Table 54. Air Travel Energy Use

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fuel Cost (1987 dollars per million Btu)	4.5	6.1	8.5	8.7	7.1	7.0	6.7	6.5	6.6	6.6	6.5	6.6	6.6	6.7
Yield-domestic (ticket price) 1/	10.9	10.4	11.0	10.8	10.1	9.8	9.4	9.1	8.8	8.5	8.2	7.9	7.7	7.4
Yield-international (1996 dollars) 1/	9.0	9.2	9.1	8.8	8.3	8.0	7.8	7.5	7.2	7.0	6.8	6.5	6.3	6.1
Travel Demand (billion miles)														
Revenue Passenger Miles, Domestic	465.4	493.3	491.5	495.2	503.5	520.9	538.9	561.8	582.7	594.4	605.7	618.1	629.9	641.3
Load Factor, Domestic 2/	0.73	0.75	0.75	0.75	0.75	0.76	0.76	0.76	0.76	0.77	0.77	0.77	0.77	0.78
Revenue Passenger Miles, International	155.1	174.3	189.7	205.4	219.1	233.9	249.1	264.1	278.8	287.2	295.4	302.5	310.4	318.9
Load Factor, International 2/	0.75	0.78	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Revenue Ton Miles, Freight (billion)	27.4	29.4	29.3	31.6	35.4	36.4	37.9	40.4	43.2	46.2	49.2	52.2	55.2	58.6
Seat Miles Demanded (billion)	919.4	980.3	990.1	1015.3	1046.3	1091.7	1138.6	1192.4	1240.5	1266.3	1291.0	1315.6	1340.2	1365.0
Narrow Body Aircraft	564.1	600.7	597.7	605.4	618.9	642.4	666.8	697.0	723.3	737.8	751.6	766.4	780.7	794.6
Wide Body Aircraft	261.2	296.2	308.5	324.0	337.7	355.0	372.7	390.4	405.9	413.6	420.8	426.6	433.2	439.3
Regional Jets	94.1	83.4	83.9	85.9	89.7	94.3	99.2	105.0	111.3	115.0	118.6	122.6	126.4	131.1
Aircraft Sales														
Narrow Body Aircraft	98.0	125.0	205.0	211.5	214.3	214.5	210.4	201.5	194.0	195.0	197.1	200.9	205.6	211.6
Wide Body Aircraft	30.0	18.0	53.3	55.5	56.7	57.3	56.6	54.7	53.1	53.9	54.9	56.4	58.2	60.4
Regional Jets	303.0	286.0	151.7	156.0	157.6	157.3	153.7	146.8	140.9	141.2	142.2	144.5	147.4	151.2
Total Aircraft Sales	431.0	429.0	410.1	423.0	428.5	429.1	420.7	402.9	388.1	390.0	394.3	401.7	411.3	423.2
Aircraft Stock														
Narrow Body Aircraft	4894.0	4822.0	5063.8	5132.4	5206.3	5282.9	5358.0	5426.6	5489.3	5554.0	5619.5	5687.1	5761.1	5844.5
Wide Body Aircraft	1394.0	1381.0	1387.3	1400.8	1412.8	1422.8	1429.6	1432.4	1433.3	1435.3	1439.5	1445.7	1454.6	1466.7
Regional Jets	1586.0	1843.0	1435.9	1585.3	1735.3	1883.9	2027.9	2163.8	2292.4	2419.9	2547.6	2676.0	2805.4	2936.3
Total Aircraft Stock	7874.0	8046.0	7887.0	8118.5	8354.3	8589.6	8815.6	9022.7	9215.0	9409.2	9606.7	9808.8	10021.0	10247.5
Aircraft Active Stock														
Narrow Body Aircraft	4065.0	3876.0	3830.4	3846.9	3895.7	4000.8	4109.1	4248.1	4363.4	4411.9	4456.1	4497.2	4514.5	4533.4
Wide Body Aircraft	1090.0	712.0	735.8	766.4	792.4	826.4	860.6	894.4	922.8	932.9	941.9	947.7	955.0	961.3
Regional Jets	1530.0	1200.0	1307.4	1423.6	1537.6	1645.7	1744.0	1828.5	1899.7	1962.7	2017.9	2065.8	2107.0	2142.2
Total Active Stock	6685.0	5788.0	5873.5	6037.0	6225.8	6473.0	6713.7	6971.0	7185.9	7307.4	7415.8	7510.8	7576.5	7637.0
Aircraft Parked Stock														
Narrow Body Aircraft	829.0	577.0	61.9	121.9	161.4	165.0	158.6	112.8	63.4	60.0	30.6	0.0	0.0	0.0
Wide Body Aircraft	304.0	237.0	121.4	102.5	89.5	75.5	60.1	49.0	41.8	51.2	65.1	77.6	94.8	118.3
Regional Jets	56.0	90.0	128.6	161.6	197.6	238.2	283.9	335.3	392.7	457.2	529.7	610.2	698.4	794.1
Total Parked Stock	1189.0	904.0	311.9	386.1	448.5	478.6	502.6	497.0	497.9	568.4	625.5	687.7	793.2	912.4
Aircraft Cargo Stock														
Narrow Body Aircraft	537.0	549.0	1171.4	1163.6	1149.1	1117.1	1090.4	1065.7	1062.6	1082.1	1132.9	1189.9	1246.6	1311.1
Wide Body Aircraft	430.0	424.0	530.2	531.8	530.9	520.9	508.9	489.0	468.6	451.3	432.5	420.4	404.7	387.0
Total Cargo Stock	967.0	973.0	1701.6	1695.5	1680.0	1638.0	1599.2	1554.8	1531.2	1533.4	1565.4	1610.3	1651.3	1698.1

