Industrial Energy Efficiency and Tax Reform

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Contributors

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Executive Summary

The federal tax code has provided some incentives to encourage energy efficiency since the 1970s. Currently, there are several provisions within the tax code that encourage energy efficiency in the residential and commercial sectors, and to a lesser extent, the industrial sector, but as a whole, the tax code does not prioritize investments in energy efficiency.

In recent months, the discussion of corporate tax reform has increased suggesting that significant changes to the tax code may be on the horizon. President Obama, the Republican presidential nominee Romney, and Congressional leadership have all been calling for fundamental tax reform. Such tax reform presents an excellent opportunity to enact new policies that support energy efficiency investments. In this report, we provide an overview of the current tax code as it relates to industrial energy efficiency and an analysis of the potential for tax reform proposals currently under consideration to impact the use of energy in the industrial sector.

Specifically, we are interested in the potential of new tax structures to increase investments by the industrial sector in energy efficiency compared to more traditional mechanisms such as targeted tax incentives, taxes on energy use, and taxes on pollution. Lowering the corporate tax rate and broadening the base by eliminating tax expenditures while not prioritizing energy efficiency has the potential to improve energy use at the margin through the benefits that accrue through industrial modernization. The same is true with different forms of accelerated depreciation such as Bonus Depreciation and 100 percent first year expensing, though perhaps to a lesser extent.

By contrast, less drastic changes to the tax code can have a more significant impact on investments and targeted incentives can accelerate natural market forces that drive investments in energy efficiency. It is unlikely, however, that any of these tax schemes will impact the use of energy as much as an energy or pollution tax. While not currently part of the national tax policy discussion, these concepts are still on the minds of many and could be combined with concepts such as lowering the corporate tax rate, eliminating tax expenditures in some type of grand bargain that fulfills the goals of tax reform.

This report begins with an examination of the fundamentals of corporate taxation. Next, an explanation of cost recovery is provided before moving on to the details of depreciation, tax expenditures, and how the current tax code treatment affects U.S. corporations. All of this information provides the basis to understand the proposals mentioned above and how each has the potential to impact industrial modernization and, by extension, the efficient use of energy. We compare and contrast broad-based changes to the tax code against incremental changes. The effects of a tax on energy or pollution are provided as a contrast to both.

After examining the potential of each proposal to drive industrial modernization, we discuss how each concept might by itself, or in combination with other concepts, be part of a restructured tax system. The report concludes with a summary of the potential of different tax proposals to impact energy use and then offers a set of guidelines and recommendations for changes to the tax code in a way that is likely to have the greatest impact on energy consumption by industry.

Introduction

The primary purpose of taxes is to fund government operations. Nevertheless, the Internal Revenue Code is replete with provisions, known as "tax expenditures," that have been enacted to promote various economic or social goals. Some of these provisions are broad based, impacting a broad swath of the tax base. Other provisions are targeted tax incentives intended to promote particular activities or investments.

Several targeted tax expenditures exist that apply to energy production but relatively few apply to energy efficiency, particularly in the industrial sector. The purpose of this report is to discuss, in light of the potential for tax reform, the framework for providing effective tax incentives for industrial investment in energy efficiency.

Energy efficiency investments reduce energy consumption in a cost-effective manner and are associated with a host of benefits to society, from job creation to fossil fuel emission reductions (Laitner et al. 2012). These benefits make energy efficiency an excellent candidate for support by the government through the tax code. Additionally, much of the energy sector is not a properly functioning market that captures all costs. Externalities such as damage to the environment, human health, and natural security are not captured in the consumer price of energy. With all of these variables not accounted for in the market, it is appropriate for government to intervene and attempt to encourage activities such as investments in energy efficiency that cause a net reduction of externalities.

Significant changes to the Internal Revenue Code may be on the horizon. President Obama, the Republican presidential nominee Romney, the Congressional leadership, and the leaders of the tax-writing committees in both Houses of Congress are all calling for fundamental tax reform. (Sherlock and Crandall-Hollick 2012) Such reform presents an excellent opportunity to enact new policies that support significant energy efficiency investments, or at least do not disadvantage energy efficiency.

Understanding how potential changes to the tax code could encourage or discourage investment in manufacturing modernization, energy efficiency, and combined heat and power (CHP) is essential to seizing the opportunity presented by tax reform. In this report, we discuss strategies for using the tax code to promote industrial investment in energy efficiency, keeping in mind the priorities and goals policymakers have stated with regard to tax reform: of greatest importance is to reduce tax incentives and balance the budget. We will also examine the political and legislative environment for fundamental tax reform and evaluate the tradeoffs, risks, and opportunities associated with different options.

This report begins with an overview of the role corporate taxes play in funding the federal government. We then dive into a discussion of concepts and current accounting practices that business use to determine corporate tax liability in the United States. Since our focus is industrial energy efficiency, we will concentrate on the corporate income tax section of the federal tax code starting with capital cost recovery rules in the present tax code and work our way to a description of specific tax incentives for energy efficiency under current law. We then provide a brief explanation of

the need to enact changes in incentives to promote industrial energy efficiency. Finally, we examine recently proposed broad-based approaches that radically change existing tax law as well as other more traditional approaches and their respective potential to reduce energy consumption in the industrial sector.

TAXES, INVESTMENT, AND ENERGY EFFICIENCY

In this report, when we discuss "energy efficiency investments," we are referring for the most part to investments in industrial modernization. Many businesses operate using equipment and facilities that are old and energy inefficient, either because technological advancements have been made since installation or due to the effects of simple wear and tear over the years. Therefore, replacing older equipment with newer equipment generally is accompanied by improvements in energy efficiency, even if energy efficiency was not the primary goal of the change (Laitner et al. 2012). Our analysis of the various options presented in this report rest on the idea that investment (i.e., industrial modernization) leads to increased energy efficiency.

When building new capacity, investors have the option of choosing between average and leading edge technology. The latter is likely to be more efficient and generally will cost more than the less advanced property that serves the same function. The leading edge equipment will generate many types of benefits, most of which will accrue to the investor. Benefits might include improved product quality, lower operating costs, and of course lower energy costs. Societal benefits include steps toward the correction of current market inefficiencies such as avoided pollution from the burning of fossil fuels, the avoided cost of building additional electricity generation, less reliance on inefficient "peak" generation facilities, less congestion on the nation's transmission and distribution systems, and increased national security from not importing as much foreign oil. An investor may be willing to pay for energy savings that he or she will realize, but not the benefit enjoyed by society as a whole. Thus, it is appropriate for the government to provide benefits to encourage investors to acquire energy-efficient property.[1]

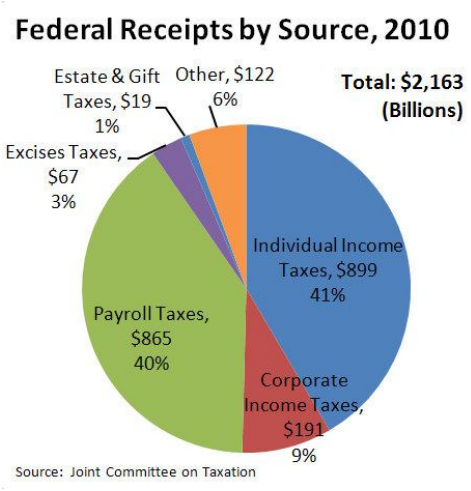
A properly functioning market would capture all costs and benefits in the price of a commodity. However, in many markets, and certainly in the current energy markets, there are many costs, such as national defense plus damage to human health and the environment caused by pollution, that are not born by the purchaser of energy (Gillingham et al. 2009). To correct for these market failures, the federal government has used taxes, subsidies, and regulation to compensate as well as to achieve other policy goals (Sherlock and Crandall-Hollick 2012).

The tax code provides a powerful tool for the government to influence corporate decision-making. Our goal here is to examine the options for changes to the tax code that are most likely to promote industrial investment and therefore energy efficiency.

[1] For a general discussion of the externalities related to alternative energy and energy efficiency, see JCT 2012a.

Current Tax Code

In 2010, the U.S. government reported receipts of $2.16 trillion, approximately 90 percent of which was collected through payroll taxes and individual and corporate income taxes (JCT 2011).



Assessing an individual or corporate income tax is appealing to economists as a mechanism to use to fund the State. The reasoning goes: membership has benefits, and as such, citizens and corporations can reasonably be expected to contribute. An intuitive connection exists between benefit and obligation. Income taxes can be justified through the idea that an individual's burden is linked, if not perfectly, to his or her ability to pay. There is a challenge, however, in determining what constitutes income, especially for a corporation with many owners. Is it **gross revenue**? Or is it the profits left over after subtracting all **operating expenses** needed to generate that income? If the latter, how are expenses determined and allocated to appropriate accounting periods?

A complex area like tax policy has its own set of terms with very precise definitions, which are important to understand if one is to engage in this topic. These terms identified in bold print, and others, are defined in a glossary contained in Appendix A.

According to the Haig-Simmons model of income (Haig 1921; Simons 1938), an ideal income tax would apply to the net increase in value of all the assets of a business inclusive of all cash and financial holdings, land, buildings, and tangible and intangible property (such as patents). This approach would be impractical because it would require the value of each business asset to be assessed annually in order to calculate tax liability, a costly and potentially controversial process. To address this issue and make a corporate income tax workable, the United States, like many other countries, determines taxable income to be gross revenue less operating expenses, where gross revenue represents all incomes, and operating expenses are the costs incurred in order to generate them.

Present and Prior Law

In this section, we will examine how common accounting practices are used to determine corporate tax liability. This section will include a detailed explanation of cost recovery, depreciation, accelerated

depreciation, tax credits, tax deduction, and current tax incentives for industrial energy efficiency. Additional information is contained in Appendix B.

Cost Recovery in General

As mentioned above, taxable income for a corporation is defined as gross revenue minus operating expenses. So how do **capital expenditures** fit in? Unlike expenses like payroll and utilities, capital expenditures are for assets that can be operational and generate income for many years.

Under a consumption tax system, goods and services are taxed at the point of sale or consumption. An example would be a sales or value-added tax. Under such a system, corporations can write off capital investment costs, thereby reducing their tax liability. Economically speaking, the expected income generated by investments is not taxed. Accountants would say the investment is expensed and deducted. And because the value of a capital investment to a company is the present value of the expected income to be generated from the asset over time**, expensing** that value or "cost" is equivalent to exempting from tax the expected return from the investment.

