Job Loss and Infrastructure Job Creation Spending During the Recession

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Summary

After the long economic expansion that characterized much of the current decade, the nation entered its 11th postwar recession in December 2007. The subsequent decrease in jobs and comparison of the latest recession to the Great Depression intensified congressional interest in passing legislation early in 2009 aimed at encouraging creation of new jobs and warding off further loss of jobs.

To mitigate all but one recession since the 1960s, Congress chose to increase federal spending on public works (infrastructure). (See CRS Report 92-939, *Countercyclical Job Creation Programs*.) Public works expenditures traditionally have gone to certain types of construction activities (e.g., building highways and bridges, dams and flood control structures) which indirectly increase demand in industries that supply their products to construction firms (e.g., manufacturing). Today, the definition of infrastructure has been expanded to include green economic activities (commonly referred to as green jobs), which include industries that utilize renewable resources (e.g., electricity generated by wind), produce energy-efficient goods and services (e.g., mass transit), and install energy-conserving products (e.g., retrofitting buildings with thermal-pane windows).

A question that typically arises during congressional consideration of economic stimulus legislation is which approach produces the most bang for the buck. In the instant case, this means how many jobs might be supported by federal expenditures on traditional and green infrastructure projects. Once stimulus legislation is signed into law, the focus of Congress customarily turns to estimates of the number of jobs that result as federal funds are allocated to specific activities. Therefore, after briefly examining the trend in employment since the recession's onset, the report turns to an in-depth look at estimates of job creation, including the limitations of the methodology often used to derive them and the difficulties associated with developing job estimates for green infrastructure in particular.

The report closes with a review of what is known to date about the number of jobs supported by infrastructure spending and other provisions in the American Recovery and Reinvestment Act (ARRA, P.L. 111-5). Section 1512 requires entities that receive ARRA appropriations from federal agencies, totaling approximately $271 billion, to include in quarterly reports to the agencies the number of direct jobs created or maintained as a result. Recipients of ARRA funds awarded by the Department of Transportation (DOT) must comply with the Section 1512 job reporting requirement; in addition, Section 1201 of P.L. 111-5 requires the DOT to estimate the direct, indirect, and total jobs associated with ARRA-funded transportation projects. Section 1513 of the act requires the Council of Economic Advisers (CEA) to report quarterly on the effect of ARRA provisions on employment and other economic indicators. The CEA's reports are the most comprehensive because they contain estimates of not only jobs supported by ARRA appropriations but also of jobs associated with other parts of P.L. 111-5 (e.g., unemployment and health insurance benefits, state fiscal relief, and tax provisions).

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After the long economic expansion that characterized much of the current decade, the nation entered its 11th postwar recession in December 2007. It was not until November 2008, however, that the Business Cycle Dating Committee of the National Bureau of Economic Research announced that a substantial and widespread decline in economic activity had begun a year earlier. As part of its announcement, the committee noted that it "views the payroll employment measure, which is based on a large survey of employers, as the most reliable comprehensive estimate of employment. This series [the CES] reached a peak in December 2007."

The committee's announcement intensified congressional interest in passage of legislation aimed at encouraging creation of new jobs and warding off further loss of jobs. So, too, did comments equating the recession to the Great Depression. (See CRS Report R40655, *The Labor Market During the Great Depression and the Current Recession*.) This, in turn, sparked the interest of some policymakers in the job creation programs of the Depression period. (See CRS Report R41017, *Job Creation Programs of the Great Depression: the WPA and the CCC*.)

To mitigate all but one recession since the 1960s, Congress chose to increase federal expenditures on infrastructure (public works), thereby directly raising demand for goods and services to offset the reduced demand of consumers. (See CRS Report 92-939, *Countercyclical Job Creation Programs*.) But, there are a number of issues associated with using spending on public works to quickly create jobs during a recession. (See CRS Report R40107, *The Role of Public Works Infrastructure in Economic Stimulus*.)

