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# Final Report

## Economic Impact of Green ARRA Projects for Nebraska

Prepared for  
the Northern Great Plains and Rocky Mountain Consortium Study

by

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## **I. Introduction**

This document provides an estimate of the economic impact resulting from “green” projects in Nebraska as part of the American Recovery and Reconstruction Act (ARRA). Green projects were defined to include energy efficiency projects, alternative energy projects, as well as projects that promote clean land and water, among others. The list of green Nebraska ARRA projects is provided in Table 1. There were a total of 82 projects. The list includes many projects let by the United States Department of Energy and the Environmental Protection Agency of the U.S. federal government. But, other Federal Agencies had projects or components of projects that met green objectives. The United States Department of Housing and Urban Development, for example, let funds to refurbish public housing projects or public buildings. These projects often promoted energy efficiency through adding insulation, replacing windows and doors with energy efficient models, or replacing existing appliances with efficient Energy Star appliances. Projects also include other non-energy related components such as replacing sidewalks and repairing floors. The list of green projects therefore contains projects where all funds went to support green objectives as well as other projects where only a portion of expenditures supported green objectives.

In the report, we provide economic impact estimates for the State of Nebraska and 7 sub-state regions. When reviewing this report, it is important to remember that the economic impact estimates are “gross” economic impacts. These projects represent the economic impacts in Nebraska, or Nebraska regions, which occurred in the present due to Federal funds coming to the State. There are several reasons to expect that these gross impacts will not be the same as the net economic impact of the spending:

- 1) The ARRA projects were financed through deficit spending and Nebraska did not receive an inordinate amount of funding. In the future, taxes will need to be higher in order to repay the funds and this will reduce future economic growth throughout the country, including in Nebraska.
- 2) The prospect of higher future taxes could reduce current investment. This is because current investments will lead to future profits, but current investment decisions will be based on expected future after-tax profits. As a result, private investment may fall and the net impact of ARRA spending may not be positive even in current times.

Most generally, all investments should be analyzed in a benefit cost framework. Only those public projects with benefits that clearly exceed costs are likely to have a positive net economic impact.

## **II. Direct Economic Impact**

Looking at the gross economic impact, nearly all “green” ARRA projects had a positive gross impact on the Nebraska economy. There were some projects, however, where the principal contractor was located outside of the state of Nebraska, so the vast majority of ARRA revenue went to support employment in another state. For example, the primary engineering consultant for many “Brownfield” projects was located in a neighboring state. However, most projects directly supported employment at Nebraska businesses, or in some cases, Nebraska public agencies. The total

budget of these projects was \$192.1 million. This spending figure suggests that the direct economic impact of the projects was likely to be substantial. However, the direct economic impact was not equal to \$192.1 million. This is because many “green” ARRA projects were focused on purchasing energy efficient items such as vehicles, appliances, windows, or fixtures. From a state perspective, the economic impact of these projects would be not be the entire cost of these items, but rather the “mark-up” portion of the price to Nebraska wholesalers or retailers which handled the projects. This is because the vehicles, appliances, and windows in most cases would have been manufactured in another state so only the wholesale or retail activity would have occurred in Nebraska. After making this adjustment, the direct economic impact from the “green” ARRA projects was \$144.1 million. This direct economic impact will be used to estimate the total economic impact in the next section of the report.

### **III. Total Economic Impact**

The total economic impact of “green jobs” in Nebraska is the sum of the direct impact and the “multiplier Impact.” The multiplier impact refers to the additional economic activity that is spurred in Nebraska by the spending of businesses and government agencies that receive ARRA funds, and that spending circulates further in the Nebraska economy. For example, a construction business that receives ARRA funds will purchase or lease equipment, buy construction materials, and employ legal and accounting firms. All of these activities will create additional employment at these types of businesses. At the same time, employees at construction firms will spend their paychecks. This spending also will broadly circulate throughout the economy and support revenue for firms (and wages for their workers) in the housing, retail, food, entertainment, personal services, and insurance industries, among others.

