NATIONAL RENEWABLE ENERGY LABORATORY

Economic and Fiscal Impacts of NREL on Colorado, FY2009-FY2011

STUDY FUNDED BY:
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TABLE OF CONTENTS

LIST OF TABLES

EXECUTIVE SUMMARY

Established as the Solar Energy Research Institute in 1977, the institute became a national laboratory of the U.S. Department of Energy (DOE) in 1991, changing its name to the National Renewable Energy Laboratory (NREL). The mission and strategic focus of the organization, which is the nation's primary laboratory for renewable energy and energy efficiency research and development, is on advancing the DOE's goals and the nation's energy goals. Scientists and researchers support market objectives to accelerate research from scientific innovations to market-viable alternative energy solutions. NREL's Technology Transfer Office works with private- and public-sector organizations to successfully transfer technologies into commercially viable products and businesses for the marketplace.

NREL is a primary employer in the state of Colorado, bringing in outside investment and paying higher-than-average wages in the state. The laboratory is also one of the largest employers in Jefferson County, contributing scientific research and business services jobs to a robust, diversified local economy. Given the nature of the research and development conducted at the NREL, employment and expenditures represent only a fraction of the benefits to the state, which range from university-laboratory-business collaborations, to spinoff technologies that are commercialized, to the development of localized business clusters.

This study quantifies the economic impacts of NREL on Jefferson County and the state of Colorado. The report details the direct, indirect, and induced economic impacts in terms of output, employment, and income. Primary data were collected from multiple departments within NREL. Data responses were verified and supplemented with interviews with facility administrators.

The net economic benefit of NREL on the state of Colorado totaled $588.3 million in 2009, growing to $742 million in FY2010 and $831.3 million in FY2011. Total (direct, indirect, and induced) employment impacts totaled 4,729 in FY2009, rising to 5,706 in FY2010 and 6,282 in FY2011. The majority of economic benefits are derived from operations, including employment.

More than 69% of workers contribute to core research and development at NREL, while 31% are in business support roles (e.g., general counsel, finance, human resources, etc.). The educational foundation of these workers far exceeds the national average—30.6% have a doctorate; 32.4% have a master's; 32.8%, a bachelor's; and 4.2%, an associate's.

Awarded research contracts, one-time construction expenditures, and visitor impacts provide economic benefit to numerous industries across the state, including the ailing construction industry. Construction expenditures to Colorado companies were significant during the study period—approximately $26.7 million in FY2009, $59.6 million in FY2010, and $69 million in FY2011. The accommodation and food services industry also received a boost via visitors to NREL, with visitor spending ranging between $900,000 and $1.2 million per year.

PURPOSE OF THE STUDY

The Business Research Division (BRD) at the Leeds School of Business was asked by the Alliance for Sustainable Energy, LLC (Alliance), to objectively measure the economic and fiscal impacts of the National Renewable Energy Laboratory (NREL) located in Golden, Colorado, for fiscal years 2009, 2010, and 2011. Alliance manages and operates NREL for the U.S. Department of Energy. This study aligns with the methodology of the 2008 and 2010 economic impact studies for CO-LABS, to which NREL belongs.

METHODOLOGY

This study was conducted in cooperation with the NREL organization. In 2008 and 2010, similar studies with a comparable methodology were conducted of CO-LABS, a consortium of Colorado-based federally funded scientific laboratories, universities, businesses, local governments, and community leaders organized to establish Colorado as a global leader in research, technology, and their commercialization (www.co-labs.org).

In order to obtain information pertinent to the economic impact study, the research team created a survey asking questions about the facility, employment, operating expenditures, and capital expenditures (including construction) for fiscal years 2009, 2010, and 2011. Data were reorganized by function and applied to a 440-sector IMPLAN input-output model. This model quantified the economic and fiscal impacts of NREL. The impacts are summarized in three areas: economic benefits, public revenues, and public costs.

Economic benefits refer to dollars generated and distributed throughout the economy due to the existence of an establishment. *Public revenues* indicate state, county, and local (nonfederal) tax revenues generated due to the existence of an establishment via income taxes, sales taxes, property taxes, and special taxes. *Public costs* refer to the cost of proving government services to the facilities and its employees, both on-site and off-site. Public revenues are included in economic benefits, thus the net economic benefits are the economic benefits minus public costs.