Table 54. Air Travel Energy Use

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Advanced Technology Penetration														
Ultra-high Bypass	0.00	0.00	0.00	0.00	0.00	0.22	0.32	0.43	0.62	0.77	0.87	0.93	0.97	0.98
Propfan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thermodynamics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Laminar Flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Advanced Aerodynamics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weight Reducing Materials	0.00	0.00	0.01	0.02	0.04	0.08	0.14	0.25	0.40	0.57	0.73	0.85	0.92	0.96
New Aircraft Efficiency 3/														
Narrow Body Aircraft	64.5	64.9	64.9	65.0	65.2	67.0	68.2	70.0	72.8	75.4	77.5	79.1	80.0	80.5
Wide Body Aircraft	62.9	63.2	63.3	63.4	63.6	65.4	66.6	68.4	71.1	73.7	75.8	77.3	78.2	78.8
Regional Jets	42.5	42.7	42.8	42.9	43.0	44.2	45.0	46.2	48.0	49.7	51.1	52.1	52.7	53.1
Average Aircraft	62.5	58.4	58.0	57.8	57.7	59.0	60.0	61.5	63.8	66.0	67.8	69.0	69.8	70.1
Aircraft Stock Efficiency 3/														
Narrow Body Aircraft	57.6	57.9	58.6	59.3	59.9	60.5	61.0	61.5	62.1	62.8	63.6	64.5	65.5	66.5
Wide Body Aircraft	56.3	56.4	57.8	58.4	59.0	59.7	60.3	60.9	61.6	62.6	63.7	64.8	66.0	67.2
Regional Jets	41.5	41.7	41.6	41.8	41.9	42.1	42.4	42.7	43.0	43.5	44.0	44.5	45.1	45.7
Average Aircraft	55.3	55.5	56.4	57.0	57.5	58.0	58.5	59.0	59.6	60.3	61.1	62.0	63.0	63.9
Fuel Consumption (trillion Btu)														
Commercial														
Jet Fuel	2726.4	2792.1	2780.8	2854.4	2971.2	3056.2	3155.4	3287.4	3413.0	3482.2	3543.3	3599.4	3650.4	3708.4
Aviation Gasoline	30.0	31.0	33.0	29.0	30.1	29.9	29.7	29.6	29.5	29.4	29.4	29.3	29.2	29.2
Military														
Jet Fuel	538.6	562.9	581.1	594.7	599.7	602.2	604.1	605.8	609.2	612.6	615.8	619.2	622.7	626.6

