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ENERGY TAX INCENTIVES AND THE ALTERNATIVE MINIMUM TAX

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ABSTRACT

We take a first look at limitations on the use of energy-related tax credits contained in the General Business Credit (GBC) due to limitations within the regular corporate income tax as well as the AMT. Between 2000 and 2005, firms were unable to use all energy-related tax credits due to GBC limitations in the regular tax. The AMT has a smaller but still pronounced impact on the ability of firms to use these credits. Finally, we provide some illustrative calculations to demonstrate how the AMT can lead to very different levelized costs of producing electricity from a wind power project.

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I. Introduction

Energy-related subsidies in the federal tax system are under increasing scrutiny. Some note that the tax system provides large subsidies to oil and gas producers at a time when we should be reducing our consumption of fossil fuels. Others note the subsidies provided to renewable energy and raise concerns about the marginal impact of those subsidies at a time when oil prices exceed $100 per barrel.

Less clear is the ability of corporate firms to take advantage of these subsidies. In particular, firms can only utilize energy-related tax credits if they have sufficient tax liability against which the credits may be offset. In addition, the Alternative Minimum Tax (AMT) can reduce the value of preferential depreciation rates for energy-related capital investment and energy-related tax credits by deferring the time at which they may be enjoyed.

In this paper, we take a first look at limitations on the use of energy-related tax credits contained in the General Business Credit (GBC) due to limitations within the regular corporate income tax as well as the AMT. We find that between 2000 and 2005, the ability of firms to take energy-related tax credits was significantly curtailed by limitations in the regular tax on the use of GBCs. We find that the AMT has a less pronounced impact on the ability of firms to use these credits though the impact is not trivial. Finally, we provide some illustrative calculations to demonstrate how the AMT can lead to very different levelized costs of producing electricity from a wind power project. Among other things, these calculations make clear the complexity of measuring the impact of the AMT on the profitability of energy-related investments.

II. Background

The various energy related tax credits in the U.S. tax code are designed to encourage our use of renewable energy sources and to stimulate domestic production of conventional energy sources. While the two goals might appear contradictory, they arise from differing energy policy objectives. One objective is to reduce our use of energy sources that create negative environmental and other externalities. Renewable electricity production tax credits (REPTC) have been promoted on the grounds that they provide an alternative to the use of fossil fuels in the production of electricity.[1] This may contribute to a reduction in SO_2, NO_x, and other emissions.[2] It also contributes to a reduction in CO_2 emissions, of particular concern for climate change.

A second policy goal is to increase energy security. While an imprecisely defined concept, it generally is manifested by a concern with reducing oil consumption and diversifying energy supplies. Tax credits for enhanced oil recovery (EOR) contribute to a diversification of oil *supply* even if they don't contribute to a reduced reliance on oil in the United States.[3]

Table 1 lists the most important energy related tax expenditures in the federal budget and their associated revenue loss. Subsidies for alcohol and biodiesel fuels are the largest tax expenditure ($10,840 million from 2009 through 2013) with biodiesel subsidies accounting for less than one percent of this figure ($80 million from 2009

[1] Over half of U.S. electricity is produced by coal-fired generating plants. An additional sixteen percent is generated by natural gas-fired plants, Energy Information Administration (2007)

[2] Title IV of the 1990 Clean Air Act established a national cap on overall annual emissions of sulfur dioxide. As long as this cap is binding, increasing the use of renewable power will not decrease sulfur dioxide emissions. It will only lower the price of sulfur dioxide allowances. A similar cap affects SO_2 and NOx from a region comprised of 28 mostly eastern states and the District of Columbia. The Clean Air Interstate Rule (CAIR), which was finalized on March 10, 2005 requires annual caps of SO_2 and NOx emissions in this area.

[3] A third argument often cited to support energy subsidies is the presence of market barriers. Metcalf (2007) notes it is difficult to support subsidies to energy on the basis of this argument.

through 2013). Most of the revenue loss associated with alcohol fuels results in a reduction in excise tax receipts ($10,630 million from 2009 through 2013) with the remainder arising from the alcohol fuel income tax credit and the tax credit for small ethanol producers. The second largest single tax expenditure is the new technology credit ($5,010 million from 2009 through 2013). This tax expenditure includes the REPTC as well as an investment tax credit for solar and geothermal power.