Income tax systems, like the tax system we have in the United States, work differently. Expenditures that only benefit the current accounting period, such as operational expenses like utility bills or payroll, can still be expensed and deducted in determining federal tax liability. Capital expenditures that benefit multiple accounting periods, on the other hand, must be **capitalized** and the cost of the property is recovered over a period of time through a system of **depreciation** or amortization deductions. In this type of tax regime, the value of an asset that is depreciated is equal to its installed price rather than the net present value of future revenues. Depreciation deductions generally reflect the annual decrease in the value of underlying property.

A cost recovery system that computes an allowance for depreciation with respect to the actual decrease in the value of an asset over time often is referred to as "economic depreciation." Although perhaps theoretically appropriate, economic depreciation has at least one significant practical flaw. The requirement to annually ascertain the value of an asset is costly, time consuming, and subject to disputes between taxpayers and tax authorities. Thus, almost all income tax depreciation systems developed to date have employed conventions and assumptions to be used in the determination of cost recovery. These conventions include a placed-in-service date (when depreciation begins), a useful life or recovery period (the time period over which depreciation is calculated and allowed), the depreciation method (the formula used to calculate the annual allowance), and the salvage value (the non-depreciable portion of the cost of the property).

The most significant conventions that influence the determination of annual depreciation deductions are the useful life and the depreciation method. Useful lives generally are assigned to various types of property by statute or administrative guidance and often correlate to the expected economic useful lives of the subject property. In some instances, a useful life shorter than the expected economic useful life of an asset will be allowed by policymakers in order to encourage investment in the underlying property or to compensate the investor for social benefits provided by the property.

Table 1: Examples of Depreciation Periods

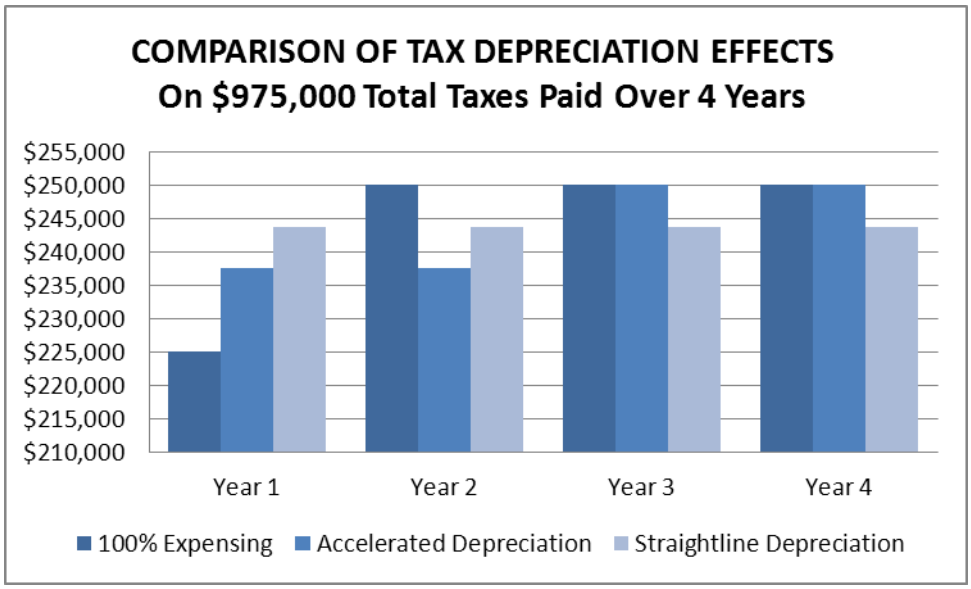
Asset Class	Description of Asset	Class Life (years) IRS (2011)
00.11	Office Furniture & Equipment	10
00.22	Automobiles	3
30.21	Equipment used in the manufacture of finished plastic products	11
—	Buildings	27.5, 39, or 40

Note: these are not the recover periods commonly used under MACRS.

There are several commonly-used depreciation methods. The straight-line method recovers the cost of property ratably over the property's useful life, and determines annual depreciation allowances by dividing the cost of the property by its life. For example, the straight-line depreciation allowance for an asset that cost $1,000, is placed in service at the beginning of the year, and has a five-year useful life, would be $200 ($1,000/5) for each of the five years. The straight-line method often is used for financial reporting purposes.

Accelerated depreciation methods provide relatively larger depreciation deductions in the early years of a property's useful life. One type of accelerated depreciation is the declining balance method, which calculates depreciation each year by dividing the unrecovered cost of an asset by its useful life and then multiplying by a factor. Accelerated methods of depreciation are appropriate in instances where an asset can be expected to lose value more rapidly earlier in its useful life, to encourage investment in particular assets, or to compensate for the possible advent of asset obsolescence or risk of business failure. Accelerated methods have been the predominant methods for recovering the cost of personal property (e.g., machinery and equipment) for federal income tax purposes for the past several decades.

It is important to understand that regardless of the depreciation schedule used—straight-line, accelerated, or 100 percent expensing (described in more detail below)—the total taxes paid over time is the same. This is demonstrated in Table #1 below. The value to the taxpayer of accelerated depreciation is the difference between the value of the additional cash flow in early years versus future years.



Note: A revenue stream of $1 million and a tax rate of 25 percent was assumed for all four years. The $250,000 asset was depreciated fully in year 1 under the 100 Expensing scenario; in two equal amounts over two years in the Accelerated Depreciation scenario;, and in four equal amounts over four years in the Straight-line Depreciation scenario.

Tax Depreciation under Current Law

Under present law, depreciation deductions for most property are determined under rules specified in Code section 168, known as the ***Modified Accelerated Cost Recovery System*** (MACRS). For a detailed description of MACRS, see Appendix B.

Under MACRS, property is assigned to various recovery periods (i.e., useful lives) that range from three to 50 years, depending on the type of property. Each recovery period is assigned a recovery method as identified in Table 2 below. The MACRS accelerated methods switch to straight-line depreciation at the point in the recovery period that maximized depreciation deductions. Property is assigned to the various MACRS recovery periods either by statute or according to its class life.

Table 2: Depreciation under MACRS

Depreciation Method	Type of Property (in terms of useful lives)
200% Declining Balance	3, 5, 7 and 10-year property
150% Declining Balance	15, and 20-year property
Straight-line	All other long-lived property such as buildings

A taxpayer may elect to use straight-line recovery periods that mirror the class life of the asset's depreciation by using the Alternative Depreciation Systems (ADS). However once the taxpayer has begins depreciating an asset on the slower ADS, that asset cannot be switched back to MACRS. The

ADS generally results in depreciating an asset over a longer period of time. The advantage to the ADS option is that it preserves tax deductions for future taxable years when they may be more beneficial based on the taxpayer's current and future income expectations.

Tax Incentives

The United States and all other developed countries impose what are considered to be income taxes on businesses. An ideal income tax, based on the Haig-Simons model of income, would apply tax to the net increase in the value of the assets of a business, including its net cash inflow. As discussed above, such an approach is impractical because it would require the annual valuation of business assets, a costly and potentially controversial process.

As a result, all income tax systems have developed rules and conventions to define and determine taxable income. Under a **normative tax system**, these rules attempt to determine taxable net income by matching gross receipts with the expenditures that gave rise to such income. Among the determinations in any income tax system is whether a business' expenditure only benefits the current accounting period and should be immediately expensed and deducted, or whether the expenditure benefits multiple accounting periods and should be capitalized and recovered over time. Another important determination is how and over which accounting periods capital costs should be recovered. These determinations are also important for financial accounting purposes.[2]

Most tax systems contain provisions that deviate from what would be considered normative tax rules. Tax rules that provide treatments that are more beneficial to taxpayers than what would be allowed under a normative tax system are known as **tax expenditures**. Tax expenditures generally represent revenue foregone by the federal government. Policymakers provide tax expenditures for a variety of reasons, such as encouraging certain activities or investments, providing a boost to worthy start-up industries, accommodating policies that cannot be accomplished through non-tax legislation or regulation, or providing tax simplification.

Some tax expenditures are broad-based, while others are narrowly targeted. The most significant broad-based tax expenditure related to business activities is the use of accelerated tax depreciation, including bonus depreciation. According to the staff of the Joint Committee on Taxation, the use of MACRS, rather than the less beneficial ADS, will result in decreased fiscal tax receipts of $135.9 billion over the fiscal year period 2011 through 2015.

Congress has also provided more targeted tax expenditures for particular investments or activities. The specially mandated depreciable lives within MACRS are examples of targeted tax expenditures.

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[2] There generally is an inverse relationship between a business' incentives in reporting financial accounting income and taxable income. A firm generally will want to attract investors by maximizing its reported financial accounting income (often by accelerating gross income and deferring expenses) while minimizing its taxable income (often by deferring income inclusions and accelerating deductions) to reduce its tax liabilities.

These lives allow investments in qualified property to be recovered more quickly than allowed under the regular, beneficial MACRS schedule.

A tax expenditure can take any number of forms. It may be an exclusion from gross income for certain types of income that otherwise would be subject to tax; a special, lower tax rate for certain types of income; a tax credit for a portion of the cost of, or production from, property or an activity; or a special depreciation or expensing scheme to recover the cost of an investment. Congress has used most of these tools in providing various targeted tax expenditures for investment in energy efficiency.

Tax Credits versus Accelerated Deductions

The two most common types of tax expenditures to provide incentives for specific types of capital investment are tax credits and accelerated depreciation.[3]

An investment tax credit generally allows a taxpayer to reduce its tax liability by some percentage of the cost of qualified property acquired by the taxpayer. The credit generally is available only for new property and the investing taxpayer generally must continue to hold the property for a period of time to fully qualify for the credit.

Accelerated depreciation allows the cost of qualified property to be deducted against taxable income more rapidly than would otherwise be allowed under a normal depreciation scheme. The most extreme example of accelerated depreciation is **Bonus Depreciation**, which allows all or a significant portion of the cost of qualified investment to be deducted in the year the property is placed in service.

Investment tax credits and accelerated depreciation share certain similarities. Both reduce the taxpayer's tax liability in the initial year or years that the qualified property is placed in service, and thus act as an incentive to invest in qualified property.[4] However, there are quantitative and qualitative differences between the two types of incentives.

