CLEAN ELECTRICITY PERFORMANCE PROGRAM AND SUBTITLE G TAX PROVISIONS OF THE BUILD BACK BETTER BILL

By Bruce C. Buckheit

The Clean Electricity Performance Program (CEPP) is a major climate component in the pending Build Back Better reconciliation package. Certain industry advocates have suggested that (a) the goals and schedule of the CEPP are too aggressive and cannot be achieved and (b) more needs to be done to ensure some viability of the natural gas production sector. This report provides facts relevant to these issues and the writer's assessment of critical issues surrounding proposed revisions to the CEPP.

- This country has had some form of production and/or investment tax credits (PTC/ITC) for renewable energy in place for nearly 20 years, and yet we see low or no renewable energy development in many states as a result of political preferences for fossil fuel generation. For this reason, the PTC/ITC and local grant provisions of the Administration's program, by themselves, should not be relied on to achieve the Administration's goals.
- The $40/MW "penalty" payment provisions of the CEPP (to be paid by shareholders rather than ratepayers) are likely the most (and only) effective tool to reach the Administration's goal of 80 percent Clean Energy (CE) by 2030, where CE is defined as units having an emission rate of 0.1 mt/MWh CO_2. By itself the $40/MWh payment does not achieve this goal (requiring only 67 percent CE nationwide) but it ensures that pro-fossil states do their share in reducing GHG emissions. With the penalty payment provisions in place, green state RE portfolio requirements, the PTC/ITC extensions of the BBB and the local bonus programs of the CEPP should ensure that the goal will be reached.
- However, contrary to alarms raised by some, full but minimum compliance with the CEPP "penalty" provisions, will not "crater" natural gas-fired generation over the next ten years, but merely curtail such generation to 2017 levels.
- Concerns about this program's implications for grid stability are unfounded. The U.S. can reach the 80 percent clean energy goal and still retain dispatchable generating resources capable of providing almost 50 percent of overall demand.
- The mandates in this program are crucial for effectiveness. The penalties for shareholders will drive much of the change under this program and each 0.5 percent decrease in the program's annual CE target will decrease effectiveness by 20-25 percent.
- If new, unabated, gas-fired generation is able to qualify as CE, the 85 percent cap on CE increases would drastically reduce program effectiveness. Only a handful of states - those with substantial percentages of coal and oil-fired generation - would need to reduce any CO_2 emissions under this program.
- Partial crediting for gas, even as small as $15/MWh, can be expected to have a very large impact on the amount of new gas generation.

Overall Structure of the CEPP and Subtitle G "Green Energy" Provisions[1]

The CEPP and PTC/ITC provisions of Subtitle G would incentivize an increase in renewable energy and provide funds to communities to assist in a transition to CE through a mix of carrots and sticks. The "stick" is a $40/MWh "payment" for those who fail to increase CE generation by four percentage points of overall

[1] There are numerous other smaller, but still important, features to the proposal that this report does not address.

load each year. Complementing this provision is a CEPP grant program of $150/MWh for each "new" MWh of CE over 1.5 percent[2] of load (i.e., a one-year grant for "new" generation in that single year). This grant is provided to the LSE and must be used for the benefit of the ratepayers, including worker retention and other programs. In addition, Subtitle G provides for larger, more flexible, and longer term production tax credits for renewable generation of up to 3.0 cents/kWh ($30/MWh) or (at the investor's option) up to 36 percent of basis for investors. Subtitle G also provides price support for nuclear generation on an as-needed basis. Throughout a review of the potential effectiveness of these provisions it is important to keep in mind where the different funds flow. The tax credits go to the developer, who presumably is then able to offer lower prices to the LSE and the ratepayers. The $150/MWh bonus grant is available to the LSE, but may only be used to benefit the ratepayers (and presumably not the shareholders), while the penalty "payment" is to be made by the shareholders and owners of the LSE (and not by the ratepayers). The proposed bill does provide a reference that suggests that compliance with these provisions will include tradeable "clean energy credits" similar to RECs that are currently employed in renewable programs.

