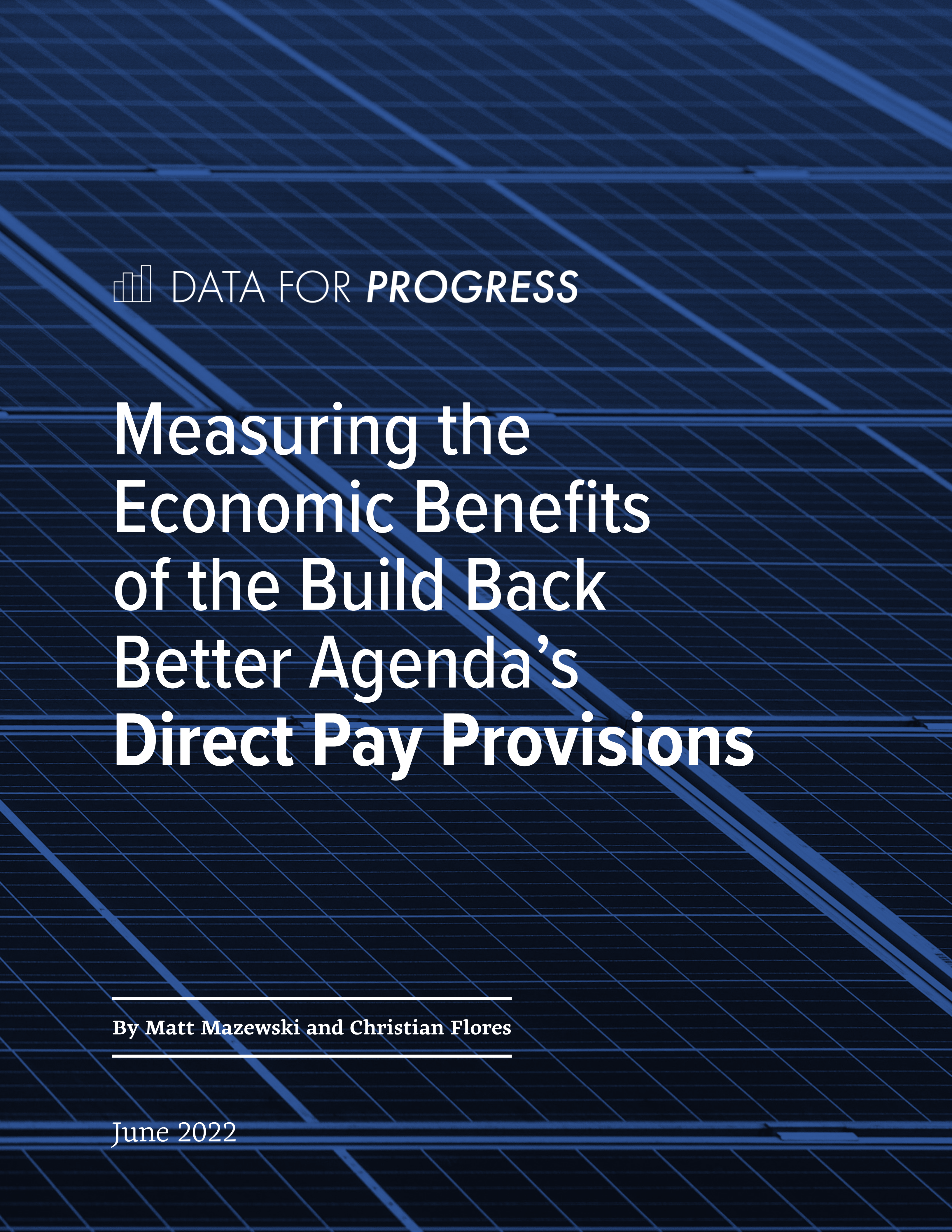

DATA FOR *PROGRESS*

Measuring the Economic Benefits of the Build Back Better Agenda's **Direct Pay Provisions**

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Introduction and Summary of Findings

Federal clean energy tax credits are a critical tool for routing investments into projects that promote environmental sustainability and a robust domestic supply of renewable energy. Absent substantial increases in these investments in the near future, the U.S. will most likely fail to achieve the level of renewable generation needed to prevent the worst consequences of climate change.[1] Moreover, our economy will remain exposed to inflation risks stemming from the volatility of fossil fuel prices.[2,3]

Administrative and bureaucratic barriers, however, often make it difficult for individuals and firms to fully take advantage of these incentives. The Build Back Better (BBB) agenda not only includes expansions and extensions of existing green tax credits, but also seeks to increase their use by reviving a mechanism known as Direct Pay.

