

# **Encouraging Modernization of the Industrial Sector and Other Energy-Saving Capital Investments through Tax Reform**

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## **ACEEE Tax Reform Working Papers**

This is the fifth in a series of working papers on tax reform issues related to energy efficiency that ACEEE is preparing in 2012. We welcome feedback on this working paper. Send comments to [taxreform@aceee.org](mailto:taxreform@aceee.org).

UPDATE: A summary report on this and the other working papers was published in February 2013 and is available at <http://aceee.org/research-report/e132>.

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## Executive Summary

Much of the equipment and production processes in America's factories are decades old and not as efficient as modern equipment and processes in use by many of our international competitors. While some factories have been modernized, many have not. Modernizing these factories will allow them to better compete in world markets by improving product quality and reducing product costs, including through reduced energy use. Modernization of our factories will build on several competitive advantages the U.S. now has—low electric and natural gas prices (relative to the rest of the world) and lower labor costs due to higher productivity.

As we emerge from the Great Recession, many industrial firms have capital to invest, but a nudge from the tax code could spur substantial additional investments here in the U.S. We suggest three possible tax policies that could spur investment. All are designed to be low cost in order not to add much to the federal budget deficit and to address a desire by many tax reform proponents to reduce tax rates by reducing tax expenditures. The three policies are:

1. Provide a low tax rate for repatriation of company profits *provided* these repatriated profits are used to increase a company's capital investments relative to their average capital investments in recent years. This provision would apply to multinational firms with substantial profits now parked abroad.
2. Allow accelerated depreciation on increased capital investments in production capacity, allowing companies to reduce their near-term taxes. If depreciation periods were cut in half, the amount of the incentive would be similar to the incentive on repatriated profits discussed above.
3. Provide repayable tax incentives for increased capital investments. The credit would be taken on taxes in the year the expenses were made, but then the credit would be paid back to the Treasury in subsequent years. A credit of 35% of the amount of the capital investment increase that is repaid over ten years would provide about the same incentive as the other two approaches.

We recommend that at least two of these approaches be enacted. The first approach would benefit only large multinational firms, while second and/or third approach should be included in order to benefit firms that primarily serve the domestic market. A firm would only be able to use one of the approaches.

For the commercial sector, a different approach is needed, since much of capital investment is for land and buildings and not for energy-consuming systems. We suggest an option to provide accelerated depreciation for purchases of high-efficiency equipment in the commercial sector, where "high efficiency" means equipment that meets energy efficiency specifications set by the Federal Energy Management Program (FEMP).

For all of these incentives, the costs to the Treasury are low, but the advantages in terms of energy savings and more competitive U.S. manufacturers would be substantial for years to come.



## Introduction

The energy efficiency of a nation's manufacturing base has been shown to be directly correlated with the vintage of the process equipment. Thus one of the policy strategies to increase the efficiency of the manufacturing sector is to modernize the manufacturing base (Laitner et al. 2012). The United States is poised to enter a period of major modernization that offers the promise of important improvements in the energy efficiency of our manufacturing base (Russell and Young 2012).

This opportunity results from a conjunction of market events that are making the U.S. an attractive global market for manufacturing. Changes in U.S. energy markets, particularly the emergence of bountiful natural gas from non-conventional production, have made our country a low-cost energy manufacturing destination. This attractive energy outlook combines with high levels of labor productivity and a history of innovation to create an attractive environment for investments in manufacturing capacity, both for domestic and export markets (Russell and Young 2012; BCG 2012). As the economy recovers, the existing manufacturing base, which has shrunk as a result of the recent economic downturn, will be stretched to meet expanding demand. This will put greater pressure on manufacturers to invest in additional production capacity. Projections for manufacturing sector investments are in the hundreds of billion dollars, with the potential in the chemical industry alone approaching \$100 billion in 91 major projects (Krauss 2012).

Unfortunately there is no assurance that these investments will be made in the U.S. While market fundamentals appear strong, access to capital remains a challenge to many companies as a result of continuing weakness in the U.S. financial sector and uncertainty about the global economic outlook. While some point to the high level of cash holding by many companies, industrial leaders have indicated that they see these reserves as insurance against a return to economic difficulties.

Thus, policies that promote investments in modernization of the industrial capacity would appear timely. Our country faces a once-in-a-generation opportunity to revitalize our manufacturing sector with the employment and economic benefits that would result. Now is the time to consider implementing these policies.

While direct incentives for industrial modernization and other capital investment have been the policy response in the past (e.g., bonus depreciation provisions enacted over the past decade), given the large federal budget deficit the cost to the federal Treasury has largely taken this option off the table. As a result we need to explore alternative policies that minimize the cost to the Treasury.