When Congress considers spending on infrastructure to help stimulate a flagging economy, "how many jobs are created" is a commonly asked question. After first briefly examining trends in employment since the latest recession began, this report focuses on job creation estimates available in late 2008 associated with increased spending on traditional and so-called green infrastructure, placing a heavy emphasis on explaining the methodology often used to derive them and the difficulties associated with developing estimates for green economic activities in particular.

Once stimulus legislation is signed into law, the focus of Congress customarily turns to estimates of the number of jobs that result as federal funds are allocated to specific activities. In the case of the American Recovery and Reinvestment Act (ARRA, P.L. 111-5), which was enacted in early 2009, Congress included language requiring entities that receive ARRA appropriations from federal agencies to report the number of jobs created or maintained as a result and requiring the Council of Economic Advisers to report on the employment and other economic effects of ARRA provisions. The report closes with a review of what is known to date about the number of jobs associated with the stimulus act.

Net Job Loss

Total nonfarm employment declined steadily between December 2007 and October 2009, falling from 137,951,000 to 129,633,000. The great majority of this 8,318,000 job loss occurred after November 2008. Despite a small uptick in employment from October to November 2009, the number of jobs on employer payrolls fell the following month. Firms have been increasing their employment since then, however, with the number of jobs in April 2010 preliminarily rising to 130,161,000.

As is typical during economic downturns, employees in the goods-producing sector (mining, construction, manufacturing) have been the most adversely affected. Workers in the sector's construction industry began experiencing job losses even before the economy-wide downturn began.

Employment in the service-providing sector most recently peaked in December 2007, when the recession began. Some service-providing industries—utilities, education and health services—have continued to add workers. But, job losses elsewhere in the sector have far outweighed their gains. The financial activities industry began to lose jobs before the advent of the economy-wide downturn. This mirrors the above-mentioned trend in construction employment in part because real estate is a component of financial activities and it, like construction, has been hurt by the collapse of the housing market. Other components of financial activities, such as brokerage firms that packaged high-risk mortgages and the investors (e.g., banks) that purchased them, have been negatively affected by the housing market downturn as well.

Despite the widely expressed belief that the recession ended sometime in the third quarter of 2009, the pattern following the end of the prior 10 postwar recessions suggests that an uninterrupted rebound in jobs will not be immediate. According to a CRS analysis, in all but one of these recessions,

> the number of jobs on employer payrolls fluctuated for months.... Sustained job growth occurred within three to five months of the start of seven recoveries. In sharp contrast, steady job growth did not commence until March 1992—12 months after the July 1990–March 1991 recession ended—and not until September 2003—22 months after the March–November 2001 recession ended.[1]

Infrastructure Spending and Job Creation Estimates

When in response to a recession Congress has acted to create jobs by raising demand for goods and services through increased federal spending, it often has chosen to direct the funds to infrastructure (public works) activities. Other means of direct countercyclical job creation—public service employment, fiscal relief to state governments, and employment tax credits—have been relied on much less often.[2]

Historically, public works has been synonymous with heavy and civil construction activities (e.g., road and bridge building, flood control structures and dam building). Today, it includes green economic activities or so-called green jobs. Although numerous studies on the emerging green economy have been released in the last several years, no consistent definition of green jobs exists at present. Green jobs seemingly are those in and related to industries that utilize renewable resources to produce their outputs (e.g., energy generated by wind, solar, and geothermal technologies) and jobs in and related to industries that produce energy-efficient goods (e.g., Energy Star appliances) and services (e.g., mass transit).[3] For this reason, the following

[1] CRS Report R40798, *Unemployment and Employment Trends Before and After the End of Recessions*, by Linda Levine.

[2] CRS Report 92-939, *Countercyclical Job Creation Programs*, by Linda Levine.

[3] Related jobs include, for example, those in industries that manufacture wind turbines and install thermal-pane windows.

discussion focuses on what is known about the job-generating impact of infrastructure spending broadly defined.