Table 3 below provides a demonstration of how each incentive registers in different sections of a firm's income statement, and yet can have the same net impact on tax liability. An investment tax credit generally provides a dollar-for-dollar reduction in the tax liability of a taxpayer by the amount

[3] For a more detailed discussion, see, generally, JCT 2012b

[4] If a taxpayer does not have sufficient taxable income or tax liability in the year qualified property is placed in service, the benefit of accelerated depreciation or a tax credit can be carried to and utilized in another taxable year. Accelerated depreciation deductions that give rise to a net operating loss can be carried back to reduce the taxable income from the taxpayer's two preceding taxable years, or the next 20 years. Tax credits generally can be carried back only one year (and only if the credit was in existence in that year) or forward 20 years.

of the credit. The allowance of the tax credit generally does not affect the investor's tax liability in future years.[5]

Table 3: Two Different Ways to Encourage a $100,000 Investment—Immediate Expensing Versus a 20% Investment Tax Credit in the Year of Installation

	Tax Credit	Tax Deduction	Difference
Revenue	$1,000,000	$1,000,000	0
Other Expenses	$100,000	$100,000	0
Depreciation	20,000	$100,000	$80,000
Taxable Income	$880,000	$800,000	$80,000
Tax Assessment at 25% Rate	$220,000	$200,000	$ 20,000
Tax Credit (20%)	$20,000	0	$20,000
Taxes Owed	$200,000	$200,000	0

Accelerated depreciation, on the other hand (as the name suggests), accelerates deductions that the taxpayer would otherwise be entitled to over the life of qualified property. For example, expensing, the most extreme form of accelerated depreciation, allows the entire cost of the property to be deducted and reduces taxable income in the first year of the property's life rather than ratably over the tax life of the property. Like an investment tax credit, expensing reduces a taxpayer's liability in the year the property is placed in service. However, because expensing is an acceleration of depreciation deductions, the taxpayer's tax liability will rise in the later years of the qualifying property's life because the taxpayer will have no tax depreciation deductions for those years. Assuming constant tax rates, the cumulative tax liability of the taxpayer over the life of the property will be the same with or without expensing or accelerated depreciation. Expensing or accelerated depreciation is beneficial because it provides for tax deferral by shifting tax liabilities to the later years of the property's life.

One way to view an investment tax credit is as if the government provided a grant for the acquisition of the property in an amount equal to value of the credit. The taxpayer is responsible for funding the remaining cost of the property. Under expensing or accelerated depreciation, the government provides the taxpayer with an interest-free loan equal to the amount of foregone taxes that are sheltered by the accelerated deductions. The taxpayer "pays back" the loan when its tax liability rises in the later years of the property's life.

[5] Some investment tax credits require the taxpayer to reduce the depreciable basis in the property by all or a portion of the amount of the credit. This reduction will affect future tax liability through reduced depreciation deductions or increased gain on disposition. Although there are policy rationales for the basis reduction, it is not an intrinsic feature of an investment tax credit.

Even though it provides a timing difference with respect to tax payments, accelerated depreciation can be designed to provide a deeper tax subsidy than an investment tax credit. Whether accelerated depreciation or a tax credit is more valuable depends on a variety of factors, including the tax credit rate, the applicable tax rate, the taxpayer's discount rate, and the degree of acceleration of depreciation deductions.[6]

For financial accounting purposes, an investment tax credit generally is preferable to accelerated depreciation. A tax credit is a "permanent difference," i.e., an item that is provided for tax purposes but not **book income** purposes. Such permanent differences reduce a firm's tax expense and effective tax rate for financial accounting purposes. Accelerated depreciation is a "timing difference" because depreciation is taken into account for both tax and book purposes, but on different schedules. Such timing differences are reflected in a deferred tax reserve and do not reduce a firm's tax expense or effective tax rate for financial accounting purposes. Thus, a firm that values financial accounting benefits (e.g., a publicly traded entity) may prefer an investment tax credit to accelerated depreciation, all other factors being equal.

Tax credits and accelerated depreciation have different effects for federal government budget scorekeeping purposes. Before Congress considers tax legislation, the staff of the Joint Committee on Taxation (JCT) must provide an estimate of its effects on the budget. These estimates generally are made with respect to a ten-year budget window. An investment tax credit will be estimated to reduce revenue in each year of the budget window that the credit is allowed. Accelerated depreciation will be estimated to reduce revenue in each year of the budget window that the proposed accelerated deduction exceeds the current-law deduction, but will show revenue gains in the subsequent years as the timing difference reverses. Thus, the overall ten-year budgetary effect of an expensing or other accelerated depreciation proposal may be less than that of an equally or less beneficial tax credit proposal, particularly if the depreciation benefit sunsets or the qualified property has a short depreciable life.

The federal government looks at the value of money over time differently than the private sector. In the private sector, a dollar today is worth more than a dollar tomorrow because future revenues are discounted for the time value of money: the present value of a dollar in the future is less than a dollar today. However, when the federal government analyzes a tax proposal, a dollar of revenue in a future year is not discounted, but treated equal to a dollar of revenue in the current year. Thus whether a company takes a dollar of depreciation in the current tax year, or a future tax year, the impact over the budget window is the same.

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[6] See Table 3 where an investment tax credit can be calibrated to provide the same benefit as expensing in the year that property is placed in service. As discussed herein, the credit model would provide the investor greater tax benefits in future years because he or she would still have $80,000 of future depreciation deductions that are not available under the expensing model. However, the credit rate can be calibrated to provide benefits equal to expensing over the life of the property on present value basis.

There are certain tax code limitations that suggest that accelerated depreciation may be preferable to an investment credit in certain instances. For example, if a taxpayer does not have sufficient taxable income or tax liability in the year qualified property is placed in service, the benefit of accelerated depreciation or a tax credit can be carried to and utilized in another taxable year. Accelerated depreciation deductions that give rise to a net operating loss can be carried back to reduce the taxable income from the taxpayer's two preceding taxable years, or the next 20 years. Tax credits generally can be carried back only one year (and only if the credit was in existence in that year) or forward 20 years.

A **refundable tax credit** is a payment to the taxpayer and has been used to offset other types of taxes that cannot be reduced as a method of encouraging certain activities. Section 1603 of the American Recovery and Reinvestment Tax Act (ARRTA) provided a refundable credit in lieu of an investment tax credit for certain investments in renewable energy systems (U.S. Treasury 2012). While a **nonrefundable tax credit** can only reduce tax liability to zero, a refundable credit can be larger than the amount of paid by a taxpayer during the year. Most tax credits are nonrefundable.

Similarly, under current law, an investment tax credit generally cannot reduce a taxpayer's **alternative minimum tax** liability and can only eliminate 75 percent of the taxpayer's regular tax liability.[7] Unused credits can be carried over to another taxable year as described above. Bonus depreciation can be used to eliminate fully the taxpayer's regular taxable income or its alternative minimum taxable income. Thus, taxpayers subject to the alternative minimum tax, or that have relatively low tax regular tax liabilities, may prefer bonus depreciation to an investment tax credit.

Overview of Important Energy Efficiency Tax Incentives

Currently, there are a number of important tax incentives that apply to energy efficiency. There are three common methods of providing an incentive:

1. Providing an incentive upon purchase of an asset deemed to be an "energy efficiency" asset;
2. Providing an incentive for energy saved (or generated by renewable energy); or
3. Providing an incentive to a manufacturer to manufacture more energy-efficient products.

The first and last options are the easiest because determination of action is quite simple. A consumer has or has not made a qualifying purchase; the manufacturer has or has not manufactured a qualifying product. The second option is problematic as determination of energy savings, the proving of a negative, can be technically difficult. Additionally, collecting the data can be time consuming and for these reasons such incentives are uncommon in the tax code.

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[7] The corporate alternative minimum tax is a separate, parallel tax system that requires a taxpayer to calculate its tax liability without using several of the tax preferences and credits otherwise available under the regular tax system. The taxpayer pays the greater of its alternative minimum tax liability or its regular tax liability, and receives a tax credit to the extent its alternative minimum tax liability exceeds its regular tax liability.

The most common practice is to provide consumers with incentives, either through tax deductions or credits, upon proof of purchase of a qualifying device. Examples include the personal income tax credit for purchase of a hybrid automobile, a corporate income tax deduction of up to $1.80 per square foot of improved building space (Section 179D: see *Energy Policy Act of 2005*) and the 10 percent investment tax credit for CHP installations made before January 2017 (see Section 48 of the Internal Revenue Service Code).

Examples of other tax credits include the Section 45M credit to appliance manufacturers for making energy-efficient dishwashers, clothes washers or refrigerators, and the Section 45L credit to building contractors for building energy-efficient housing.

Any tax incentive such as bonus depreciation can be used for capital investments in equipment that will reduce energy costs, though not targeting energy efficiency investments directly. Some lighting vendors promote the bonus depreciation over the EPAct Section 179D deduction since the paperwork is simpler and doesn't require technical verification of meeting the requirement to meet or exceed the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) 90.1 standard. From the standpoint of the client, the net impact on tax liability is the same.

Specific Tax Incentives for Energy Efficiency

There are many provisions in the tax code that encourage energy efficiency. Many are aimed at the residential market though a few identified in the table below target corporations.

Provision/Section	Tax Incentive
Exclusion for Energy Conservation Subsidies Provided by Utilities: Section 136	Provides an exclusion from gross income of the value of any subsidy, (whether direct or indirect) by a public utility to a customer for the purchase or installation of any energy conservation measure. "Energy conservation measure" refers to any installation or modification primarily designed to reduce consumption of electricity or natural gas or to improve the management of energy demand with respect to a dwelling unit.
Energy Credit for Combined Heat and Power (CHP) Systems: Section 48	Provides a ten percent credit for combined heat and power (CHP) property placed in service before January 1, 2017.
Energy Efficient Commercial Building Deduction: Section 179D	Provides for a deduction up to a maximum of $1.80/sq.ft. of reconditioned space for an amount equal to the cost of energy efficient commercial building property placed in service during the taxable year.
Treatment of Smart Meters and Smart Grid Property: Section 168	Reduces the recovery period from 20 to 10 years for qualified smart electric meters and qualified smart electric grid systems.

Note: All sections relate to the Internal Revenue Code: Title 26, subtitle A, Chapter 1.

The Case for Tax Reform

Concern is growing that the current tax code makes U.S. business less competitive internationally, creates market inefficiencies and is too complicated. As a result, interest is growing in lowering the corporate tax rate and broadening the corporate tax base. The resulting simpler, more predictable tax code would lower compliance transaction costs and reduce capital investment risks.