This white paper will explore policies that could promote investment in modernization of the industrial sector and other energy-saving capital investments that do not involve direct investment incentives.

## Keeping Costs Down

Among the policy options to consider for promoting investments in modernization are tapping into non-tax-based sources of capital or involving some form of repayment to the Treasury of the funding so that costs to the Treasury are low. In the following sections we discuss three such options:

1. Allowing foreign profits to be repatriated without tax, or with low taxes, if the money is applied to acceptable capital investments;
2. Accelerated depreciation for such capital investments; and
3. Repayable tax incentives.

An example of the first option is to encourage multinational corporations with substantial overseas profits to repatriate these funds to invest in their domestic operations. The second and third options would benefit all companies. We recommend that companies be required to choose only one option—there should be no “double dipping” allowed. Before discussing these options, we first turn to a discussion of “acceptable” capital investments.

## Acceptable Capital Investments

Capital investments by U.S. are substantial, with investments by non-farm businesses totaling about \$1.1 trillion in 2010. Over the prior decade, annual capital investments ranged from just under \$1 trillion to not quite \$1.4 trillion (Census 2012). If all capital investments were eligible for special treatment, the first trillion dollars of special treatment would go to investments that would happen anyway—a large cost to the Treasury without any significant benefits. Instead, special treatment should be limited to increases in capital investment relative to some base period. As a starting point for discussions, we suggest a rolling base period based on a firm’s average capital investments over the previous three years, adjusted for mergers, acquisitions, and divestitures. Multiple years are needed to reduce sudden changes in the baseline but the baseline period should be short enough to make it easy to calculate and to reduce the impact of the Great Recession as a consideration. New firms would be able to credit all investments in their first year, and increases above their one-year and two-year averages for the next two years. Rules would be needed to handle subsidiaries, in order to discourage formation of new companies just to take advantage of the tax break. For example, subsidiaries should be credited to the firms that own them. Where there are multiple owners, ownership shares can be used to credit the various owners.

There are questions regarding whether all capital investments should receive encouragement, or just certain types of capital investments, or investments in certain sectors, such as industry. We recommend concentrating these incentives on manufacturing<sup>1</sup> because modernizing capital investments in industry have been shown to offer significant energy efficiency benefits, reducing the intensity of manufacturing while making these facilities more globally competitive (Laitner et al. 2012). However, later in this paper we do advance a specific, more targeted proposal for the commercial sector. We also recommend limiting special treatment to capital equipment and not real estate; buildings owned by industrial firms should be subject to the same treatment as buildings owned by commercial firms.

Another question is whether, from an energy efficiency point of view, should all capital investments be included or just ones that meet a specific definition of “energy efficient”? In industry, most capital

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<sup>1</sup> While the primary focus of this provision is the manufacturing industry, we encourage looking at including other capital-intensive industries such as agriculture, mining and construction.

investments will be for process equipment. The energy efficiency in processes results from the overall configuration of the process, not in the efficiencies of the individual components alone. When new capital is invested in industry, most of these systems will be more efficient than the systems they replace (due to steady improvements in equipment and system design in recent decades) and thus, at least in industry, allowing all capital investments in process equipment to qualify makes sense. In the commercial sector, while efficient systems design is important, there is also a lot that can be done with more efficient equipment, as we discuss below.

## **Repatriation of Profits for Increased Capital Investments in Manufacturing**

According to a May 2011 JP Morgan Chase study, about \$1.4 trillion in foreign profits are held overseas by U.S.-based firms (Hirsch 2011). A 2012 Bloomberg study estimates that about \$1.2 trillion is held overseas by about 70 of the very largest firms (Rubin 2012). If these profits are repatriated to the U.S., they are subject to corporate income taxes, taxes that average about 25% for all U.S. businesses (Markle and Shackelford 2011). The tax rate for large multinationals is probably less since they generally have very sophisticated accounting departments that have figured out many ways to legally reduce their taxes.

These multinational firms and some economists have argued that we should eliminate or reduce taxes on repatriated profits in order to encourage U.S. firms to bring this money home and benefit the U.S. economy. In 2004, there was a one-year special program to allow overseas profits to be repatriated home and be subject to only a 5.25% tax rate. This experience was reviewed in a Congressional Research Service (CRS) report (Marples and Gravelle 2011). Citing a variety of sources, they found that some \$312 billion was repatriated to the U.S. under the program. A total of 843 firms claimed the special treatment for repatriations, out of roughly 9,7000 eligible corporations. 32% of the repatriations were by the pharmaceutical industry. The top ten firms across all industries accounted for 42% of the repatriations.