The section below begins with an in-depth examination of how job creation estimates usually are developed. The focus then narrows to look at two models that can be used to calculate the number of jobs nationwide dependent upon demand in the construction industry among others, and one model that can be used to calculate the number of jobs by state dependent on the construction industry among other industries. The section ends by reviewing the difficulties that researchers encounter in estimating the number of jobs supported by expenditures on green economic activities and the consequent caution that should be taken when utilizing these estimates in particular.

Job Creation Estimates: What Are They?

Interest in how many jobs are created by a particular type of economic activity has surfaced when the economy is in a downturn and policymakers seek to compare the relative advantages of different stimulus options. It also has arisen when policymakers want to know the impact of shifting expenditures from one federal budget category to another (e.g., away from defense and towards social services programs). Unless there is an *increase* in total spending, however, the number of jobs in the labor market would remain largely unchanged.[4]

Although there are other bases upon which to develop estimates of the number of jobs created by a given economic activity, an input-output (I-O) model of the economy often is utilized due to its cost-effectiveness.[5] An I-O model describes the interrelationships between industries in the production process, showing how the dollar value of a sale is distributed across industries at a particular point in time. It thus reflects how much of the purchased product comes from final and supplier industries. An I-O table might show, for example, the dollar value of roof trusses produced by the veneer, plywood, and engineered wood products manufacturing industry and the dollar value of bricks produced by the clay product and refractory manufacturing industry used by the construction industry to erect residential buildings.

The output requirements from each industry must then be converted to employment requirements. Employment requirements are derived from productivity estimates for each industry at a particular point in time. The total employment requirement associated with a given type of final demand (e.g., a water reuse program) is the employment in the industry producing the final product or service and in the supplier industries. In other words, it is an approximation of both the direct and indirect employment dependent upon/supported by the economic activity. It commonly is expressed as the number of jobs per billion dollars of expenditures valued in a particular year's dollars.

Like an I-O table, an employment requirements table is a matrix of hundreds of columns and rows. Each column displays the number of jobs supported in each of the industry rows by an expenditure of one billion dollars in the column industry. For example, one billion dollars spent in

[4] Small differences in the total number of jobs could occur at the same spending levels if the economic activities to (from) which funds were being shifted were more (less) capital-intensive, for example.

[5] Another basis for estimating the impact of policy and other changes on the economy is conducting surveys. According to the U.S. Bureau of Economic Analysis (BEA), the advantage of the I-O approach to making impact estimates is the accessibility of the data sources required to develop the I-O model.

the construction industry supports (direct) employment in the various components of that industry (e.g., residential and commercial building, highway and bridge building) and (indirect) employment in the many industries that supply their goods and services to the construction industry (e.g., asphalt shingle manufacturing, fabricated metal bridge section manufacturing). An employment requirements table thus permits estimation of the varying impact of an expenditure on different industries and the varying impact of different kinds of expenditures.

Some Caveats

I-O models freeze technology and productivity at a particular point in time. Thus, the job-generating potential of an economic activity undertaken today could differ from that of an earlier period if there were technological and productivity improvements in the intervening years. Similarly, the estimates often are stated in terms of the number of jobs created for every billion dollars of expenditures, but a billion dollars spent in one year could buy less (or more) than a billion dollars spent in another year depending on changes in price levels over time.

There also could be differences in estimated versus actual job creation because I-O models assume that resources are unlimited. If, for example, the economy was performing at a fairly high level with plants operating near full capacity and with fairly few workers unemployed, the actual number of new jobs might fall short of the estimate due to capital and labor constraints. This is less likely to matter during a broad-based economic downturn.

Further, I-O tables do not necessarily differentiate between imported and domestically produced goods. As a consequence, the domestic employment impact of expenditures might be overstated to the extent that inputs are imported. Similarly, I-O tables typically do not express employment in terms of full-time equivalents (i.e., both full-time and part-time jobs are counted equally). Thus, programs which draw upon industries that rely relatively more on part-time workers (e.g., retail trade) might appear to create more jobs than programs that draw to a greater extent on industries employing relatively more full-time workers (e.g., manufacturing).

