Economic Impacts of Cement Industry Regulations:

The Proposed Portland Cement NESHAP Rule

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Introduction

Over the last several years, the national economy has been undermined by severe weakness in the housing market, a slow-down in industrial and commercial growth, increased unemployment, and a variety of other indicators, resulting in an economic downturn of near-historic proportions. To address these economic trends, policy makers have traditionally relied upon investment in infrastructure as part of an integrated approach to reverse current macroeconomic trends. This Congress, for example, has adopted stimulus legislation, including the American Recovery and Reinvestment Act of 2009 (ARRA)(Pub. L. 111-5). As in past efforts, the centerpiece of ARRA has been a significant outlay for infrastructure, including core investments in roads, bridges, sewers, and other projects. Infrastructure investment creates a multiplier effect for the economy by combining direct employment impacts (e.g., construction, planning, and the like) and upstream impacts (e.g., the manufacture of construction materials and the like). In the longer term, improved infrastructure is literally the pathway by which improved commerce flows.

At the same time as ARRA and other stimulus policies are being implemented, the US Environmental Protection Agency (EPA) is developing environmental regulations that adversely affect the ability of future infrastructure investment to deliver the promised economic stimulus. For example, the EPA is developing air regulations that will force the cement industry to close production facilities and will also reduce new capital investments in the United States. The net result will be the replacement of domestically-produced cement with more imported product to satisfy new recovery-based market expansion.

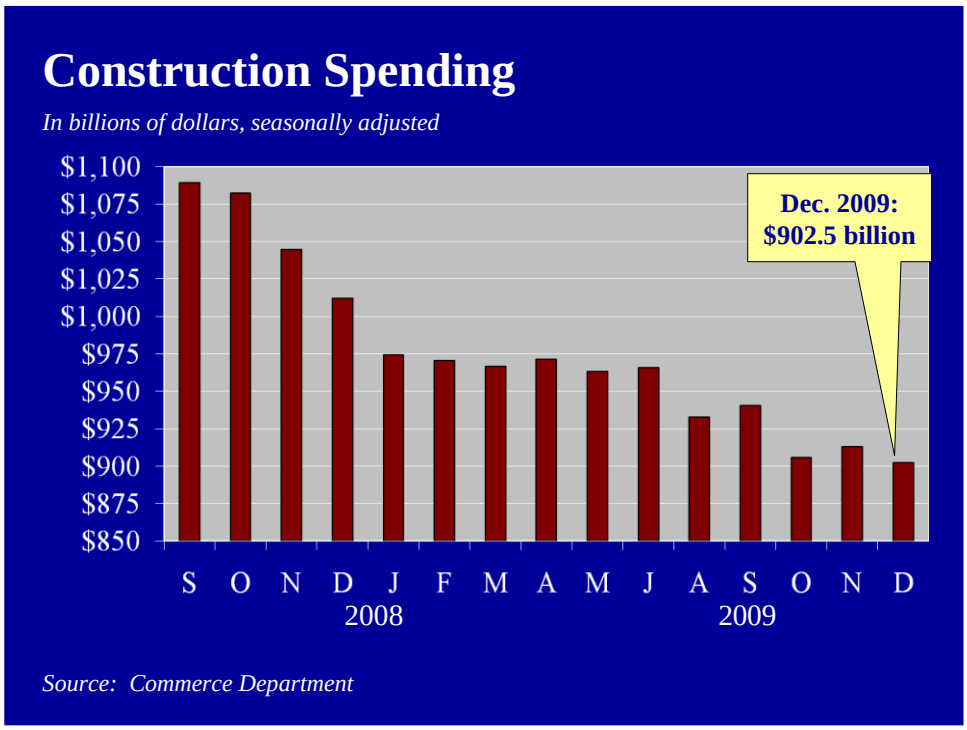
This report will first estimate the total direct and indirect economic impacts of the cement industry on the U.S. economy. Models demonstrate that the total economic footprint of the

industry, when combined with construction projects dependent on affordable and reliable cement supplies, accounts for millions of well-paying jobs and more than $1 trillion of the nation's output. All the while, the industry has been a significant investor in environmental protection. Next, the report will demonstrate that the proposed national emissions standard will cause significant outsourcing of cement production to foreign sources of supply. Last, the report will demonstrate that the proposed standard will have significant direct economic impacts and will substantially undermine the effect of recently-adopted stimulus programs, reducing potential upstream employment gains for some projects by as much as 40 percent. Fortunately, there are ways to address environmental concerns without forcing the Hobson's choice between severe economic hardship and improved air quality.

