports - Imports	-3.6	-4.3	-5.2	-5.5
11. Coal Consumption	4.0	2.6	1.5	1.0
12. Coal Production	0.5	0.4	0.4	0.1
13. Coal Exports - Imports	-3.5	-2.2	-1.1	-0.9
14. Renewables, Electric	8.0	9.4	10.3	11.2
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	2.8	3.1	3.7	4.4
17. Electricity Generation Terawatt Hours (TWh)	52.8	56.7	59.1	62.6
18. Carbon Emissions Million Tons (MtC)	16.2	15.0	13.2	13.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon			1256.0	1090.0

Notes:

14. A thermal efficiency of 0.385 is assumed.

Organization/Project: KNRED; Kanazawa University, Stabilize Carbon Emissions

Country/Region: Japan (JAPAN)

Reference (including date) of most recent report: Macroeconomic and Sectoral Impacts of Carbon Taxation, Noriyuki Goto, forthcoming in Energy Economics, December 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	18.0	27.0	38.0	
2. Real GNP (or GDP) Index 1990 = 100	100.0	134.0	171.0	
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	437.0	470.0	517.0	
4. Total Production				
5. Oil Consumption	252.0	256.0	264.0	
6. Oil Production				
7. Oil Exports - Imports				
8. Natural Gas Consumption	56.0	57.0	59.0	
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	64.0	62.0	56.0	
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	19.0	22.0	26.0	
15. Nuclear Energy	46.0	71.0	102.0	
16. Renewables, Nonelectric	1.0	2.0	10.0	
17. Electricity Generation Terawatt Hours (TWh)	751.0	819.0	890.0	
18. Carbon Emissions Million Tons (MtC)	300.0	300.0	300.0	
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	255.0	529.0	

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Oceania (OECDP)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	134.5	164.6	201.8
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	111.9	92.2	94.6	102.4
4. Total Production	169.7	119.4	87.4	78.5
5. Oil Consumption	40.1	40.0	39.5	39.8
6. Oil Production	31.0	23.4	7.7	3.9
7. Oil Exports - Imports	-9.1	-16.7	-31.7	-36.0
8. Natural Gas Consumption	19.5	21.9	26.1	24.7
9. Natural Gas Production	21.1	21.9	26.1	24.7
10. Gas Exports - Imports	1.6	0.0	0.0	0.0
11. Coal Consumption	43.0	10.3	2.5	1.5
12. Coal Production	108.3	54.2	27.1	13.5
13. Coal Exports - Imports	65.3	43.8	24.6	12.1
14. Renewables, Electric	9.3	19.5	23.9	29.6
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	0.0	0.5	2.6	6.9
17. Electricity Generation Terawatt Hours (TWh)	175.4	178.5	194.4	224.1
18. Carbon Emissions Million Tons (MtC)	86.2	48.0	49.2	45.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):
2000 = 7.0; 2010 = 0.0; 2020 = 2.3.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Former USSR & Eastern Europe (A1)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	143.0	196.7	273.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1800.8	1630.4	1789.9	2012.8
4. Total Production	1966.0	1705.1	2252.0	3634.4
5. Oil Consumption	532.5	443.1	505.5	581.7
6. Oil Production	628.2	467.6	967.5	2102.7
7. Oil Exports - Imports	95.7	24.4	462.1	1521.0
8. Natural Gas Consumption	629.4	580.1	586.7	695.3
9. Natural Gas Production	681.5	580.1	586.7	695.3
10. Gas Exports - Imports	52.1	0.0	0.0	0.0
11. Coal Consumption	499.0	208.0	129.1	71.5
12. Coal Production	516.4	258.2	129.1	172.1
13. Coal Exports - Imports	17.4	50.3	0.0	100.6
14. Renewables, Electric	73.5	187.2	241.6	300.0
15. Nuclear Energy	66.4	93.0	120.8	120.8
16. Renewables, Nonelectric	0.0	119.0	206.0	243.6
17. Electricity Generation Terawatt Hours (TWh)	2203.3	2336.6	2341.5	2585.8
18. Carbon Emissions Million Tons (MtC)	1282.1	756.4	750.0	824.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):
2000 = 136.5; 2010 = 119.3; 2020 = 110.9.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Centrally Planned Economy Asia (A2)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	155.9	233.9	354.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	707.0	788.0	1019.5	1379.5
4. Total Production	734.7	699.4	974.6	1258.8
5. Oil Consumption	116.7	112.4	126.7	160.8
6. Oil Production	137.7	118.2	87.1	40.2
7. Oil Exports - Imports	21.0	5.7	-39.7	-120.6
8. Natural Gas Consumption	12.3	49.1	109.5	54.8
9. Natural Gas Production	12.3	49.1	109.5	54.8
10. Gas Exports - Imports	0.0	0.0	0.0	0.0
11. Coal Consumption	543.5	442.3	537.8	819.7
12. Coal Production	550.2	348.0	532.6	819.7
13. Coal Exports - Imports	6.7	-94.4	-5.2	0.0
14. Renewables, Electric	34.5	103.5	156.5	255.2
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	0.0	80.7	89.0	89.0
17. Electricity Generation Terawatt Hours (TWh)	647.1	920.3	1314.2	1996.0
18. Carbon Emissions Million Tons (MtC)	653.5	520.6	662.9	951.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):