Independent studies found small and statistically insignificant impacts on both domestic capital investments and employment. Rather, some empirical evidence suggests that the repatriations were used primarily to return money to shareholders through stock repurchase programs. Under the 2004 program, the repatriated money could be used for nearly any purpose. Marple and Gravelle end their study by noting that an option for future application is to tie any special tax benefits for repatriation to increases in desired activity such as domestic employment, wages, or investment.

Thus, repatriation could provide a source of capital needed for investments in the U.S., but building on the CRS suggestion, guidance should be provided on how the money must be used in order to earn a tax break. We suggest that one way to encourage increased domestic capital investment is to have a reduced tax rate (perhaps the same 5.25% used in 2004) for profits that are invested for increased capital investment in industry, relative to a base period. Such a provision would encourage U.S. firms to increase domestic investments. They will still invest overseas, but with lower tax rates for repatriated profits, they would be encouraged to invest more in the U.S.

## Accelerated Depreciation for Increased Capital Investments in Manufacturing

A provision giving special treatment for multinational firms would not provide any benefit for firms that only do business in the U.S.—another provision would be needed to encourage capital investments by these firms. However, as noted above, for any provision to move forward given the current budget situation, the cost to the Treasury needs to be kept very low.

Based on this consideration, we recommend that accelerated depreciation be considered for increases in capital investment relative to a base period. Accelerated depreciation allows firms to increase their depreciation expenses in the initial years after an investment, reducing their taxes. However, if more of an asset is depreciated in the early years after an investment, depreciation will be lower in later years, increasing taxes. Under federal budget scoring rules, the short-term costs and long-term income are added together, allowing accelerated depreciation to have a long-term cost of essentially zero.<sup>2</sup>

From 1981–1986, accelerated depreciation was part of the tax code, with assets assigned to 3-, 5-, 10-, and 15-year recovery periods. However, this system was ended in 1986 as part of the agreement for broadening and simplifying the corporate tax code.

More recently, as part of economic stimulus legislation enacted in 2002 and extended several times, a portion of capital investment can be accelerated into the first year, with the rest depreciated over the normal lifetime. Such *bonus depreciation* originally covered 30% of the investment cost. It was increased to 100% in 2010 and reduced to 50% for 2012. Under current law, bonus depreciation ends Dec. 31, 2012. We could not find any studies on the impacts of accelerated depreciation in the 1980s or any studies on the bonus depreciation provisions that have been in effect for the past eight years. However, the Congressional Research Service reviewed two studies on bonus depreciation from the 2002–2004 period and found that “[t]akeup rates for those allowances were lower than expected and only 10% of firms taking them said that the allowances played a decisive role in their investment decisions.” This limited impact is likely due in part to the temporary nature of the incentive and to the fact that only some investments were incented (Guenther 2012). The Tax Policy Center (a joint project of the Urban Institute and the Brookings Institution) elaborate a little on the short-term nature of the incentives, stating: “Businesses may have expected that Congress would extend the provisions, thus blunting their incentive to speed up investment. It takes time for businesses to make major investments, making it hard to fit them into specified time periods. Finally, many businesses may have had too little income to offset with these additional tax benefits, a problem that is especially acute during economic downturns” (Tax Policy Center undated).

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<sup>2</sup> This statement applies to long-term analyses of federal spending. For some analyses, only spending and savings are considered for ten years and considerations beyond ten years ignored. Under such a short-term window, accelerated depreciation will have costs since a portion of the repayment will be outside of the ten-year “scoring window.” However, many of the devices that can be used to decrease long-term deficits have large impacts beyond ten years—for example, raising the retirement age. We expect the ten-year window to be used less in the future than it has in the past.

Accelerated depreciation, including bonus depreciation, can be expensive. We are not proposing accelerated depreciation for all capital investments. Instead, to complement the repatriation provision discussed above, we are suggesting that accelerated depreciation cover increases in capital investment relative to the base period. To keep it simple, we suggest that normal depreciation periods be cut in half for such investments. Another option would be to use the 3–15 year depreciation periods that applied in the early 1980s.

## Repayable Tax Incentives

Repayable tax incentives represent another strategy to encourage investments while limiting the long-term costs to the Treasury by requiring recipients to repay the tax incentive over time as benefits are realized. The initial credit helps reduce the upfront cost of the investment, and the latter payments reduce the cost to the Treasury. For example, if a business receives an initial tax credit of \$100,000 on a combined heat and power (CHP) system the year the system was placed into service, they might repay the federal credit at the rate of \$20,000 per year over the next five years. The initial credit encourages the investment, and the subsequent repayments channel the value of some of the energy bill savings back to the federal government, so that the long-term cost to the federal government is very low—just defaults plus interest costs. Essentially this would be a zero-interest loan.