The Multiplier Effect

A more comprehensive estimate of the number of jobs created by a particular type of economic activity has three components:

- the number of jobs directly attributable to the activity,
- the number of jobs indirectly attributable to the activity, and
- the number of jobs induced throughout the economy as a result of the activity.

Induced jobs are those dependent upon the purchases of persons in direct and indirect jobs. For example, workers who are directly or indirectly employed as the result of a highway construction program might spend some portion of their wages in their communities at grocery stores, auto repair shops, and movie theaters.

Estimates of induced jobs or the multiplier are considered tenuous. To calculate the multiplier effect, one must estimate how much of the additional money earned by directly and indirectly employed workers will likely be spent versus saved. The actual number of jobs created by this added spending will further depend on economic conditions (e.g., the availability of labor, the

inflation rate). As a result, there are widely varying estimates of the multiplier effect and those job creation studies that include induced employment utilize different multipliers.

Job Estimates and Construction Spending

The Federal Highway Administration

Perhaps the most widely known estimate of the employment impact of federal spending on our nation's roads comes from the Federal Highway Administration (FHWA). Although the FHWA twice updated its 1997 analysis, which estimated that $1 billion of federal-aid highway expenditures plus a $250 million state match supported 47,575 jobs, some proponents of stimulating job growth through increased federal spending on infrastructure continue to use this figure. The most recent update by the FHWA to 2007 indicates that a $1.25 billion expenditure on highway construction consisting of $1 billion from the federal government and $250 million from state government could support 34,779 jobs. If a state match is not required, "then $1 billion in Federal funds supports 27,800 jobs."[6] The jobs number has decreased over time in part because of increases in the price of inputs, such as asphalt and diesel fuel.

The FHWA breaks down the estimate of 27,822 jobs per billion dollars of federal spending on highways as follows:

- 9,536 construction-oriented jobs (i.e., jobs at construction companies working on the projects and at businesses that provide direct inputs to the projects such as asphalt, concrete, and guard rails);
- 4,324 jobs in supporting industries (i.e., employment at firms that provide inputs to the industries directly providing the materials and equipment utilized in highway construction such as producers of sheet metal who supply the manufacturers of guard rails); and
- 13,962 induced jobs (i.e., jobs throughout the economy dependent upon consumer expenditures from the wages of workers in "construction-oriented" and "industry-supporting" jobs).

Thus, induced jobs account for one-half of the total estimate.

The FHWA notes one caveat about I-O analysis in addition to those mentioned above; that is, the job estimate "utilizes the national average mix of construction materials and labor inputs. Specific projects and local utilization ratios will alter the estimated number of jobs supported."[7] For example, a different combination of materials and number of workers might be required for road resurfacing projects compared to bridge building or commuter rail projects.

The FHWA also states that

> [t]he employment figures have recently been used as a justification for including highway spending in an economic stimulus package. But with the exception of short-term resurfacing

[6] U.S. Department of Transportation, Federal Highway Administration, *Employment Impacts of Highway Infrastructure Investment*. Available from author upon request.

[7] Ibid.

and preservation projects, highway funds spend out slowly, with only 27% of a project, on average, outlaying in the first year.[8]

BLS Employment Requirements Table

In recognition of the fact that "people want to assess the impact on employment of different policies or actions," the U.S. Bureau of Labor Statistics (BLS) makes available electronically free-of-charge to the public the employment requirements tables it develops as part of its employment projections program.[9] I-O and employment requirements tables developed and utilized by others often are proprietary and not made widely available.

The employment requirements tables are based on the official I-O tables for the nation that the U.S. Bureau of Economic Analysis (BEA) develops every five years. BLS takes the latest national I-O table available from BEA—in this case, 1997—and updates it to reflect more recent production and distribution technologies. It then utilizes the updated I-O table and recent labor productivity data to develop an employment requirements table. The employment requirements table referenced in this report reflects 2006 technologies of production and distribution as well as labor productivity. It is the table that was available in late 2008 when this report was first released.[10]

The BLS employment requirements table provides information for the construction industry as a whole. The construction industry, according to the North American Industry Classification System, is composed of three major subdivisions:

- construction of buildings (residential and nonresidential),
- heavy and civil engineering construction (highway, street, and bridge construction; utility system construction; construction of flood control structures, dams, and hydroelectric power generation facilities), and
- specialty trade contractors (foundation, structure, and building exterior contractors; building equipment contractors; building finishing contractors).