2000 = 39.0; 2010 = 36.1; 2020 = 23.3.

The region includes other Asian Planned Economies.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: World Total (A8)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	134.5	172.9	224.5
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	8152.6	7935.6	8959.9	10538.2
4. Total Production				
5. Oil Consumption	3280.0	2915.3	3054.6	3341.3
6. Oil Production				
7. Oil Exports - Imports				
8. Natural Gas Consumption	1625.7	1610.1	1913.4	2321.7
9. Natural Gas Production				
10. Gas Exports - Imports				
11. Coal Consumption	2239.8	1211.9	972.6	1183.9
12. Coal Production				
13. Coal Exports - Imports				
14. Renewables, Electric	533.1	1199.1	1609.1	2081.8
15. Nuclear Energy	474.2	566.6	674.8	674.8
16. Renewables, Nonelectric	0.0	432.5	735.4	934.8
17. Electricity Generation Terawatt Hours (TWh)	11374.0	13323.2	15540.1	19252.9
18. Carbon Emissions Million Tons (MtC)	5830.2	3865.9	3961.9	4663.5
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (Mtc):
2000 = 613.4; 2010 = 561.8; 2020 = 531.4.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Japan (JAPAN)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	134.5	164.6	201.8
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	428.7	426.7	453.2	475.5
4. Total Production	75.5	124.6	162.1	172.3
5. Oil Consumption	246.6	206.5	182.3	172.4
6. Oil Production	0.7	0.3	0.2	0.1
7. Oil Exports - Imports	-245.9	-206.2	-182.2	-172.3
8. Natural Gas Consumption	41.7	23.1	22.7	22.4
9. Natural Gas Production	1.8	0.9	0.5	0.2
10. Gas Exports - Imports	-39.9	-22.2	-22.2	-22.2
11. Coal Consumption	73.2	76.7	88.1	109.4
12. Coal Production	5.8	2.9	1.4	0.7
13. Coal Exports - Imports	-67.4	-73.8	-86.7	-108.7
14. Renewables, Electric	22.3	38.1	46.8	58.1
15. Nuclear Energy	44.9	70.2	101.1	101.1
16. Renewables, Nonelectric	0.0	12.1	12.1	12.1
17. Electricity Generation Terawatt Hours (TWh)	791.2	851.4	983.8	1137.9
18. Carbon Emissions Million Tons (MtC)	296.1	256.4	247.9	260.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (Mtc):
2000 = 0.2; 2010 = 0.2; 2020 = 0.2.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Latin America (LATAM)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	144.4	200.6	281.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	439.5	547.5	702.2	922.8
4. Total Production	557.4	547.5	702.2	911.5
5. Oil Consumption	244.9	249.5	298.6	361.7
6. Oil Production	363.4	249.5	298.6	350.4
7. Oil Exports - Imports	118.5	0.0	0.0	-11.3
8. Natural Gas Consumption	74.8	57.0	77.1	110.6
9. Natural Gas Production	74.8	57.0	77.1	110.6
10. Gas Exports - Imports	0.0	0.0	0.0	0.0
11. Coal Consumption	22.3	16.0	13.9	18.4
12. Coal Production	21.7	16.0	13.9	18.4
13. Coal Exports - Imports	-0.6	0.0	0.0	0.0
14. Renewables, Electric	95.7	169.4	244.6	362.4
15. Nuclear Energy	1.8	7.1	15.2	15.2
16. Renewables, Nonelectric	0.0	48.5	52.9	54.6
17. Electricity Generation Terawatt Hours (TWh)	601.3	953.9	1251.6	1728.3
18. Carbon Emissions Million Tons (MtC)	262.9	197.5	246.5	324.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (Mtc):
2000 = 52.8; 2010 = 52.8; 2020 = 49.7.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Middle East & Northern Africa (AFME)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	143.9	208.3	303.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	386.1	393.0	565.0	809.6
4. Total Production	1193.0	1348.6	1693.8	1328.8
5. Oil Consumption	311.6	215.9	301.3	424.5
6. Oil Production	1102.2	1176.9	1431.4	715.0
7. Oil Exports - Imports	790.6	961.0	1130.1	290.1
8. Natural Gas Consumption	55.3	145.6	212.5	338.9
9. Natural Gas Production	85.1	145.6	212.5	567.7
10. Gas Exports - Imports	29.8	0.0	0.0	228.7
11. Coal Consumption	14.2	6.8	4.2	5.8
12. Coal Production	0.7	1.4	2.9	5.8
13. Coal Exports - Imports	-13.5	-5.3	-1.3	0.0
14. Renewables, Electric	5.0	12.5	25.0	27.6
15. Nuclear Energy	0.0	0.0	0.0	0.0
16. Renewables, Nonelectric	0.0	12.3	22.1	12.7
17. Electricity Generation Terawatt Hours (TWh)	320.8	598.3	821.8	1146.9
18. Carbon Emissions Million Tons (MtC)	298.0	209.3	267.6	440.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):
2000 = 54.6; 2010 = 100.7; 2020 = 100.7.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Western Europe (OECD)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.2	156.8	192.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1447.9	1290.8	1371.5	1473.4
4. Total Production	881.8	922.3	903.9	737.8
5. Oil Consumption	615.2	532.8	512.5	496.2
6. Oil Production	205.1	164.3	51.3	25.6
7. Oil Exports - Imports	-410.2	-368.5	-461.2	-470.6
8. Natural Gas Consumption	235.4	222.9	267.0	362.2
9. Natural Gas Production	158.0	222.9	267.0	133.5
10. Gas Exports - Imports	-77.4	0.0	0.0	-228.7
11. Coal Consumption	313.2	117.3	65.1	65.6
12. Coal Production	234.6	117.3	58.7	29.3
13. Coal Exports - Imports	-78.6	0.0	-6.5	-36.3
14. Renewables, Electric	103.7	198.9	254.7	276.8
15. Nuclear Energy	180.4	193.0	218.2	218.2
16. Renewables, Nonelectric	0.0	25.9	54.1	54.4
17. Electricity Generation Terawatt Hours (TWh)	2263.6	2370.5	2796.3	3298.2
18. Carbon Emissions Million Tons (MtC)	942.5	619.3	609.4	650.5
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):