CEPP and Green Energy Tax Provisions in Context

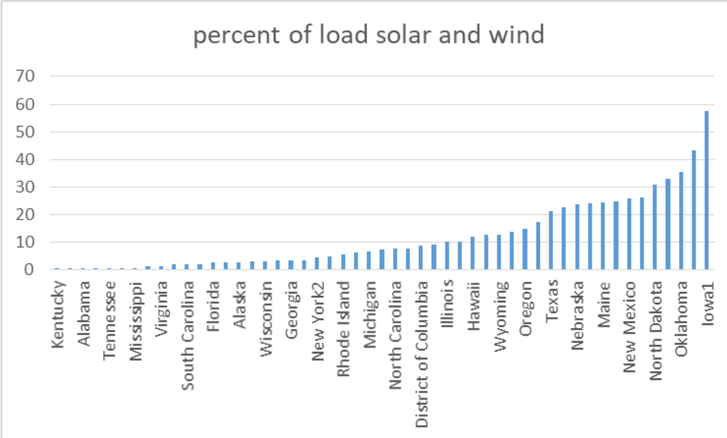
Today U.S. generation is slightly over 4,000 million MWh; approximately 60 percent (2,400 million MWh) is from fossil fuels, 20 percent (800 million MWh) from nuclear generation, and 20 percent (800 million MWh) from renewable energy. To get to 80 percent "clean" energy (CE) the U.S. would need to add 1,600 million MWh of renewable energy (assuming all nuclear units continue to run). Some of the new generation needed is already in the pipeline as a result of prior extensions of the PTC/ITC and offshore wind development. Several groups have modeled the effects of these proposals, based on the assumption that all generators will behave in a financially rational manner, and have concluded that the programs will achieve the stated goal. However, the energy market is more complicated than can be accommodated by these models and history has shown that all generators do not behave in what economists would call a financially rational manner.

The PTC and ITC for wind and solar power have now been available in one form or another for over a decade, and every state has significant options for implementation of RE. But, as Figure One demonstrates, significant RE development has been limited to a few states, at least in part, because of political issues. In certain areas, zoning, state and local income tax, and other barriers have been imposed that severely hamper the development of new renewable energy. Thus, for example, local opposition to wind energy in Virginia has resulted in no onshore wind energy in the Commonwealth and very limited solar energy development. These barriers cannot be overcome simply by extending the PTC/ITC.

Figure One: 2020 Wind and Solar Generation as Percent of Load[3]

[2] 2.5 percent in 2023. This makes sense because those projects are already in the pipeline.

[3] Net Generation by State by Type of Producer by Energy Source (EIA-906, EIA-920, and EIA-923)



The $40/MWh payment provision should be considered a major driver of this program, if not the major driver - especially since the proposal requires that the payment be paid by the shareholders and not be passed on to the ratepayers. $40/MWh is substantial as it mirrors the wholesale price of electricity, but is much less than the grants available for those who do comply with the 4 percent requirement. The program is cleverly constructed to encourage utilities to meet the 4 percent threshold. For example, If West Virginia's utilities miss the threshold by one percent, the shareholders are obliged to pay a fine of $23 million, but, if they add that final one percent, and thereby comply, the LSEs can qualify for a grant of $212 million to benefit their customers by rate reductions, system improvements, worker retention, and other programs to assist in the transition.[4] Thus, falling just short of the threshold is an unlikely option for utilities.