An overview of the size and impact of the construction and cement industries

The United States economy is literally built on concrete. Homes, office buildings, industrial parks, shopping malls, streets and highways, and virtually the entire built environment utilize concrete in the construction process. Though down from its peak two years ago, construction spending nonetheless accounts for almost $1 trillion of annual spending, or about one-fourteenth of gross domestic product (see Figure 1).

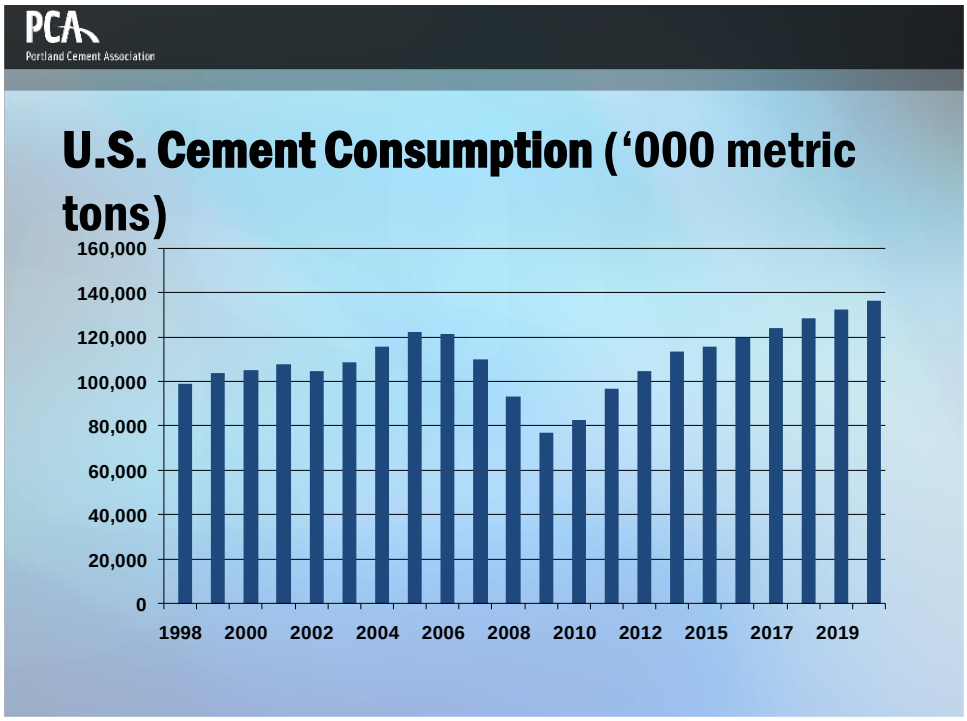
Figure 1



What's more, cement—the critical ingredient that holds concrete together—is itself a major industry. As with construction spending, cement consumption has declined in tandem with the nation economic downturn over the past several years (see Figure 2). Still, with 167 cement kilns and 116 clinker producing plants located across the United States, the Portland cement industry has a huge impact on the national economy.

To estimate the economic impact of the industry, we have utilized the IMPLAN input-output model developed by the Minnesota IMPLAN Group. Input-output models track how spending flows through a

Figure 2



Source: Portland Cement Association

regional, state, or national economy. The estimates include direct, indirect, and induced impacts. Direct impacts are the result of cement producers hiring workers and purchasing inputs from a wide range of vendors. These vendors, in turn, purchase goods and services to support their local operations. For example, the firm supplying gypsum to the kiln hires employees, utilizes inventory-counting services and engages other professional service providers such as accountants—activity that is captured as indirect impacts. Induced impacts track the economic

and fiscal effects of the spending by employees of the cement manufacturers and their suppliers for goods and services.

According to the IMPLAN model, the industry itself directly supported more than 17,000 jobs in 2008. But adding indirect employment from vendors selling to the industry, and induced employment derived from spending by cement and related industry workers, the jobs total exceeded more than 153,000 nationwide (see Table 1). Importantly, these are primarily high-wage jobs generating about $7.5 billion annually in wages and benefits.