The challenge of course is that there is a constituency for every tax expenditure. One person's "market intervention" is another's "economic development tool." This reality is certain to make any effort to reform the corporate tax code contentious. Creating tax expenditures has been a very effective tool for lawmakers to be responsive to economic, social or political needs. Lawmakers have a long history of supporting certain investments, such as education, home ownership, and energy efficiency. Many tax expenditures, including those for energy efficiency, were created to correct for unrealized external costs, or to account for inefficient or ineffective markets. Others, such as the tax deduction for interest paid on mortgages, were created to encourage economic and community growth.

Though incentives for a few economic activities that have broad support and recognition as necessary to achieve the collective goals of society can be justified, the credibility of the tax code is compromised when so much economic behavior is treated by the tax code as being "special". Revenue shortfalls are

likely, the bureaucracy needed to support analysis, measurement and verification will increase, and the potential for a specific incentive to have an impact will diminish as companies are swamped with incentives that exceed their tax liabilities.

There is also the potential for the favorite technology of the day to preclude the emergence of a better technology tomorrow; or the gaming of the system by an inexpensive tweak to the established technology of yesterday. The elimination of many existing tax expenditures could bring new health to dysfunctional markets and provide consumers with new and better solutions than have been available in the past while also increasing tax revenues and enabling broad based changes that have the potential to create even greater economic impact.

The premise of this report though is that should the country undertake a major revision of its corporate tax policy, it will have the opportunity to create a new structure that is simpler and favors actions that are better in the long-term for the country as a whole. We will now attempt to answer the question: How?

Options for Tax Reform

Policymakers are focused on future tax reform. The Obama Administration has issued a framework for what tax reform might look like. Congressional leadership has spoken of the need for tax reform. Both the House and Senate tax-writing committees have held numerous hearings (Sherlock, and Crandall-Hollick) on a variety of tax reform subject over the last two years. Several factors have prompted this dialogue. The broad-based individual tax cuts enacted in 2001 and 2003 were approved on a temporary basis, and many policymakers feel a need to make all or some of these provisions permanent. Others believe that only through some type of grand bargain that includes tax reform, can the necessary comprises be made to address the nation's budgetary problems.

Many believe corporate tax reform is necessary to make the U.S. tax system more competitive relative to its trading partners. The United States is one of the few nations that do not use a territorial international tax regime (In a territorial system, offshore business income is not subject to home country taxation.) In the U.S., off shore income is subject to the tax of the host country and to the U.S corporate tax rate up to a maximum of 35 percent total. Since the U.S. rate of 35 percent is the highest among developed countries, many U.S. corporations may have an incentive to keep profits abroad and make investments there instead of domestically.

In light of the current budget situation, most believe corporate tax reform must be done on at least a revenue neutral basis. Many call for lowering the corporate tax rate to a 25 to 28 percent range, and offsetting that revenue loss by broadening the tax base by eliminating various corporate tax expenditures. Proponents believe a flatter tax base with a lower tax rate will increase competitiveness, reduce economic distortions caused by high tax rates and tax preferences, and simplify the administration of tax law (NAM 2012).

BROAD-BASED CHANGES

As we discuss earlier in the paper, tax reform to support industrial energy efficiency would have to encourage industrial modernization. Though the two broad-based options for change discussed below have a great deal of support among corporate decision-makers, we are skeptical that they would necessarily lead to energy efficiency investments on their own. We explore the reasons for this in the following paragraphs and then, for comparison purposes, include a brief discussion of pollution and energy taxes, proposals considered in the past, which would likely have a much more pronounced impact on energy use and investments in efficiency.

Eliminate Tax Expenditures and Lower Tax Rate

This proposal resembles the tax reform plans put forward both by President Obama and by the Republican Party (Calmes and Cushman 2012). Under this proposal, the corporate tax rate would be reduced from its current rate of 35 to 25 percent or so. This tax rate reduction would be paid for by eliminating many current tax expenditures. This activity could be expected to result in energy savings under the theories that lower corporate tax rates lead to more investment in factory modernization (U.S. Chamber of Commerce 2012), and that modernization includes combined heat and power, and other energy efficiency investments (Elliott et al. 2008). As we mentioned earlier, research has shown a direct correlation between the vintage of manufacturing infrastructure to energy efficiency, so tax policies that promote capital stock turnover will reduce the energy intensity of the manufacturing base. (Elliott et al. 2008; Laitner et al. 2012).

Policy Concerns

Plans for tax reform that call for lower tax rates accompanied by reducing or eliminating tax expenditures have already been widely circulated (U.S. Chamber of Commerce 2012). A great deal of support exists for these types of plans among policymakers. For example, such a system is featured prominently in Paul Ryan's plan for tax reform that he developed as Chairman of the House Budget Committee during the 111th Congress (Ryan 2010). The plan would allow for long-term planning. Currently, many tax incentives including those relating to energy efficiency often are only in place for a short period of time, and future extensions can be uncertain from year to year. Uncertainty can be a major disincentive to making major investments, and a tax reform plan that emphasizes a lower tax rate and eliminates many tax expenditures can also reduce uncertainty over the long run.

It is unlikely that a realistic plan for tax reform would call for *all* tax expenditures to be eliminated. There would be political challenges associated with removing any particular tax expenditure. However, if the target is a 25 percent corporate tax rate as has been suggested in Congress, it would be necessary to eliminate a large number of tax expenditures one of which might be accelerated depreciation. The potential impacts of that change are discussed below.

Eliminating Accelerated Depreciation as Part of Broadening the Base

One of the most frequently mentioned tax preferences that would be targeted for elimination in a base broadening exercise is accelerated depreciation, primarily because of the size and breadth of MACRS.

According to a preliminary analysis by the staff of JCT, replacing MACRS with the ADS would raise $724.1 billion over the fiscal year 2012 through 2021 budget period, while cutting the corporate tax rate from its current 35 percent to 28 percent would lose $717.5 billion over the same period (Barthold 2011). Note that the MACRS estimate does not include any transition relief or take into account taxpayer behavioral effects, and the rate cut estimate does not take into account the interactive effect of the rate cut and base broadening. Nevertheless, the JCT analysis demonstrates that it may be difficult to significantly reduce the corporate tax rate without addressing depreciation allowances, the largest business tax expenditure.

Many of the tax expenditures that would be targeted for repeal under tax reform's base broadening, including accelerated depreciation, are enjoyed by the manufacturing sector. Traditionally, Congress has enacted tax policies intended to benefit manufacturers. One of the challenges of corporate tax reform will be whether and how to retain these preferences while cutting the overall tax rate.

Not all tax reform proposals would eliminate accelerated depreciation. In 2007, the Treasury Department under the Bush Administration analyzed the relationships among rate reduction, accelerated depreciation changes and real output. Treasury estimated that the corporate tax rate could be lowered to 28 percent by repealing various business tax expenditures, including accelerated depreciation. The Treasury analysis cautioned, however, that "the combined policy of base broadening and lowering the business tax rate to 28 percent might well have little or no effect on the level of real output in the long run because the economic gain from the lower corporate tax rate may well be largely offset by the economic cost of eliminating accelerated depreciation." Instead, the Treasury analysis suggested that the level of real output could rise by about 0.5 percent if accelerated depreciation were retained and the corporate tax rate cut to 31 percent. Finally, Treasury suggested a real output increase of about 1.5 percent could be achieved by keeping the current corporate tax rate, but providing a 35percent partial expensing allowance (with economic depreciation for the remaining cost of capital investment) (OTP 2007).

Thus, enactment of a long-term or permanent bonus depreciation provision similar to that of an expensing proposal above most likely can only be accommodated in a broader tax reform effort. While U.S. policymakers are seriously discussing corporate tax reform, most of the plans to date involve a reduction in the corporate tax rate offset by broadening the tax base by repealing various tax expenditures. The most prominent tax expenditure relates to the current accelerated depreciation system, and the current thinking regarding corporate tax reform involves reducing depreciation allowances. Reversing this trend towards bonus depreciation could prove difficult. However, there are sound policy arguments for making the current cost recovery system even more rapid, and the tax reform debate will provide an opportunity to make these arguments.

Effect on Energy Efficiency

Reducing corporate tax rates would likely have a positive but relatively minor impact on energy efficiency. If such a plan were supported by certain targeted tax incentives or financing opportunities, somewhat more investment in energy efficiency would be likely, though these options would be

accompanied by complications and political challenges of their own. Ultimately, reducing the corporate tax rate and removing many tax expenditures would not be the easiest or most effective way to reform the tax code to support energy efficiency.

100 Percent Expensing

In order to address the disincentives to energy efficiency in the current depreciation laws, the second proposal to be examined provides 100 percent expensing for any **tangible personal property** placed in service after the date of enactment that is subject to an allowance for depreciation. Companies would be able to receive the entire tax benefit from making an investment in a single year. The proposal would not apply if property is placed in service pursuant to a binding contract in effect on the date of enactment, or if construction on the property began before the date of enactment.

Essentially, the proposal would extend to all taxpayers and make permanent the existing 100 percent bonus depreciation allowance that was applicable to property placed in service after September 8, 2010 and before January 1, 2012.

The proposal would provide an incentive to replace old machinery and equipment with new machinery and equipment. Accelerating the turnover of equipment will lead to energy savings because new machinery and equipment is often more energy efficient than old machinery and equipment (Laitner et al. 2012).

Some economists believe the immediate expensing of capital investment can result in positive welfare gains (Cassou and Lansing 2006). As discussed above, the immediate expensing of capital goods eliminates from tax the expected return on the investment and is step toward converting the current income tax system to a consumption tax system that favors investment and saving.

Policymakers have often favored expensing. The Obama Administration has proposed temporary expensing as a way of stimulating the economy (OTP 2010). The Bush Administration proposed both temporary expensing to stimulate the economy and a form of permanent expensing as a component of tax reform (OTP 2007). Congress reacted to these proposals by enacting, expanding and extending bonus depreciation several times in the last decade.[8] Legislation introduced in the current (112th) Congress would extend bonus depreciation for an additional year or permanently (H.R. 1773, S.12).