Table 1. Energy-Related Tax Expenditures (in millions of dollars)		
	2008	2009-2013
Alternative Fuels		
Alcohol and biodiesel fuel credits	4,260	10,840
New technology credit	800	5,010
Credit for holding clean renewable energy bonds	40	350
Other: energy facility bonds, clean-burning vehicles, fuel cell, microturbine, and solar investments.	360	250
Total: Alternative Fuels	5,460	16,450
Coal		
Alternative fuel production credit	1,310	170
Capital gains treatment of royalties on coal	190	870
Credit for investment in clean coal facilities	50	925
Partial expensing for advanced mine safety equipment	20	-
Total: Coal	1,570	1,965
Energy Conservation		
Exclusion of utility conservation subsidies	120	560
Allowance of deduction for certain energy efficient commercial building property	170	120
Credit for energy efficiency improvements for new and existing homes	180	30
Total: Energy Conservation	470	710
Oil and Gas		
Excess of percentage over cost depletion, fuels	910	4,430
Expensing of exploration and development costs, fuels	510	1,550
Other: alternative fuel production credit, partial expensing for new refinery investment,	260	1,200

accelerated depreciation for certain natural gas pipelines and other investments		
Total: Oil and Gas	1,680	7,180
Source: Office of Management and Budget (2008). Amounts are in millions of dollars. Note that tax expenditures should not be summed due to interactions among them. The summing is done for illustrative purposes to indicate the relative importance of tax expenditures across different fuel sources.		

We focus on the ability of firms to use their energy-related tax credits. Firms are limited in their use of credits for two basic reasons. First, they may not be earning enough positive income to take advantage of their credits. Only 53 percent of firms in 2005 had a positive net income. These firms accounted for over 90 percent of total corporate assets. Second, they may be limited in their use of these credits by the Alternative Minimum Tax. Less than one percent of firms were affected by the AMT, either through limits on the use of tax credits or direct AMT payments, in 2005. These firms, however, accounted for 23 percent of corporate assets.[4]

The interaction between the AMT and energy subsidies has not been explored before and so we pay particular attention to this policy. The AMT is designed to ensure that a taxpayer's use of certain deductions and credits does not allow the taxpayer to avoid significant tax liability. In brief, the AMT requires the filer to recompute taxable income after disallowing various preferences and adjustments. This gives rise to alternative minimum taxable income which – after a possible exemption of income, depending on the level of alternative minimum taxable income – is taxed at a twenty

[4] Generally, the general business credit may not exceed net income tax less the greater of the taxpayer's tentative minimum tax liability or 25 percent of net regular tax liability above $25,000. However, the limitation is determined separately for the portion of the credit attributable to the empowerment zone and renewal community employment credit component, the alcohol fuels credit, and the credit for electricity produced from renewable sources. For purposes of calculating the general business credit limitation, net regular income tax liability is the sum of regular tax less all other nonrefundable credits.

percent rate. This tentative minimum tax is compared to the regular tax liability and the taxpayer pays whichever is larger.

Under the corporate AMT, firms begin with taxable income before net operating loss deductions and add back in a number of preferences and adjustments to compute alternative maximum taxable income. These adjustments include using less generous depreciation schedules and tax-exempt interest income from specified private activity bonds, among other things. An exemption of up to $40,000 is allowed (reduced for larger amounts of AMTI) and a twenty percent marginal tax rate applied. After subtracting allowable foreign tax credits, the tentative minimum tax is obtained. If this amount is greater than the regular tax liability, the corporation must pay the difference as an AMT.

Note that the tentative minimum tax is compared to the regular tax liability before taking all but foreign tax and possessions tax credits. Thus a corporation may not be subject to the alternative minimum tax but could still be affected by it through a disallowance of some of its tax credits in the current year. To illustrate with a simple example, a firm has a regular tax liability before tax credits of 100. Its tentative minimum tax is 95. Therefore, it need not pay an AMT tax. But it can only use a maximum of 5 in tax credits to offset its regular tax liability. A firm with 15 in current year tax credits would have to carry forward (or back) 10 of the current year credits to avoid its after-credit tax liability from following below its TMT. This description of the corporate AMT is necessarily brief. For more information, see Lyon (1997) and Carlson (2005). We turn next to explore what energy-related tax credits are used by corporations.

III. Information from the Corporate Tax Data

In this section we analyze the most important energy tax credits taken by corporations. Table 2 provides information on the aggregate credits for four of the most significant energy tax credits received by corporations.[5]

Table 2. Aggregate Value of Significant Energy Tax Credits Taken by Corporations (in thousands of dollars)

Year	Nonconventional Source Fuel Credit	Enhanced Oil Recovery Credit	Renewable Energy Production Tax Credit	Energy Investment Credit
2000	1,516,989	394,569	44,399	176,860
2001	1,806,406	457,228	70,628	71,330
2002	2,189,942	379,921	131,602	72,035
2003	2,104,097	486,938	142,818	59,954
2004	2,725,372	534,824	209,581	50,333
2005	3,914,073	717,342	331,285	3,488

Source: Statistics of Income Corporate Tax Return Files. Amounts are in thousands of dollars.