Because cement is an important input to the construction sector, the industry's overall economic impact is substantial. According to IMPLAN, in 2008, almost $27.5 billion of America's economic activity, or gross output, occurred in the cement manufacturing industry. What's more, in addition to federal tax payments by the industry and its employees, almost $931 million in indirect tax revenue was generated for state and local governments.

Table 1 only tracks the multipliers from cement manufacturing itself. It does not include the employment, income and fiscal impacts of all the industries that rely on cement as an input, the construction sector being the most obvious. The economic footprint of the cement industry, combined with construction projects made viable by affordable and reliable cement supplies, accounts for millions of jobs and more than $1 trillion of the nation's output.

Table 1

Economic and Fiscal Impacts of Portland Cement Manufacturing in the US 2008

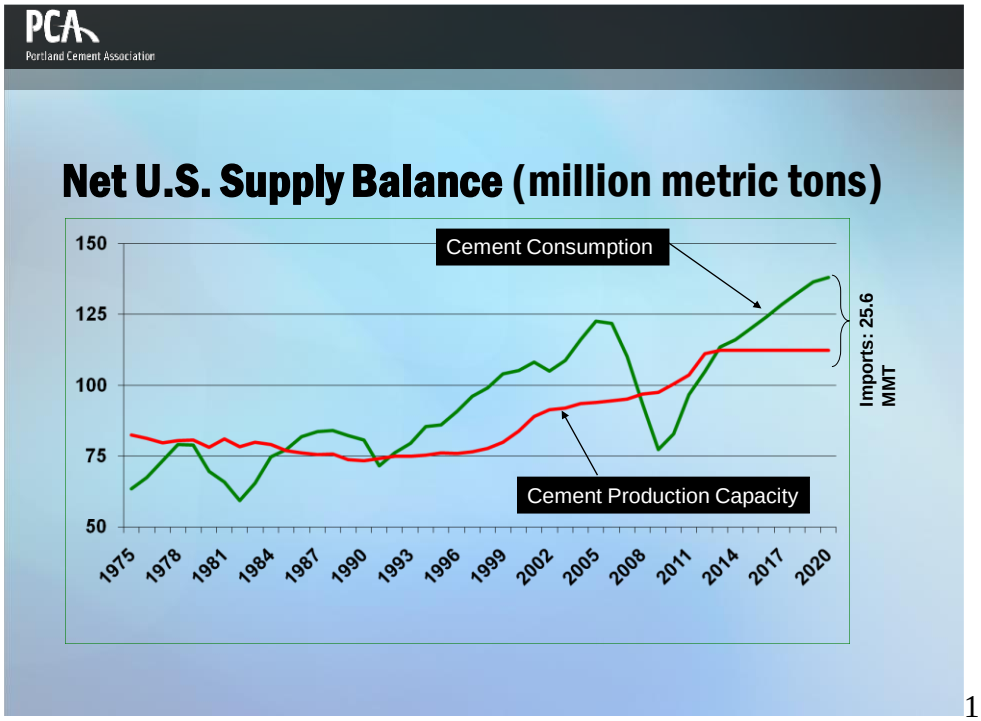
Description	Impact
Economic Activity (Output)	$ 27,441,579,000
Labor Income (salaries, wages, benefits)	$ 7,515,180,000
Employment*	153,259
Other Property Income**	$ 6,039,759,000
Indirect Business Taxes***	$ 930,763,000

* Expressed as number of jobs. ** Includes royalties, rents, dividends, and corporate profits. *** Includes state and local sales and use taxes, property taxes, license and permit fees. Sources: Portland Cement Association, IMPLAN model, authors' estimates.

Cement industry is sensitive to import penetration

Economic data from the recent past demonstrate that the cement industry is highly sensitive to import penetration, particularly in specific regions of the United States with water-borne freight access and appropriate distribution channels. As indicated in Figure 3, consumption of cement increased rapidly between 1998 and 2006 as the economy boomed and the new records were set for residential and non-residential construction. But because of limitations in domestic production capacity and certain environmental regulatory constraints on production expansion, cement shortages occurred and reliance upon imported cement became more prevalent, accounting for about one-fourth of total consumption by 2007.