2000 = 55.0; 2010 = 21.3; 2020 = 21.3

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: North America (OECDN)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	128.2	156.8	192.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2179.3	2047.6	2082.0	2188.5
4. Total Production	1896.7	1773.6	1512.2	1561.9
5. Oil Consumption	875.3	829.3	759.9	719.1
6. Oil Production	518.9	503.2	133.6	66.8
7. Oil Exports - Imports	-356.4	-326.1	-626.2	-652.3
8. Natural Gas Consumption	503.0	414.1	494.4	563.6
9. Natural Gas Production	503.0	414.1	494.4	563.6
10. Gas Exports - Imports	0.0	0.0	0.0	0.0
11. Coal Consumption	502.0	235.7	87.5	46.2
12. Coal Production	575.8	287.9	143.9	72.0
13. Coal Exports - Imports	73.8	52.2	56.4	25.8
14. Renewables, Electric	141.9	337.0	417.8	461.2
15. Nuclear Energy	157.5	164.0	174.4	174.4
16. Renewables, Nonelectric	0.0	67.5	148.0	224.0
17. Electricity Generation Terawatt Hours (TWh)	3456.6	3821.0	4229.2	4792.7
18. Carbon Emissions Million Tons (MtC)	1509.8	932.8	778.7	738.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):
2000 = 210.0; 2010 = 204.6; 2020 = 209.5.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: South & East Asia (SEASI)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
 "Global Energy System and CO2 Emissions Control Policies", June
 1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	153.0	225.1	334.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	509.6	568.4	700.4	939.2
4. Total Production	413.8	477.1	506.8	690.6
5. Oil Consumption	246.8	226.6	253.8	289.8
6. Oil Production	152.0	113.1	38.0	19.0
7. Oil Exports - Imports	-94.8	-113.5	-215.8	-270.8
8. Natural Gas Consumption	51.0	82.3	108.0	140.5
9. Natural Gas Production	84.8	104.5	130.2	162.7
10. Gas Exports - Imports	33.8	22.2	22.2	22.2
11. Coal Consumption	155.8	73.4	36.7	39.2
12. Coal Production	121.0	73.4	36.7	39.2
13. Coal Exports - Imports	-34.8	0.0	0.0	0.0
14. Renewables, Electric	35.5	101.1	155.5	250.2
15. Nuclear Energy	20.5	36.6	42.4	42.4
16. Renewables, Nonelectric	0.0	48.4	104.0	177.2
17. Electricity Generation Terawatt Hours (TWh)	673.2	994.0	1247.7	1868.4
18. Carbon Emissions Million Tons (MtC)	384.4	270.0	292.1	342.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (MtC):
 2000 = 33.0; 2010 = 11.0; 2020 = 11.0.