The sources of impacts that sum to economic benefits, public costs, and public revenues include capital expenditures, operating expenditures, off-site employee effects, and secondary effects.

Capital expenditures refer to the purchase or upgrade of equipment, land, or buildings. For this study, capital expenditures are primarily captured through construction, which includes new construction, tenant improvements, and additions. Economic benefits arise from expenditures on materials, architectural and engineering services, and construction labor. The projects inherently generate tax revenues, including sales taxes on materials, impact fees, and property taxes. Public costs derive from providing government services to the property development and construction workers.

Operating expenditures include ongoing costs for materials, maintenance costs, utilities, and salaries and benefits. Direct public revenues are scarce in relation to operations of federal facilities due to their tax-exempt status; however, public costs still exist when providing government services to the facilities (i.e., fire and police protection).

Off-site employee effects take into account the impact of employees incurred outside the workplace. Benefits encompass employee spending, including expenditures on housing (rent or own), retail purchases, transportation, entertainment, and other disposable income expenditures. Public revenues

include sales taxes and property taxes, while public costs include services to respective households. The off-site impacts rest primarily in the county of employee residence rather than in the locale of the facility.

Secondary effects, or the *multiplier effects*, estimate the indirect employment and earnings generated in the study area due to the interindustry relationships between the facility and other industries. As an example, consider a manufacturing company operating in Jefferson County. The firm employs management, engineers, and support staff for its direct manufacturing operations. In addition, the company spends on goods and services to support its manufacturing operations, leading to auxiliary jobs in the community in transportation, accounting, utilities, retail goods, and so on—the *indirect impact*. Furthermore, employees spend earnings on goods and services in the community, leading to jobs in retail, accounting, entertainment, and so on—the *induced impact*.

Conceptually, multipliers quantify the number of jobs. Multipliers are static and do not account for disruptive shifts in infrastructure without specifically addressing infrastructure changes. This model uses IMPLAN multipliers aggregated specifically for Jefferson County and for the state of Colorado. Public revenues and public costs are not tabulated due to the unknown residence dispersion of secondary employees.

ECONOMIC OVERVIEW

The recession had a modest impact on Colorado real GDP, with a contraction of 0.5% in 2009 followed by a 1.4% increase in 2010. The Denver-Aurora-Broomfield MSA real GDP continued to grow during the downturn, adding 0.5% in 2009 and 1.3% in 2010. GDP growth from the Government sector has been strong through the recession. In 2009, the Government sector's contribution to GDP gained 3% statewide and 2.3% in 2010.

Seasonally adjusted Colorado employment began to fall in April 2008, dipping 6.4% before beginning to recover in February 2010. As of August 2011, employment had grown 1.3% from the February 2010 low. Seasonally adjusted growth in the Denver-Aurora-Broomfield MSA experienced similar percentage declines and recoveries. Federal government employment in the state demonstrated a counter-cyclical employment gain during the recession, and has since begun shedding jobs, down 4.8% year-over-year in August. A large spike in federal government employment in 2010 was due to short-term employment related to the Census.

Current unemployment levels for several major Colorado counties are mixed, with no consistent trend. Jefferson County unemployment in August 2011 was 8%, while Denver County reported 9.3% and Boulder County, 6.5%. Adams County reported unemployment of 9.4%; Douglas County, 6.8%; and Arapahoe County, 8.5%.

MODEL INPUT DATA AND ASSUMPTIONS

Construction

NREL reported $47.4 million in construction expenditures in FY2009, $97.4 million in FY2010, and $105 million in FY2011. The construction budget was categorized by hard costs, soft costs (e.g., professional fees, engineering and design fees, environmental testing, and nondirect costs), and labor. NREL estimated 62% of materials and 85% of architectural and engineering services were sourced within the

state of Colorado. The major construction projects included the second phase of NREL's Research Support Facility, adding approximately 150,000 square feet serving 550 staff; the Energy Systems Infrastructure Facility, adding approximately 175,000 square feet with offices and laboratories for 200-250 staff; and the Ingress/Egress project, which included site access roads and entrance buildings for security.