Looking state-by-state as a surrogate for a utility-by utility analysis, the 4 percent annual increase was surprisingly effective,[5] but, by itself, it does not mandate an increase to 80 percent CE, mostly because of the 85 percent cap on CE. Not considering the cap, the annual minimum RE required would be 1,545 million MWh; but the cap reduces that figure to 1,133 million MWh in 2030.[6]

This is a substantial sum equal to roughly 20 percent of the capital cost of the RE and can be used to assist in transitioning to a greener grid. In addition, Congress is considering extending and increasing the production tax credit (PTC) and investment tax credit (ITC) programs for wind and solar.[7] Notably, each of these provisions would be fixed at those rates for projects that commence construction through 2032.[8]

The Obama era PTC/ITC package and subsequent extensions were effective in driving more renewable energy development than proposed in the Clean Power Plan, but the program has been limited because of the short duration of those programs, which limited the industry's ability to plan and grow. This proposed PTC/ITC program would apply to projects that commence construction through 2032 and later and provide tax benefits for those projects for 10 years. The consensus among the project developers, environmental economists and utility regulators consulted, is that this package (CEPP plus tax credits) should deliver high levels of renewable generation and storage. Separate projections indicate that it will

[4] In 2024 and later. In 2023 the bonus would be $127 million.

[5] See attached workbook.

[6] The effect of the cap is less in the early years of the program.

[7] And geothermal, CCS and other programs, see Section by Section Subtitle F, G, H, & J.pdf (house.gov)

[8] These "bonus" rates are available for projects that pay "prevailing wage" and meet apprenticeship and domestic content requirements. For reference, the average wholesale cost of electricity is $40/MWh.

further hasten the retirement of coal-fired and some gas-fired generation in the 10 year time frame and substantially limit the amount of new gas-fired generation. There will, however, likely be some relatively small number of existing coal-fired generation and a larger amount of existing and new gas-fired generation at the end of the period. The current carbon intensity of 0.1 mt/MWh will require gas-fired generation with CCS to achieve approximately 80-85 percent capture under the full range of operating conditions, a target that no CCS project has achieved in practice. The CEPP is also silent on calculating carbon intensities, which may be a key issue. At the current level of 0.1 mt/MWh, whether upstream and life cycle losses should be considered in determining the emission rate of a source is not critical in order to be protective against uncaptured gas, but, if this figure is raised to 0.3 mt/MWh or above, DOE's rulemaking should consider and accurately measure upstream and lifecycle emissions. This analysis employs several simplifying assumptions:

- Overall demand is constant
- Nuclear generation is constant
- New RE replaces coal first, then gas as needed
- States with 2023 CE percentages higher than 85 percent retain their CE percentage
- When a state reaches 85 percent CE no new CE is added

In most instances the effect of these assumptions is straightforward and linear (e.g., if one assumes a one-percent increase in demand, the CE obligation rises with that increase). One feature that stands out is that it may be financially advantageous for a utility to install a single large project early in the program and pay penalties thereafter – and that this conduct would also be a benefit to near term emission reduction goals. It is also apparent that one or more REC markets will come into play and compliance strategies in any state or market will depend on REC prices.[9] The discontinuity between the penalty ($40/MWh) and the bonus ($150/MWh, above a threshold) may present an opportunity for environmental gerrymandering where RECs are bundled in such a way that one operator opts to pay the penalty and another operator maximizes the available bonus grants. Presumably, such gamesmanship can be limited by the language tying CE targets to utilities highest year, as well as DOE and the state regulatory authorities rulemaking and regulations.

The PTC and ITC are strong drivers of growth in many markets and the effectiveness of the bonus program is enhanced where a LSE adds more than 4 percent of load in a year. And so, it is reasonable to expect that the combination of these Federal programs and state renewable portfolio standards will allow the country to meet the goals of the program.