Organization/Project: NE200; New Earth 21 Model, 200\$/tC case

Country/Region: Subsaharan Africa (AFSS)

Reference (including date) of most recent report: Yasumasa Fujii et al.,
"Global Energy System and CO2 Emissions Control Policies", June
1993 (revised March 1994).

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	21.0	21.9	22.3	22.6
2. Real GNP (or GDP) Index 1990 = 100	100.0	144.8	201.8	282.4
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	141.8	150.8	181.8	234.5
4. Total Production	264.0	217.9	165.0	163.6
5. Oil Consumption	50.2	59.1	74.7	95.2
6. Oil Production	140.9	99.0	39.3	17.6
7. Oil Exports - Imports	90.7	39.9	-35.4	-77.6
8. Natural Gas Consumption	3.5	13.9	9.5	8.8
9. Natural Gas Production	3.5	13.9	9.5	8.8
10. Gas Exports - Imports	0.0	0.0	0.0	0.0
11. Coal Consumption	73.8	25.4	7.7	6.6
12. Coal Production	105.3	52.7	26.3	13.2
13. Coal Exports - Imports	31.5	27.2	18.6	6.6
14. Renewables, Electric	11.6	32.0	42.7	60.9
15. Nuclear Energy	2.7	2.7	2.7	2.7
16. Renewables, Nonelectric	0.0	17.6	44.4	60.4
17. Electricity Generation Terawatt Hours (TWh)	241.7	298.9	359.8	474.5
18. Carbon Emissions Million Tons (MtC)	115.9	55.6	57.5	86.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	200.0	200.0	200.0

Notes:

Carbon dioxide recovery and disposal (Mtc):
2000 = 25.4; 2010 = 16.1; 2020 = 2.5.

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: OECDN (OECDN)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	119.4	145.0	176.3
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2071.6	2035.9	2152.8	2361.2
4. Total Production	1824.3	1764.1	1781.0	1853.9
5. Oil Consumption	877.5	822.3	840.5	894.5
6. Oil Production	536.4	476.6	398.5	318.2
7. Oil Exports - Imports	-347.6	-348.2	-444.5	-579.0
8. Natural Gas Consumption	448.9	433.1	420.8	412.7
9. Natural Gas Production	462.8	436.9	424.5	416.3
10. Gas Exports - Imports	1.5	-8.2	-8.0	-7.8
11. Coal Consumption	509.2	510.6	546.6	606.0
12. Coal Production	589.1	580.7	613.2	671.5
13. Coal Exports - Imports	67.4	64.6	57.4	53.0
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	3226.2	3564.9	4175.8	5005.4
18. Carbon Emissions Million Tons (MtC)	1512.8	1462.0	1508.8	1614.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	101.5	151.2	200.9