Figure 3



[1]

Source: Portland Cement Association

With the enormous downturn in the U.S. economy, a significant decrease in demand resulted in declining cement imports between 2007 and 2009, followed by a similar reduction in domestic production, as supply continued to exceed domestic demand. But though long-term commitments to capital funding to increase domestic production capacity (due to the extensive regulatory, permitting and construction timeframe to bring new production online) have risen in recent years—a trend expected to continue through 2012 or 2013—beyond that date, the industry is expected to face enhanced regulatory constraints that will inhibit further capacity expansion (see discussion below). In a worst-case scenario, all incremental cement consumption after 2013 could be from foreign sources, due to the combination of U.S. production closure and further investment for capacity expansion ceases.

Increased regulatory pressure on the cement industry makes imports all the more likely as a mechanism to address any new cement demand attributable to new infrastructure investment. The industry currently operates about 125 import terminals with a capacity of approximately 45 million metric tons.[1] Because weak global economic conditions have reduced freight rates and increased ship availability, relatively modest increases in cost of operations, coupled with deferral of capital investment resulting from regulatory constraints, could result in significant increases in reliance upon foreign sources of supply. When critical commodity production is increasingly outsourced, as the example of petroleum production and the Organization of the Petroleum Exporting Countries (OPEC) amply demonstrates, both economic and security interests are severely undermined.

[1] E. Sullivan, Statement before the House Transportation and Infrastructure Committee, Jan. 22, 2009, available at http://transportation.house.gov.

Current cement investments in environmental protection are significant

The industry has invested millions of dollars in targeted environmental programs over the past several years, including technologies to reduce CO_2 emissions and other air pollutants, minimize waste production, recycle and recover inputs, enhance energy efficiency, and conserve natural resources. For example, Lafarge has improved efficiency by decreasing emissions from 763 to 655 pounds of CO2 for each ton of cement since 1990 and believes it can bring the number down to 610 pounds by the end of 2010.[2] Other manufacturers have similar programs designed to retrofit their kilns with newer technology. However, because cement manufacturers in some other countries have not made the same commitment to CO_2 and other emission reductions, they are able to produce at a lower cost and increase their market share in the U.S. (i.e. because cement, in general, is a homogeneous product, it is also a fungible commodity that competes almost exclusively on the basis of price).

Without substantial use of the flexibility authorized under the Clean Air Act, however, an additional threat to the long-term viability of U.S. manufacturers may well be the recently proposed "NESHAP" rule for Portland cement. Looking to 2010 and beyond, the likelihood that Congress and/or EPA will impose restrictions on greenhouse gas emissions will increase. EPA has already commenced actions that will lead to the regulation of CO_2. These factors mean that the domestic cement industry will find itself facing additional competitive pressures vis-à-vis foreign manufacturers.

[2] Elisabeth Rosenthal, "Cement Industry is at Center of Climate Change Debate," *New York Times,* October 26, 2007.

Rules like the proposed NESHAP can precipitate substantial outsourcing

NESHAP is the acronym for "national emission standards for hazardous air pollutants." Promulgated by EPA, NESHAP rules cover particular air emissions for which the Agency determines a level of pollutant reduction that is achievable with existing technology. The resulting standard is known as the MACT, or "maximum achievable control technology." On May 6, 2009, the EPA proposed a new rule that would establish a new NESHAP for cement kilns. The rules proposed would cover all US cement manufacturing facilities. While it is beyond the scope of this report to evaluate all of the technical burdens related to the proposed NESHAP, or to conduct a legal analysis of the rule, even a cursory examination of the comments docketed by EPA discloses significant concerns regarding the extent to which the proposed rule is achievable in practice by the vast majority of the US cement industry. Concerns have been raised regarding achievability, regional disparities, technological constraints, and even the environmental benefits attributable to the proposal.

It is not the purpose of this report to evaluate technical details of the proposed rule. However, even a cursory examination of expert comments filed with EPA indicates that requiring every U.S. facility to implement proposed control strategies to achieve simultaneous compliance with stringent standards could endanger the viability of the industry particularly in certain regions and localities. Adoption of the proposed rule would make it difficult to raise the capital or maintain sufficient business confidence to modernize existing kilns. The construction of new plants could also be stymied. Even EPA estimates that adoption of the rule will result in $340 million of new costs to the industry and an almost 10 percent drop in U.S. cement production. And the EPA estimates probably understates the true compliance costs, because

there is no experience on which such estimates can be based—i.e., no cement manufacturing plant has ever attempted to meet these four distinct emission standards simultaneously.