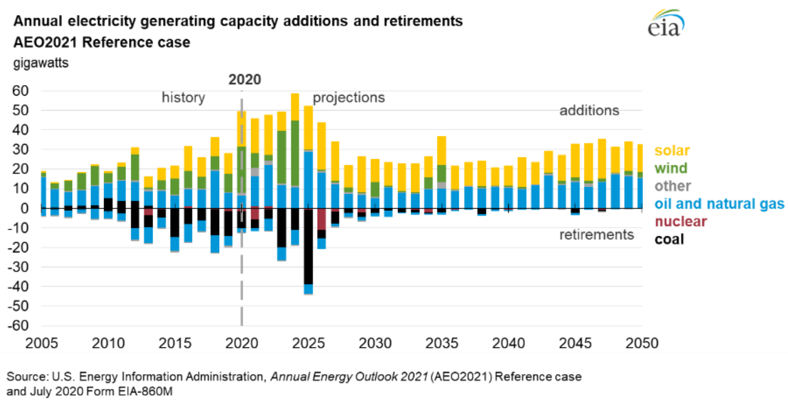
Review of Potential Revisions to the Program

It is reported that the current version of the CEPP is perceived by some as moving "too fast" and that Sen. Manchin is considering lowering the 4 percent per year requirement to 3 percent a year or less. American electric utilities increased their use of zero-carbon power sources by roughly 1.4 percentage points a year over the last five years. That use increased by 2.3 percentage points in 2020. Thus, broadly speaking, U.S. RE additions would need to double recent performance – but only double that performance. This challenge is supported by a number of projects already in the pipeline, including almost 10 GW of offshore

[9] Different utilities had different compliance strategies in the Acid Rain program. Some "conservative" utilities wanted to "own" their compliance options and so built scrubbers, others added scrubbers when demand for new scrubbers was down (and so prices for new scrubbers were low), others were opportunistic market participants and only considered adding scrubbers when they could not buy allowances.

wind power slated to come online in the early years of the program. Indeed, the Department of Energy's Energy Information Agency's (EIA) most recent projection for new renewable generation for 2023 and 2024 demonstrates that the CEPP threshold for those years will be met by projects already under development. See Figure Two, below.

Figure Two: Generating Capacity Additions and Retirements



By way of example, West Virginia utilities could meet the 4 percent threshold and avoid any payment if they added the equivalent[10] of one 681 MW wind farm in each of the program years. If they did so, they would be eligible for grants of approximately $127 million in 2023 and $212 million in each of the subsequent program years for the benefit of the ratepayers, including rate reduction, coal waste remediation, and worker retention programs.

Because West Virginia currently has such a low baseline percentage of Clean Energy, it may retain much of its existing coal fleet without paying the $40/MWh penalty. Under the CEPP West Virginia could avoid any penalty by reducing coal generation by 36 percent over 8 years – adding 18 million MWh of wind energy and leaving over 32 million MWh/year of coal-fired generation in place. As shown in a recent study by Synapse Energy Economics sponsored by the West Virginia School of Law,[11] the CEPP reductions are feasible and consistent with the age and economic viability of units that would otherwise retire.

The U.S. can reach the 80 percent clean energy goal and still retain dispatchable generating resources capable of providing almost 50 percent of overall need – including coal, natural gas, nuclear, biomass, geothermal, and some hydroelectric resources. Concerns about localized transmission constraints, weather delays, and the like can be effectively managed by the nation-wide REC trading program that the CEPP appears to contemplate.

It is also reported that, "Mr. Manchin is also weighing a provision that would pay utilities not just for using more clean energy but for switching from coal — an industry that is already collapsing — to natural gas. The incentives for using natural gas would be smaller but designed to keep the industry afloat." [12] Since the choice of generation technologies is largely determined by the difference in cost between competing technologies, providing a subsidy to new gas-fired generation undercuts the subsidies for renewable