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: OECDE (OECDE)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	120.3	156.4	207.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1316.7	1445.4	1462.1	1519.5
4. Total Production	754.5	845.2	809.2	748.0
5. Oil Consumption	611.1	624.7	600.1	595.6
6. Oil Production	201.6	216.7	199.4	132.8
7. Oil Exports - Imports	-411.6	-409.8	-402.5	-464.6
8. Natural Gas Consumption	218.6	313.8	359.9	394.2
9. Natural Gas Production	153.5	178.7	164.8	144.0
10. Gas Exports - Imports	-63.4	-132.6	-192.2	-247.1
11. Coal Consumption	251.3	234.4	207.2	190.5
12. Coal Production	163.8	177.2	150.0	132.1
13. Coal Exports - Imports	-89.0	-81.2	-71.8	-66.0
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	2129.3	2409.5	2544.8	2858.5
18. Carbon Emissions Million Tons (MtC)	899.6	955.0	937.0	939.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	63.1	94.1	125.0

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: OECDP (OECDP)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	140.3	204.3	293.7
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	529.2	580.8	585.5	602.4
4. Total Production	227.4	260.3	315.1	347.8
5. Oil Consumption	280.9	293.9	273.6	286.2
6. Oil Production	30.6	23.6	15.6	10.0
7. Oil Exports - Imports	-253.5	-271.1	-258.9	-277.1
8. Natural Gas Consumption	61.5	83.1	70.9	77.6
9. Natural Gas Production	22.5	24.3	21.8	22.4
10. Gas Exports - Imports	-39.3	-59.2	-49.5	-55.6
11. Coal Consumption	119.3	100.5	73.2	79.4
12. Coal Production	106.8	108.9	109.9	156.2
13. Coal Exports - Imports	-15.5	-12.3	27.8	78.2
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	917.5	1065.2	1042.3	975.1
18. Carbon Emissions Million Tons (MtC)	503.7	524.2	509.3	544.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	57.0	84.9	112.8

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: OECD (A4)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	123.6	159.7	208.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	3917.5	4062.1	4200.4	4483.1
4. Total Production	2806.3	2869.6	2905.3	2949.7
5. Oil Consumption	1769.5	1740.8	1714.2	1776.2
6. Oil Production	768.7	717.0	613.4	460.9
7. Oil Exports - Imports	-1012.7	-1029.1	-1105.9	-1320.7
8. Natural Gas Consumption	728.9	830.0	851.6	884.5
9. Natural Gas Production	638.7	639.9	611.1	582.8
10. Gas Exports - Imports	-101.2	-200.0	-249.6	-310.5
11. Coal Consumption	879.8	845.5	827.0	875.9
12. Coal Production	859.6	866.8	873.1	959.7
13. Coal Exports - Imports	-37.0	-28.9	13.4	65.2
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	6272.9	7039.6	7762.9	8839.0
18. Carbon Emissions Million Tons (MtC)	2916.1	2941.2	2955.1	3097.4
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

15: Includes hydro, nuclear, and others

19: Different reduction costs apply to different OECD subregions.

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: OPEC (A5)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	135.3	197.8	286.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	345.1	432.4	554.1	719.9
4. Total Production	1413.4	1738.2	2212.1	2895.2
5. Oil Consumption	213.7	254.5	293.9	342.6
6. Oil Production	1223.7	1432.7	1760.1	2226.5
7. Oil Exports - Imports	996.0	1178.2	1466.2	1883.9
8. Natural Gas Consumption	121.2	164.0	239.7	347.3
9. Natural Gas Production	176.8	288.1	426.4	631.2
10. Gas Exports - Imports	53.5	121.2	182.4	277.7
11. Coal Consumption	4.8	6.5	9.5	13.7
12. Coal Production	7.4	10.0	14.7	21.2
13. Coal Exports - Imports	2.6	3.5	5.1	7.4
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	23.7	32.4	47.9	70.9
18. Carbon Emissions Million Tons (MtC)	253.4	315.0	397.4	508.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: NODC (A6)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	138.8	205.6	304.1
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	1107.4	1488.6	2071.2	2785.3
4. Total Production	1016.4	1281.3	1600.2	2040.3
5. Oil Consumption	571.9	747.2	973.2	1161.1
6. Oil Production	499.3	573.6	567.5	535.3
7. Oil Exports - Imports	-83.5	-177.3	-410.5	-631.7
8. Natural Gas Consumption	110.6	153.5	227.4	336.4
9. Natural Gas Production	118.2	155.9	215.4	296.3
10. Gas Exports - Imports	7.4	2.1	-12.3	-40.6
11. Coal Consumption	333.8	463.3	686.3	1015.0
12. Coal Production	307.8	427.2	632.9	936.0
13. Coal Exports - Imports	-25.1	-34.9	-51.7	-76.5
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	396.3	541.3	801.3	1186.1
18. Carbon Emissions Million Tons (MtC)	878.3	1182.5	1646.7	2217.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: FCPEs (A3)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	103.4	147.6	208.7
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	2411.7	2442.7	2854.1	3350.6
4. Total Production	2601.0	2597.0	3035.0	3551.9
5. Oil Consumption	606.0	506.3	554.5	599.1
6. Oil Production	718.8	534.6	604.8	667.5
7. Oil Exports - Imports	109.9	28.2	50.2	68.4
8. Natural Gas Consumption	590.5	638.7	803.3	1014.6
9. Natural Gas Production	637.0	735.7	933.3	1182.6
10. Gas Exports - Imports	43.4	97.0	130.0	168.1
11. Coal Consumption	1112.6	1153.0	1292.3	1449.1
12. Coal Production	1142.7	1182.1	1292.9	1414.0
13. Coal Exports - Imports	29.4	29.1	0.6	-35.1
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	445.8	628.9	887.1	1251.3
18. Carbon Emissions Million Tons (MtC)	2008.4	1997.9	2278.7	2601.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