Direct Pay, which is modeled on an earlier initiative under the 2009 American Recovery and Reinvestment Act (ARRA), would allow tax credits to be paid out as cash rather than simply as reductions in incurred tax liability. This would represent an important step in limiting administrative hurdles in the claiming of clean energy credits and would allow their benefits to be more fully realized.

In this memo, we employ the Data for Progress Jobs Model to provide an estimate of the impact that a Direct Pay option would have on jobs and economic output relative to that which would otherwise result from the expansion of credits contemplated by the BBB agenda.[4]

Based on an analysis of the earlier round of Direct Pay grants and assumptions about what projects face difficulty benefiting from green credits under the current system, **we find that such an option would create or preserve a total of an additional 4.3 million jobs over the period 2022-2031, and would contribute around $568 billion to GDP during the same time period.**

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Background on Direct Pay and Clean Energy Tax Credits in Build Back Better

As discussed in an April 2022 Data for Progress memo entitled "Direct Pay: Avenues Toward a Clean Energy Economy," the BBB agenda contains an important provision, Section 6417, that would allow a Direct Pay option for many of the clean energy tax credits in the portion of the bill based on the Growing Renewable Energy and Efficiency Now Act (GREEN Act, H.R. 848). This means that eligible entities could have these credits treated as an overpayment of taxes entitling them to a cash refund, rather than as ordinary reductions in the amount of taxes owed. The virtue of such an approach is that it would allow the full value of clean energy credits to be collected even by those who might not otherwise have sufficient tax liability to claim the full amount.

Section 6417 builds on a widely utilized provision of the ARRA known as Section 1603, which together with the Domestic Manufacturing and Energy Jobs Act of 2010 established a Direct Pay system for federal renewable energy tax credits for the first time. This system paid out more than $26 billion for over 100,000 clean power projects during the time it was in effect, which stimulated a total of over $90 billion in private and public investments. As of 2017, projects supported by Section 1603 Direct Pay incentives accounted for an estimated total of 91.2 TWh of annual electricity generation — enough to power roughly 8.4 million homes.[5] Unfortunately, however, the program expired in 2011 and was never renewed by Congress.[6]

This policy constituted an important step in addressing the climate crisis. The experience with 1603 is one that policymakers should look to as a guide going forward, and, in fact, the drafters of the BBB agenda already have: Not only would this legislation resurrect Direct Pay, but it would also apply it to a broader range of new and existing incentives than under 1603.

In Table 1, we show the estimated expenditures (net budgetary impact) in billions of nominal dollars over the period 2022-2031 for 13 tax credits that would be eligible for Direct Pay under Section 6417 of the BBB agenda.[7] These figures are based on estimates by the Joint Committee on Taxation (JCT) published in November 2021.[8]

TABLE 1: DIRECT PAY-ELIGIBLE CREDITS IN BUILD BACK BETTER (BILLIONS OF DOLLARS), 2022-2031

Credit	Total for 2022-2031 (billions of dollars)
Sec. 45 Production Tax Credit	54.9
Sec. 48 Investment Tax Credit	52.1
Sec. 48D Investment Credit for Electric Transmission Property	11.3
Sec. 45Q Carbon Oxide Sequestration Credit	2.1
Sec. 45W Zero-Emission Nuclear Power Production Credit	23.0
Sec. 45X Credit for Production of Clean Hydrogen	9.2
Sec. 30C Alternative Fuel Refueling Property Credit	6.3
Sec. 48C Advanced Energy Manufacturing Credit	7.6
Sec. 48E Advanced Manufacturing Investment Credit	10.2
Sec. 45AA Advanced Manufacturing Production Credit	2.5
Sec. 45BB Clean Electricity Production Credit	6.0
Sec. 48F Clean Electricity Investment Credit	37.2
Sec. 45CC Clean Fuel Production Tax Credit	9.7
TOTAL	**232.1**

The previous memo on Direct Pay highlighted polling from Data for Progress which showed that a majority of voters would like to see reform that allows clean energy tax credits to be more readily usable by businesses and individuals. At present, clean energy developers undertaking renewable energy projects that qualify for federal incentives often do not have sufficient tax liability to be able to claim their full value. This is because tax credits are generally set up to reduce tax liability, and unless specifically stipulated to be "refundable" cannot reduce this liability below zero.