There can be little doubt that regardless of the total impact of the NESHAP rule, substantial pressure to rely upon foreign sources of cement supply will result. A recent review of the literature by the respected environmental economics group Resources for the Future declared flatly that, "several studies suggest a link between pressure on firms in industrialized countries to reduce emissions and the outsourcing of production."[3] In another recent review, the Congressional Research Service found that industries that "face a competitive market (sometimes international in scope) both in terms of producers of the same products and producers of substitute products…are price sensitive" and "therefore any increase in manufacturing costs hurts the competitiveness" of such industries.[4] Expert testimony from construction, building materials, and cement industry sources offered at recent EPA hearings all confirm the concern that the proposed rule "would drive…the industry offshore."[5] This prediction seems fully consistent with reports on the impact on the cement industry of past regulatory initiatives. For example, as one consumer organization told EPA, *Business Week* listed factors that "exacerbate the high prices and shortages" for cement and concrete products: high among them were "regulations that make it tough for cement manufacturers to increase capacity."[6] Some studies have shown that the

[3] M. Vandenbergh and M. Cohen, Climate Change Governance: Boundaries and Leakage, RFF Discussion Paper 09-51 (Nov. 2009) at 34.
[4] L. Parker & B. Yacobucci, Climate Change: Costs and Benefits of the Cap-and-Trade Provisions of HR 2454, Sept. 14, 2009, at 83.
[5] C. Whetzel, Proposal Will Devastate Cement Industry, Drive Plants Offshore, Officials Tell EPA, (BNA) Daily Environment Report, June 17, 2009, at A-17.
[6] Letter from T. Deas to L. Jackson, Comments of EmPower Consumers (Sept. 4, 2009), citing P. Coy, A Concrete Problem: Middle-Income Housing, Business Week, June 9, 2006, at http://www.businessweek.com/the_thread/hotproperty/archives/2006/06/a_concrete_prob.html.

overall impact of regulations can add as much as 20 to 35 percent to the price of end-use projects.[7]

In the case of the NESHAP proposal, because the EPA rule would not go into effect until 2013, domestic cement manufacturers are unlikely to make capacity-enhancing investments until the rule is finalized. If that process takes two years, manufacturers will wait until then to make decisions about expanding capacity. In the interim, no new investments are likely to occur. Second, it is hoped that by 2011 the national economy will be firing on all cylinders. Once economic recovery begins to stimulate demand in the building-materials sector, and as domestic supply is reduced, builders may then have little choice but to rely upon increased purchases from abroad. In a worse-case scenario, domestic producers would then lose pricing power and consumers would become potentially subject to cartel-like pricing. The nascent national economic recovery has already started to swell America's perennial trade deficit. Increasing our reliance on cement imports in the years ahead will only serve to worsen this serious economic imbalance.[8]

Not only would enhanced import reliance undermine economic recovery, it would also greatly diminish environmental benefits. To the extent the NESHAP rule pushes production of cement out of the United States to countries whose kilns have greater carbon footprints and higher emissions of conventional pollutants, the result would be a net increase in the global emissions of CO_2 and other pollutants. In addition, because transporting the product to the U.S. will require the use of fossil fuels, the amount of carbon emissions per unit of cement used in this country would increase significantly. At the same time, increased releases of mercury and

[7] Increasing Affordable Housing and Expanding Homeownership, Real Estate Services, March 12, 2005, at http://kaktus.com/wordpress/real-estate-articles/increasing-affordable-housing-and-expanding-homeownership/.
[8] The U.S. trade deficit grew to $40.2 billion in December, its widest point since January 2009, on a sharp jump in imports.

hydrocarbons from less-controlled facilities overseas will simply add to the global pool of these substances in the biosphere, thereby subverting the purported goals of the proposed EPA rule.