15: Includes hydro, nuclear, and others

Organization/Project: OWRED; OPEC World Energy Model (OWEM),
Varying-Cutoff Reduction Case

Country/Region: World (A8)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.8	17.8	20.9	24.9
2. Real GNP (or GDP) Index 1990 = 100	100.0	124.4	167.1	225.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	7781.7	8425.8	9679.8	11338.8
4. Total Production	7837.1	8486.1	9752.6	11437.2
5. Oil Consumption	3161.1	3248.9	3535.8	3879.1
6. Oil Production	3210.5	3257.8	3545.8	3890.2
7. Oil Exports - Imports	9.7	0.0	0.0	0.0
8. Natural Gas Consumption	1551.2	1786.2	2122.0	2582.8
9. Natural Gas Production	1570.7	1819.6	2186.3	2692.8
10. Gas Exports - Imports	3.2	20.3	50.5	94.7
11. Coal Consumption	2330.9	2468.3	2815.1	3353.8
12. Coal Production	2317.5	2486.3	2813.6	3330.9
13. Coal Exports - Imports	-30.2	-31.2	-32.6	-39.0
14. Renewables, Electric				
15. Nuclear Energy				
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	7138.8	8242.1	9499.1	11347.2
18. Carbon Emissions Million Tons (MtC)	6056.2	6436.6	7277.9	8424.9
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

15: Includes hydro, nuclear, and others

19: Different reduction costs apply to different world regions.

Organization/Project: PN200; Paul Scherrer Institute, Nuclear Available,
Double Oil Price, 200\$/tC.

Country/Region: Switzerland (SWISS)

Reference (including date) of most recent report: MARKAL-MACRO runs for
Switzerland. Swiss country study submitted to the CHALLENGE
project, September 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	30.0	40.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	114.4	131.3	152.2
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	28.4	30.4	31.7	34.5
4. Total Production	14.0	16.0	17.8	20.7
5. Oil Consumption	12.2	10.0	8.7	7.9
6. Oil Production				
7. Oil Exports - Imports	-12.2	-10.0	-8.7	-7.9
8. Natural Gas Consumption	1.8	3.9	4.5	5.1
9. Natural Gas Production				
10. Gas Exports - Imports	-1.8	-3.9	-4.5	-5.1
11. Coal Consumption	0.4	0.5	0.6	0.8
12. Coal Production				
13. Coal Exports - Imports	-0.4	-0.5	-0.6	-0.8
14. Renewables, Electric	7.7	8.1	8.5	8.3
15. Nuclear Energy	5.3	6.9	8.3	11.2
16. Renewables, Nonelectric	1.0	1.0	1.0	1.2
17. Electricity Generation Terawatt Hours (TWh)	59.4	68.2	76.0	87.6
18. Carbon Emissions Million Tons (MtC)	11.7	11.2	10.7	10.6
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	100.0	200.0	200.0

Organization/Project: PS200; Paul Scherrer Institute, Nuclear Moratorium,
Double Oil Price, \$200/tC.