The commercial and institutional buildings multiplier was applied to construction hard costs and labor. The professional, scientific, and technical services multiplier was applied to project soft costs. The facility indicated the percentage of construction expenditures allocated to soft costs, hard costs, and labor.

Operations

Operating expenses were provided for supplies, materials, equipment, training, services, maintenance, printing, and shipping costs. These estimates excluded labor and benefits, awards, travel, rent, utilities, contracted services, and/or construction costs reported elsewhere within the survey. NREL's operating expenditures totaled $35.2 million, $44.0 million, and $50.0 million in fiscal years 2009, 2010, and 2011, respectively. Approximately 90% of these expenditures remained within the state of Colorado and 75% stayed in the Denver Metro region. Jefferson County captured 30% of expenditures. The federal nonmilitary multiplier was applied to facility expenditures.

Lease payments totaled $7.4 million, $7.3 million, and $6.8 million in fiscal years 2009, 2010, and 2011, respectively. Maintenance costs ranged between $2.1 million and $2.9 million. Additionally, utilities were estimated at $2.1 million, $2.2 million, and $3.4 million in the three fiscal years.

Employment

NREL reported a total of 1,799 FTEs in FY2009, growing to 2,027 in FY2010 and 2,131 in FY2011[1] (see Table 1). Salary and benefits averaged $87,586, $97,267, and $93,349 in fiscal years 2009, 2010, and 2011, respectively. Salaries are commensurate with educational level—the highest degrees for employees as of 2010 were doctorates/PhDs (30.6%), master's (32.4%), bachelor's (32.8%), and associate's (4.2%).

TABLE 1: NREL TOTAL EMPLOYMENT, FY2009-FY2011

	FY2009		FY2010		FY2011	
Status	Employment	Compensation[a] (Millions)	Employment	Compensation (Millions)	Employment	Compensation (Millions)
Full-Time	1,353	$148.8	1,575	$187.4	1,624	$191.1
Part-Time	93	7.4	104	8.7	113	6.7
Contract	399	1.3	400	1.0	450	1.0
Total[b]	**1,799**	**$157.5**	**2,027**	**$197.2**	**2,131**	**$198.9**

[a]Compensation includes salary and benefits.
[b]FTEs include full-time, one-half part-time employees, and contract workers.

Occupations

NREL's operations are the work of scientific and support staff. Positions were segmented by the 39 business units within NREL (e.g., National Wind Technology Center, Renewable Fuels and Vehicle Systems, Finance, Office of General Counsel, etc.). Of the full-time, part-time, and temporary positions

[1]Part-time workers were counted as one-half FTE.

working within these units in 2010, approximately 69% were in core research and development, while 31% were employed in business support operations. Core positions include engineers, postdoctoral researchers, IT professionals, and research analysts. Support positions include attorneys, human resources, budgeting, and communications.

Expenditures

Facility expenditures reported from NREL totaled $298.2 million, $377.5 million, and $431.6 million in Colorado in fiscal years 2009, 2010, and 2011, respectively (Table 2). NREL reported operating expenditures, disaggregating lease payments, operating expenditures, employees, maintenance, and utilities by location.

TABLE 2: NREL'S COLORADO EXPENDITURES, IN MILLIONS

Expenditures	FY2009	FY2010	FY2011
Labor	$157.5	$197.2	$198.9
Operating Expenditures	35.2	44	50
Lease Payments	7.4	7.3	6.8
Maintenance Costs	2.1	2.9	2.9
Total Direct Colorado Operations	$202.2	$251.4	$258.6
Construction	26.7	59.6	69.0
Subcontracted Research and Development	69.3	66.5	104
Total Colorado Direct Expenditures	**$298.2**	**$377.5**	**$431.6**

Roughly 40% of NREL's Colorado operating, construction, and contracted research expenditures are spent within Jefferson County (Table 3).