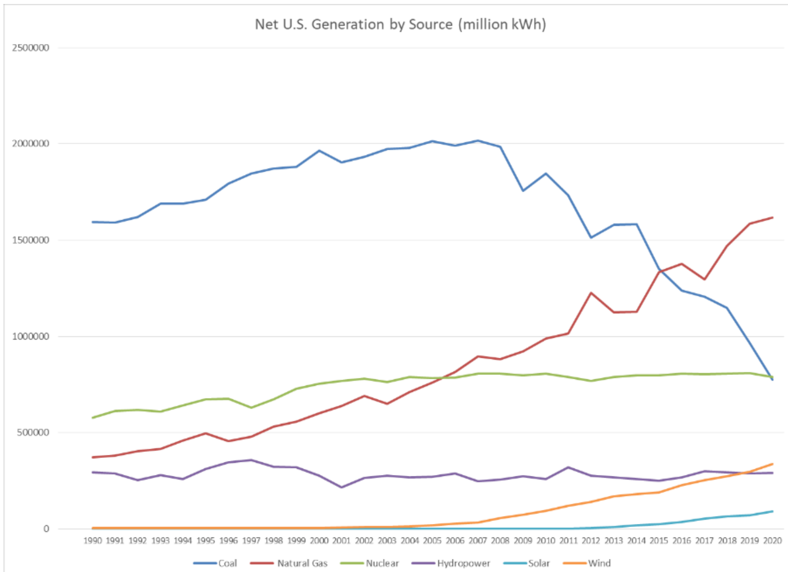
[10] They need not actually build the wind farms themselves, but could acquire renewable energy credits in a market. It should also be noted that West Virginia's utilities export about 30 percent of the electricity they product to neighboring states. This analysis assumes that such exports continue. If they do not, the amount of new RE needed would be less.

[11] West Virginia's Energy Future (wvu.edu)

[12] Joe Manchin Will Craft U.S. Climate Plan - The New York Times (nytimes.com)

generation and simply wastes money. Moreover, there is no indication that the natural gas industry is in need of any support. As shown in Figure Three, below, with the development of fracking technologies, natural gas-fired generation has grown rapidly in recent years. Creating a carve-out supporting natural gas has no economic justification, and further is antithetical to the purpose of the CEPP.

<u>Figure *Three:* U.S. Net Generation by Source</u>



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If the market trends of the past several years continue, one can expect that most of the reduced need for fossil fuel-fired generation will be accommodated by reduced generation from coal-fired units. However, international demand for liquefied natural gas (LNG) fired generation has led to increased domestic gas prices (and profits), which may shift some generation to coal. Table One, below, demonstrates that the proposed 4 percent threshold for penalty payments which leads to the majority of the emission reductions contemplated by the CEPP, modestly reduces domestic demand for natural gas for electricity generation from current record levels to those of just three or four years ago (see Figure Three, above and Table Two, below).

<u>Table One*:* U.S. Fossil Generation as Impacted by the Proposed Four Percent CE Increase Requirement</u>

Annual US Fossil Generation (MWh) to comply with 4 percent threshold	TOTAL GENERATION	COAL	OIL	NATURAL GAS
FOSSIL GENERATION IN BASE YEAR	2,514,626,661	926,560,951	39,598,784	1,548,466,926
NEW RE GENERATION ADDED 2023-2030	1,170,595,662			
2030 FOSSIL GENERATION IF COAL/OIL REDUCE GENERATION FIRST		0	2,400,000	1,341,630,999
2030 FOSSIL GENERATION IF REDUCTION IS 75% COAL/OIL; 25 % NATURAL GAS		82,197,513	6,015,476	1,255,818,010

Thus, in these analyses, where load growth is assumed to be zero, natural gas generation is curtailed by 14-19 percent as a result of the CEPP penalty provision, and returns to 2017 generation levels. As Table