National economic consequences: direct and upstream threats to economic recovery

In order to address the significant economic downturn in the United States over the last several years, policy makers have adopted a suite of policies designed to stimulate the economy. These policies include an uptick in direct infrastructure investment. Irons (2009) observed that a "recovery package that focused on job creation through infrastructure investment could help reduce the severity and length of the job market downturn."[9] DOT and Standard & Poors-DRI data also demonstrate "clear economic benefits" from infrastructure investments, with each dollar invested in highway construction yielding $1.80 in additional gross domestic product and each billion dollars in investment supporting almost 40,000 jobs.[10] Unfortunately, by imposing higher direct economic costs, stimulating outsourcing, and thereby increasing cement imports, proposed rules like the NESHAP can work at direct cross-purposes to economic recovery.

a. *Direct economic impacts: income and job losses within the cement sector*

The U.S. is slowly recovering from the most serious economic downturn since the 1930s. Many bellwether companies have been forced into bankruptcy, home prices have fallen on average more than 20 percent, the equity markets remain 35 percent below their 2007 highs, and in excess of 15 million workers are currently unemployed. As a consequence of what has come to be called the Great Recession of 2008-2010, household net worth has declined by more than

[9] J.S. Irons, Statement before the House Transportation and Infrastructure Committee, Oct. 29, 2008, available at http://transportation.house.gov (research and policy director, Economic Policy Institute).
[10] T. Donohue, Statement Before the House Transportation and Infrastructure Committee, Jan. 22, 2009, available at http://transportation.house.gov (US Chamber of Commerce findings predicated on Standard & Poors-DRI and US DOT data).

10 trillion dollars, home foreclosures have more than doubled, and personal bankruptcy filings have increased 100 percent over the past 18 months (see Figures 4, 5 and 6).