**Table 1: List of Green ARRA Projects**

<b>Award Key</b>	<b>Funding Agency</b>	<b>Brief description</b>
3418	National Science Foundation	Solar energy research
3974	National Science Foundation	Climate change research
4562	Public and Indian Housing	Energy efficiency
4677	Public and Indian Housing	Energy efficiency
4844	National Science Foundation	Solar energy research
6167	National Science Foundation	Research on soil erosion
10534	Environmental Protection Agency	Clean diesel vehicles
10561	Environmental Protection Agency	Environmental quality planning
13597	National Science Foundation	Research on soils and climate
19361	Department of Energy	Energy efficiency
19409	Department of Energy	Energy efficiency
19503	Department of Energy	Energy efficiency
19593	Department of Energy	Weatherization assistance
19623	Department of Energy	Energy efficient lamps and bulbs
19629	Department of Energy	Energy efficient bulbs
19640	Department of Energy	Energy efficiency planning
19759	Department of Energy	Lighting retrofit
19766	Department of Energy	Energy efficient windows
20122	Department of Energy	Omaha Tribe
20165	Environmental Protection Agency	Brownfield remediation
22634	Department of Housing and Urban Development	Energy efficient windows and doors
22637	Department of Housing and Urban Development	Energy efficient heating system
22639	Department of Housing and Urban Development	Energy efficient windows
22761	Environmental Protection Agency	Clean diesel vehicles
22880	Environmental Protection Agency	drinking water infrastructure
23700	Public Buildings Commission	Installation of photovoltaic cells
23707	Public Buildings Commission	Energy audit
26034	Department of Housing and Urban Development	Energy efficient appliances
26037	Department of Housing and Urban Development	Energy efficient appliances
26039	Department of Housing and Urban Development	Energy efficient homes
28780	Environmental Protection Agency	Clean diesel vehicles
31571	Department of Energy	Grant to state energy office
31610	Department of Energy	Energy efficient heating system
31657	Department of Energy	Energy efficient heating system
31714	Department of Energy	Energy audit and E-85 tank
34396	Department of Energy	Appliance rebate program
35860	Public Buildings Commission	Energy and water audit
35934	Public Buildings Commission	Energy management system
37804	Department of Housing and Urban Development	Energy efficient lights and doors
37889	Department of Transportation	Mass transit
39000	Department of Housing and Urban Development	Energy star appliances
39002	Department of Housing and Urban Development	Energy star appliances
39094	Department of Housing and Urban Development	Energy star appliances
39096	Department of Housing and Urban Development	Energy star appliances
39099	Department of Housing and Urban Development	Energy star appliances
39100	Department of Housing and Urban Development	Energy efficient heating system
40341	Department of Housing and Urban Development	Energy efficient windows
40345	Department of Housing and Urban Development	Energy efficient windows
40348	Department of Transportation	Hybrid vehicles
43596	Department of Energy	Geothermal project
44060	Environmental Protection Agency	Pollution remediation
46471	Department of Housing and Urban Development	Energy efficient windows, doors and lighting
46473	Department of Housing and Urban Development	Energy efficient housing
46478	Department of Transportation	Mass transit
49055	Environmental Protection Agency	Waste water infrastructure
49257	Food and Nutrition Services	Energy efficiency in school food services