Policy Concerns

Some have questioned the efficacy of expensing in spurring capital investment. Most analysts would agree that by accelerating cash flows expensing lowers the cost of capital and that in turn should provide an incentive to invest in qualified property (JCT 2012b). However, studies of the effects of

[8]These include the Job Creation and Worker Assistance Act of 20002, Jobs and Growth Tax Relief Reconciliation Act of 2003, Economic Stimulus Act of 2008, American Recovery and Reinvestment Act of 2009, and Small Business Jobs Act of 2010.

the bonus depreciation provisions enacted in 2002 and 2004 indicate that the allowances were relatively ineffective in stimulating the economy (Guenther 2012). The studies found that fewer taxpayers claimed bonus depreciation than anticipated, and relatively few firms indicated that bonus depreciation was a key determinant in the firm's investment decision. The studies concluded that the temporary bonus depreciation allowances may have caused firms to accelerate some investments that would have occurred at a later time. It must be noted that the studies focused on temporary expensing measures that were enacted at a time of economic downturns. A permanent expensing provision enacted once the economy has moved toward recovery may provide more positive investment results.

Our conversations with various industrial stakeholders have led us to become skeptical of the ability of a permanent extension of bonus depreciation to drive capital investment by large firms. The impact on smaller companies that are cash flow-constrained, however, is more significant and therefore the potential to drive their investment decisions is greater. On balance though, this is a significant change in the tax policy that results in at best a marginal economic benefit and even less measurable change in energy consumption. Even more importantly, the elimination of depreciation removes one of the few economic development tools the government has to encourage private activities that produce public benefits.

Budgetary Cost

Allowing the cost of all tangible personal property to be expensed would have a significant revenue cost. Businesses in the United States annually place in service a significant amount of property that would qualify for expensing under the proposal. From 2000 to 2009, annual capital expenditures for equipment by all U.S. nonfarm businesses averaged approximately $730 billion (Census 2011). The cost of permanently extending the current law, 50 percent bonus depreciation allowance that is scheduled to expire at the end of 2012 would be over $330 billion for the fiscal year period 2013 through 2021 (CBO 2011). The cost of providing 100 percent expensing, as under the proposal, would be significantly higher.

Legislative Opportunities/Political Climate/Tax Reform

The enactment of a permanent bonus depreciation provision will involve a significant policy choice and will have a significant budgetary effect. For these reasons, the best, and perhaps only, opportunity for such legislation is in the context a broader tax reform effort.

Pollution and Energy Taxes

While there appears to be limited interest in imposing a tax on pollution, carbon, or energy, lawmakers might turn to new revenue sources if it becomes too difficult to limit or eliminate tax expenditures enough to reach the desired rate reductions. If there is a need to bridge a revenue gap to achieve rate reduction, Congress may be more receptive to a tax on pollution or energy.

Pollution Tax

The concept of a carbon tax has been raised by environmentalists, policy makers, and others over the years as a mechanism to address looming budget deficits and mitigate the generation of carbon dioxide and other greenhouse gas emissions associated with climate change (Ramseur et al. 2012). The attractiveness of such a tax is that it discourages activities with negative effects much as taxes on cigarettes, alcohol and gambling do. These are often called Pigovian taxes and are a respected concept within the field of economics (Nadel and Farley 2012).

A pollution tax need not be tied to carbon emissions, but could be assessed on all types of man-made emissions into the atmosphere and the nation's waterways. The tax would be collected from the emitter as part of its federal tax liability. These taxes are attractive because they are comparatively easy to assess as most large emitters have the ability to determine directly or indirectly the volume of pollutants they emit, and because by making pollution more expensive, it is discouraged. Other, less polluting technologies become more cost competitive and market forces are put to work to reduce our collective impacts on the environment.

A pollution tax would make fossil fuels and electricity generated from them more expensive. This would encourage investments in energy-efficient technologies and practices. Since presumably electricity derived from renewable energy systems would not produce pollution, it would not be taxed and would become more cost competitive. This will encourage investments in renewable energy and energy efficiency since both will be immune from the tax.

Energy Tax

An energy tax could be assessed just like a sales tax. All energy purchases, retail or otherwise, would be assessed a tax. (Currently, utility sales to manufacturers for electricity, natural gas and water that is used in manufacturing, are not subject to state sales or use tax.) This national energy sales tax would be assessed on all forms of energy (electricity, natural gas, gasoline, steam, etc.) at the time of sale. It would encourage investments in energy efficiency even more than an equivalent tax on pollution because all forms of energy, even renewable energy, would be assessed.

This approach would of course be a very difficult policy to enact.[9] Beyond the multitude of stakeholders already aligned against such a plan, consumers of energy would have immediate visibility of the tax, just as they do any sales tax. They would "feel" it more than a pollution tax, which would be collected at the source and thus its visible impact on product or service price diluted. There is also the issue of what constitutes “energy” and how its value is assessed. For example, if steam is derived from burning coal, is the consumption of coal taxed, or the consumption of steam? If the steam is created by burning natural gas, is the tax rate the same? When are products that are generally considered to be

[9] In 1993, the Clinton Administration proposed a tax based on the Btu content of various energy sources. The proposal passed the House but was soundly rejected by the Senate.

food considered to be a fuel that is subject to an energy tax? It would also work against investments in renewable energy, in a means similar to the current situation within the tobacco industry where government both encourages and discourages an activity through subsidy and tax. Assessing a tax as close to the beginning of the fossil fuel energy supply chain as possible would do much to simplify collection and resolve the issues mentioned above, though it would then start to look more like a pollution tax.

As outlined earlier, government assesses an array of taxes and fees to encourage and discourage certain behaviors and investments, or creates exemptions from taxes to do the same. An energy tax conceptually is intended to discourage energy use and encourage efficiency. In a time of constrained energy supplies, this might be palatable as it motivates for a common good. However, recent changes in the natural gas industry have many feeling that a return to times of bountiful supplies of energy is at hand and that there is no longer a need to discourage energy consumption. Many in this camp are also skeptical of anthropological causes of climate change, making either of these proposals political long shots. Nevertheless, they are options that could become part of a re-engineered national tax code in the future possibly in combination with one of the options described earlier in this report as a mechanism to offset reduced revenues and to ensure greater investments in energy efficiency.

Changes that Can Be Made without Comprehensive Tax Reform

Though many policymakers on both sides of the aisle hope to pass comprehensive tax reform in the next few years, there are enough ideological differences and practical difficulties over the details to stall the process indefinitely. The tax debate in the current Congressional session has been dominated by discussions regarding over 100 provisions that expired at the end of 2011 or are scheduled to expire at the end of 2012. These include of payroll tax relief first enacted in as part of the Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010, the disposition of the so-called "Bush era tax cuts"[10] and the "traditional" tax extenders.[11] With so many provisions to be addressed, many are pessimistic that a near-term solution is possible. If true tax reform becomes politically impractical, there are several options for smaller reforms to support energy efficiency that do not require a complete overhaul of the tax code.

Change to Depreciation Schedules

One possible change to the tax code would be a revision of depreciation rates and asset classes. The evolution of depreciation laws since the inception of the income tax in 1913 has tended to increase tax

[10] The "Bush era tax cuts" are those provisions that were enacted in 2001 and 2003, originally scheduled to expire at the end of 2010, but extended until the end of 2012. The principal provisions include reductions in the individual tax brackets, marriage penalty relief, an expanded child tax credit, reductions in the tax rates for dividends and capital gains, and estate tax relief.

[11] The "traditional" tax extenders are a group of primarily targeted tax provisions that Congress originally enacted with sunset dates, but has routinely extended on a short-term basis. The principal provisions include the research credit, some international tax provisions, the deduction for state sales tax, the production tax credit for electricity produced from renewable resources, the exclusion for mass transit benefits, and other targeted energy and energy efficiency tax provisions.

collections by slowing depreciation allowances or spur investment by accelerating depreciation allowances. As the code currently stands, there are a multitude of classes and depreciation schedules. The volume of special provisions leads to confusion and expensive compliance. A more streamlined set of classes and schedules would go a long way to helping all taxpayers and could be designed to have no discernible impact on revenues.

Although there are tax incentives that favor investments in energy efficiency, there are also many features of the current depreciation laws that discourage energy efficiency investment, as identified by Sachs et al. (2012):

- Long recovery periods assigned to earlier generations of assets may delay their replacement in favor of newer, more efficient alternatives. Innovations in industrial system design may blur the distinction between structural versus non-structural asset classifications, and accordingly, the manner in which the assets are to be depreciated. In other words, certain components are increasingly flexible in their siting and configuration. Equipment that is a permanent or "structural" asset in one configuration may be perceived as "personal property" in another. For example, overhead lighting, steam boilers, and core HVAC equipment are all assigned the 39-year recovery period applicable to buildings even though such additions generally have a much shorter useful life.
- Technologies may evolve more rapidly than the tax code. Recovery periods established with mid-20th century technologies in mind do not always reflect the true service life of modern replacements.
- Investors' time horizons for decision-making may be wholly disconnected from the depreciation recovery periods prescribed for their production assets. While some business asset costs are recovered over as many as 39 years, corporate planning horizons are much shorter, often no more than five years. Opportunities for faster cost recovery are highly valued for this reason.

Longer depreciation periods effectively generate higher tax costs for any given asset, thus discouraging investment in that type of asset. Consequently, distortion of asset depreciation schedules relative to their true economic lives discourages energy efficiency upgrades. Though fixing depreciation schedules is not the entire solution, it certainly should be part of any future tax reform.

Specific Incentives for Energy Efficiency

Energy-efficient property generally costs more than less efficient property that serves the same function. As described throughout this report, there are also benefits that accrue to society as a whole when investors purchase energy-efficient equipment and buildings. Ideally, government will provide just enough incentive to persuade the investor to choose the lower-energy consuming option, or the value of the external benefits to society, whichever is less. Since these are essentially difficult to determine on a *post hoc* basis, other, less exact methods are required.

One option is a tax code that prioritizes energy efficiency by providing full or partial expensing of or a tax credit for apportion of the cost of qualified energy-efficient property. The credit, perhaps equal to

10 percent of the cost of the qualifying asset, would be subject to recapture if the taxpayer disposes of the property within the five-year period beginning with the date the property is placed in service. The amount of recapture would be 100 percent of the credit if the property is disposed of within the first year after being placed in service, and recapture percentage would decrease by 20 percentage points for each subsequent year.

A tax credit could be refundable or nonrefundable. The Section 1603 program gave taxpayers investing in renewable energy systems the choice of whether to take cash payment in lieu of an investment tax credit. Since many of these taxpayers had little or no tax liability, they opted for the payment. The program had the desired result as over 45,000 projects were funded (U.S. Treasury 2012).