Figure 4

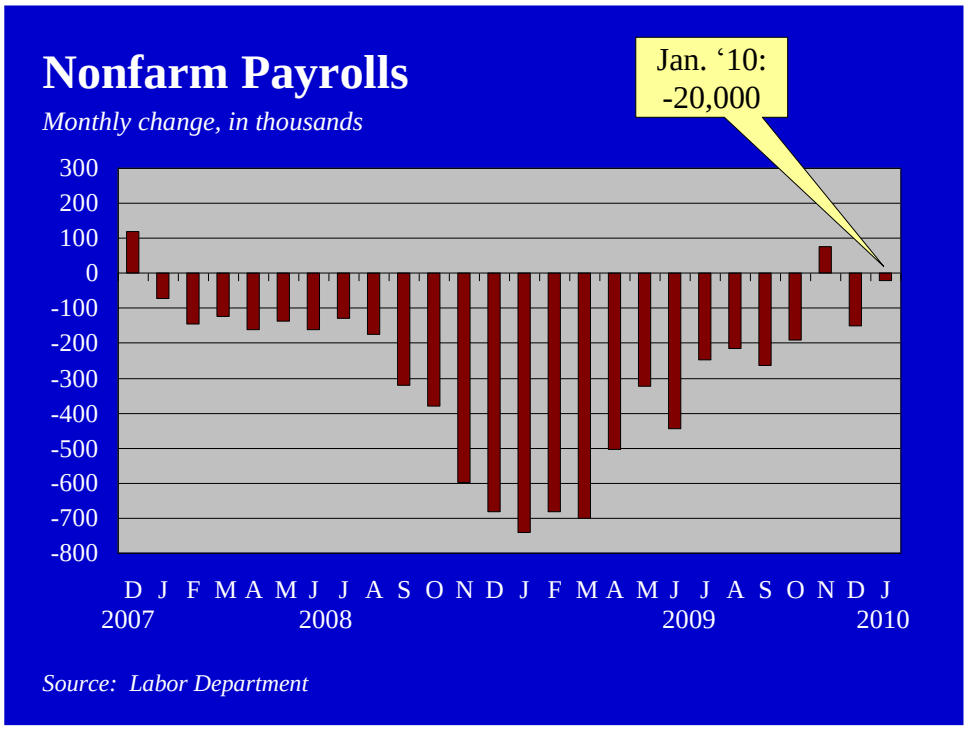


Figure 5

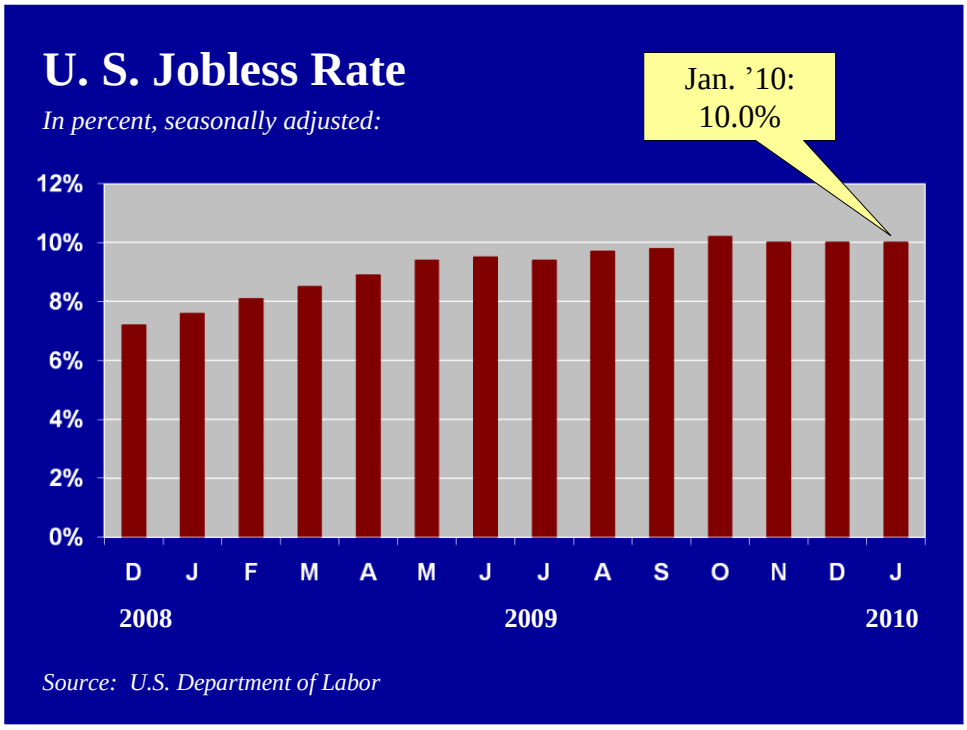
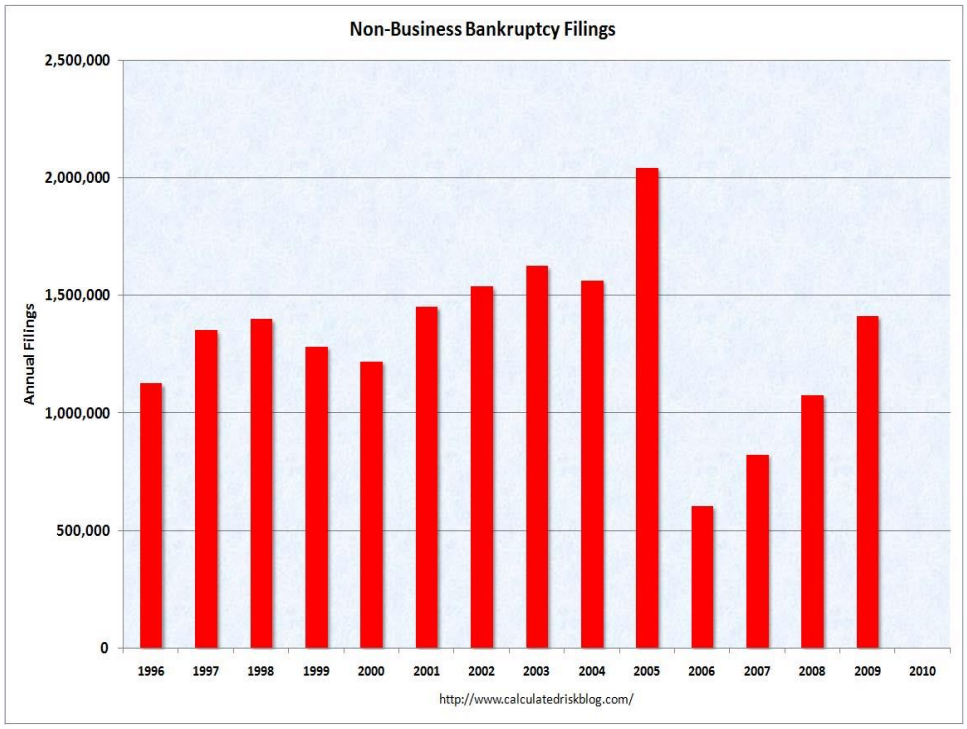


Figure 6



As discussed above, the U.S. cement industry employs tens of thousands workers and provides a product that is critical for America's rebuilding and economic recovery. Further, cement manufacturing has strong backward and forward linkages with other key industries. The IMPLAN input-output model indicates that for every job lost in the cement industry, another eight will be lost across the economy. Put differently, should 10 percent of the domestic industry disappear, the direct, indirect and induced job losses would exceed 15,000. And this figure doesn't include possible job losses in the huge construction sector that might occur in the face of higher concrete prices.