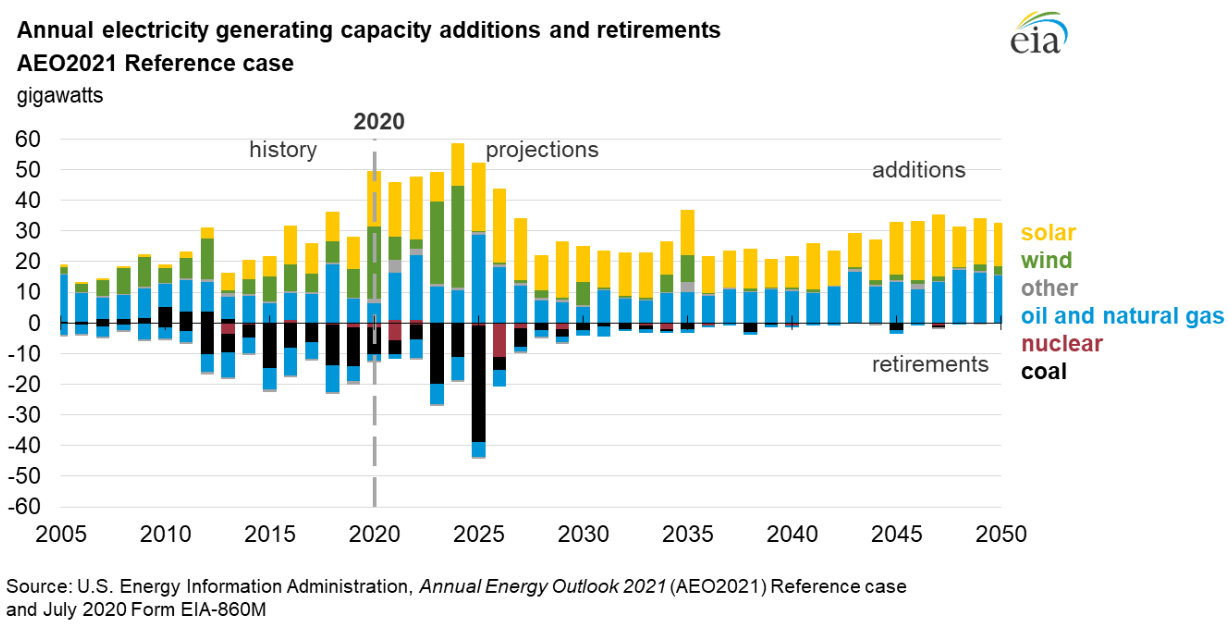
Two shows, 2020 production is 50 percent greater than in 2010, while domestic consumption has increased by 25 percent.

Table Two: U.S. Natural Gas Production and Consumption

	Production (trillion ft^3)	Consumption (trillion $ft^{3)}$
2010	21.3	24.1
2020	33.9	30.7
2030 (BAU forecast)	37.9	30.9

It should be noted that, while West Virginia is ranked number six in the production of natural gas, maintaining and distributing production of existing wells is not labor intensive.[13] Further, EIA's Annual Energy Outlook projects that for the foreseeable future any new generation needs not met by renewables will be met by new natural gas-fired generation. These needs include retiring coal, nuclear, and fossil fueled plants and new electricity demands from EVs.[14]

Figure *Four:* Energy Information Agency Forecast Capacity Additions and Retirements



It should also be noted that the electric sector is only one of several sectors that are consumers of natural gas. Those sectors are not directly affected by the CEPP. The EIA projects continued growth in overall energy supplied by natural gas.

Figure *Five:* EIA Projection of Natural Gas Consumption

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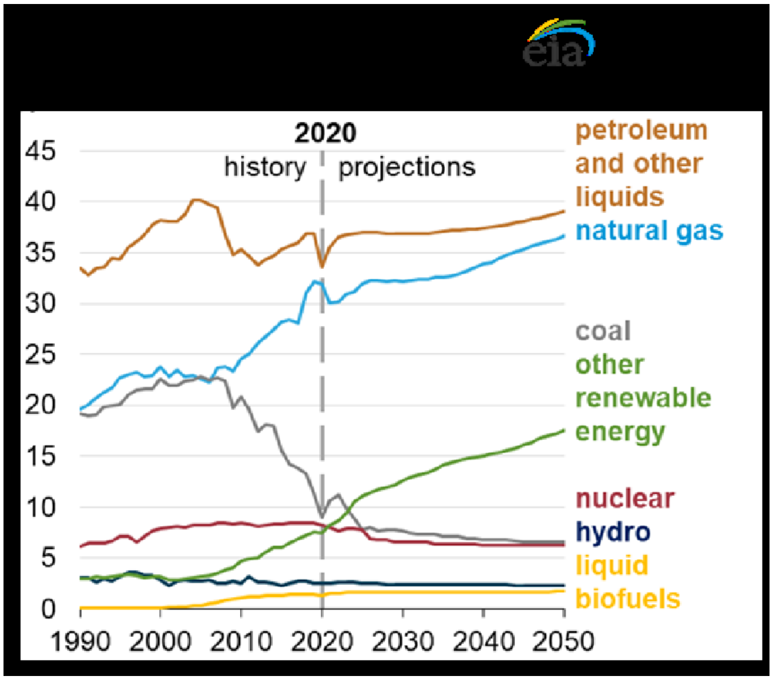
[13] Oil production from the Marcellus is not directly impacted by this portion of the legislation and jobs in the natural gas side of things are put at roughly 10,000 ([PolitiFact | How many oil and gas jobs are there in West Virginia? It's surprisingly hard to say]())