As a result, many renewable project sponsors are forced to turn to so-called "tax equity investors," or entities with larger tax liabilities who partner with them to structure deals that effectively transfer the sponsor's credits to the investor. In return, the investor shares a portion of these benefits in a transaction that is often described as "monetizing" the credits. Because Direct Pay reduces the need for such middlemen, it can not only significantly smooth the process of claiming credits for those who currently turn to investors, but can also make credits available to those who currently have difficulty accessing the tax equity market.

This is especially important in light of the fact that tax equity has become more difficult to access as demand has outpaced the supply of capital from willing investors and investors have come to prefer larger transaction sizes. Smaller projects are now less likely to be viable, both because their sponsors are more likely to need tax equity in the first place (since they do not have enough tax liability of their own to fully benefit from credits) and because the cost of their projects is likely to be too low to whet the appetite of investors.[9]

Modeling the Economic Impact of Direct Pay

An important question regarding Section 6417 of the BBB agenda is that of the economic impact it could be expected to have relative to a legislative alternative that authorized the same tax credit expansions without establishing a Direct Pay option. In our modeling exercise, we attempt to quantify the relative importance of this payment mechanism by using the Data for Progress Jobs Model to estimate the economic impacts of the BBB agenda's clean energy tax credits under two scenarios, one in which Direct Pay is available and a counterfactual in which it is not.

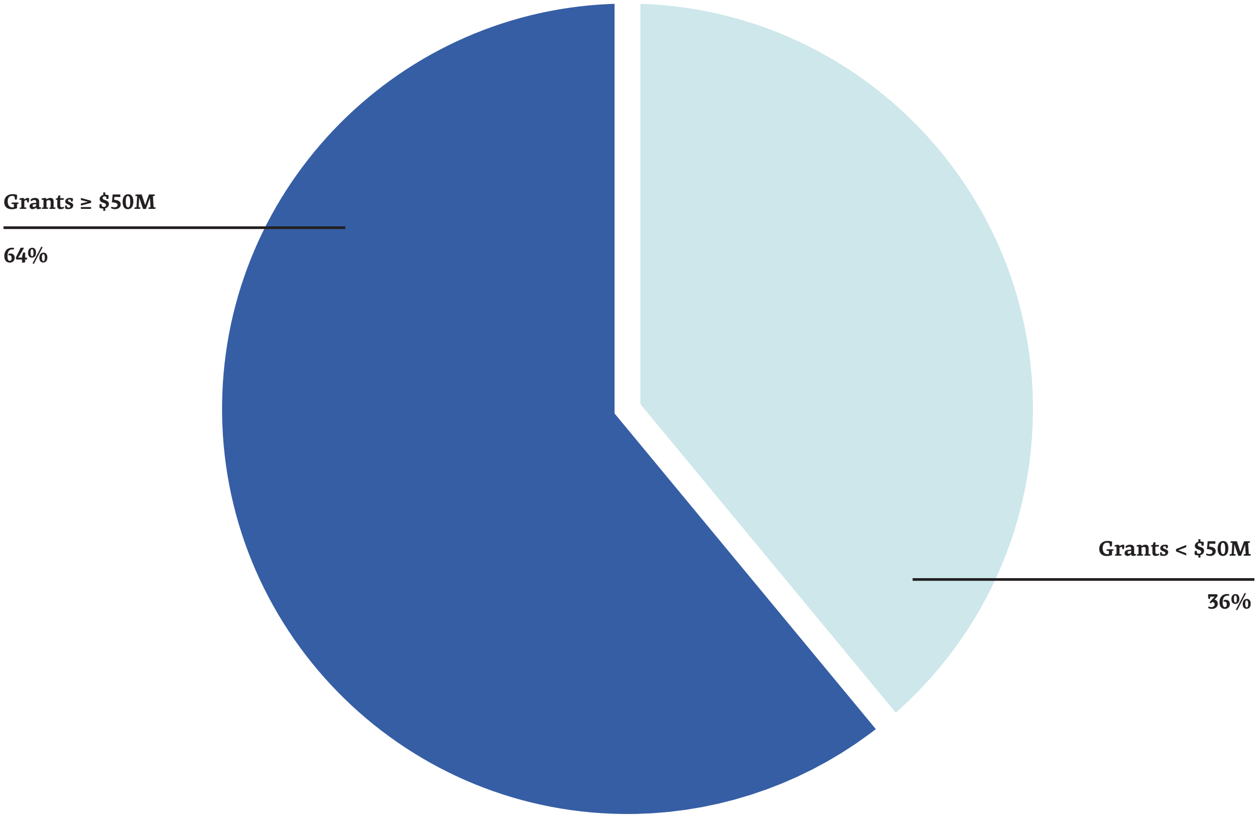
One difficulty in such an exercise is trying to estimate the amount by which uptake of clean energy credits changes in response to the presence of a Direct Pay option. Unfortunately, there appear to be no published studies in the literature that have sought to examine the effects of Section 1603 in this regard. One paper that considered the economic impact of the grants that were made through that program explicitly acknowledged that it could only measure the economic activity associated with the projects that received funding, but could not conclude whether any particular project would still have been undertaken in the absence of the policy.[10]