Table 54. Air Travel Energy Use

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2004-2030
Fuel Cost (1987 dollars per million Btu)	6.7	6.9	6.9	7.0	7.1	7.2	7.2	7.2	7.3	7.4	7.5	7.6	7.7	7.7	0.9%
Yield-domestic (ticket price) 1/	7.1	6.9	6.6	6.4	6.3	6.3	6.3	6.3	6.3	6.2	6.2	6.2	6.2	6.1	-2.0%
Yield-international (1996 dollars) 1/	5.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.5	-1.9%
Travel Demand (billion miles)															
Revenue Passenger Miles, Domestic	652.2	662.4	671.1	671.8	672.2	672.6	673.0	673.6	674.4	675.4	676.8	678.4	680.4	682.8	1.3%
Load Factor, Domestic 2/	0.78	0.78	0.78	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.81	0.81	0.81	0.81	0.3%
Revenue Passenger Miles, International	328.2	338.6	350.7	360.4	370.6	380.9	391.2	401.5	411.7	421.7	431.6	441.4	450.9	460.2	3.8%
Load Factor, International 2/	0.79	0.79	0.79	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.1%
Revenue Ton Miles, Freight (billion)	62.6	66.0	68.8	71.6	74.4	77.1	79.9	82.8	85.7	88.7	91.8	94.9	98.3	101.7	4.9%
Seat Miles Demanded (billion)	1390.1	1415.5	1441.0	1451.8	1462.7	1473.7	1484.7	1495.8	1506.9	1518.7	1530.6	1542.6	1554.8	1567.1	1.8%
Narrow Body Aircraft	808.2	821.2	833.0	835.4	837.5	839.0	841.1	843.4	845.9	848.6	851.6	854.9	858.6	862.5	1.4%
Wide Body Aircraft	447.2	455.9	466.4	472.3	479.6	487.6	495.0	504.3	513.4	522.2	530.9	539.3	547.6	555.5	2.4%
Regional Jets	134.8	138.3	141.6	144.2	145.6	147.1	148.5	148.1	147.7	147.8	148.1	148.3	148.7	149.1	2.3%
Aircraft Sales															
Narrow Body Aircraft	217.8	222.2	222.7	229.1	235.0	240.8	246.8	253.3	260.3	267.2	273.6	279.0	284.9	290.8	3.3%
Wide Body Aircraft	62.7	64.4	65.1	67.5	69.8	72.1	74.4	77.0	79.7	82.4	85.0	87.4	89.8	93.1	6.5%
Regional Jets	155.2	157.7	157.6	161.6	165.2	168.7	172.4	176.3	180.6	184.8	188.6	191.7	195.0	197.8	-1.4%
Total Aircraft Sales	435.6	444.3	445.4	458.3	470.1	481.6	493.6	506.6	520.5	534.4	547.1	558.1	569.8	581.6	1.2%
Aircraft Stock															
Narrow Body Aircraft	5934.7	6024.7	6110.0	6196.0	6283.3	6372.3	6463.8	6558.5	6656.9	6760.3	6869.2	6981.4	7098.5	7218.1	1.6%
Wide Body Aircraft	1480.7	1495.7	1510.6	1528.1	1549.0	1573.2	1599.9	1630.1	1662.9	1698.0	1734.9	1773.0	1813.1	1855.1	1.1%
Regional Jets	3068.8	3201.2	3330.5	3460.7	3591.1	3721.2	3850.8	3980.0	4108.8	4236.7	4363.2	4487.2	4608.8	4726.8	3.7%
Total Aircraft Stock	10484.2	10721.6	10951.1	11184.8	11423.4	11666.7	11914.6	12168.6	12428.6	12695.0	12967.3	13241.7	13520.4	13800.1	2.1%
Aircraft Active Stock															
Narrow Body Aircraft	4564.3	4603.6	4684.3	4680.6	4660.2	4637.2	4617.6	4599.0	4581.7	4565.7	4551.0	4537.8	4526.1	4515.7	0.6%
Wide Body Aircraft	971.2	982.9	998.1	1007.4	1018.9	1033.7	1051.7	1072.3	1095.1	1120.1	1147.5	1177.4	1209.9	1245.4	2.2%
Regional Jets	2171.7	2194.7	2209.4	2220.9	2230.2	2238.6	2247.9	2259.9	2276.2	2297.5	2323.9	2354.7	2389.7	2427.7	2.7%
Total Active Stock	7707.2	7781.2	7891.9	7908.9	7909.3	7909.5	7917.3	7931.3	7953.0	7983.3	8022.4	8069.9	8125.7	8188.9	1.3%
Aircraft Parked Stock															
Narrow Body Aircraft	0.0	0.0	0.0	117.2	266.9	436.2	606.2	728.4	786.5	828.9	851.7	928.9	1020.0	1114.7	2.6%
Wide Body Aircraft	136.2	148.0	158.9	189.8	223.4	254.8	278.9	296.6	300.8	301.0	306.7	319.7	328.2	332.7	1.3%
Regional Jets	897.1	1006.5	1121.1	1239.8	1360.9	1482.6	1602.9	1720.1	1832.6	1939.2	2039.2	2132.6	2219.1	2299.2	13.3%
Total Parked Stock	1033.3	1154.5	1280.0	1546.8	1851.2	2173.7	2488.0	2745.1	2919.9	3069.1	3197.7	3381.2	3567.3	3746.6	5.6%
Aircraft Cargo Stock															
Narrow Body Aircraft	1370.4	1421.2	1425.6	1398.2	1356.2	1298.9	1240.0	1231.1	1288.7	1365.7	1466.4	1514.7	1552.4	1587.6	4.2%
Wide Body Aircraft	373.2	364.7	353.6	330.9	306.7	284.6	269.3	261.1	267.0	276.9	280.8	275.9	274.9	277.0	-1.6%
Total Cargo Stock	1743.6	1785.9	1779.2	1729.1	1662.9	1583.5	1509.3	1492.1	1555.7	1642.6	1747.2	1790.6	1827.3	1864.6	2.5%