Country/Region: Switzerland (SWISS)

Reference (including date) of most recent report: MARKAL-MACRO runs for
Switzerland. Swiss country study submitted to the CHALLENGE
project, September 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	30.0	40.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	114.4	131.1	151.6
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	28.4	30.4	30.6	31.6
4. Total Production	14.0	16.0	16.6	17.4
5. Oil Consumption	12.2	10.0	8.7	7.7
6. Oil Production	0.0	0.0	0.0	0.0
7. Oil Exports - Imports	-12.2	-10.0	-8.7	-7.7
8. Natural Gas Consumption	1.8	4.0	4.8	6.0
9. Natural Gas Production	0.0	0.0	0.0	0.0
10. Gas Exports - Imports	-1.8	-4.0	-4.8	-6.0
11. Coal Consumption	0.4	0.4	0.5	0.5
12. Coal Production	0.0	0.0	0.0	0.0
13. Coal Exports - Imports	-0.4	-0.4	-0.5	-0.5
14. Renewables, Electric	7.7	8.1	8.7	9.3
15. Nuclear Energy	5.3	6.9	6.9	6.9
16. Renewables, Nonelectric	1.0	1.0	1.0	1.2
17. Electricity Generation Terawatt Hours (TWh)	59.4	68.6	72.4	79.7
18. Carbon Emissions Million Tons (MtC)	11.7	11.2	10.7	10.7
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	10.0	200.0	200.0

Organization/Project: TEM25; Tata Energy Research Institute, Reductions in CO2 Emissions

Country/Region: India (INDIA)

Reference (including date) of most recent report: TERI Energy Economy Evaluation and Simulation (TEESE) Model, August 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	22.8	26.5	26.5	28.5
2. Real GNP (or GDP) Index 1990 = 100	100.0	188.6	327.2	656.9
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	119.3	216.6	334.1	451.7
4. Total Production	152.7	276.9	352.6	483.0
5. Oil Consumption	51.9	80.0	131.5	133.1
6. Oil Production	34.1	50.0	70.5	80.0
7. Oil Exports - Imports	-19.5	-30.0	-61.0	-53.1
8. Natural Gas Consumption	5.3	39.4	54.8	64.4
9. Natural Gas Production	14.6	39.4	54.8	64.4
10. Gas Exports - Imports	9.3	0.0	0.0	0.0
11. Coal Consumption	100.5	88.7	132.6	233.8
12. Coal Production	98.5	176.7	212.5	318.2
13. Coal Exports - Imports	-2.0	88.0	79.9	84.4
14. Renewables, Electric	5.9	8.0	11.4	13.0
15. Nuclear Energy	0.6	2.8	3.4	5.4
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	268.0	422.0	574.0	1029.0
18. Carbon Emissions Million Tons (MtC)	159.9	194.7	275.8	452.1
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0	628.9	79.4	521.7

Notes:

2000 = 10% reduction; 2010 = 12.5% reduction; 2020 = 25% reduction.

Organization/Project: TERED; Tata Energy Research Institute

Country/Region: India, Base Case (INDIA)

Reference (including date) of most recent report: TERI Energy Economy Evaluation and Simulation (TEESE) Model, June 1995.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	16.2		16.2	
2. Real GNP (or GDP) Index 1990 = 100	100.0		290.0	
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	212.0		481.0	
4. Total Production	192.0		392.0	
5. Oil Consumption	54.0		132.0	
6. Oil Production	33.0		47.0	
7. Oil Exports - Imports	-26.7		-109.0	
8. Natural Gas Consumption	10.7		32.6	
9. Natural Gas Production	14.9		30.3	
10. Gas Exports - Imports	0.0		-2.3	
11. Coal Consumption	138.8		292.0	
12. Coal Production	137.5		286.0	
13. Coal Exports - Imports	-1.3		-6.0	
14. Renewables, Electric				
15. Nuclear Energy	0.5		0.8	
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	289.0		856.0	
18. Carbon Emissions Million Tons (MtC)	178.5		385.0	
19. Marginal Reduction Costs 1990 \$ per ton of carbon	0.0		58.0	

Notes:

10. Imbalance due to flaring.

Organization/Project: TS200; INET/ITEESA, Tsinghua University, Beijing,
200\$/tC case

Country/Region: China (A2)