As explained above, one of the benefits of Direct Pay is that it allows eligible entities to claim credits without having to rely on tax equity investors to help them monetize their value, an option that is increasingly needed as these investors have come to prefer involvement in only the very largest projects. Therefore, we can posit for the sake of our modeling that projects representing transactions below a certain dollar amount will not be undertaken in the absence of Direct Pay, but will be undertaken if the option is made available. One industry publication from 2020 observed that "[a]nything below $50-75 million is likely going to be a tougher sell [for tax equity investors],"[11] and so we choose $50 million as our cutoff for this exercise.

How many renewable energy projects fall below this threshold? To provide an approximate answer to this question, we look to data from the Treasury Department on the grants awarded under the ARRA Section 1603 program.[12] After adjusting the grant sizes for inflation (converting into 2022 dollars), we total them up and consider the fraction of the total accounted for by grants of less than $50 million as opposed to those of greater than or equal to $50 million.

Figure 1 shows the results: Projects under $50 million accounted for only 36 percent of the inflation-adjusted total awarded under Section 1603, while those at or over $50 million accounted for 64 percent. Note that the amount of 1603 grants generally corresponded to about 30 percent of project costs, and the typical tax equity transaction likewise amounts to about a one-third stake in a clean energy installation.[13] Hence, it seems reasonable to use these grant sizes as a guide to which projects would be too small to attract the interest of tax equity investors.

FIGURE 1: SHARE OF 1603 GRANTS LESS THAN AND GREATER THAN OR EQUAL TO $50M



Since 36 percent of the total value of the Section 1603 grants was accounted for by projects that, if undertaken today, could reasonably be expected to have trouble obtaining tax equity financing, we make the assumption that uptake of tax credits would be reduced by about 36 percent in the absence of Direct Pay. Since the JCT estimates of the budgetary impact of the BBB agenda's credits are based on the actual legislation, we therefore obtain estimates of expenditures in the counterfactual world without Direct Pay by multiplying the JCT cost forecasts by 0.64.

Model Results

In Figure 2 and Table 2a, we show the results of using our Jobs Model to estimate the employment effects of the clean energy tax credits in the BBB agenda under alternative scenarios with and without Direct Pay. We base these calculations on estimates of the total amount of spending that would be stimulated by the credits (i.e., the value of the credit payments plus the private investment needed to claim that credit amount).[14]

We find that total job creation over the period 2022-2031 would be around 7.7 million without Direct Pay and around 12.1 million with Direct Pay, for a difference of around 4.3 million job-years.[15]