TABLE 3: NREL'S JEFFERSON COUNTY EXPENDITURES, IN MILLIONS

Expenditures	FY2009	FY2010	FY2011
Labor	$85.4	$106.9	$107.8
Operating Expenditures	10.56	13.2	15
Lease Payments	7.4	7.3	6.8
Maintenance Costs	2.1	2.9	2.9
Total Direct Colorado Operations	$105.4	$130.3	$132.5
Construction	2.5	5.6	6.4
Subcontracted Research and Development	20.79	19.95	31.2
Total Colorado Direct Expenditures	**$128.7**	**$155.8**	**$170.1**

Off-site employee effects

NREL provided the total number of employees living in each ZIP code in Colorado in order to assign off-site economic benefits to their respective counties. More than 98.6% of the employees reside in Colorado, 91% live in the Denver Metro region,[2] and 54% live in Jefferson County (Table 4).

[2] Including Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson counties.

TABLE 4: COUNTY RESIDENCES OF NREL EMPLOYEES, 2011

County	Employees	Percentage
Adams	56	3.3%
Arapahoe	55	3.2
Boulder	160	9.4
Broomfield	32	1.9
Denver	272	16.0
Douglas	49	2.9
Jefferson	921	54.2
Denver MSA	1,545	90.9
Colorado	1,675	98.6
Total	**1,699**	**100.0%**

[a]For this calculation, part-time employees are counted as 1.
[b]Denver Metro includes Adams, Arapahoe, Broomfield, Denver, Douglas, and Jefferson counties.

Housing statistics were gathered from the U.S. Census Bureau's 2006-2009 American Community Survey[3] for use in the impact model. Data include average household size, percentage of single-family and multifamily units, median home prices, and median rents (Table 5)

TABLE 5: HOUSING DATA, 2006-2009

County	Average Household Size (People)	Single Family[a] (% of Units)	Multi-family (% of Units)	Median Owner-Occupied Unit Value	Median Monthly Rent
Jefferson	2.42	75.6%	24.4%	$257,800	$884
Colorado	2.53	74.8	25.2	234,100	835

[a]Single family includes mobile homes.
Source: American Community Survey 2006-2009, retrieved December 12, 2010.

Pupil counts, funding, and taxes were obtained from the Colorado Department of Education, and the number of occupied households was obtained from the 2010 U.S. Census. Jefferson County property taxes per pupil totaled $2,363—the second highest in the Denver MSA. Statewide, this figure was $2,378. Funding per pupil totaled $6,370 per pupil in Jefferson County and $6,606 statewide (Table 6).

TABLE 6: PUBLIC SCHOOL FUNDING FY2010-2011

County	Enrollment	Total Program Funding	Funding per Pupil	Taxes	Taxes per Pupil	Households	Pupils per Households
Adams	80,162	545,610,638	$6,806	$111,762,126	$1,394	153,764	0.52
Arapahoe	105,175	692,696,762	$6,586	$214,992,485	$2,044	224,011	0.47
Boulder	53,642	344,482,309	$6,422	$180,206,554	$3,359	119,300	0.45
Broomfield	NA	NA	NA	NA	NA	21,414	NA
Denver	72,770	505,129,562	$6,941	$285,169,022	$3,919	263,107	0.28
Douglas	57,946	363,795,969	$6,278	$125,871,583	$2,172	102,018	0.57
Jefferson	81,192	517,205,296	$6,370	$191,890,325	$2,363	218,160	0.37
Colorado	**791,000**	**5,225,244,885**	**$6,606**	**$1,881,028,126**	**$2,378**	**1,972,868**	**0.40**

Sources: Colorado Department of Education, 2010 Fall Pupil Membership by District, www.cde.state.co.us, retrieved September 24, 2011, and the U.S. Census Bureau.

[3]www.Census.gov, retrieved December 12, 2010.

Consumer spending data were obtained from the Bureau of Labor Statistics' 2008-2009 Consumer Expenditure Survey for MSAs in western states.[4] It is estimated that 25.4% of consumers' disposable income is spent on taxable retail goods and services in Colorado. This assumes the following taxable goods and services: food at home, food away from home, alcoholic beverages, housekeeping supplies, household furnishings and equipment, apparel and services, vehicle purchases, gasoline and motor oil, personal care products and services, reading, and tobacco products and smoking supplies.

Indirect Effects

Multipliers were selected based on the published North American Industrial Classification System (NAICS) codes. IMPLAN multipliers were obtained from MIG by matching the NAICS description to IMPLAN's corresponding unaggregated sectors. Employment, earnings, and output multipliers were based on NAICS sector Public Administration (92), and corresponded to "federal, nonmilitary" in IMPLAN. Other multipliers were selected based on the specified expenditures, including maintenance, construction, operations, and utilities.

