



How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth

JANUARY 2009

James Heintz
Associate Research Professor
& Associate Director

Robert Pollin
Professor of Economics & Co-Director

Heidi Garrett-Peltier
Research Assistant

Political Economy Research Institute



INFRASTRUCTURE INVESTMENTS AND THE U.S. ECONOMY

Summary of Main Findings

The United States system of civilian public infrastructure has deteriorated badly over the past generation. The breaching of New Orleans' water levees in 2005 in the wake of Hurricane Katrina and the collapse of the I-35W bridge in Minneapolis in 2007 offered tragic testimony to this long-acknowledged but still neglected reality.

After this generation of neglect, the project of rebuilding our infrastructure now needs to be embraced as a first-tier economic policy priority, and not simply to prevent repetitions of the disasters in New Orleans and Minneapolis. The more general point is that infrastructure investments are essential for the functioning of the U.S. economy. According to the U.S. Bureau of Economic Analysis, total public assets, excluding defense, were valued at \$8.2 trillion in 2007. This represents approximately 50 percent of the stock of *all* non-residential private assets—a formidable asset base which underpins the national economy.

Core economic infrastructure—in the areas of energy, transportation, and water and sewerage—is particularly important in maintaining economic performance. However, the rate of public investment in these core areas began falling in the 1970s and has not returned to its previous levels since then. As an average since 1980, the growth of infrastructure investment has lagged behind overall economic growth. The result has been a worsening infrastructure deficit and mounting investment needs.

With the rapid deterioration of economic conditions in recent months and rising unemployment, public investment is back on the policy agenda—as a job-creation program linked to the need to revitalize the nation's crumbling infrastructure. In November 2008, President-elect Obama announced his intention of creating 2.5 million jobs by introducing a large-scale public investment program during his first two years in office. Since this initial announcement, the proposed size of the stimulus package and the job-creation targets have varied. Nevertheless, public investment remains at the center of thinking about the 'new New Deal'—the set of policies that are needed to address the ongoing crisis.

In this report, we examine the employment impacts of an expanded infrastructure investment program and what it would take to create millions of jobs. We develop specific policy scenarios based on an assessment of the nation's infrastructure needs in four core areas—transportation, energy, water systems, and public school buildings—and estimate the employment that would be created if the policies were implemented, with a specific focus on manufacturing employment. We also examine what the long-run impacts of such a program would be in terms of productivity and overall economic growth. Finally, we offer some brief observations on both U.S. competitiveness and environmental sustainability that emerge directly from our main findings.

Some of the key findings include the following:

Assessing U.S. Infrastructure Needs

- *Estimating assessed needs.* Based on assessments from a range of government agencies and private studies, we estimate a “baseline” infrastructure investment level that would adequately meet the economy’s assessed needs over the next five years. We also present a “high-end” assessment that would accelerate the project of meeting our long-term infrastructure needs.
- *Baseline assessment.* Our baseline estimate of infrastructure investment needs amount to \$87 billion per year, of which about \$54 billion would come from the public and \$33 billion would be private investment. This amounts to a \$275 billion investment project over the next five years.
- *High-end assessment.* Our high-end estimate is \$148 billion per year, of which \$93 billion would need to come from the public sector, and \$55 billion from the private sector.

Infrastructure Investments and Economic Growth Rise and Fall Together

- *1950-79: Public infrastructure investment and economic growth rise together.* Between 1950 – 79, public investments in core areas—transportation, water management, and electricity transmission—grew at an average annual rate of 4.0 percent. Overall economic growth (GDP) averaged 4.1 percent per year over that same period.
- *1980-2007: Public infrastructure investment and economic growth fall together.* Between 1980 – 2007, public investment growth slows dramatically, to an average 2.3 percent. GDP growth also falls in this more recent period, to a 2.9 percent average annual rate.
- *Faster public investment growth produces faster overall growth.* The change in the public investment growth rate is a significant contributor to GDP growth. For the year 2007, the impact due to both our baseline and high-end scenarios from an increase in public infrastructure investments only (holding aside private infrastructure investments) would be as follows:
 - *Baseline scenario:* The \$54 billion baseline increase in public infrastructure investment would yield an annual GDP increase of about \$46 billion. This would provide an annual productivity dividend of about \$150 for every U.S. resident.
 - *High-end scenario:* The \$93 billion high-end increase in public infrastructure investment would yield an annual GDP increase of about \$77 billion. This is a productivity dividend of about \$260 per year for every U.S. resident.