Case Study: Harleyville, South Carolina

Uncertainty about the proposed rule is already altering industry behavior. In 2006, Lafarge North America announced plans to expand and modernize its cement production facility in Harleyville, South Carolina. In response to the county and state offering $9 million in incentives, Lafarge had intended to invest up to $291 million in new plant infrastructure and equipment. Not only would this expenditure have supported several hundred temporary construction jobs, but the expanded facility would have required the addition of 18 new permanent jobs and allowed the company to retain the 112 positions already in place.

But shortly after the NESHAP rule was proposed in early 2009, Lafarge shelved the planned expansion at the Harleyville site. After looking at the incremental capital and operational expenditures that would be required to meet the proposed NESHAP standards, the company determined that a more cost-effective strategy would be to import cement through the

nearby Port of Charleston to meet future incremental customer demand in the southeastern United States. With a median household income in Harleyville 15 percent below the statewide median, and 25 percent below the national median, the relatively high-paying jobs that would have come from the Lafarge project will be sorely missed.

b. *Upstream impacts*: *making future infrastructural stimulus investments less effective*

As discussed, the ARRA—also known as the 2009 stimulus program—set aside some $150 billion for new infrastructure spending and repair. A second round of infrastructure spending to help bolster the sluggish economy may be forthcoming in 2010, and there is a strong likelihood of future rounds of such spending over the next several years. To the degree that uncertainty regarding the proposed NESHAP rule deters capital investment in domestic facilities, and to the extent the purchase of cement therefore comes increasingly from foreign sources rather than from domestic production, the real economic impact of stimulus programs in the medium- and longer-term for US manufacturing jobs will be diminished. Even if current rounds of stimulus investment merely draw down on existing supplies, such shifting of capacity overseas will undermine the effectiveness of future efforts to use infrastructure investment as a tool to enhance economic growth.

In explaining the way infrastructure investments stimulate the economy, it is useful to make a distinction between direct effects (such as constructions jobs, planning and design, and the like), upstream effects (like stimulating the manufacturing of and demand for cement and concrete), and longer-term effects (like the return on investment in enhanced commerce over renewed highways, waterways, and other arteries). This second category – upstream effects – is a key factor in assessing the multiplier effect associated with infrastructure investment.

According to Irons (2009), a major portion of upstream jobs created by infrastructure investment are in the manufacturing sector. The Operating Engineers and the Carpenters unions put the matter simply: "A spike in construction will provide a greater demand for construction supplies."[11] Hampering this upstream component of infrastructure investments can result in a significant decrease in the number of jobs created by federal stimulus activities. Irons (2009) estimates that every 1,000 jobs created through investment in construction supports 610 total upstream jobs. Therefore, significant outsourcing of cement production capacity places almost 40 percent of the upstream jobs of certain projects at risk.

[11] National Construction Alliance, Statement Before the House Transportation and Infrastructure Committee, Jan. 22, 2009, available at http://transportation.house.gov (R.J. Poupore, executive vice president).

Summary and conclusion

The cement industry is one of the pillars of America's economy. Cement is the essential ingredient in concrete, a ubiquitous building material that is the second most consumed product globally after water. Concrete is the foundation of the nation's infrastructure and is utilized in the construction of roads, homes, commercial buildings, dams and levees.

Cement manufacture by itself generates more than $27 billion annually in economic activity while supporting 153,000 jobs across America. But the total economic footprint of the cement industry, combined with construction projects made viable by affordable and reliable cement supplies, probably accounts for millions of jobs and more than $1 trillion of the nation's output.

As discussed above, the proposed rule has the potential to decimate the industry by forcing the closure of numerous cement kilns that will be unable to comply with the costly new directives. Thousands of jobs could be lost and cement production would likely be outsourced to overseas production. The employment impact of the infrastructure component of future economic stimulus programs can be impaired by as much as 40 percent if construction materials are produced abroad. The proposed rule would undermine the balance between environmental protection and economic viability of the cement industry. EPA should rethink its approach by designing a rule that more closely approximates what is achievable in practice and in all regions of the United States. Such a rule better achieves the balance of environmental and economic protections contemplated by the Clean Air Act.