The nonconventional source fuel credit (NSFC) was first established by the Windfall Profit Tax of 1980 (PL 96-223) under Section 29 of the tax code. The section provides for a $3.00 per barrel of oil-equivalent production tax credit for alternative fuels (indexed in 1979 dollars and worth $6.79 in 2005). The credit phases out for oil prices above $23.50 in 1979 dollars ($53.20 in 2005). Originally benefitting shale and tar sand oil, synthetic fuels from coal, and coalbed methane, the major recipient of the credit was coalbed methane until its eligibility for the credit ended in 2002. Since then synthetic

[5] Energy related tax credits are also received by non-corporate organizational forms. In this paper we focus only on corporate returns, excluding pass-through entities including S-corporations, regulated investment companies and real estate investment trusts. Energy credits that are earned by individual filers are small relative to credits earned by C-corporations. In 2005, EOR credits claimed by individual filers are estimated to equal $56.62 million, $1.96 million for the REPTC, $2.72 million for the energy investment credit and zero for the NSFC. These estimates are based on a sample of individual tax returns from the Statistics of Income. The estimates should be viewed with some caution, however, due to the limited number of tax payers claiming these credits.

coal has been the major beneficiary of the credit. Energy Information Administration (2008) notes that synthetic coal production doubled between 2002 and 2007.[6] The Section 29 tax credit for synthetic fuels and certain biomass gas expired at the end of 2007.

The Energy Policy Act of 2005 (EPACT2005) added coke and coke gas to the list of qualified fuels and made the credit part of the general business credit.[7] Qualifying facilities must be placed in service before January, 1 2010. The amount of credit-eligible coke produced may not exceed an average barrel-of-oil equivalent of 4,000 barrels per day. The $3.00 credit for coke or coke gas is indexed for inflation using 2004 as the base year instead of 1979 and does not phase out with the price of oil. The phase-out of the Section 29 credit, however, does not apply to coke or coke gas.

The tax expenditure for this credit is estimated to be $170 million between FY 2009 and 2013. This is a sharp decline as the credit has essentially phased out as of 2006 given high crude oil prices.

The EOR credit is a fifteen percent investment tax credit applied to various tertiary recovery methods for oil production and expenditures paid or incurred to construct a qualifying gas treatment plant in Alaska after 2004. To the extent that a credit is allowed for the cost of these methods, the taxpayer must reduce the amount otherwise

[6] The EIA study uses the terms synthetic and refined coals interchangeably. The American Jobs Creation Act of 2004 established a new tax credit for the production of refined coal as part of Section 45. This tax credit did not replace the existing Section 29 credit. To qualify for the new credit refined coal had to meet two standards: 1) emissions of nitrogen oxides and either sulfur dioxide or mercury in the refined coal must be at least twenty percent lower than would occur if feedstock coal were burned; and 2) the refined coal must be at least fifty percent higher in value than the feedstock.

[7] Most energy tax credits are part of the general business credit. Prior to EPACT2005, the Section 29 credits were an exception and so any unused credits had to be carried forward as an AMT credit. As part of the general business credit, excess credits can now be carried backward one year and forward twenty years. EPACT2005 also redesignated Section 29 as Section 45K.

deductible or required to be capitalized and recovered through depreciation, depletion, or amortization, as appropriate, with respect to the costs. The original credit was enacted in the Omnibus Budget Reconciliation Act of 1990 and phases out when the real price of oil exceeds $28 per barrel in 1991 dollars. There was no reduction of the credit in the years 2000 through 2005 of our analysis.[8]

The REPTC, enacted in the Energy Policy Act of 1992, provided for a production tax credit of 1.5¢ per kWh (indexed) of electricity generated from wind and closed-loop biomass systems.[9] The credit was 2.0 ¢ per kWh in 2007. The electricity production credit is reduced over a 3 cent phase out range to the extent the annual average contract price per kilowatt-hour of electricity sold in the prior year from the same qualified energy resource exceeds 8 cents (adjusted for inflation; 10.7 cents for 2007). The credit has never been reduced since its enactment. The tax credit has been extended and expanded over time and currently is available for wind, closed-loop biomass, open-loop biomass, geothermal energy, solar energy, small irrigation power, municipal solid waste, qualified hydropower production, refined coal and Indian coal.[10] Firms may take the credit for ten years. EPACT2005 added the new hydropower and Indian coal credits with the latter receiving a credit of $1.50 per ton for the first four years and $2.00 per ton for three additional years.

[8] The following nine tertiary recovery methods generally qualify for the EOR credit: miscible fluid displacement, steam-drive injection, microemulsion flooding, in situ combustion, polymer-augmented water flooding, cyclic-steam injection, alkaline flooding, carbonated water flooding, and immiscible non-hydrocarbon gas displacement, or any other method approved by the IRS.

[9] A closed-loop biomass is plant material grown specifically for use in a biomass generator.

[10] In the case of open-loop biomass facilities, small irrigation power facilities, landfill gas facilities, trash combustion facilities, and qualified hydropower facilities the otherwise allowable credit amount is 0.75 cent per kilowatthour, indexed for inflation measured after 1992 (1 cent per kilowatt-hour for 2007).

A variety of energy investment tax credits are available. As of 2005 – the last year of our analysis – a ten percent business tax credit could be taken for solar or geothermal property (30 percent for solar property put in place beginning in 2006 and running through 2008).[11] The sharp drop off in the energy investment credit in 2005 ($3.5 million) was likely due to the fact that the American Jobs Creation Act of 2004 modified the REPTC to include geothermal power. Generally, the REPTC provides a greater incentive for geothermal investment than the energy investment credit. In addition EPACT2005 provided a 15 percent credit for advanced coal projects (20 percent for Integrated Gasification Combined Cycle (IGCC) property) and 20 percent for qualified gasification projects.