Income Taxes

The state income tax rate is 4.63%. However, the effective tax rate is below 3%. (See Table 7.)

TABLE 7: COLORADO INDIVIDUAL STATISTICS OF INCOME, ADJUSTED GROSS INCOME TAX, 2008

Minimum	Maximum	Midpoint	Number of Returns	Colorado Gross Tax (Millions)	Colorado Net Tax (Millions)	Colorado Gross Tax per Return	Colorado Net Tax per Return	Estimated Colorado Gross Tax Rate	Estimated Colorado Net Tax Rate
$250,000	> $250,000	$250,000	40,134	$887.8	$799.2	$22,120.25	$19,913.01	NA	NA
$100,000	$250,000	$175,000	277,342	$1,304.1	$1,274.0	$4,701.99	$4,593.61	2.69%	2.62%
$75,001	$100,000	$87,501	202,834	$506.3	$498.8	$2,496.02	$2,459.06	2.85%	2.81%
$50,001	$75,000	$62,501	318,161	$509.1	$502.9	$1,600.05	$1,580.76	2.56%	2.53%
$35,001	$50,000	$42,501	285,209	$281.5	$279.2	$986.98	$978.80	2.32%	2.30%
$25,001	$35,000	$30,001	248,979	$146.2	$145.3	$587.18	$583.73	1.96%	1.95%
$20,001	$25,000	$22,501	135,930	$47.1	$46.8	$346.36	$344.36	1.54%	1.53%
$15,001	$20,000	$17,501	139,486	$27.7	$27.5	$198.64	$197.51	1.14%	1.13%
$10,001	$15,000	$12,501	130,686	$10.3	$10.2	$78.48	$77.99	0.63%	0.62%
$5,001	$10,000	$7,501	112,812	$0.6	$0.6	$5.27	$5.25	0.07%	0.07%
$0	$5,000	$2,500	76,617	$0.2	$0.2	$2.77	$2.77	0.11%	0.11%
(Negative Income)		NA	23,480	$0.1	$0.2	$4.02	$6.73	NA	NA
Total			**1,991,671**	**$3,720.8**	**$3,584.9**	**$1,868.19**	**$1,799.96**	**NA**	**NA**

Source: Colorado Department of Revenue, Office of Research and Analysis, Federal AGI and Tax, All Full-Year Resident Returns, 2008 Individual Income Tax Returns.

Property Taxes

Given the tax exempt status of federal properties, the property taxes captured in this study are derived from employees' home property taxes. The Colorado Department of Local Affairs, Division of Property Taxation's *2010 Annual Report,*[5] provides a summary of county, average municipal, average school, and average special property levies in *Section XI: Assessed Valuation, Revenue, and Average Levies by County* (Table 8). Taking the weighted average of property tax by the stated residences of NREL employees provided weighted average mill levies for the state.

[4] http://www.bls.gov/cex/2009/msas/west.pdf, retrieved December 12, 2010.

[5] http://www.colorado.gov/cs/Satellite/DOLA-Main/CBON/1251590375296, retrieved September 24, 2011.

TABLE 8: PROPERTY TAX LEVIES, 2010

County	Assessed Valuation 2010	Total Revenue	County Mill Levy	Average Municipal Levy[a]	Average School Levy	Average Special Levy[b]	Total Average County Levy[c]
Adams	$4,609,492,840	$489,605,898	26.883	7.224	56.085	3.566	106.217
Arapahoe	7,968,810,420	760,394,292	15.949	7.914	50.688	3.205	95.421
Boulder	5,808,272,120	491,517,669	24.645	11.423	44.594	1.611	84.624
Broomfield	1,089,316,550	116,546,550	17.511	11.457	51.452	6.574	106.991
Denver	11,960,083,760	842,280,859	26.043	0.000	39.972	2.017	70.424
Douglas	4,916,844,570	513,567,789	19.774	1.874	46.890	4.983	104.451
Jefferson	7,352,599,610	702,199,340	24.346	4.961	48.210	3.652	95.504
Colorado	92,794,864,875	6,794,300,280	18.224	7.391	36.541	2.854	73.218
NREL Weighted Average	$7,019,664,655	$619,542,519	21.990	4.529	42.544	2.943	82.632