Under either the basic proposal or the alternative, qualified energy-efficient property would be defined as meeting or exceeding certain industry standards such as those required for a US EPA ENERGY STAR® label. For this purpose, only property that is subject to the allowance for depreciation would be qualified energy-efficient property (i.e., used in trade or business).

Benefits

Because energy-efficient property generally will cost more than less efficient property, a tax benefit that decreases the initial cost of the property likely will prove to be most effective in stimulating investment. The expensing proposal and the investment tax credit alternative both provide front-loaded tax benefits that reduce the effective cost of qualified investment. Ultimately, these investments will result in energy and energy cost savings. As discussed above, an expensing proposal and an investment tax credit proposal can be calibrated to have the same economic value, but will have different ancillary effects. Firms concerned about financial accounting presentation likely will prefer an investment tax credit to accelerated depreciation, all other factors being equal. Conversely, a firm subject to the alternative minimum tax may prefer bonus depreciation.

Cost

A targeted tax benefit, whether it is an expensing provision or an investment tax credit, could be constructed to have little impact on overall revenues. Other previous energy efficiency proposals have been estimated to have relative small revenue costs. For example, the Energy Policy Act of 2005 contained several temporary energy conservation provisions: the deduction for energy-efficient commercial building property, the credit for the construction of energy-efficient homes, the credit for the energy-efficient improvements to existing homes, the credit for energy-efficient appliances, and the credit for the energy-efficient residential property. The total budgetary impact for these provisions was estimated to be modest—approximately $1 billion (JCT 2005). The relatively low cost can be attributed to the fact that the provisions were temporary and narrowly targeted.

A tax credit that is available only for five years would have significantly less revenue cost over ten years than a permanent provision. There may be policy reasons to sunset or phase out a provision as well. At times, a tax incentive is needed only for a short-term to jump start or create initial market

acceptance for a new technology.[12] Other times, a tax incentive is needed to encourage early adopters to invest in a technology or device ahead of future regulatory change mandating such investment. For example, if the U.S. Department of Energy were to promulgate regulations that would increase the energy efficiency standards for certain business equipment starting on some date in the future, a tax incentive to encourage firms to make such investments before such date could ease transition into the new regime (and lessen a rush to install the older, less efficient equipment before such date).

Finally, policymakers may want to make a provision temporary in order to study it effects before deciding whether to modify or continue it on a permanent basis. An expensing provision will have less of a budgetary impact than a tax credit provision of equal financial value because expensing involves a timing difference that will "turn around" in the budget window. Most manufacturing equipment has a five- or seven-year recovery period under present law. Providing expensing for such property on a permanent basis will be less costly than providing a permanent investment tax credit. In fact, providing expensing on a temporary basis (e.g., 3 years) should have almost no budgetary impact.

However, as we are interested in changes that impact energy use over the long-term, it is important to get out of the on-again-off-again cycle of short-term and temporary incentives and move to a structure that encourages efficiency permanently. This means there will be a budgetary impact for this proposal.

Finally, the revenue cost of the proposal could be limited by more narrowly targeting the definition of qualified investments. However, as discussed in detail below, narrow targeting can create significant policy concerns.

Design Features

The most important features of a targeted tax benefit are defining the property or activity that qualifies for the benefit and determining the level of subsidy.

There generally are two types of approaches to defining the qualified property or activity. One approach is input based; the taxpayer qualifies for the tax benefit if it makes a specified type of investment or conducts specified activities. The other approach is output based; the taxpayer qualifies for the tax benefit if demonstrates it achieve a certain specified result.

Most targeted tax benefits, particularly expensing and investment tax credit provisions, are input based. In providing input-based tax benefits, Congress generally is not rewarding the mere purchase of a type of property. Rather, Congress assumes that the use of such property will produce the results that Congress intended to encourage. Although it is trying to produce a result, Congress provides

[12] The concept of using a tax credit focused on Market Transformation is examined in Nadel, and Farley 2012

input-based tax benefits because such provisions generally are easier than output-based benefits to design and administer.

There are downsides to input-based tax benefits. First, there is no assurance that the investor will use the property to produce efficiently the contemplated result. Providing incentives only for a narrow base of property may crowd out investment in other property that may provide the same or better results. Similarly, because an input-based definition generally targets existing technologies, there is no incentive to perform research to discover new, but nonqualified, technologies.

Great Britain and The Netherlands are addressing this by routinely reviewing their list of eligible technologies, moving products off after achieving a certain market penetration, and putting new promising technologies on the list (Ryan et al. 2012).

Output-based incentives avoid many of these issues. An output-based incentive provides a benefit to the investor so long as the investor achieves certain results. The approach can be technology neutral. An example of a demand side out-put based incentive is contained in the recent Senate bill S.1914 (Snowe, Bingaman and Feinstein) that provides a sliding scale incentive based on energy savings for commercial retrofits; starting at 20 percent savings and capping out at 50 percent savings. An example of an output-based incentive for generation is the production tax credit for electricity produced from renewable resources. Although the various renewable resources (wind, biomass, geothermal, solid waste, etc.) are specifically defined, an investor can receive a certain level of tax credit for each kilowatt of electricity produced from such sources, regardless of the technology employed in the generation. The risk of performance or nonperformance is on the taxpayer. Under input- or cost-based approaches, the risk is on the government providing the subsidy.

There are downsides to output-based tax benefits. It is difficult to assign a present benefit value for expensing or tax credits that buy down the cost of an investment, because qualifying for the benefit depends on future events. This fault can be overcome by (1) simply providing the upfront benefit to property designed to produce the future intended results, or (2) providing the upfront benefit and recapturing it if future intended results are not produced. Output-based benefits are difficult to administer; some reliable monitoring regime is necessary to ensure the investor qualifies for the claimed tax benefit.[13] Finally, an output-based benefit may not be appropriate for energy efficiency because it is difficult to design a subsidy for a lack of activity—i.e., the energy that is not produced or consumed.

The second design issue related to targeted tax benefits is determining the level of subsidy needed to produce the desired result. Ideally, the level of subsidy should be calibrated to encourage the desired activity that would not occur absent the incentive. If the subsidy level is set too low, little or no

[13] The production tax credit for renewable electricity under section 45 does not have this problem because electricity production generally requires metering for nontax reasons.

activity will occur. If the subsidy level is set too high, investment may occur, but the desired result may not. Or more incentive will be given than is required to produce the desired result.

Finally, most targeted tax incentives provide benefits to known or developed technologies, suggesting that some investment will be made even absent the benefit (JCT 2012a). Providing tax benefits to such "free riders" increases the budgetary cost of the provision without a corresponding increase in the desired result. One way to address this issue is to only provide benefits for incremental investment, but such an approach can create design and administrative difficulties. Other solutions are to set a high minimum performance requirement and/or to provide benefits only for technologies commercialized by multiple firms that collectively have low market share.

Legislative Opportunities/Political Climate/Tax Reform

The traditional means of providing tax benefits to alternative energy and energy-efficient investments has been through targeted provisions similar to those described in the proposals above. The current Congress has shown interest in promoting targeted energy tax proposals. A recent House Ways and Means subcommittee hearing on expired and expiring provisions was dominated by discussions of extending certain renewable energy and energy conservation provisions (AGC 2012; DiMugno 2012). There have been multiple attempts to extend and modify these provisions in the Senate (S.AMDT. 1812, S. 2204). Other legislation introduced in this Congress proposes additional tax incentives for energy conservation (S. 1914).

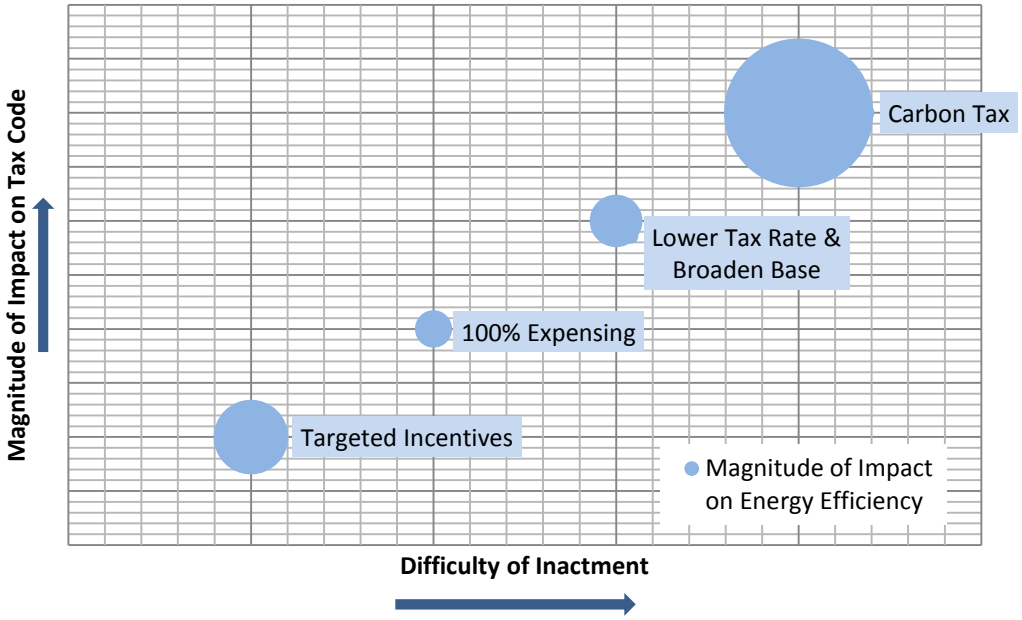
Congress generally has not enacted energy or energy efficiency tax provisions on a standalone basis. Such provisions typically have been enacted as part of a tax title that becomes attached to a broader energy policy bill or a broader tax bill. Congress has not enacted a comprehensive energy bill since 2005, and there does not appear to be any prospects for such a bill in the near term.

Discussion

If the ultimate goal of tax reform is to develop a new corporate tax code that is "better" than the existing scheme, there are many proposals under consideration that would appear to move us in that direction. However, no "perfect" tax code exists—tradeoffs will be made. Each of the proposals has its strengths and weaknesses.

The major proposals discussed in this report involve significant changes to the existing tax code. These changes will in turn produce significant impacts on the economy, many of which are not entirely known. Undertakings with such broad ramifications take considerable political will. The graphic below approximates[14] the difficulty of enacting significant change to the corporate tax code and the potential to increase investments in energy efficiency.

[14] These variables cannot be measured on an interval scale, but by relative order of magnitude for the purpose of illustration.



Expanding bonus depreciation, while politically popular, has only a marginal potential to change the rate of capital investment and by extension, the use of energy in the industrial sector.