As Table 2 indicates, the NSFC accounts for nearly 80 percent of all energy-related tax credits received by corporations. As noted above, this credit's share of total energy-related credits will likely fall in the future as the credit phases out with high oil prices and the credit for synthetic fuel expires at the end of 2007.

Focusing on the three major energy tax credits, Table 3 shows that firms with assets in excess of $1 billion are the predominant recipient of these credits. The REPTC has a slightly more dispersed distribution with three percent of the credits being received by firms with assets below $50 million and four percent by firms with assets between $100 and $250 million. To put these distributions in perspective, the last column of Table 3 reports the distribution of general business credits for all firms reporting positive GBCs in 2005. Firms with assets in excess of $1 billion received 71 percent of all GBCs.

[11] The business energy credit also applies for the purchase of qualifying fuel cell and stationary microturbine power plants from 2006 through 2008. The credit for qualifying fuel cell investment is 30 percent but may not exceed $500 for each 0.5 kilowatt of capacity. The credit for qualifying microturbine investment is limited to the lesser of 10 percent of the basis of the property or $200 for each kilowatt of capacity.

In general, it appears that energy-related GBCs are more highly concentrated in very large firms.

Table 3. 2005 Energy Tax Credits by Firm Size (in thousands of dollars)

Asset Size	Nonconventional Source Fuel Credits	Enhanced Oil Recovery Credit	Renewable Energy Production Tax Credit	All General Business Credits
Under 1,000	35,159	2,153	2,374	1,608,222
Between 1,000 and 10,000	17,314	43	1,891	1,574,013
Between 10,000 and 50,000	8,222	1,019	2,729	2,111,301
Between 50,000 and 100,000	863	12	142	1,215,963
Between 100,000 and 250,000	1,125	672	11,978	1,730,079
Between 250,000 and 500,000	5,022	16	1,267	1,700,059
Between 500,000 and 1,000,000	673	14,974	7,778	1,892,589
Greater than 1,000,000	3,845,696	698,454	303,125	29,266,699
Total	**3,914,073**	**717,342**	**331,285**	**41,098,924**

Source: Statistics of Income Corporate Tax Return Files. The last column reports the distribution of GBCs for all firms with positive GBCs. Figures include the portion of the GBC credit attributable to the empowerment zone and renewal community employment credit component, the alcohol fuels credit, and the credit for electricity produced from renewable sources that do not appear on IRS Form 3800.

Table 4 shows the distribution of energy tax credits by industry sector. Ninety percent of the NSFCs were taken by firms in the finance and insurance (30 percent), the utility industry (30 percent) and the manufacturing industry (17 percent). The manufacturing sector includes large integrated oil companies. The EOR is highly concentrated with 69 percent of the credits taken by manufacturers and 21 percent by firms in the mining industry. The REPTC is also highly concentrated with 70 percent taken by the utilities industry and 11 percent taken by the manufacturing industry. The

credits also tend to be fairly concentrated in a small number of firms. In 2005, five firms out of 282, based on firm observation weights, accounted for over 60 percent of the REPTC. In the same year, five firms out of 33, based on firm observation weights, accounted for 35 percent of the NSFC and for the EOR credit 5 firms out of 246 accounted for 69 percent of the credits.

Table 4. 2005 Energy Tax Credits by Industry Sector (in thousands of dollars)

	Nonconventional Source Fuel Credits	Enhanced Oil Recovery Credit	Renewable Energy Production Tax Credit	All General Business Credits
Agriculture, Forestry, Fishing and Hunting	-	507	-	42,319
Mining	4,843	152,780	2,099	328,627
Utilities	1,156,307	11,503	233,963	1,244,757
Construction	80,690	28	4,172	73,991
Manufacturing	649,233	492,998	34,888	21,473,499
Wholesale Trade	10,027	28,635	4,921	988,268
Retail Trade	2,895	-	-	662,267
Transportation and Warehousing	112,023	-	6,228	231,473
Information	5,772	-	-	3,606,824
Finance and Insurance	1,205,938	203	9,663	3,243,994
Real Estate, Rental and Leasing	2,106	16	712	124,357
Professional, Scientific, and Technical Services	0	4	3,094	4,175,924
Holding Companies	422,764	30,652	22,416	2,987,423
Administrative and Support and Waste Management and Remediation Services	140,960	17	9,004	250,657

Education Services	-	-	-	4,313
Health Care and Social Insurance	-	-	-	350,193
Arts, Entertainment and Recreation	-	-	-	43,241
Accommodation and Recreation	120,515	-	124	1,230,599
Other Services	**-**	**-**	**-**	
Total	**3,914,073**	**717,342**	**331,285**	**41,098,924**

Source: Statistics of Income Corporate Tax Return Files. Amounts are in thousands of dollars. The last column reports the distribution of GBCs for all firms with positive GBCs.