[a]Municipal revenues are divided by the sum of municipal assessed valuation.
[b]Special district revenues are divided by the sum of special district assessed valuation.
[c]Average will not add to the total average county levy because denominators (assessed valuation) are not common to all.
[d]NREL weighted average weighted by stated 90.9% residence of employees in the Denver MSA.
Note: These figures include tax increment valuation, and all tax revenues attributable to the increment are allocated to the increment financing authority.
Source: http://www.colorado.gov/cs/Satellite/DOLA-Main/CBON/1251590375296, retrieved September 24, 2011.

Sales Taxes

State, city, and county tax rates are published on the Colorado Department of Revenue website (https://www.colorado.gov/revenueonline/#2) (Table 9 and Table 10).

TABLE 9: COUNTY SALES TAX RATES

County	County Rate	RTD	Scientific and Cultural Facilities	Metropolitan Football Stadium	Total County
Adams	0.75%	1.00%	0.10%	0.10%	1.95%
Arapahoe	0.25	1.00	0.10	0.10	1.45
Boulder	0.65	1.00	0.10	0.10	1.85
Broomfield[a]	4.15	1.00	0.10	0.10	5.35
Denver[a]	3.62	1.00	0.10	0.10	4.82
Douglas	1.00	1.00	0.10	0.10	2.20
Jefferson	0.50	1.00	0.10	0.10	1.70
Colorado	2.90	0.00	0.00	0.00	2.90

Note: Does not include local improvement districts in dispersed areas of the counties.
[a]County and city tax rates are combined in Broomfield and Denver.
Source: https://www.colorado.gov/revenueonline/#2, retrieved September 16, 2011.

TABLE 10: CITY TAX RATES

City	City Rate
Arvada	3.46%
Aurora	3.75
Boulder[a]	3.41
Brighton	3.75
Broomfield	4.15
Denver[a]	3.62
Erie	3.50
Golden	3.00
Lafayette	3.50
Lakewood	3.00
Littleton	3.00
Longmont	3.28
Louisville	3.50
Westminster	3.85

[a]Boulder and Denver have an alternative tax on food and liquor for immediate consumption (3.56% and 4%); Fort Collins has an alternative tax on food for home consumption (2.25%).
Source: https://www.colorado.gov/revenueonline/#2, retrieved September 16, 2011.

Cost of Government

NREL undoubtedly provides economic benefits and public revenues to Colorado through operations and employees' off-site impacts. However, costs exist in providing state, county, and local government services to the facilities and their employees, including general government administration, public works (e.g., roads, utilities), public safety (e.g., fire protection, police protection), parks and recreation, and so forth. Comprehensive annual financial reports (CAFRs) were used as resources to identify these costs at state, county, and city levels. Costs were assigned to residents and businesses based on government function, and per capita expenses were derived using total business employment and residential population as denominators. The cost of providing state government services was estimated at $1,223 per resident and $1,151 per employee. The average cost of providing city and county government services totaled $498 per resident and $428 per employee.

Visitor Effects

Visitor effects primarily result from out-of-town visitors to the study area due to the existence of the facility. This typically includes management, employees, and scientists visiting the facility for operational meetings, training, or research. Benefits sum from the visitors' expenditures on hotels and motels, vehicle rentals, dining, and other miscellaneous expenditures. Public revenues derive from sales and accommodation taxes paid on the visit. Given the relatively small number of visitors in comparison to local business activity and visitation, additional public costs, such as additional police and fire protection, are considered marginal.

Overnight visitors to NREL totaled more than 2,400 in FY2011. Visitors attended conferences, presentations, meetings, tours, fact-finding missions, and partnership meetings, and participated in focus groups. These individuals stayed an average of 1.9 nights. Day visitors totaled 103,935. (See Table 11.)