FIGURE 2: AGGREGATE EMPLOYMENT EFFECTS WITH AND WITHOUT DIRECT PAY, 2022-2031

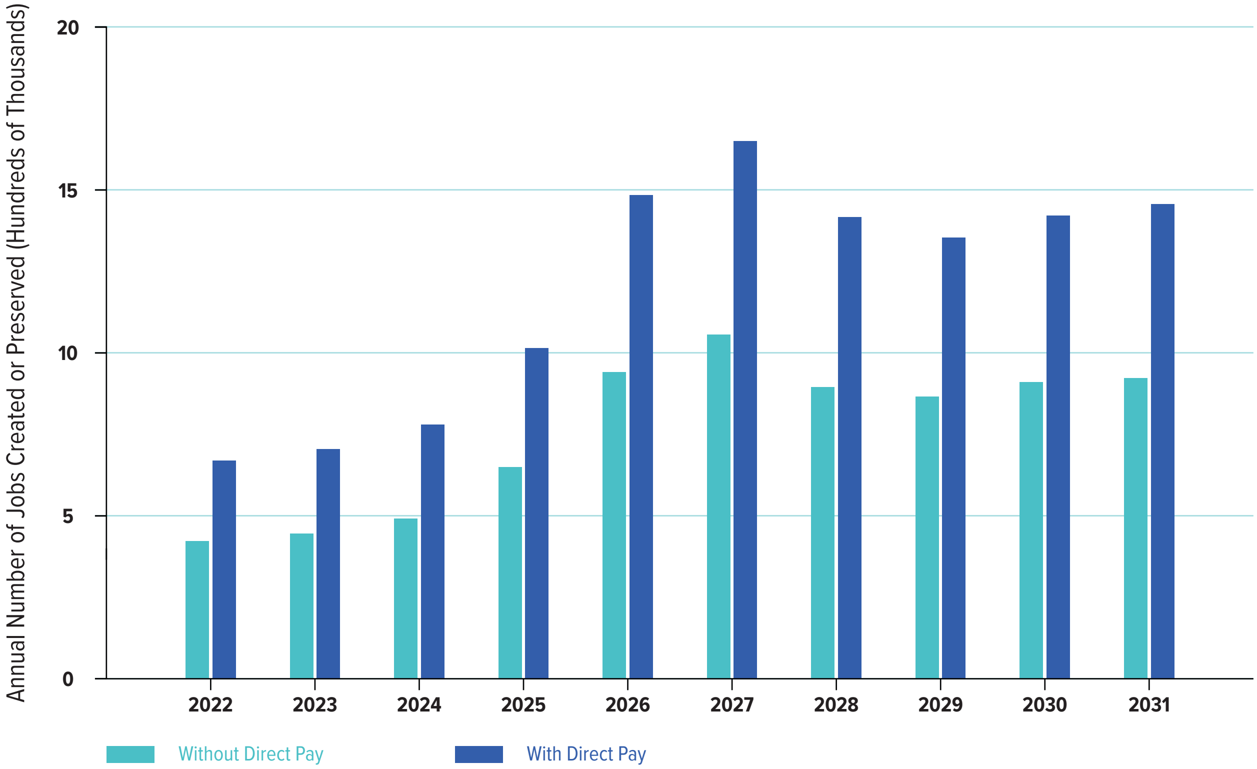


TABLE 2A: AGGREGATE EMPLOYMENT EFFECTS WITH AND WITHOUT DIRECT PAY, 2022-2031

Year	Annual Number of Jobs Created or Preserved — No Direct Pay	Annual Number of Jobs Created or Preserved — Direct Pay	Difference in Annual Number of Jobs Created or Preserved
2022	434,967	679,636	244,669
2023	459,054	717,273	258,219
2024	508,780	794,970	286,190
2025	657,816	1,027,838	370,022
2026	952,457	1,488,215	535,758
2027	1,062,893	1,660,770	597,877
2028	909,049	1,420,390	511,341
2029	874,902	1,367,036	492,134
2030	915,135	1,429,900	514,765
2031	938,552	1,466,489	527,937
TOTAL	**7,713,605**	**12,052,517**	**4,338,912**

In Table 2b we show a breakdown of total job creation by industry and find that approximately one-third of these jobs are in manufacturing. If we separately estimate how many of these jobs are direct jobs, or those supported by spending on the tax credits themselves rather than the second-order effects of that spending,[16] we find that 878,551 of 2,131,851 direct jobs, or about 40 percent, are in manufacturing. Since many of the clean energy tax credits in the BBB agenda include provisions that increase the credits' generosity if certain prevailing wage or apprenticeship requirements are met, we expect that a significant portion of these jobs would be the sort of high-quality "good jobs" that the progressive movement aims to support.[17]

TABLE 2B: AGGREGATE EMPLOYMENT EFFECTS BY INDUSTRY, TOTAL FOR 2022-2031[18],[19]