**Table 1: List of Green ARRA Projects (Continued)**

51153	Department of Energy	Energy efficiency
51220	Department of Energy	Grid resiliency
51469	Environmental Protection Agency	Brownfield remediation
52816	Department of Housing and Urban Development	Energy conservation
56561	Environmental Protection Agency	Pollution remediation
58885	Department of Energy	Energy efficient windows and doors
59129	Environmental Protection Agency	Brownfield remediation
59130	Environmental Protection Agency	Brownfield remediation
59131	Environmental Protection Agency	Brownfield remediation
60322	Department of Housing and Urban Development	Energy star appliances and efficient doors
60324	Department of Housing and Urban Development	Energy efficient heating system
60329	Department of Housing and Urban Development	Energy star appliances
61364	Department of Defense	Energy efficient renovation; hazardous materials
61374	Department of Defense	Architecture for energy efficient renovation
69896	U.S. Fish and Wildlife Services	Geothermal project
71414	Natural Resources Conservation Service	Watershed infrastructure
72259	Indian Health Service	Water treatment plan
72622	U.S. Forest Service	Hazardous waste assessment
75040	Department of Energy	City of Lincoln Green Initiatives
75161	Department of Energy	Energy efficient retrofit of building
75422	Department of Energy	Energy efficiency
75789	Department of Energy	Energy efficient windows
76628	Department of Energy	Wind turbine technology
76646	Department of Energy	Energy efficient retrofit of building
77834	Department of Labor	Training for workers in green occupations
78121	Public Buildings Commission	Energy efficiency
84350	Army Corp of Engineers	Wetlands restoration
86161	Environmental Protection Agency	Brownfield remediation
90216	Department of Energy	Energy audit
92756	Department of Energy	Energy efficient retrofit of building
93570	Department of Energy	Energy efficiency
93717	Department of Energy	Geothermal project
99821	Department of Energy	Energy efficiency

Source:

Thompson, Eric and Trevor Nelson, 2010. *Interim List of Green ARRA Projects in Nebraska*. Joint Report of the University of Nebraska-Lincoln Bureau of Business Research and the Labor Market Information Division of the Nebraska Department of Labor.

Such additional “multiplier impacts” are typically 50% to 75% as large as the initial direct impact. In other words, each \$1 of direct impact would lead to an additional multiplier impact of \$0.75. The total impact from both the direct and multiplier impact would be \$1.75. In this example, the ratio of the total economic impact to the direct economic impact was 1.75. This ratio, of course, can vary by industry depending on the tendency of that industry to consume supplies from local vendors, the wages it pays its workers, and other factors. As a result, it is necessary to have a methodology to calculate such economic multipliers for all of the Nebraska industries and agencies that receive ARRA funding for green projects. Fortunately, such multipliers showing the ratio of total economic impact to the direct economic impact can be calculated with the IMPLAN software model.

Our research team calculated multipliers using IMPLAN software for each of the projects in Table 1. The results are presented in Table 2, which shows the direct economic impact of the green ARRA investments, the multiplier impact and the total (gross) economic impact of green ARRA spending. The total gross economic impact of green ARRA funding was \$236.9 million. A component of these impacts benefits workers in the labor market. We estimate that \$88.3 million of this total economic impact flows to workers in the form of labor income. As seen in Table 2, this income was sufficient to support approximately 1,970 job-years of employment. In other words, there was enough labor income to support 1,970 jobs for one year.

**Table 2: Gross Economic Impact of Nebraska Green ARRA Projects on Nebraska**

<b>Impact Concept</b>	<b>Direct</b>	<b>Multiplier</b>	<b>Total</b>
Economic Impact (millions of \$)	\$144.1	\$92.8	\$236.9
Labor Income (millions of \$)	\$58.1	\$30.2	\$88.3
Employment	1,151.0	818.2	1,969.2

Source: Author’s calculation.

#### **IV. Total Economic Impact by Region of Nebraska**

While many of these economic impacts were concentrated in Nebraska’s largest cities, it is also true that the economic impacts occurred throughout the state of Nebraska. We consider the geography of the economic impacts in Table 3, which shows the total gross economic impact of green ARRA in the 7 sub-state regions of Nebraska as defined by the Nebraska Department of Labor. These regions include the Omaha metropolitan area, the Lincoln metropolitan area, the Southeast region, the Northeast region, the Central region, the Mid-Plains region, and the Panhandle region. The specific counties included in each of these Nebraska regions are reported in Appendix 1.