We also considered what other general business credits are taken by firms that take the major energy tax credits. Table 5 reports this information. Interestingly, firms taking energy related tax credits take substantial amounts of low income housing credits.[12] For firms taking the NSFC, for example, the low income housing credit comprises 62 percent of their general business credits in 2005. In contrast, for all firms reporting some general business credits, the low income housing credit accounts for 30 percent of total credits.

Table 5. Other Credits Taken by Energy Credit Taking Firms in 2005

	NSFC	EOR	REPTC	All Firms with GBCs
NSFC	35%	0%	7%	3%
EOR	0%	36%	3%	5%
REPTC	0.3%	2%	9%	1%
Low Income Housing Credit	62%	41%	69%	30%
Investment Credit	3%	6%	2%	3%
Credit for Increasing Research Activities	0.1%	7%	6%	41%

This table reports the share of current year GBCs taken in the row categories conditional on the corporation taking the credit in the column header. This excludes post October 22, 2004 REPTCs. See text for more information.

[12] Desai, et al. (2008) provide a description and analysis of this tax credit.

Source: Statistics of Income Corporate Tax Return Files. Amounts are in thousands of dollars.

Summing up, we observe that most of the energy credits are taken by very large firms and generally in sectors that one would expect. However, energy credits are taken by firms in a fairly large number of industries. Firms taking the top energy credits are also taking large amounts of low income housing credits.

V. Impact of the AMT on GBCs

Firms cannot always use their energy tax credits (or other general business credits). One benefit of the GBC (and complication for tax analysts) is that unused general business credits may be carried back one year and forward twenty years.[13] This provides flexibility and additional value for credits than occurs in the absence of the GBC rules. The Nonconventional Source Fuel Credit was made part of the general business credit in EPACT2005 precisely to allow firms to take advantage of the carry forward and backward rules. Prior to this change in the tax code, NSFCs not taken in the current year became AMT credits.

Firms cannot use tax credits in the current year either because they don't have sufficient regular tax liability against which to offset the credit or the credit would reduce their tax liability below the Alternative Minimum Tax Tentative Minimum Tax (TMT). Most tax credits may be used to the extent that the filer's tax liability does not fall below its TMT. As noted above a firm may not have to pay any AMT tax but could still have its taxes increased by the presence of the AMT.

Our tax calculator uses a set of SAS routines to perform the same calculations a tax filer would make when filling out the general business credit Form 3800 and any

[13] Some credits unused at the end of the twenty year period or upon the death of an individual taxpayer may be taken as a deduction in the subsequent tax year. Of the three credits we focus on in this paper, only the EOR is eligible for this deduction.

additional required business credit forms. In 2005, our tax calculator determined that firms could use $13.1 billion in general business credits out of an available stock of $41.1 billion. The corporate tax file reports that $13.5 billion general business credits were used in 2005. The $400 million difference is due to observations with missing data and other potential data quality issues. Certain general business credits are not included on Form 3800 and are calculated after the credits appearing on the Form 3800. A taxpayer's tentative minimum tax is treated as being zero for purposes of determining the tax liability limitation with respect to the section 45 credit for electricity produced from a facility (placed in service after October 22, 2004) during the first four years of production beginning on the date the facility is placed in service. These renewable production tax credits are part of the general business credit and are calculated on Form 8835. In addition, the empowerment zone and renewal community employment credit (Form 8844), the alcohol fuels credit (Form 6478) and the New York Liberty Zone employee credit (Form 8884) are also components of the general business credit but not subject to the general business credit limitation rules.

To determine the effect of the AMT on the three energy credits examined in this study, a taxpayer's tentative minimum tax is treated as being zero for the purpose of determining a firm's tax liability limitation with respect to each individual energy credit. In addition, the allowable energy credits are computed after all other general business tax credits have been determined.

Our analysis uses data from income tax returns from the Internal Revenue Service, Statistics of Income (SOI) Corporate Tax Return files for 2000 through 2005. The SOI files are constructed annually based on a sample of all corporate tax returns

filed. The SOI files are stratified to sample larger firms at a greater rate than smaller firms. Most corporations with assets in excess of $50 million are included in the sample. We have excluded S-corporations, regulated investment companies and real estate investment trusts from our analysis.

In 2005 less than one percent of corporations were subject to the AMT or affected by the TMT. But almost one-quarter of corporate assets were in firms affected by the AMT in that year. Alternatively, of the 2,902 firms with assets in excess of $1 billion in 2005, 22 percent of these firms either made positive AMT payments or were affected by the TMT limitation. Firms in the manufacturing, mining, and utilities industries, industries most likely to take energy related tax credits were disproportionately affected by the AMT.