The proposal that currently appears to have considerable political momentum—lowering the corporate rate and broadening the base—has perhaps a bit more chance of impacting investment rates and energy use. However, it is fair to ask will corporations with a short-term focus be more likely to make long-term investments at a 25 percent tax rate than at a 35 percent tax rate? It is unlikely the corporate tax rate is the determining factor when making investments. More likely, it is one of many variables that are considered and rather it is the mix of them that drives investment.

By contrast, modifying the existing tax structure to include incentives favoring investments with potential to reduced energy use creates a market pull. The potency of these incentives can be increased by locking them in for long periods of time so that there is stability and predictability.

An even more effective method to influence the market is to institute Pigouvian taxes such as a carbon tax that encourages investments with low environmental impacts and discourages actions and investments with greater impacts.

Of course none of these options is exclusive of the others. A reduction in the corporate tax rate could be combined with an emissions tax, and targeted incentives for investments in efficiency to encourage investments that ultimately reduce a facility's exposure to emission fees. Such a structure could be constructed to be revenue neutral and implemented incrementally so as to mitigate disruption to the economy.

Conclusion

This report did not set out to construct a new tax code ideally suited to minimize the use of energy. Rather, we wanted to look at proposals that have a realistic opportunity of being considering in the next one to four years. Throughout this report we have evaluated the strengths and weaknesses of the existing and proposed corporate tax structures. It should come as no surprise that there is no ideal system, but a series of trade-offs to be weighed in an effort to find balance between many competing priorities.

We started with the premise that industrial modernization yields lower energy intensity, and therefore encouraging capital investment is a desirable thing to do if one wants to prioritize energy efficiency. However, this connection is not absolute and the gain is not sufficient to achieve all the reduction in energy use that is possible.

To satisfy a policy goal of compensating for the market failures that exist in conventional energy markets, preferential treatment of energy efficiency is required. To that end, the following five considerations should be included in any new corporate tax structure:

1. Industrial modernization results in greater productivity and should be encouraged by the government. There are many economic benefits, one of which is greater energy efficiency;
2. Business can be more proactive in making investments when the tax code is simple and stable;
3. Government has a role to play when markets do not capture all costs and benefits. There are several market failures in the current energy markets and pending a solution, it is appropriate for the government to intervene with corrective action. These should be structured to achieve energy related goals valued by a majority of the country;
4. Whether comprehensive tax reform or a more incremental approach is undertaken, it is unlikely that all tax expenditures will be eliminated. Since energy efficiency has many benefits that accrue to society as a whole, keeping or even expanding incentives that target long-term improvement is the nation's use of energy should be a priority; and
5. Whenever possible, there should be an intuitive connection between a tax and the goals of society. There should be a direct correlation between tax expenditure and a specific societal goal.

One of the roles of government is to be an instrument of the people to organize and direct their collective activities and aspirations. The tax code, to the degree that it can be designed to accomplish these collective goals, should be so constructed.

Efficient use of energy is one of these national aspirations. There is broad consensus that the nation can and should do a better job of managing its energy resources. It is in the long-term interest of the nation to use energy more efficiently and so it is also in the best interest of the county to have a tax code that encourages energy efficiency for the long term.

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Appendix A: Glossary

Alternative Minimum Tax: The alternative minimum tax reduces or eliminates many tax credits, exclusions, or deductions for certain individuals or corporations. The goal of the alternative minimum tax is to ensure that all taxpayers, even those who benefit from many different tax deductions, pay at least a minimum amount of tax.

Bonus Depreciation: A form of accelerated depreciation that enables a company to deduct some portion (up to 100%) of the cost of an asset in its first year of use. The provision was enacted in February 2009 as part of the American Recovery and Reinvestment Act (ARRA).

Book Income: Income as reported in corporate financial statements. This is usually different from taxable income.

Capital Expenditure: A business investment in long-term assets, such as buildings, vehicles, or equipment.

Capitalize: In business accounting, to record a purchase or investment with a useful life of more than one year as an asset, and then to depreciate or amortize it.

Depreciation: The principle that the cost of a long-term operating asset should be allocated over the cost of the asset's useful life. The amount of the depreciation deduction that a company can claim in any given year impacts the company's tax liability, so the rules surrounding depreciation methods and length of useful lives are regulated by the IRS.

Depreciation Method: A systematic process of distributing the depreciation of the cost of a tangible asset over a period of time that may be matched to its expected service life. Common methods include: straight line, 150 percent declining balance, and 200 percent declining balance. More information is contained in Appendix B.

Energy Policy Act (EPAct): (Pub.L. 109-58) a bill passed in July, 2005 that provides amongst many provisions, tax incentives for investment in energy efficiency for buildings, vehicles, and renewable energy.

Expense: In business accounting, to report an expenditure on the current year's income statement, rather than capitalizing the expenditure and depreciating it over multiple years.

Expensing: In tax accounting, it is the depreciation of the full value of an asset in the first year of use; sometimes referred to as 100 percent expensing. Essentially, it is the treatment of an asset as an expense in the determination of tax liability.

Externalities: Costs or benefits to society that are not included in the price of goods or services, and are incurred by people who are not the buyers or sellers. Externalities can be positive or negative.

Gross Revenue: The value of all income received for goods or services sold over a period of time, before subtracting operating expenses, taxes, or other expenditures.

Nonrefundable Tax Credit: a credit that reduces a taxpayer's federal tax liability. Most tax credits are nonrefundable and can only reduce a taxpayer's liability to zero.

Normative Tax System: The basic rules of the tax system that define factors such as tax rate, base, and period. Tax expenditures like credits or accelerated deductions are deviations from the normative tax system.

Operating Expenses: Any expenses that a corporation incurs as a cost of doing business, such as payroll, cost of supplies, and rent and utility bills.

Personal Property: Any kind of property that can be moved, as opposed to real property or real estate. Tangible personal property refers to physical property (e.g., equipment, furniture, etc.). Intangible personal property refers to property that cannot be physically touched or felt, but nonetheless has value, such as intellectual property.

Real Property: Includes real estate, realty and other immovable property such as land, roads, mines, buildings, and other fixed structures.

Refundable Tax Credit: a tax credit that refunded to the taxpayer by the Internal Revenue Service in the form of a direct payment.

Salvage Value: The residual value of an asset at the end of its useful life. Tangible assets can be depreciated to zero, or to their anticipated salvage value.

Tangible Property: Literally, anything that can be touched, including real estate and personal property.

Tax Expenditures: Any government spending program implemented through the tax code. Tax expenditures can be tax credits, deductions, or exemptions.

Appendix B: Depreciation Systems

THE MODIFIED ACCELERATED COST RECOVERY SYSTEM

In General

The depreciation deductions for most tangible property placed in service after 1986 are determined under rules specified in Code section 168, known as the Modified Accelerated Cost Recovery System, (MACRS). Less beneficial depreciation allowances generally are used for purposes of the alternative depreciation system and in computing alternative minimum taxable income.

Under MACRS, property is assigned to various recovery periods (i.e., useful lives) and each recovery period is assigned a recovery method (i.e., a depreciation method). The recovery periods are three, five, seven, ten, 15, 25, 27.5, 39 and 50 years. (These periods are reduced for qualified property used on an Indian reservation.) The recovery methods are the 200 percent declining balance method (for three-, five-, seven-, and ten-year property), the 150 percent declining balance method (for most 15- and 20-year property, certain property used in farming, and property for which the taxpayer elects) and the straight-line method (for all other property, generally buildings and other long-lived property). The MACRS accelerated methods switch to straight-line depreciation at the point in the recovery period that maximizes depreciation deductions.

No distinction is made between new or used property—both are subject to the same recovery periods and the same depreciation rules when placed in service by the taxpayer.

Recovery Periods

Property is assigned to a MACRS recovery period in one of two ways. Congress directly assigned specific recovery periods to certain property. For example, Code section 168(e)(3) classifies automobiles and light general-purpose trucks as five-year property. Other property is assigned to a recovery period based on the property's "class life." Class lives for most assets are listed in Revenue Procedure 87-56 and were developed by the Treasury Department pursuant to studies generally conducted in the mid-20th century and occasionally revised. Certain types of property (such as office equipment) are assigned class lives regardless of the industry in which they are utilized. Most property, however, is assigned a class life depending upon industry classifications. For example, assets used in the production of cement are assigned to the 20-year class life.

Property is assigned to the various MACRS recovery periods either statutorily or pursuant to its class life as follows:

Three-year property is property with a class life of four years or less; certain horses; and certain "rent to own" consumer durable property.

Five-year property generally is property with a class life of more than four years and less than 10 years; automobiles and light general purpose trucks; semi-conductor manufacturing equipment; computer-based telephone central office switching equipment; qualified technological equipment,

including computers and peripheral equipment; property used in the conduct of research and experimentation; and geothermal, solar, wind and biomass energy property.

Seven-year property is property with a class life of 10 years or more but less than 16 years; any railroad track; motorsports entertainment complexes; any Alaskan natural gas pipeline; and any property that does not have a class life and is not otherwise classified.

Ten-year property is property with a class life of 16 years or more but less than 20 years; single purpose agricultural and horticultural structures; any tree or vine bearing fruits or nuts; qualified smart electric meters; and qualified smart electric grid systems.

15-year property is property with a class life of 20 years or more but less than 25 years; municipal wastewater treatment plants; telephone distribution plants and other comparable equipment used for the two-way exchange of voice and data communications; retail motor fuels outlets; certain leasehold, retail and restaurant improvements; initial clearing and grading land improvements with respect to gas utility property; and electricity transmission property.

20-year property is property with a class life of 25 years or more, other than certain structures with a recovery period of 27.5 years or more; water utility property and municipal sewers placed in service before June 13, 1996; and initial clearing and grading land improvements with respect to electric utility transmission and distribution property.

25-year property is water utility property and municipal sewers placed in service after June 12, 1996.

27.5-year property is residential rental property.

39-year property is nonresidential rental property.

50-year property is railroad grading or tunnel bores.

Other Rules

MACRS contains conventions that specify when during the year the asset is deemed placed in service and is used to determine how much depreciation is allowed in the first recovery period. The half-year convention generally applies to most tangible personal property, and effectively provides that depreciation begins in the middle of the taxable year of acquisition. Under the half-year convention, the depreciation allowance for the first recovery period is 50 percent of the amount of the deduction that otherwise would have been determined. However, if 40 percent or more of property additions for the taxable year are place in service in the last quarter of the year, a mid-quarter convention applies for the year. A mid-month convention applies to real property such that depreciation for such property begins in the middle of the month that the property is actually placed in service.