Table 54. Air Travel Energy Use

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2004-2030
Advanced Technology Penetration															
Ultra-high Bypass	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	26.0%
Propfan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Thermodynamics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Hybrid Laminar Flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Advanced Aerodynamics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Weight Reducing Materials	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	22.6%
New Aircraft Efficiency 3/															
Narrow Body Aircraft	80.8	80.9	81.0	81.0	81.0	81.1	81.1	81.1	81.1	81.1	81.1	81.1	81.1	81.2	0.9%
Wide Body Aircraft	79.0	79.2	79.3	79.4	79.4	79.4	79.5	79.5	79.5	79.5	79.5	79.5	79.6	79.6	0.9%
Regional Jets	53.2	53.3	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	0.9%
Average Aircraft	70.3	70.4	70.6	70.6	70.6	70.5	70.5	70.5	70.4	70.4	70.3	70.3	70.2	70.1	0.7%
Aircraft Stock Efficiency 3/															
Narrow Body Aircraft	67.5	68.5	69.3	70.4	71.4	72.5	73.5	74.6	75.7	76.8	77.8	78.8	79.6	80.1	1.3%
Wide Body Aircraft	68.3	69.4	70.4	71.5	72.6	73.6	74.6	75.5	76.3	77.1	77.7	78.3	78.7	79.0	1.3%
Regional Jets	46.3	46.9	47.5	48.1	48.7	49.3	49.9	50.5	51.0	51.5	51.9	52.2	52.5	52.8	0.9%
Average Aircraft	64.8	65.8	66.6	67.6	68.6	69.6	70.5	71.5	72.4	73.4	74.2	75.0	75.6	76.0	1.2%
Fuel Consumption (trillion Btu)															
Commercial															
Jet Fuel	3776.6	3831.6	3878.7	3890.0	3902.6	3914.8	3928.0	3940.8	3955.8	3974.3	3997.6	4028.1	4068.0	4117.7	1.5%
Aviation Gasoline	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	-0.3%
Military															
Jet Fuel	630.8	634.8	638.6	642.1	645.4	648.6	651.6	654.5	657.3	660.0	662.6	665.1	667.6	670.0	0.7%

Table 54. Air Travel Energy Use

1/ Fraction of seats filled.
2/ 1992 cents per passenger mile.
3/ Seat miles per gallon.
Btu = British thermal unit.
N/A = Not applicable.
Sources: 2003 and 2004 derived using: Decision Analysis Corporation of Virginia, NEMS Transportation Sector Model: Model Maintenance Re-Estimation of the AirTravel Demand Model, Subtask 22-1(a), (September 30, 1997); Federal Aviation Administration (FAA), FAA Aviation Forecasts, Fiscal Years 1998-2009, FAA-APO 98-1, and previous editions; United States Department of Transportation (DOT), Research and Special Programs Administration (RSPA), Fuel Cost and Consumption Tables, annual summaries, 1979-1990; U.S. Department of Transportation, RSPA, Air Carrier Financial Statistics Quarterly, December 1999/1998; U.S. Department of Transportation, RSPA, Air Carrier Statistics Monthly, December 1999/1998 (Washington, DC, 1999); Greene, D.L., "Energy Efficiency Improvement Potential of Commercial Aircraft to 2010," ORNL-6622, 6/1990; Rathi, A. B. Peterson, and D. Greene, Air Transport Energy Use Model, Oak Ridge National Laboratory, April 1991, Draft; Energy Information Administration (EIA), State Energy Data Report 2001, DOE/EIA-0214(2001) (Washington, DC, December 2004); Department of Defense, Defense Energy Support Center, Fact Book: Fiscal Year 1999; and EIA, AEO2006 National Energy Modeling System run aeo2006.d111905a. Projections: EIA AEO2006 National Energy Modeling System run aeo2006.d111905a.