[14] https://www.eia.gov/outlooks/aeo/electricity/images/subtopic2_fig1.png



> "EIA projects that consumption of natural gas will keep growing as well, driven by expectations that natural gas prices will remain low compared with historical levels. In the Reference case, the industrial sector becomes the largest consumer of natural gas starting in the early 2020s. This sector will expand the use of natural gas as a feedstock in the chemical industries, as well as for industrial heat and power."[15]

Thus, while the CEPP may reduce the rate of growth in the use of natural gas, there is no reason to believe that it will cause the industry to collapse.

Impacts of Potential Revisions to the Program

1. Raise the 0.1 mt/MWh threshold for what is considered CE, retain the structure for the balance of the program.

   The cost of CCS remains quite high and so it is doubtful that the industry would support raising the current threshold to levels that would require any amount of CCS. At 0.4 mt/MWh new gas generation would be permitted and would receive the same bonus as new RE and so, this should be a clear bright line. CE defined at 0.3mt/MWh would exclude new gas-fired generation.

2. Modify the percent increase in CE subject to penalty and bonus.

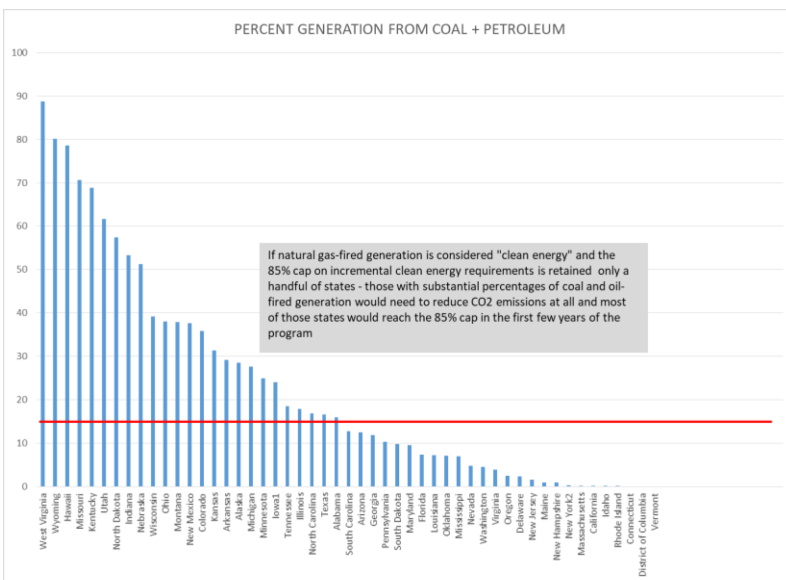
[15] U.S. Energy Information Administration | AEO2021 Narrative at page 7.