No depreciation is allowed in the year of disposition of MACRS property. In addition, MACRS assumes that the salvage value of property is zero, allowing the entire cost of the property to be depreciated.

Depreciation for MACRS property generally is determined on an item-by-item basis. In certain limited instances, special rules allow taxpayers to depreciate all property with the same recovery period and of the same vintage as one asset in a general asset account. The proceeds realized on any disposition of property in a general asset account are included in income as ordinary income rather than offset by the basis of the property.

When originally enacted in 1986, MACRS provided authority to the Secretary of the Treasury to adjust the class lives applicable to any type of property. This authority was repealed in 1988 before it was invoked. From time to time, Congress has instructed the Treasury Department to study current-law depreciation system and the depreciation allowances applicable to specific types of property (e.g., horses, fruit and nut trees, scientific equipment, rental tuxedos, and vehicles) and report their findings to the tax-writing committees. The group responsible for these studies, Treasury's Office of Depreciation Analysis, has since disbanded.

MACRS does not apply to all tangible property. Motion picture films and videotapes and sound recordings are excluded from MACRS and are depreciated under the income forecast method. The income forecast method generally attempts to match the cost to produce such property with the income generated by the property. MACRS also does not apply to public utility property if the taxpayer does not use a normalization method of accounting. A normalization method of accounting attempts to spread the benefits of MACRS depreciation among the utility ratepayers serviced by the property.

Alternative Depreciation System

A taxpayer may elect to use straight-line recovery periods that mirror the class life of the asset's depreciation by using the Alternative Depreciation Systems (ADS). However once the taxpayer begins depreciating an asset on the slower ADS, that asset cannot be switched back to MACRS. The ADS generally results in depreciating an asset over a longer period of time. The advantage of the ADS option is that the lower depreciation deduction will translate to higher earnings on an income statement.

ADS uses the straight-line depreciation method which most often results in longer recovery periods (generally, the property's class life) than regular MACRS, so it usually less beneficial than using MACRS. A taxpayer may elect to use the alternative depreciation system for property placed in service during a year because the taxpayer may have insufficient income for the year to utilize the more generous MACRS allowances.

The alternative depreciation system also applies to "listed property" that is not used more than 50 percent in a trade or business. Listed property generally is property susceptible to personal use by individuals, and includes passenger automobiles; other transportation property; property generally used for entertainment, recreation or amusement; computers and peripheral equipment; and cellular phones. Other rules limit the amount of depreciation that may be claimed annually with respect to a passenger automobile regardless of the business use percentage.

Alternative Minimum Tax

The alternative minimum tax (AMT) originally was enacted 1969, and subsequently significantly modified by the Tax Reform Act of 1986, to ensure that taxpayers with significant economic income did not escape taxation on such items of income. To accomplish this goal, the AMT disallows the use of certain permanent items of tax preference (such as tax-exempt interest on certain private activity bonds) and negates the benefit inherent in certain timing items (such as accelerated depreciation under MACRS). Depreciation allowances under the AMT historically have been less beneficial than those allowed under the regular tax.

Under present law, the recovery periods for tangible personal property are the same for AMT and regular tax purposes. However, the 200 percent declining balance method is not allowed; rather, the 150 percent declining balance method is used under the AMT. Depreciation for real property is determined using the alternative depreciation system under the AMT.

Accelerated Depreciation

Accelerated depreciation methods provide relatively larger depreciation deductions in the early years of a property's useful life. One type of accelerated depreciation is the declining balance method, which calculates depreciation each year by dividing the unrecovered cost of an asset by its useful life and then multiplying by a factor. For example, depreciation under the 200 percent declining balance method for an asset that originally cost $1,000, is placed in service at the beginning of the year, and has a five-year useful life would be $400 ($1,000/5x2) in the first year, $240 (($1,000-$400)/5x2) in the second year, $144 (($1,000-$400-$240)/5x2) in the third year, and so on. Accelerated methods of depreciation are appropriate in instances where an asset can be expected to lose value more rapidly earlier in its useful life or to encourage investment in particular assets. Accelerated methods have been the predominant methods for recovering the cost of personal property (e.g., machinery and equipment) for federal income tax purposes for the past several decades.

Bonus Depreciation

Special rules contained in economic stimulus bills following the events of September 11, 2001, provided additional first-year depreciation ("bonus depreciation") for acquisitions of new tangible personal property. Pursuant to the Job Creation and Worker Assistance Act of 2002, taxpayers could immediately deduct 30 percent of the cost of qualified property (generally, new tangible personal property) that was acquired after September 10, 2001, and placed in service before January 1, 2005. This "bonus depreciation" was in lieu of depreciation a taxpayer would otherwise claim over the life of the property. Bonus depreciation did not apply if the property was acquired pursuant to a binding contract in existence, or if construction began, before September 11, 2001. The portion of the cost of property not immediately deducted under the bonus depreciation rules is recovered pursuant to the normal MACRS rules.

Congress has extended and increased the bonus depreciation provision several times. Congress provided a 100 percent bonus depreciation allowance for property placed in service after September 8,

2010, and before January 1, 2012. The bonus depreciation allowance is 50 percent for property placed in service in 2012, and is scheduled to sunset thereafter.

Taxpayers may elect to forgo using bonus depreciation and instead receive a refund of certain tax credit carryovers.

EXPENSING UNDER SECTION 179 AND OTHER PROVISIONS

Under Code section 179, a taxpayer with sufficiently small annual capital investment may elect, in lieu of claiming depreciation, to expense immediately a certain amount of the cost of property placed in service in the taxable year. Property eligible for the expensing election under section 179 generally is tangible personal property (and certain computer software for taxable years beginning before 2008). The amount eligible to be expensed phases out as the cost of a taxpayer's property additions for the year exceeds a certain amount. The amounts allowed to be expensed and the beginnings of the phase-out range by year are:

Taxable Year	Expense Amount	Phases Out Beginning At
2007-09	$250,000	$800,000
2010-11	$500,000	$2,000,000
2012	$125,000	$500,000
after 2012	$25,000	$200,000

In addition to section 179, other Code provisions allow full or partial expensing for certain specific types of property (e.g., clean-fuel burning vehicles, tertiary injections, investments in empowerment zones, and certain environmental remediation costs).

PRIOR LAW

The Accelerated Cost Recovery System

As the name suggests, MACRS is the successor depreciation system to the Accelerated Cost Recovery System (ACRS). ACRS had been adopted in 1981; the Tax Reform Act of 1986 modified ACRS to produce MACRS.

In format, ACRS was similar to MACRS. Under both systems, property is assigned to a discrete number of recovery periods and a specific accelerated depreciation method applies to each recovery period. However, ACRS utilized fewer recovery periods than MACRS does and the length of the ACRS periods generally were shorter than the MACRS periods for the same types of property. The recovery periods for ACRS were three, five, ten and 15 years. Most tangible personal property fell into the three- and five- year classifications. Ten-year property generally consisted of public utility property and 15-year property generally consisted of real property. The recovery period for real property was lengthened to 18 and then 19 years by subsequent revenue acts.

ACRS was enacted as an incentive to invest in depreciable property. The lives and methods provided by ACRS allowed taxpayers to recover the cost of capital investments much more rapidly than would be indicated by the use of economic depreciation. The staff of the Joint Committee on Taxation estimated that the replacement of ACRS with MACRS by the Tax Reform Act of 1986 increased federal revenues by over $12 billion over a five-year budgetary period.

Facts and Circumstances Determinations

The enactment of the ACRS in 1981 ended the ability of a taxpayer to determine its depreciation deductions on a taxpayer-specific facts and circumstances basis. Under prior depreciation systems, taxpayers were allowed certain leeway in determining useful lives, depreciation methods, salvage value and other conventions for various types of property based on the property's characteristics and the taxpayer's use of the property.

Depreciation deductions have been allowed since the inception of the income tax in 1913. From 1913 to 1934, taxpayers were provided considerable latitude in determining appropriate allowance for depreciation based on their facts and circumstances. In 1934, in order to provide revenue for New Deal public works projects and to offset declines in tax receipts because of the Great Depression, the Treasury Department promulgated rules regarding the burden of proof required for taxpayers to support their depreciation deductions. These rules generally reduced depreciation deductions claimed by taxpayers.

In 1942, Treasury promulgated Bulletin F, which provided guidelines for the useful lives for various types of property. Although taxpayers could still show that shorter lives were appropriate, the effect of Bulletin F was to further slow depreciation allowances.

In 1962, Treasury revoked Bulletin F and provided the "class life" system to assist taxpayers and the IRS in agreeing upon acceptable useful lives to be used in the context of a taxpayer facts-and-circumstances depreciation system. Guidelines for useful lives were intended "to provide taxpayers with a greater degree of certainty in determining the amount of their depreciation deductions and to provide greater uniformity in the audit of these deductions by the Internal Revenue Service." Class life guidelines purposely were set at levels shorter than those reported by most industry participants surveyed in a Treasury study. The class lives were also shorter than the lives previously set forth in Bulletin F. A "reserve ratio test" was developed to ensure that taxpayers did not establish useful lives that were too short. The reserve ratio test was intended as an objective measure by which the taxpayer's asset retirement and replacement policies were taken into account so that the taxpayer and the Internal Revenue Service could judge whether the taxpayer's chosen useful lives were appropriate.

A later Treasury study indicated that many taxpayers continued to compute depreciation allowances based on their own facts and circumstances rather than the new class life guidelines and that the reserve ratio test contained certain flaws. Consequently, in 1971 the Treasury introduced the Class Life Asset Depreciation Range (ADR) System. The ADR system classified assets based on industry groups and provided useful lives for each group. Taxpayers were allowed to elect depreciable lives that ranged anywhere from 80 to 120 percent of the applicable class life for a group of assets.

The ADR system computed depreciation on a mass asset basis and had specific rules with respect to the use of depreciation methods (both straight-line and accelerated methods were allowed), salvage value, used property, and ordinary and extraordinary retirements. The Treasury Department revised the ADR system over the decade it was in existence—categories were added and deleted, some lives were shortened while others were lengthened. In general, ADR provided taxpayers with more beneficial depreciation than the guideline system promulgated in 1962. The ADR system was effectively repealed by Congress with the enactment of ACRS.