Year	Total Number of Jobs Created or Preserved (2022-2031)
Manufacturing	3,978,997
Administrative and Support Services	3,630,708
Construction	1,708,875
Educational Services	615,416
Transportation and Warehousing	446,035
Wholesale Trade	376,743
Professional, Scientific, and Technical Services	372,922
Finance and Insurance	154,398
Agriculture, Forestry, Fishing and Hunting	150,585
Public Administration	140,539
Retail Trade	120,854
Mining, Quarrying, and Oil and Gas Extraction	74,056
Information	59,542
Management of Companies and Enterprises	52,726
Utilities	48,438
Accommodation and Food Services	41,848
Health Care and Social Assistance	36,446
Other Services (Except Public Administration)	35,955
Real Estate and Rental and Leasing	7,337
Arts, Entertainment, and Recreation	91
TOTAL	**12,052,517**

Likewise, Table 3 shows our projections of the effect the credits would have on GDP under the two scenarios. Without Direct Pay, we estimate this effect at about $1.0 trillion over the next decade, while this increases to about $1.6 trillion with Direct Pay. The difference amounts to around $568 billion cumulatively by 2031, or around $56.8 billion per year on average.

FIGURE 3: AGGREGATE EFFECTS ON VALUE ADDED/GDP, 2022-2031

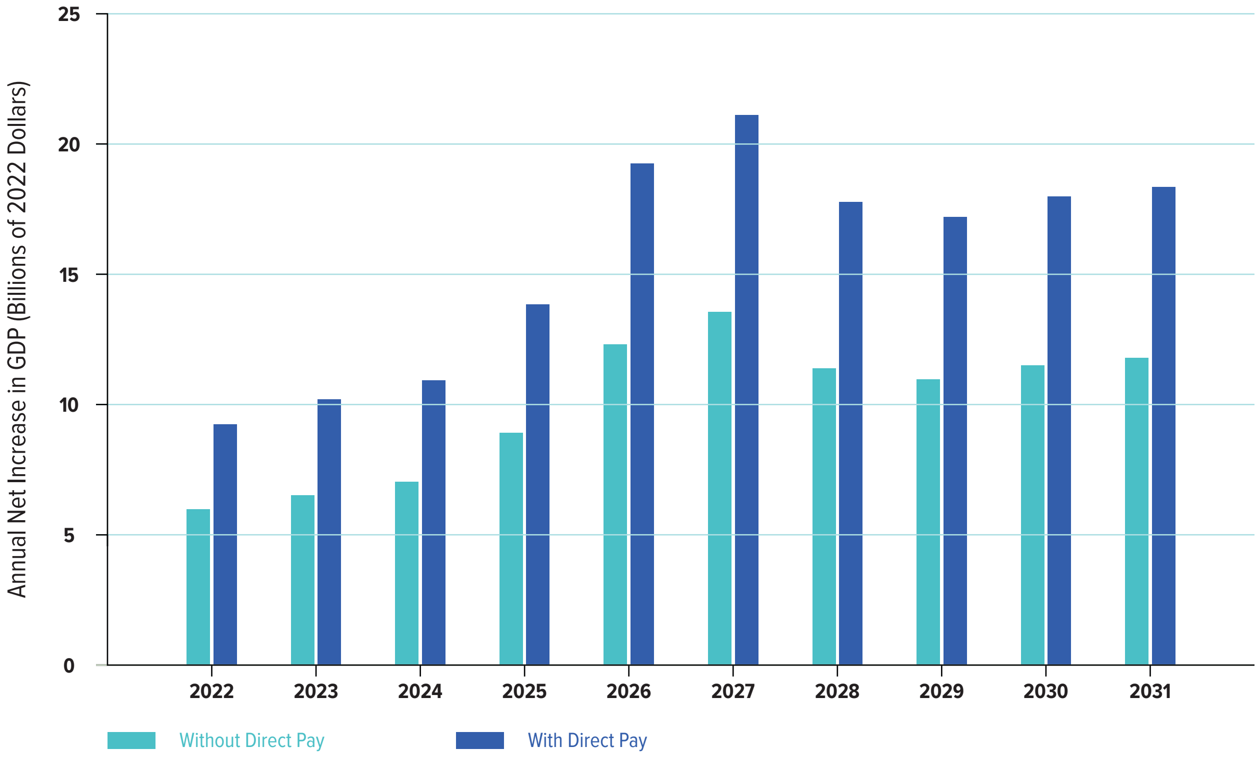


TABLE 3: AGGREGATE EFFECTS ON VALUE ADDED/GDP, 2022-2031[20]

