

Broadband

Total Additional Investment (per year) (1)	\$10,000,000,000
% Capitalized Labor in Telephone Plant (2)	28%
% Capitalized Labor in Installing Fiber Optic Plant (3)	0.50
\$ Amount of Labor Needed to Implement the Broadband Investment (4)	\$4,450,000,000
Average Total Compensation of Telecom Industry Worker (May 2007) (5)	\$89,326
# Direct Telecommunications Jobs Created from Given BB Investment	49,817
Cost of Capital Equipment to Deploy Broadband at Given Investment Level	\$5,550,000,000
% Amount of Capital Equipment Expense that goes to Labor (Employee Compensation) (6)	35%
\$ Amount towards Labor for Capital Equipment	\$1,936,950,000
Average Total Compensation for Computer and Electronic Products Mfg. Worker (May 2007) (7)	\$93,769
# Jobs Created Directly through Manufacturing of Required Capital Equipment	20,657
(Leakage of Mfg. Jobs Through Imports of Capital Equipment) (8)	(6,817)
# U.S. Jobs Created Directly through Manufacturing of Required Capital Equipment	13,840
Net Direct Jobs	63,657
Employment Multiplier of Communications Industry Jobs (9)	2.52
Indirect and Induced Jobs Created by Direct Telecommunications Jobs Created	125,540
Employment Multiplier of (Communications Equipment) Manufacturing Industry Jobs (10)	2.91
Indirect and Induced Jobs Created by Comm. Equip. Manufacturing Jobs Created	40,274
Net Indirect+Induced Jobs	165,814
Total = Direct+Indirect+Induced	229,471
Network Effect Multiplier	1.17
# Jobs from Network Effect	268,481
Total Additional Jobs Created	497,953

Notes:

- (1) Assumes 75% of broadband investment is allocated to high-speed fiber optic deployment (e.g. FTTH - Fiber to the Home) and 25% of investment goes to phone- or cable-based DSL-level broadband. (Fiber generally has a more intensive labor component than broadband delivered through telephone networks because telephone and cable plant (lines) already exists for the most part and are retrofitted with equipment to provide broadband service.)
- (2) "Telephone plant requirements consist of 28% capitalized labor." - Stephen B. Pociask, TeleNomic Research LLC, "Building a Nationwide Broadband Network: Speeding Job Growth" February 25, 2002, page 5.
- (3) "50% of the cost in deploying fiber optic networks is from labor." - Corning Corporation (2008) See <[lw.pennnet.com/display_article/219598/13/ARTCL/none/none/1/Optimization-of-FTTH-passive-optical-networks-continues](http://www.pennnet.com/display_article/219598/13/ARTCL/none/none/1/Optimization-of-FTTH-passive-optical-networks-continues)>
- (4) Thus, in this model, 55.5% of the cost of deploying broadband networks is in capital equipment, and 44.5% is in labor.
- (5) Source of data: Bureau of Labor Statistics, May 2007. Composition of workforce and cost of labor in the Telecommunications Industry (NAICS 517100)
- (6) Compensation to employees represents 34.9% of the aggregate cost of the "Computer and Electronic Parts" industries according to the Bureau of Economic Statistics.
- (7) Source of data: Bureau of Labor Statistics, 2006. Composition of workforce and cost of labor in the Telecommunications Industry. (NAICS Code 334200)
- (8) A certain number of jobs created through the increased demand for telecommunications and computer equipment needed to deliver broadband will leak out of the economy because they will be filled by computer manufacturing or assembly plants abroad. We estimate that this will be the case with 33.3% of the jobs, based on dividing the total imports of goods by the gross output of manufacturing in 2007.
- (9) The employment multiplier for jobs in the communications industry is 2.52 according to Dr. Josh Bivens' August 2003 report, "Updated Employment Multipliers for the U.S. Economy."
- (10) In his paper, "Updated Employment Multipliers for the U.S. Economy," Josh Bivens finds that, "Each 100 jobs in manufacturing supports 2.91 jobs elsewhere in the economy." (page 1.) While he notes later that, "The computer equipment and office machinery industry has the second highest employment multiplier in the entire manufacturing industry; 905 indirect jobs are supported for each 100 jobs in this sector," he later notes that, "that result should be viewed with some caution." We have elected to use the far more conservative multiplier of 2.91 that Dr. Bivens found for the entire manufacturing industry.
- (11) Crandall, Jackson, and Singer in their study "The Effects of Ubiquitous Broadband Adoption on Investment, Jobs, and the U.S. Economy" find a broadband network effect of 1.17. While network effects do decline with the build out of networks and technology over time, nevertheless, given the fact that 40% of Americans still do not have broadband internet (and many of those that do have slow speeds), we still see significant opportunities for network effects from broadband to be realized.