Some 11,768 jobs are directly and indirectly dependent upon $1 billion of spending on construction. A majority of the jobs are in the construction industry itself (i.e., 6,925 direct jobs).

The figure from the BLS employment requirements table for construction expenditures (11,768) is somewhat lower than the direct and indirect jobs figure for highway expenditures from the FHWA (13,860). Potential explanations for the disparity include differences in industry definition, data sources, method of updating the model, and time period.

The employment requirements available from BLS do not break out other types of construction that have been discussed as part of a federal job creation package (e.g., public school construction). BLS formerly conducted surveys to estimate full-time year-long employment

[8] Ibid.

[9] U.S. Bureau of Labor Statistics, *Layout and Description for 201-order Employment Requirements Tables*, Washington, DC, December 2007, p. 3, http://stats.bls.gov/emp/empind4.htm.

[10] BLS in late 2009 released an employment requirements table updated to reflect 2008 technologies of production and distribution as well as labor productivity. It is available at http://stats.bls.gov/emp/ep_data_emp_requirements.htm.

associated with a variety of different construction activities, including new schools, hospitals, water and sewer facilities, roads, mass transit, and maintenance and repair construction. The survey information was last updated a few decades ago, however.

BEA's Regional Input-Output Modeling System (RIMS II)

From its Regional Input-Output Modeling System (RIMS II), the BEA produces estimates by geographic area of the employment, earnings, and output dependent on additional spending in hundreds of different industries. [11] For a fee to most parties, BEA utilizes either the 1997 benchmark I-O for the nation or the 2006 annual I-O for the nation adjusted by 2006 data from its regional economic accounts to provide these estimates at the subnational level.[12]

As shown in **Table 1**, the number of jobs directly and indirectly supported by an expenditure of $1 billion in the construction industry in a given state ranges widely. The main reason for the disparity in job creation estimates is that each state has a different mix of industries within its borders. As a consequence, one state varies from the next in its capacity to supply all the intermediate goods needed to carry out construction projects. A secondary explanation is that earnings vary by state.

Table 1. Number of Direct and Indirect Jobs by State Dependent on an Expenditure of $1 Billion in the Construction Industry

State	Number of Jobs	State	Number of Jobs
Alabama	15,851	Montana	16,127
Alaska	11,009	Nebraska	13,946
Arizona	12,238	Nevada	11,459
Arkansas	15,306	New Hampshire	12,374
California	12,289	New Jersey	11,118
Colorado	12,575	New Mexico	14,279
Connecticut	10,709	New York	10,106
Delaware	9,518	North Carolina	15,555
District of Columbia	1,874	North Dakota	13,500
Florida	13,127	Ohio	14,391
Georgia	14,224	Oklahoma	16,232
Hawaii	11,614	Oregon	13,184
Idaho	15,860	Pennsylvania	12,390
Illinois	11,916	Rhode Island	10,767

[11] For additional information on RIMS II see BEA, *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System*, http://www.bea.gov/scb/pdf/regional/perinc/meth/rims2.pdf.

[12] More specific detail by industry is available from the 1997 benchmark I-O than from the annual I-O. Therefore, Table 1 (Number of Direct and Indirect Jobs Per $1 Million of Output Produced by the Water, Sewage and Other Systems Industry) in CRS Report R40107, *The Role of Public Works Infrastructure in Economic Stimulus*, was drawn from the 1997 benchmark I-O because the 2006 annual I-O provides data only for the utilities industry as a whole.