In this context, we suggest that for increases in capital investment over the base period, a business receive an initial 35% investment tax credit. This percentage was chosen to have a value similar to the other provisions (our analysis is presented in the next section). Recipients of this credit would then repay the credit over the following ten years. Businesses already track past investments and depreciation from year to year when compiling their annual taxes. Tracking repayments would be very similar.

This idea has already begun to circulate in Congress. In 2011, Senator Shaheen from New Hampshire circulated a draft bill that would provide a repayable tax incentive for CHP systems. Under the proposal, an incentive would be given to electric utilities that finance CHP systems. The amount of the incentive would then be repaid to the Treasury through an annual installment payment paid by the customer who owns the CHP system equal to the amount of the subsidy divided by an installment period, specified in years. In the draft Shaheen bill, the installment period is 3 years (e.g., the customer repays the subsidy over 3 years) but payments don't begin until the third year after the subsidy is paid (i.e., the customer repays nothing for the first two years, then repays one-third of the subsidy each year for the next three years). However, this particular proposal is complicated by the fact that the electric utility would receive the tax incentive, but the business that hosted the CHP system would make the repayment, resulting in some tricky legal issues. These issues would be much more limited if the same firm received the credit and then made the repayments.

Under current federal procedures for “scoring” the cost of tax expenditures, costs and income are estimated for each year, as well as a simple total, without any discounting. Thus a \$100,000 expense followed by five years of \$20,000 repayments would be scored as zero over the life of the program. There would, however, be some small cost risk to the Treasury based on the potential for businesses or individuals to go bankrupt before they fully repaid their obligation.

## Comparison of the Options for Manufacturing

Each of these approaches attempts to achieve the same goal of increasing investments, but through different mechanisms. Repatriation taps into funds that are a new source of investment. Accelerated depreciation and repayable incentives both provide reductions in taxes for businesses that do not have overseas profits they could repatriate. Accelerated depreciation and repayable incentives are different ways of achieving essentially the same goal and we recommend that only one of these options be enacted to complement repatriation. A business eligible for both repatriation and either accelerated depreciation or a repayable incentive would need to pick just one—“double dipping” should not be allowed. A rough quick comparison of the choices is provided in Table 1, based on simple assumptions. This comparison indicates that the repatriation may be a little more generous than accelerated depreciation or the 35% refundable tax incentive, but all three are similar. However, specific businesses may have reasons to prefer one over the other.

**Table 1. Comparison of Repatriation, Accelerated Depreciation, and a Repayable Tax Incentive for an Illustrative Firm and Investment**

Investment (millions)		\$	10.00		
Marginal tax rate			20%		
Current depreciation period (years)			10		
Annual discount rate (nominal)			10%		
	Repatriation	Accel. Deprec.	Repay. Incent.	Notes	
Avoided taxes (million \$)	\$	1.50			Reduce rate from 20% to 5%
PV current deprec			\$6.14		
PV halving deprec			\$7.58		
Value of halving deprec.			\$1.44		PV current - PV halving
Credit				\$	3.50 35%
PV of repayments					\$2.15 PV of repayments over 10 yrs
Net value of credit					\$1.35 Credit - PV of repayments

## Accelerated Depreciation for Purchases of Energy-Efficient Equipment, Primarily in the Commercial Sector

The discussion so far has focused on increasing capital investments in manufacturing. Promoting increased capital investments by industry is likely to improve energy efficiency as new industrial equipment and systems are generally more efficient than existing equipment. For the commercial sector, a different approach is needed.

The majority of capital investment is for “bricks and mortar,” where energy efficiency is less of a consideration. As discussed previously, allowing accelerated depreciation or other special treatment for increased capital investments in the commercial sector would promote construction and perhaps real estate speculation, but have only a modest impact on energy efficiency. In order to better target accelerated depreciation for the commercial sector, we recommend that it apply only to energy-efficient equipment, where “energy efficient” is defined as meeting the energy-efficient specifications

developed by the Federal Energy Management Program (FEMP) for federal facilities. Accelerated equipment should also be allowed for the same equipment in the industrial sector, even if total capital investment does not increase.