Reference (including date) of most recent report: Submitted to CHALLENGE,
September 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	20.0	20.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	216.0	405.0	690.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	690.0	994.0	1350.0	1670.0
4. Total Production	722.0	1020.0	1313.0	1559.0
5. Oil Consumption	117.3	170.0	218.0	260.0
6. Oil Production	138.3	180.0	210.0	220.0
7. Oil Exports - Imports	21.0	10.0	-8.0	-40.0
8. Natural Gas Consumption	14.2	30.0	114.0	185.0
9. Natural Gas Production	14.2	30.0	65.0	98.0
10. Gas Exports - Imports	0.0	0.0	-49.0	-87.0
11. Coal Consumption	529.2	705.0	876.0	1014.0
12. Coal Production	544.2	730.0	896.0	1030.0
13. Coal Exports - Imports	15.0	25.0	20.0	16.0
14. Renewables, Electric	29.0	78.0	110.0	143.0
15. Nuclear Energy	0.0	10.0	30.0	63.0
16. Renewables, Nonelectric	0.2	0.5	2.0	5.0
17. Electricity Generation Terawatt Hours (TWh)	623.0	1425.0	2300.0	3260.0
18. Carbon Emissions Million Tons (MtC)	639.0	868.0	1130.0	1345.0
19. Marginal Reduction Costs 1990 \$ per ton of carbon			200.0	200.0

Organization/Project: VEME1; Veiki, 100\$/tC carbon tax in the year 2010

Country/Region: Hungary (HNGRY)

Reference (including date) of most recent report: Submitted to CHALLENGE, February 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	130.0	220.0	370.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	29.7	30.2	33.7	38.8
4. Total Production	14.1	12.8	11.9	14.3
5. Oil Consumption	8.2	10.2	10.6	11.2
6. Oil Production	1.9	1.8	1.3	1.0
7. Oil Exports - Imports	-6.3	-8.4	-9.3	-10.2
8. Natural Gas Consumption	8.9	10.4	12.5	13.1
9. Natural Gas Production	3.7	3.2	2.4	1.8
10. Gas Exports - Imports	-5.2	-7.2	-10.1	-11.3
11. Coal Consumption	6.6	5.8	4.8	5.0
12. Coal Production	5.1	4.1	2.4	2.2
13. Coal Exports - Imports	-1.5	-1.6	-2.4	-2.8
14. Renewables, Electric	0.1	0.1	0.1	0.1
15. Nuclear Energy	3.3	3.5	5.7	9.2
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	39.5	37.0	47.1	60.0
18. Carbon Emissions Million Tons (MtC)	21.6	23.4	24.0	25.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

19. Carbon tax only applied in the power sector

Organization/Project: VEME2; Veiki, 200\$/tC carbon tax in the year 2010

Country/Region: Hungary (HNGRY)

Reference (including date) of most recent report: Submitted to CHALLENGE, February 1993.

	1990	2000	2010	2020
1. International Crude Oil Price 1990 \$ per barrel	20.0	20.0	30.0	40.0
2. Real GNP (or GDP) Index 1990 = 100	100.0	130.0	220.0	370.0
Primary Commercial Energy, Million Tons of Oil Equivalent				
3. Total Consumption	29.7	30.2	34.2	39.3
4. Total Production	14.1	12.8	14.5	16.9
5. Oil Consumption	8.2	10.1	9.6	10.2
6. Oil Production	1.9	1.8	1.3	1.0
7. Oil Exports - Imports	-6.3	-8.3	-8.3	-9.2
8. Natural Gas Consumption	8.9	10.4	12.5	13.1
9. Natural Gas Production	3.7	3.2	2.4	1.8
10. Gas Exports - Imports	-5.2	-7.2	-10.1	-11.3
11. Coal Consumption	6.6	5.8	3.6	3.9
12. Coal Production	5.1	4.1	2.4	2.2
13. Coal Exports - Imports	-1.5	-1.7	-1.2	-1.7
14. Renewables, Electric	0.1	0.1	0.1	0.1
15. Nuclear Energy	3.3	3.5	8.3	11.8
16. Renewables, Nonelectric				
17. Electricity Generation Terawatt Hours (TWh)	39.5	37.0	47.1	60.0
18. Carbon Emissions Million Tons (MtC)	21.6	23.4	21.8	23.2
19. Marginal Reduction Costs 1990 \$ per ton of carbon				

Notes:

19. Carbon tax only applied in the power sector