TABLE 11: NREL VISITORS

Fiscal Year	Day Visitors	Overnight Visitors	Length (Nights)	Allowable Lodging Rate	Per Diem	Travel Day Per Diem	Total Visitor Spend
FY2009	18,309	3,230	1.9	$149	$49	$37	$1,161,768
FY2010	15,853	2,330	1.9	$158	$66	$50	$938,587
FY2011	11,324	2,465	1.9	$141	$66	$50	$910,569

Source: Lodging and per diem obtained from the U.S. General Services Administration, http://www.gsa.gov/portal/category/100120, retrieved September 25, 2011.

Federal allowable lodging expenses in Jefferson County in FY2011 were $141 per night (excluding taxes), and per diem for meals and expenses totaled $66.

ECONOMIC IMPACT

Impact on Colorado

The net economic benefit of NREL on the state of Colorado totaled $588.3 million in 2009, growing to $742 million in FY2010 and $831.3 million in FY2011 (Table 12). Total (direct, indirect, and induced) employment impacts totaled 4,729 in FY2009, growing to 5,706 in FY2010 and 6,282 in FY2011. The majority of economic benefits derived from operations, including employment. Awarded research contracts, one-time expenditures on construction, and visitor impacts provided economic benefit to numerous industries across the state, including the ailing construction industry.

Given the tax-exempt status of the federal facilities, public revenues (city, county, school, and special) are largely derived from employee income taxes, off-site sales, and property taxes. While federal facilities are tax exempt, they do receive government services, including police and fire protection and the benefits of parks and roads. The costs of providing government services (state, city, county, school, and special) to the facilities, employees, and Colorado residents nearly equaled collected revenues at $8.7 million.

TABLE 12: NREL IMPACT ON COLORADO

	Impact Type	Employment	Labor Income, Millions	Output, Millions
2009	Direct Effect	2,402	$203.6	$286.7
	Indirect Effect	787	$39.4	$105.4
	Induced Effect	1,540	$63.5	$196.3
	Total Effect	4,729	$306.5	$588.3
2010	Direct Effect	2,858	$256.1	$364.5
	Indirect Effect	953	$49.2	$131.9
	Induced Effect	1,896	$79.7	$245.6
	Total Effect	5,706	$385.0	$742.0
2011	Direct Effect	3,198	$279.8	$414.3
	Indirect Effect	1,046	$55.1	$148.6
	Induced Effect	2,038	$87.4	$268.4
	Total Effect	6,282	$422.3	$831.3

Impact on Jefferson County

The net economic benefit of NREL on Jefferson County totaled $227.9 million in FY2009, growing to $275.2 million in FY2010 and $304.9 million in FY2011 (Table 13). The majority of economic benefits were derived from operations, including employment. Awarded research contracts, one-time expenditures on construction, and visitor impacts provided economic benefit to numerous industries in Jefferson County, including the ailing construction industry.

Given the tax-exempt status of the federal facilities, local public revenues (city, county, school, and special) are largely derived from employee off-site sales and property taxes. While federal facilities are tax exempt, they do receive government services, including police and fire protection and the benefits of parks and roads. The costs of providing government services (city, county, school, and special) to the facilities, employees, and residents in Jefferson County totaled $2.4 million in 2010.

TABLE 13: NREL IMPACT ON JEFFERSON COUNTY

	Impact Type	Employment	Labor Income, Millions	Output, Millions
2009	Direct Effect	1,141	$98.2	$129.9
	Indirect Effect	362	$14.7	$37.2
	Induced Effect	530	$19.9	$60.8
	Total Effect	2,033	$132.8	$227.9
2010	Direct Effect	1,281	$120.6	$156.7
	Indirect Effect	420	$17.5	$44.5
	Induced Effect	635	$24.4	$74.0
	Total Effect	2,336	$162.4	$275.2
2011	Direct Effect	1,413	$130.1	$175.5
	Indirect Effect	455	$19.3	$49.6
	Induced Effect	674	$26.4	$79.8
	Total Effect	2,542	$175.8	$304.9

CONCLUSION

NREL provided significant economic benefits to Colorado and Jefferson County from FY2009 to FY2011. Net economic benefits were estimated between $588 million and $831 million per year, and directly and indirectly accounted for 4,700 to 6,300 jobs statewide.

While quantifying the laboratory's benefits to the state and the county presents important economic metrics, further research may be done to capture the downstream benefits of tech transfer, commercialization, and enterprise creation.