Table 6 shows how the general business credit of firms in 2005 taking certain energy tax credits is affected by the AMT. For firms that report a nonconventional source fuel credit, their total usable GBCs on their form 1120 totaled $355 million in 2005.[14] The next row shows the total GBCs before any limitation on their use. This includes carry forwards from previous years. The third row reports a calculation of aggregate GBCs that could be used in the absence of an AMT TMT limitation. Comparing the first and second rows, we see that firms reporting an NSFC on their form 3800 were able to use 21 percent of their GBCs (and carry forwards) in 2005. A comparison of the second and third rows indicates that 47 percent of their GBCs could not be used due to TMT limitations. The remaining 33 percent of total tentative GBCs were unavailable for current use due to regular tax limitations.

[14] This is just the portion of the NSFC included in their GBC for firms with 2005 tax years ending after December 31, 2005 when the NSFC became part of the general business credit.

Comparing the three energy related tax credits in Table 6, firms reporting an NSFC were most affected by the AMT. For the NSFC and the REPTC, between one-quarter and one-half of these credits are unavailable for use due to TMT limitations. This is considerably higher than the average for all firms reporting positive GBCs. Firms receiving EOR credits were not affected by TMT limitations. Generally, these firms reported relatively large regular tax liabilities in 2005, which make TMT limitations less binding if AMT adjustments and preferences have not changed.

Table 6. Use of GBCs in 2005
(credit amounts in thousands of dollars)

	NSFC	EOR	REPTC	All Firms
Total Usable GBCs	355,097	1,701,953	1,490,999	13,080,968
Total Tentative GBCs	1,728,160	2,160,284	2,910,347	41,098,924
Total GBCs: no TMT Limitation	1,160,725	1,760,070	2,177,489	15,407,375
Share of GBCs Used in Current Year	21%	79%	51%	32%
Share of GBCs Unusable in Current Year due to TMT Limitation	47%	3%	24%	6%
Share of GBCs Unusable in Current Year due to Regular Tax Limitations	33%	19%	25%	63%

Total tentative GBCs include carry forwards. The All Firms column includes all firms with GBC greater than zero. See text for explanation.
Source: Statistics of Income Corporate Tax Return Files.

The calculations in Table 6 include carry forwards. Another way to look at the data is to consider what share of newly minted energy-related tax credits are available for use in the current year. Table 7 reports the results. We calculated the level of usable

GBCs if no energy related tax credit were reported on form 3800 in 2005. Consider the first column. Firms reported an aggregate of $496 million in NSFC in 2005. Had they reported no NSFCs on form 3800, their usable GBCs would have fallen from $355 million to $284 million, a difference of $71 million. In other words, $71 million out of $496 million in year 2005 NSFCs were used in 2005. This represents 14 percent of their usable GBCs in that year. In a second calculation, we remove the TMT restriction on the use of NSFCs on form 3800. This increases the amount of usable GBCs by $275 million, 55 percent of total NSFCs reported on form 3800. The remainder of the $496 million – 30 percent – were limited due to regular tax constraints. This is calculated as a residual.

Table 7 indicates that the NSFCs contained in the GBC were most affected by the AMT in 2005. Over half of the new credits could not be taken in 2005. Most of the EOR credits could be taken in the current year while roughly half of the REPTCs were taken in 2005. For these two latter tax credits, regular tax limitations were more significant than the AMT in reducing the immediate use of the tax credits. REPTCs earned from facilities producing renewable power placed in service after October 22, 2004 were not included in this analysis as they were not subject to TMT limitations.

Table 7. Disposition of New Credits in 2005
(credit amounts in thousands of dollars)

	NSFC	EOR	REPTC
Aggregate Energy Credit	495,668	717,342	223,879
Contained in current year GBC	14%	88%	53%
Deferred due to TMT Limitation	55%	4%	13%
Deferred due to regular tax limitation	30%	9%	34%

Excludes post October 22, 2004 REPTCs. See text for details.
Source: Statistics of Income Corporate Tax Return Files.

We carried out a similar calculation for the REPTC for the years 2000 through 2005. Table 8 reports the results. For most years, between half and two-thirds of credit could be taken in the current year. In 2003 and 2004, however, only one-quarter of the credits could be taken immediately. The time series suggests that the AMT in general has not had a significant impact on the ability of firms to take the REPTC with the aggregate amount deferred due to TMT limitations equal to 5 percent or less in four out of six of the years.

Table 8. Disposition of New REPTCs
(credit amounts in thousands of dollars)

	2000	2001	2002	2003	2004	2005
Aggregate REPTC Credits	44,399	70,629	131,602	142,818	207,251	223,879
Contained in current year GBC	59%	60%	65%	27%	27%	53%
Deferred due to TMT Limitation	0%	1%	9%	5%	0%	13%
Deferred due to regular tax limitation	41%	39%	26%	68%	73%	34%

Excludes post October 22, 2004 REPTCs. See text for details.
Source: Statistics of Income Corporate Tax Return Files.

The fact that a firm may not be able to use an energy-related tax credit in the current year suggests the question of when they will be able to use it. Table 9 reports data on the average number of years GBCs are limited for firms that report a REPTC. All firms observed in at least five years are limited in their use of their GBC in at least one year. For firms that are observed three or more years in the data, there is a 90 percent probability that the firm will be limited in its use of its GBC in at least one year.