FEMP has been identifying efficient equipment for federal purchasers for more than a decade. They use ENERGY STAR specifications for some equipment, and for other equipment have developed their own specifications. In general, the aim of both FEMP and ENERGY STAR have been to identify the roughly top quartile of equipment as energy efficient. As of this writing FEMP has efficiency specifications for 67 types of equipment. These are listed in Figure 1. We recommend that the same accelerated depreciation periods be used for energy-efficient equipment—half of conventional depreciation periods. By offering more rapid depreciation for efficient equipment relative to standard efficiency equipment, more businesses will be encouraged to purchase efficient equipment when existing equipment needs to be replaced.

Figure 1. FEMP Guidelines for Procuring Energy-Efficient Products

## Procuring Energy-Efficient Products

Federal mandates require that Federal agencies purchase energy-efficient products. To help agency buyers meet these requirements, the Federal Energy Management Program (FEMP) maintains a list of FEMP-designated and ENERGY STAR®-qualified product categories found frequently in Federal facilities. Refer to the legend to see which program covers each product category. For more information on these products and requirements, visit [www.femp.energy.gov/coveredproducts](http://www.femp.energy.gov/coveredproducts).

### Legend of Energy-Efficient Product Programs

- ENERGY STAR
- ▲ FEMP-Designated
- ◆ Low Standby Power
- Electronic Product Environmental Assessment Tool (EPEAT)



### Heating & Cooling (Space & Water)

#### Commercial Space Heating and Cooling

- Boilers ▲
- Central Air Conditioners ■
- Chillers
  - Air-Cooled Electric ▲
  - Water-Cooled Electric ▲
- Air Source Heat Pumps ■

#### Commercial Water Heating

- Gas Water Heaters ▲

#### Residential Space Heating and Cooling

- Room Air Conditioners ■
- Central Air Conditioners ■
- Boilers ■
- Fans
  - Ceiling ■
  - Ventilation ■
- Gas Furnaces ■
- Heat Pumps
  - Air Source ■
  - Ground-Source ■

#### Residential Water Heating

- Electric Resistance Storage ▲
- Heat Pump ■
- Gas Condensing ■
- Storage ■
- Whole-Home Tankless (Instantaneous) ■
- Solar ■



### IT & Electronics

#### Information Technology

- Computers
  - Desktops and Workstations ■◆●
  - Notebooks and Integrated Computers ●
- Displays and Monitors ■●
- Enterprise Servers ■
- Imaging Equipment
  - Copiers ■
  - Digital Duplicators ■

- Fax/Printer Machines ■◆
- Mailing Machines ■
- Multifunction Devices ■
- Printers ■
- Scanners ■

#### Electronics

- Audio/Video ■
- Televisions (TVs) ■
- Battery Chargers ■
- Cordless Phones ■◆
- Set-Top and Cable Boxes ■



### Lighting

- Exterior Lighting ▲
- Fluorescent Ballasts ▲
- LED Lighting (Commercial) ■
- Light Bulbs
  - Compact Fluorescent (CFL) ■
  - Light Emitting Diodes (LED) ■
- Luminaires
  - Fluorescent ▲
  - Downlight (Commercial) ▲
  - Industrial (High-Bay) ▲
- Light Fixtures (Residential) ■
- Decorative Light Strings ■



### Commercial Food Service Equipment

- Dishwashers (Commercial) ■
- Fryers ■
- Griddles ■
- Hot Food Holding Cabinets ■
- Ice Machines
  - Air-Cooled ■
  - Water Cooled ▲
- Ovens (Commercial) ■
- Refrigerators and Freezers (Commercial) ■
- Steam Cookers ■
- Pre-Rinse Spray Valves ▲
- Beverage Vending Machines ■



### Appliances

- Clothes Washers (Commercial) ■
- Clothes Washers (Residential) ■
- Room Dehumidifiers ■
- Dishwashers (Residential) ■
- Refrigerators (Residential) ■
- Freezers (Residential) ■
- Room Air Cleaners and Purifiers ■



### Other

#### Building Envelope

- Cool Roofing Products ■
- Windows, Doors, and Skylights ■

#### Additional Guidance

- Centrifugal Pumping Systems
- Lighting Controls

#### WaterSense Plumbing

- Faucets, Showerheads, Toilets, and Urinals

#### Suspended Categories

- Electric Motors
- Distribution Transformers
- Fluorescent Tube Lamps

#### Miscellaneous

- Water Coolers ■

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## Next Steps

This paper suggests several concepts to promote investment that would result in greater energy efficiency, but additional research and analysis are needed to determine how attractive these provisions would be for businesses. There is also the need to determine the distribution of costs and benefits to the federal Treasury. There will be near-term costs, with increased tax collections in later years after equipment is depreciated. But a focus on the role of investments as a strategy to improve the efficiency of the economy represents an important policy frontier.

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