The effect of this modification is linear, or close to it. If baseline increase in RE is 1.5 percent of overall load, each 0.5 percent reduction in threshold reduces program effectiveness by 20 percent . If one assumes that the baseline increase in RE should be considered to be 2 percent of overall load, then each 0.5 percent reduction in the threshold reduces program effectiveness by 25 percent

3. <u>Raise the threshold but provide only partial credit for new gas.</u>

This option would appear to remove the penalty for generating with gas, but provide a smaller bonus to gas than RE. If one simply considers new, unabated, gas-fired generation as CE and does not otherwise modify the program, program effectiveness is drastically reduced by the 85 percent cap on CE increases. If natural gas-fired generation is considered "clean energy" and the 85 percent cap on incremental clean energy requirements is retained, only a handful of states - those with substantial percentages of coal and oil-fired generation - would need to reduce CO_2 emissions at all and most of those states would reach the 85 percent cap in the first few years of the program. Figure Six shows the percent of load that is generated by the only remaining "unclean" sources – coal and petroleum. Once a LSE reduces its use of those sources to 15 percent, it need not add any new CE.

<u>Figure *Six*: 2020 Percent Generation from Coal and Petroleum, by State.</u>



In addition, this option creates several perverse effects that are difficult, if not impossible to model. This is because economic models all assume "rational behavior by operators". Today a surprising amount of generation is "out of merit order" meaning that state regulators allow fossil units to run even when they are not the low-cost option. However, what these models can identify are the interactions that should be considered. Interestingly, the Rhodium Group finds that new gas-fired generation will lead to more retirements of nuclear units and encourages retention subsidies for nuclear.

The EIA "high" and "low gas price" alternative analyses were reviewed as a proxy for a subsidy on new gas to estimate the effect of a gas subsidy. The variability in Henry Hub gas prices ($2.68 - $5.04/MMBtu) and delivered gas prices is large and so, as one might expect, is the effect on the mix of generation. Natural gas-fired generation in the low gas price analysis is twice as high as predicted in the high gas price scenario. RE is reduced by one-third in the low gas price alternative compared to the high price alternative. Natural gas-fired generation typically requires 6 MMBtu of heat input to generate 1 MWh of electricity, so the range of fuel cost variability modeled by EIA translates to a fuel cost differential of $15 - $30/MWh. We see today that very small shifts in the price of natural gas have a relatively large effect on the balance of generation. Thus, at least on an “order of magnitude basis” a $15/MWh stimulus from partial crediting can be expected to have a very large impact on the amount of new gas generation.

<u>Eliminate the penalty, just rely on potential tax credits/subsidies.</u>

West Virginia electricity producer AEP’s CEO Akins stated, “And I don’t like the penalty — we already have all the impetus in the world to continue to this clean energy transition.”[16] However, a number of states have adopted pro-fossil generation policies and requirements that limit development of renewable energy. AEP’s assertion that it has sufficient motivation to add RE is shown to be incorrect by West Virginia’s lack of investment in clean energy to date – only 6.2 percent of West Virginia’s electricity is currently produced by renewable sources.

These incentives have been available for more than a decade, but AEP and others have not been persuaded to add RE. This holds true for the option of reducing the penalty to a "nominal" amount.

<u>Eliminate/reduce the "bonus" and/or the PTC/ITC.</u>

The Rhodium Group and others have done modeling that shows that robust PTC/ITC can get reductions equivalent to the penalty provisions, but, as above, these models assume rational behavior by operators. The Rhodium Group study looks at different scales of incentives and shows (not surprisingly) that the larger the incentive, the more RE you get. It is not clear to see if there is any "threshold" or “knee in the curve” where an objective evaluation of the size of the tax credits can be evaluated and any such estimates would be subject to uncertainty as to future technology costs and natural gas prices. Rhodium concludes that the PTC/ITC extensions would get about the same reduction as the penalty provisions and so, if it were just about the impact on the Federal budget, one could keep the 4 percent mandate and cut either the tax incentives or the bonus (or both). Industry should have no interest in this approach and so it is unlikely that this path will be pursued.

[16] Joe Manchin Will Craft U.S. Climate Plan - The New York Times (nytimes.com)