Health IT

Total Additional Investment (per year)	\$10,000,000,000			
Allocation of Spending by Industry		Hardware	Software	IT Services
% Invested (1)		23.0%	34.2%	42.8%
\$ Invested		\$2,300,000,000	\$3,420,000,000	\$4,280,000,000
Direct Labor Projections				
% Amount of Expense to Labor (2)		35.0%	37.1%	71.2%
\$ Amount of Expense to Labor		\$805,000,000	\$1,268,820,000	\$3,047,360,000
Avg. Annual Wages		\$61,840	\$80,040	\$75,420
Total Cost of Labor (Wages + Benefits) (3)		\$92,513	\$119,740	\$112,828
# Direct Jobs Created		8,702	10,596	27,009
Leakage Due to Imports (4)	(2,898)	(2,898)	0	0
Net Direct Jobs	43,409	5,804	10,596	27,009
Weighted Type I Employment Multiplier (Direct+Indirect)	1.84	2.37	2.21	1.58
Weighted Type II Employment Multiplier (Direct+Indirect+Induced)	3.66	5.18	4.29	3.09
Total = Direct+Indirect	79,891	13,743	23,391	42,758
Total = Direct+Indirect+Induced	159,079	30,039	45,450	83,590
Net Indirect Jobs	36,482			
Net Induced Jobs	79,188			
Network Effect Multiplier	0.33			
# Jobs from Network Effect	53,026			
Total Additional Jobs Created	212,105			

Notes:

(1) US Health Care Industry 2008 Spending on IT Services. Source: Gartner.

(2) From 2006 BEA inputs data, "The Use of Commodities by Industries before Redefinitions, Annual IO Accounts, 2006". Using NAICS codes 334000, 511000, and 514000

(3) Source BLS Employer Costs for Employee Compensation, Supplemental Tables, September 2008 <www.bls.gov/ncs/ect/sp/ecsuptc8.txt>.

(4) Calculated using BEA data as ratio of total import of goods to gross output of manufacturing industry. Assumes leakage only for hardware spending. Assumes imports/exports in software & services cancel each other out.

Smart Grid

Total Additional Investment (per year)	\$10,000,000,000				
Allocation of Spending by Industry (in millions)		Hardware	Software	IT Services	Construction
% Invested (1)		33.9%	22.5%	28.8%	14.8%
\$ Invested		\$3,389	\$2,252	\$2,881	\$1,477
Producer Value Ratio (2)		0.99	0.75	0.90	0.84
Final Demand Multiplier (Type II) (3)		17.87	17.23	22.51	25.06
Net Direct, Indirect and Induced Jobs		60,128	29,187	58,508	31,236
Network Effect Multiplier	0.33				
# Jobs from Network Effect	59,686				
Total Additional Jobs Created	238,746				

Notes:

- (1) Adjusted average projected spending by utilities on domestic goods and services by industry (2009-2013). Source: Energy Insights, an IDC Company. Prepared for IBM.
- (2) Using BEA calculated ratio of gross operating surplus to total industry output from 2006 BEA inputs data, "The Use of Commodities by Industries before Redefinitions, Annual IO Accounts, 2006".
- (3) Using aggregate industry RIMS II Type II (endogenous) final-demand multipliers for construction, computer and electronic product manufacturing, publishing including software, and professional, scientific, and technical services.