From the underlying data, we can compute the probability of limited GBCs for firms reporting an REPTC conditional on the years observed in the Treasury data. In any given year there is a sixty percent probability that a firm reporting an REPTC will have its GBCs limited for some reason. Conditional on the firm having its GBC limited in a

given year, the probability that it will be limited in the following year rises to 85 percent. And for those firms who are have been limited in two consecutive years, the probability that their GBC will be limited in a third year is 78 percent.

Table 9. GBC Limitations Across Time

Years Observed	Average Number of Years GBCs Limited	Total Number of Firms
1	0.53	68
2	1.07	27
3	1.92	13
4	2.38	8
5	3.29	7
6	4.29	7

This table reports the number of years that firms reporting REPTCs are limited in their use of GBCs for any reason.

General business credits can be limited because the firm is in a loss situation or simply has insufficient regular tax against which to apply the GBC. It may also be limited because of the AMT. Table 10 is similar to the previous table except that it focuses on GBC limitations due to the TMT. Now we observe that roughly half the firms observed for three or more years have TMT limitations on their GBC in at least one year. For firms in the sample for six years, the probability of a TMT limitation in more than one year equals 43 percent. While the AMT alone cannot explain limitations on the use of GBCs, its impact is far from trivial.

Table 10. TMT Limitations on the GBC		
Years Observed	Average Number of Years GBCs Limited By TMT	Total
1	0.04	68
2	0.15	27
3	0.31	13
4	0.38	8
5	0.86	7
6	1.43	7
This table reports the number of years that firms reporting REPTCs are limited in their use of GBCs because of the TMT.		

This section has shown that the AMT can affect a firm's ability to use energy-related tax credits in a given year. While less of a limitation on the immediate use of credits than the restriction under the regular income that credits may not exceed before-credit tax liability, the AMT does affect the value of these credits. The loss in value arises from the deferral of tax benefits into the future. When the benefits may be realized depends in part on when the firm leaves AMT status. As a result measuring the impact of the AMT on firms' investment decisions is highly complex. We turn in the next section to providing some examples to illustrate just how complex the impact of the AMT on investment is.

III. The Alternative Minimum Tax and Project Choice: An Example

This section illustrates the complexity of the AMT by focusing on a particular investment decision: the choice of an electricity generation investment using a levelized cost analysis. The levelized cost analysis asks what price must be received for electricity sold by a generator to cover fixed and variable costs of providing the electricity including

the required return for equity owners.[15] This approach has been used in a variety of studies of electric power generation (e.g. Deutch and Moniz (2003), Tolley and Jones (2004), and Sekar, et al. (2005)). We follow the methodology of Metcalf (2007). The steps to constructing an estimate of levelized cost are:

- Compute the present discounted value of costs in each year over life of a project. This includes all capital and operating costs net of tax deductions.
- Sum all costs over life of project. This is the present discounted value of the project's overall costs.
- Compute the amount of constant real before-tax revenue required each year that will equal the total present discounted value of costs over the life of the project.
- Divide this required revenue value by total kilowatt-hours produced by plant to obtain a cost per kWh.

In particular we consider the construction of a wind project using the cost and technology assumptions used in Metcalf (2007). The firm undertaking the project has other projects that generate income and costs and for simplicity we take assume that the tax status of the firm (regular, AMT, or TMT) is determined by factors unrelated to this particular project. The AMT has the following implications for the wind project cost calculation:

- Income streams from the project will be taxed at the AMT 20 percent tax rate rather than the regular corporate income tax rate of 35 percent.[16]
- The production tax credit cannot be taken immediately.
- The project must be depreciated over five years using the 150 percent declining balance method rather than the 200 percent declining balance method.
- An AMT tax credit may be carried forward and applied against regular tax liability if the firm leaves AMT status. Its use of this credit is limited by its tentative minimum tax. We make various assumptions about the ability to use the AMT credit in calculations below.

[15] The price is a constant real price received over the life of the plant to cover lifetime fixed and variable costs.

[16] We ignore the impact of the section 199 domestic production deduction as well as state taxes.

We compute levelized costs for the wind project using parameter assumptions taken from Metcalf (2007). Table 11 presents levelized cost calculations for a wind project that is put into place in 2005. Under the tax rules in place for that year and assuming the firm is not on the AMT, the levelized cost is 5.00¢ per kWh. A firm that is on the AMT cannot use the production tax credit and must depreciate the capital using a less generous schedule. Its income on the project, however, is taxed at a lower marginal tax rate. The result is to raise the levelized cost of the project by just under two percent.

Table 11. Wind Power Levelized Costs

1	No AMT	5.00
2	AMT Always	5.09
AMT for Five Years		
3	Credit usable in year 6	5.14
4	Credit usable in year 15	5.24
5	Credit never usable	5.50
6	AMT Starts in Three Years	4.72
AMT Starts in 3 years and Lasts for 5 years		
7	Credit usable in year 9	5.00
8	Credit usable in year 18	5.03
9	Credit never usable	5.05
10	No PTC and Five Year Depreciation	5.19
11	PTC and Fifteen Year DDB Depreciation	5.53
12	No PTC and Fifteen Year DDB Depreciation	5.73

Source: Authors' calculations.