State	Number of Jobs	State	Number of Jobs
Indiana	13,747	South Carolina	15,319
Iowa	14,330	South Dakota	15,316
Kansas	13,625	Tennessee	14,556
Kentucky	15,039	Texas	12,985
Louisiana	13,731	Utah	14,692
Maine	15,988	Vermont	14,883
Maryland	10,687	Virginia	12,085
Massachusetts	10,714	Washington	12,171
Michigan	13,354	West Virginia	13,834
Minnesota	12,998	Wisconsin	13,673
Mississippi	15,357	Wyoming	13,091
Missouri	13,241	United States	14,315

Source: Prepared by CRS from RIMS II estimates supplied by the BEA Regional Product Division in 2008.

Job Estimates and Green Infrastructure Spending

Estimating the number of jobs dependent upon green infrastructure activities presents a greater challenge than estimates related to infrastructure projects as traditionally defined. The basis for most data collection by U.S. statistical agencies is the North American Industry Classification System (NAICS). It currently does not identify separately so-called green industries (e.g., those that utilize renewable resources to produce their outputs, those that manufacture goods which minimize energy use). For example, the NAICS disaggregates the electric utility industry into hydroelectric, fossil fuel, nuclear, and other power generation, transmission, and distribution. Such renewable sources of energy production as wind, solar, and biomass are not uniquely recognized; they are included in the "other" category. If harnessing the wind to produce electricity and plant material to produce biofuel requires a substantially different mix of inputs than relying on coal and gasoline, for example, the conventional I-O model does not seem well-suited as a basis for estimating the number of jobs supported by these green activities. Similarly, within NAICS, the construction industry does not have a unique category for retrofitting (e.g., installing additional insulation, fluorescent lighting, or energy-efficient heating and air-conditioning systems). Retrofitting likely requires a combination of inputs from supplier industries that differs from the mix for the top-to-bottom construction of buildings, once again making use of conventional I-O models problematic.

This recognized difficulty generally is either not mentioned, or how it is dealt with is not described, in the analyses of green job creation. One study, commissioned by the Center for American Progress and discussed in more detail below, does address the problem. The researchers explain that because "the U.S. government surveys and accounts that are used to construct the input-output tables do not specifically recognize wind, solar, biomass, building retrofitting, or new mass transit as industries in their own right," they created synthetic industries by combining parts of industries for which data are available. The researchers provided an example in the case of the biomass "industry:" they constructed it by combining farming, forestry, wood products, and

refining industries; then they "assigned relative weights to each of these industries in terms of their contributions to producing biomass products."[13]

Further complicating the matter is the context and manner in which estimates of green jobs generally are presented. Studies often develop employment projections based on differing sets of assumptions and time horizons. For example, the number of direct and indirect jobs some 10 or more years in the future supported by an assumed increase in the demand for energy that is met by an assumed shift during the projection period from coal to wind and geothermal power generation. Some reports also include induced employment, but this is not always made clear. In addition, some analyses relate to a particular state. Their results may not be generalizeable to other areas because state economy's have different mixes of industries and may not be able to provide any or all of the inputs for a particular green output. Additionally, the assumptions and methodologies underlying the job creation estimates often are not clearly articulated, which makes thoughtful review of the results very difficult.

It should be noted that many of the studies by green economy proponents that were available when Congress was crafting stimulus legislation had not been conceived for the purpose of quickly stabilizing or increasing the number of jobs in the nation or in industries particularly hard hit by the recession. Job creation estimates from two organizations that proposed broad-based green economy strategies intended in part to stimulate the deteriorating labor market are briefly described below.