When reviewing Table 3, consider that the sub-state multiplier impacts are typically smaller than statewide multiplier impacts. This is because businesses and their employees make some purchases within the state but outside of their local sub-state region. As a result, the total economic impacts across all 7 regions in Table 3 will be less than the statewide economic impacts reported in Table 2.

**Table 3: Gross Total Economic Impact of Nebraska Green ARRA Projects on Nebraska Regions**

<b>Region</b>	<b>Economic Impact (millions of \$)</b>	<b>Labor Income Impact (millions of \$)</b>	<b>Employment Impact</b>
Omaha Metropolitan Area	\$73.5	\$26.1	554.3
Lincoln Metropolitan Area	\$50.7	\$16.9	430.3
Southeast Region	\$11.9	\$4.23	110.4
Central Region	\$17.5	\$6.5	172.1
Mid-Plains Region	\$6.9	\$2.3	69.0
Panhandle Region	\$18.9	\$6.6	163.0
Northeast Region	\$22.4	\$8.2	212.6

Source: Author's calculation

As is evident from Table 3, the sub-state impacts are greatest in the Omaha metropolitan area and the Lincoln metropolitan area. Focusing on the employment measure, the employment impact was 554 job-years in the Omaha Metropolitan Area and 430 jobs-years in the Lincoln Metropolitan Area. These figures reflect that Omaha is the largest metropolitan area in Nebraska. Among the nonmetropolitan regions, the largest impact occurred in the Northeast region. The employment impact was 213 job-years. The smallest employment impact was in the Mid-Plains region, with 69 job-years. These impacts largely followed population in the regions, though it does seem that the non-metropolitan areas in the eastern part of Nebraska were more successful in attracting funding relative to their population while the Mid-Plains region was less successful relative to its population.

**Appendix 1: Nebraska Economic Regions as Defined by the Nebraska Department of Labor**

<b>Central Region</b>		<b>Northeast Region</b>		<b>Mid Plains Region</b>
<b>000804</b>		<b>000807</b>		<b>000805</b>
Adams	003	Antelope	005	Arthur
Blaine	011	Boone	029	Chase
Buffalo	015	Boyd	031	Cherry
Clay	017	Brown	047	Dawson
Custer	021	Burt	057	Dundy
Franklin	023	Butler	063	Frontier
Garfield	027	Cedar	065	Furnas
Greeley	037	Colfax	073	Gosper
Hall	039	Cuming	075	Grant
Hamilton	043	Dakota	085	Hayes
Harlan	051	Dixon	087	Hitchcock
Howard	053	Dodge	091	Hooker
Kearney	089	Holt	101	Keith
Loup	103	Keya Paha	111	Lincoln
Merrick	107	Knox	113	Logan
Nance	119	Madison	117	McPherson
Nuckolls	139	Pierce	135	Perkins
Phelps	141	Platte	145	Red Willow
Sherman	143	Polk	171	Thomas
Valley	149	Rock		
Webster	167	Stanton		
Wheeler	173	Thurston		
	179	Wayne		
<b>Southeast Region</b>		<b>Panhandle Region</b>		<b>Omaha Consortium</b>
<b>000803</b>		<b>000806</b>		<b>000801</b>
Fillmore	007	Banner	025	Cass
Gage	013	Box Butte	055	Douglas
Jefferson	033	Cheyenne	153	Sarpy
Johnson	045	Dawes	155	Saunders
Nemaha	049	Deuel	177	Washington
Otoe	069	Garden		
Pawnee	105	Kimball		<b>Lincoln</b>
Richardson	123	Morrill		<b>MSA</b>
Saline	157	Scotts Bluff		<b>000802</b>
Thayer	161	Sheridan	109	Lancaster
York	165	Sioux	159	Seward

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