This example illustrates that the AMT may not substantially affect the cost of a project. But the result is sensitive to the firm's status on the AMT. We next assume that the firm is on the AMT when the project begins and stays on the AMT for five years. It then returns to regular tax status and never returns to AMT status. We assume that any change in tax liability from being on the AMT attributable to this project can add to a

firm's AMT tax credit if the net tax liability increases or can be used to reduce existing liability if the net tax implications for the project in a given year are negative. This is equivalent to reducing the cumulative AMT credit from other parts of the firm's activities.

If the firm may use the AMT credit attributable to this project the first year it returns to regular tax status, the levelized cost is 5.14¢ per kWh. Note that it is more costly to be on the AMT for a short period of time rather than permanently. This reflects that fact that the gain of the production tax credit in the sixth through tenth year of the project is more than offset by the higher taxes paid on income from the project from year six on. This mirrors finding by Lyon (1990) that temporary status on the AMT can raise the cost of capital for firms more than being on the AMT permanently. The longer the firm must wait in order to use its AMT credit the higher the levelized cost rises. In the limit when the credit can never be used, the levelized cost rises to 5.50¢ per kWh.

The AMT need not raise the costs of projects. The next row of Table 11 assumes the firm starts on the regular tax and becomes liable to the AMT in three years. If it stays on the AMT permanently, the levelized cost is reduced to 4.72¢ per kWh. Now the firm gets to take generous depreciation and production tax credits early in the project's life. By the time the firm enters AMT status, it has used much of its depreciation for the project. While it forgoes several years of production tax credits, its income is taxed at the lower marginal tax rate for the remainder of the project. The next three rows show the impact of a delayed entry into temporary AMT status. The AMT in this case has little impact on the cost of the project.

Finally we consider the case where the firm is not on the AMT but its tentative minimum tax is such that it cannot utilize the production tax credit. This could occur if the firm's regular tax liability before credits (except foreign tax credits) exceeds its tentative minimum tax but use of the credits will push the firm into AMT status. If the credits are never available for use, it is as if the production tax credit has been removed for a firm on the regular tax in which case the levelized cost rises to 5.19¢ per kWh.

While the focus in energy policy has been on the production tax credit, the five year depreciation of the project has considerable value. As the entry in line 11 indicates, the levelized cost for a firm on the regular tax that can use the production tax credit but must depreciate the asset over fifteen years rises to 5.53¢ per kWh. Lengthening depreciation and eliminating the PTC increases the levelized cost further to 5.73¢. The shortened tax life available for assets eligible for the section 45 and 48 tax credits appears to be as valuable if not more valuable than the production tax credit itself.

These calculations are all *ex post* cost calculations. When the firm is deciding to make a renewable energy investment it may not know whether and how long it will be subject to the AMT. Nor will it necessarily know whether or when it can use the AMT tax credit attributable to this project. Thus the AMT can add considerable uncertainty to the tax consequences of the firm's investment in this project. It is unclear how this affects the willingness of firms to invest in capital projects.

The AMT may ultimately interact with other renewable energy policy in unexpected ways. According to the Department of Energy, 29 states plus the District of Columbia have or will have renewable portfolio standards that will require or set voluntary goals that a certain percentage of the states electricity use to come from

renewable power. If these standards are binding, federal tax incentives will simply affect the price of renewable electricity rather than the amount generated.[17]

VI. Conclusion

This paper is a first effort to look at how energy-related tax credits in the corporate income tax are impacted by limitations on the use of the general business credit with particular attention paid to the impact of the Alternative Minimum Tax. For a sample of corporate tax returns between 2000 and 2005, we find that the AMT has a limited impact on the ability of firms to immediately use an energy-related tax credit. The impact varies across energy-related tax credits with the Nonconventional Source Fuel Credit most impacted by the AMT in 2005.

We also provide an illustrative example of the AMT's impact on a firm's cost of investing in a wind powered electricity generating project. The AMT's impact on cost is highly variable depending importantly on when the firm enters AMT status, how long it stays on the AMT and other income streams within the firm.

The results of the empirical analysis and the levelized cost calculations suggest the value of looking more closely at how the AMT affects the value of energy-related subsidies in the federal tax system. Considerable discussion has ensued over reforming the AMT.[18] An interesting question is how any AMT reforms would affect the value of energy subsidies in the tax system. This research is a first effort at addressing this important question.

[17] For a list of sate's renewable portfolio standards see the Department of Energy, http://www.eere.energy.gov/states/maps/renewable_portfolio_states.cfm

[18] Most popular discussions focus on the individual AMT. But many tax practitioners and economists have argued on equity and efficiency grounds that the corporate AMT should also be abolished.

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