Infrastructure Investments and Job Creation

- *Three types of job creation: direct, indirect, and induced effects.* Direct job creation refers to the jobs directly involved in constructing the new infrastructure projects. Indirect job creation refers to the jobs generated when supplies are purchased for the infrastructure projects. Induced jobs are created when the overall level of spending in the economy rises, due to workers newly receiving incomes when they are hired to build the infrastructure projects, and to produce supplies for the project.
- *Infrastructure investments as job-creation tool.* All forms of spending will produce jobs. But infrastructure investment is a highly effective engine of job creation. Thus, infrastructure investment spending will create about 18,000 total jobs for every \$1 billion in new investment spending, including direct, indirect, and induced jobs. By contrast, a rise in household spending levels generated by a tax cut will create, at most, about 14,000 total jobs per \$1 billion in spending, 22 percent less than infrastructure investments.

Overall Job Creation Based on U.S. Needs Assessments

- *Job creation through baseline program.* Infrastructure investments of \$87 billion per year to meet baseline needs will generate about 1.6 million total new jobs within the U.S., including direct, indirect and induced jobs.
- *Job creation through high-end program.* Investments of about \$148 billion per year to accelerate the rebuilding of the U.S. infrastructure will generate about 2.6 million new jobs, including direct, indirect, and induced jobs.
- *Job Creation by sector*
 - *Construction.* The highest proportion of new jobs will be in construction. For the baseline scenario, about 641,000 new construction jobs will be generated. The high-end investment scenario will generate about 1 million new construction jobs. Overall, about 40 percent of all new job creation through either investment program—including direct, indirect, and induced jobs—will be in construction. The construction sector has been severely hit by the recession, with unemployment in the industry rising from 9.4 to 15.3 percent between December 2007 and 2008.
 - *Manufacturing.* About 146,000 new manufacturing jobs will result through the baseline investment scenario, and the high-end investment scenario will generate about 252,000 new jobs. About 10 percent of the overall new job creation will be in manufacturing. Manufacturing has also been badly hit by the recession, with unemployment in the industry rising from 4.6 to 8.3 percent between December 2007 and 2008.

- *Job Creation and December 2008 Unemployment*
 - *Baseline program.* If 1.6 million new jobs were added to the December 2008 labor market, that would reduce unemployment from its actual rate of 7.2 percent to 6.2 percent.
 - *High-end program.* If 2.6 million new jobs were added to the December 2008 labor market, that would reduce unemployment further, to 5.5 percent.

U.S. Jobs and Imports

- *Domestic supplies as major source of job creation.* The main reason infrastructure investments create more jobs than an increase in household consumption is that the share of spending done within the U.S, as opposed to the purchase of imports, is significantly higher with infrastructure investments.
- *Domestic spending and imports in manufacturing.*
 - The manufacturing sector will account for about 10 percent of the total spending resulting from infrastructure investments, corresponding to the 10 percent share of employment increases.
 - With the manufacturing sector, imports represent a significantly higher share of total spending tied to infrastructure investments. Import purchases account for between 12 – 22 percent of manufacturing supplies among the four key areas of energy, transportation, school buildings, and water management infrastructure investments.
 - Raising domestic supplies up to 100 percent of total supplies would produce a total of 77,000 additional domestic jobs resulting from all infrastructure investment spending, an increase of 4 percent. But manufacturing jobs, by themselves, would account for 69,000 of the total 77,000 increase in jobs. The increase in domestic job creation within the manufacturing sector resulting from raising domestic supply purchases to 100 percent of total purchases would represent a 33 percent increase in manufacturing job creation.

Infrastructure Investments, Competitiveness, and Environmental Sustainability

- *Competitiveness.* Public investment improves private sector productivity. The impact is proportionally larger for the manufacturing sector than for the private sector as a whole. Improving the U.S. infrastructure in all four main areas—transportation systems, public school buildings, water management, and energy transmission—will improve U.S. competitiveness by contributing toward a lower-cost environment than would be possible under our aging current stock of infrastructure.
- *Environmental sustainability.* Not all categories of public investments are aimed at producing direct environmental benefits, but some are. These would include

public transportation, freight rail, and smart grid electrical transmission system that can more efficiently transport electricity from renewable energy sources. At the same time, *all* public infrastructure projects promote a clean-energy economy by raising the efficiency of production, and thereby lowering the overall demand for energy for a given level of production.