- The September 2008 report, *Green Recovery: A Program to Create Jobs and Start Building a Low-Carbon Economy*, was commissioned by the Center for American Progress (a research and educational institute). It represents an acceleration of a 10-year program included in a 2007 report (*Capturing the Energy Opportunity: Creating a Low-Carbon Economy*). The 2008 report's authors at the Department of Economics and Political Economy Research Institute (University of Massachusetts-Amherst), who relied on I-O analysis, estimate that almost 2 million jobs (935,200 direct jobs, 586,000 indirect jobs, and 496,000 induced jobs) could be created or preserved by a two-year $100 billion "green economic recovery program." Of the $100 billion total, $46 billion would be in the form of federal spending for such activities as public building retrofits, mass transit and freight rail expansion, and smart electrical grid development. Much of the remainder would be in the form of tax credits to encourage businesses and homeowners to retrofit commercial and residential buildings. The authors acknowledge that not all of the green activities

  > can contribute equally to a short-term green economic recovery program. Some ... strategies are clearly capable of delivering within a year, while others will require as long as two years to be implemented.[14]

- In December 2008, the Apollo Alliance (a coalition of labor, environmental, business and community leaders) proposed *The Apollo Economic Recovery Act*.

[13] Robert Pollin, Heidi Garrett-Peltier, and James Heintz, et al., *Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy*, Center for American Progress, Washington, DC, September 2008, p. 20, http://www.americanprogress.org.

[14] Robert Pollin, Heidi Garrett-Peltier, and James Heintz, et al., *Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy*, Center for American Progress, Washington, DC, September 2008, p. 5, http://www.americanprogress.org.

It is an initial step toward achievement of a 10-year $500 billion program to create 5 million green-collar jobs, which had been released in September 2008. The new initiative calls for federal spending of about $50 billion to create or maintain more than 650,000 direct jobs and 1.3 million indirect jobs. The derivation of these job creation figures is not always clear, appearing to rely much of the time on spending-to-jobs relationships estimated by other organizations. The proposed allocation of federal funds and associated job estimates include $10 billion to improve the efficiency and reliability of the electric transmission grid (131,000 direct and indirect jobs), $8 billion to repair roads and bridges (278,000 direct and indirect jobs), and $8 billion to encourage localities to replace aging buses and trains with U.S.-made clean-energy vehicles (37,600 direct jobs in vehicle manufacturing and 167,000 indirect jobs).

Measuring Jobs Supported by Spending Provisions in the American Recovery and Reinvestment Act

While crafting the American Recovery and Reinvestment Act (ARRA), Congress was concerned about timely tracking of the number of jobs whose creation or maintenance results from the legislation. The 111th Congress therefore addressed this matter in bill language much more than prior Congresses had in countercyclical job creation legislation.

Job Reporting by Recipients of ARRA Appropriations

At Title XV—Accountability and Transparency of Division A—Appropriations Provisions, P.L. 111-5 requires entities that receive ARRA appropriations from federal agencies (e.g., grant, loan, or contract recipients; states) to include in their quarterly reports to the agencies estimates of the number of direct jobs created and retained by infrastructure projects, for example.[15] Recipients of recovery funds were required to make their first submission of the required information in October 2009. Federal agencies are required to post the contents of these and subsequent reports on websites 30 days after the end of each calendar quarter. The Office of Management and Budget (OMB) was directed to provide guidance to help recipients prepare the reports, including the development of job estimates. The act further charged the Congressional Budget Office (CBO) and the Government Accountability Office (GAO) with commenting on the job estimates contained in the reports within 45 days after their submission to federal agencies.

Based on the self-reporting of recipients of ARRA appropriations, 640,329 jobs were saved or retained through September 30, 2009. Because the notion of a retained (saved) job caused consternation in some quarters, the OMB revised its guidance issued in June 2009. According to that guidance, upon which the aforementioned job figure was based, Congress' reference in ARRA to a job retained meant "an existing position that would not have been continued to be filled were it not for Recovery Act funding."[16] In response to feedback from the General

[15] Recipients of ARRA funds awarded to the Department of Transportation (DOT) are subject to Section 1512's job reporting requirement. Separately, at Section 1201, Congress required the DOT to estimate the direct, indirect, and total jobs created by transportation projects funded under ARRA. The DOT estimates thus are akin to the estimates for the entire bill that the CEA produces.

[16] OMB, *Implementing Guidance for the Reports on Use of Funds Pursuant to the American Recovery and* (continued...)

Accountability Office, among others, the OMB revised its guidance on jobs saved so that recipients no longer will have "to make a subjective judgment on whether a given job would have existed were it not for the Recovery Act. The updated guidance [issued in December 2009] ... defines jobs created or retained as those funded ... by the Recovery Act."[17] Based on this definition, recipients reported that 608,317 jobs were funded by ARRA in the fourth quarter of 2009. Another 682,226 jobs were created or saved at ARRA recipients in the first quarter of 2010.

Job Estimation by the Council of Economic Advisers

Title XV of P.L. 111-5 additionally tasked the Council of Economic Advisers (CEA) with submitting quarterly reports to the Committees on Appropriations on the effect of ARRA-provisions on employment and other economic indicators. The CEA's mandate thus extends well beyond the above-described reporting requirements, which apply only to $271 billion in direct government investment spending out of a total of $787 billion.[18]

The first quarterly report of the CEA was issued in September 2009. Based on two different estimating procedures, it found that ARRA might have added some one million jobs to employer payrolls in August 2009 compared to what employment would have been in the absence of the legislation.[19]

As noted above, CBO was charged in ARRA with commenting on the number of jobs created or saved as a result of direct government purchases of goods and services, grants and loans to private entities, and grants to states and localities. Although it did so in *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output as of September 2009*, CBO went further to provide a broader estimate than can be gleaned from the reports of primary and secondary recipients of more than $25,000 from appropriations in ARRA; it is an estimate more comparable to that of the CEA. Based upon information provided by macroeconomic models and historical relationships, CBO estimated that ARRA's tax cuts and outlay increases that occurred through September 2009 increased the number of people employed by between 600,000 and 1.6 million compared to the employment level without the law. The CEA's estimate of about 1 million additional jobs as of August 2009, discussed in the preceding paragraph, falls within the range estimated by CBO as of the third quarter of 2009.

In its second quarterly report, released in January 2010, the CEA estimated the effect of ARRA on employment through December 2009. It found that the stimulus law might have raised year-end employment by about 1.7–2.0 million jobs above what it otherwise would have been.[20] Similarly,

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Reinvestment Act, M-09-21, June 22, 2009, available at http://www.whitehouse.gov/omb/assets/memoranda_fy2009/m09-21.pdf.

[17] OMB, *Updated Guidance on the American Recovery and Reinvestment Act—Data Quality, Non-Reporting Recipients, and Reporting of Job Estimates*, M-10-08, December 18, 2009. See Part 2 of http://www.recovery.gov/FAQ/recipient/Documents/m10-08%20Updated%20Guidance%2012182009.pdf.

[18] The remaining ARRA funds fall into five categories: individual income tax cuts, a patch for the alternative minimum tax, investment incentives, aid to people directly hurt by the recession (e.g., unemployment insurance), and fiscal relief for state governments.

[19] Council of Economic Advisers, *The Economic Impact of the American Recovery and Reinvestment Act of 2009, First Quarterly Report*, September 10, 2009.

[20] Council of Economic Advisers, *The Economic Impact of the American Recovery and Reinvestment Act of 2009,* (continued...)

CBO estimated in its report covering the fourth quarter of 2009 that ARRA's policies might have increased the number of people employed by 1.0–2.1 million.[21]

The CEA's third quarterly report, released in April 2010, showed ARRA's employment effect through March 2010. It estimated that the law might have raised employment by 2.2–2.8 million jobs above what it otherwise would have been as of the first quarter of 2010.[22] Similarly, CBO estimated in its report covering the first quarter of 2010 that ARRA's policies might have increased the number of people employed by 1.2–2.8 million.[23]

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Second Quarterly Report, January 13, 2010.

[21] Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output From October 2009 Through December 2009*, February 2010.

[22] Council of Economic Advisers, *The Economic Impact of the American Recovery and Reinvestment Act of 2009, Third Quarterly Report,* April 14, 2010.

[23] Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output From January 2010 Through March 2010,* May 2010.