Year	Annual Net Increase in GDP (billions of 2022 dollars) — No Direct Pay	Annual Net Increase in GDP (billions of 2022 dollars) — Direct Pay	Difference in Annual Net Increase in GDP (billions of 2022 dollars)
2022	60.4	94.4	34.0
2023	65.8	102.8	37.0
2024	71.3	111.4	40.1
2025	89.8	140.3	50.5
2026	124.6	194.7	70.1
2027	136.8	213.7	76.9
2028	115.2	179.9	64.8
2029	110.8	173.1	62.3
2030	115.9	181.1	65.2
2031	118.7	185.5	66.8
TOTAL	**1,009.2**	**1,576.9**	**567.7**

Conclusion

The importance of bold and swift federal action to increase domestic renewable energy generation capacity cannot be overstated. Policymakers ought to be creative in using all available tools at their disposal to increase investments in this area, with an eye toward putting America on track to meet the Biden Administration's ambitious climate objectives while creating millions of good-paying jobs.[21] This includes not just increasing the generosity of clean energy tax credits on paper, but also ensuring that administrative barriers to claiming them are removed whenever possible.

Based on our analysis of the earlier Direct Pay program authorized under Section 1603 of the ARRA and of trends in the tax equity market, we estimate that the inclusion of a Direct Pay option in the BBB agenda would meaningfully increase the impact of its clean energy tax credit provisions. In particular, we find that the average annual number of jobs created or preserved over the next decade would be around 430,000 higher as a result of Section 6417, and annual GDP would be increased by about $56.8 billion.

Navigating the tax code can be complicated, but lawmakers should act to ensure that such complexity does not become a hindrance to tax policies achieving their intended objectives. Small businesses that want to increase their reliance on clean energy should not be prevented from doing so because they cannot find investors who are willing to partner with them. As Congress works to pass a modified version of legislation included in the BBB agenda, Direct Pay for clean energy tax credits is one policy that should be a priority in any final package to help the U.S. meet its critical energy goals.

Appendix A: Background on Input-Output Modeling

In this section, we describe the basics of the I-O framework used to generate our estimates, as well as some of the assumptions and methodological choices that are specific to our analysis. Appendix B contains even more detail about the mathematics underlying the model.[19]

An I-O model is a simplified representation of an economy that uses data on the inputs that various industries require to produce their final outputs in order to illustrate the linkages among different sectors.[20] Knowing what these linkages look like allows policy analysts to understand how an initial increase or decrease in spending by governments, firms, or consumers — what economists would refer to as a change in autonomous spending — will filter through the economy, and what will be its ultimate effect on certain macroeconomic indicators of interest, such as GDP or aggregate employment.

Input-output modeling assumes that such a change in autonomous spending has three types of effects on output and employment:

- **DIRECT EFFECTS —** the incremental economic activity and jobs created by the production of *final* goods and services brought about by the new spending;
- **INDIRECT EFFECTS —** the incremental economic activity and jobs created by the production of the *intermediate inputs* to those final goods and services; and
- **INDUCED EFFECTS —** the incremental economic activity and jobs created by the expenditures of workers who are paid to produce these final and intermediate goods and services.

To model direct and indirect effects, we can make use of data on industry-level input requirements made available by the Bureau of Economic Analysis (BEA), which publishes a variety of different tables that can be used to construct an I-O model.[22] One of these tables is known as the direct requirements matrix, which shows, for each of a specified set of industries, how many dollars of inputs are required to be purchased from each of the other industries in order to produce one dollar of its output.

Another is known as the *total requirements matrix* or the *Leontief inverse matrix*, after the economist Wassily Leontief, a pioneer of I-O analysis. This shows, for each industry, how many dollars of goods each of the other industries must ultimately produce in order for the initial industry to produce one dollar of its output, taking into account the production of intermediate inputs. Thus, the total requirements matrix allows one to isolate indirect effects by comparing to estimates that would be obtained from calculations based on the direct requirements matrix alone.

Induced effects result from the fact that a portion of the income earned by firms in a given industry when selling their outputs will be paid out as labor income for workers, who will then spend some of that income on purchases of consumer goods. The question of how best to model induced effects is itself a potentially complicated one, but for the sake of simplicity, in our baseline model run we choose to follow the approach of Pollin, Garrett-Peltier, Heintz, and Hendricks (2014),[21] who assume on the basis of relevant macroeconomic research that consumer spending has a multiplier of approximately 1.4. That is, each dollar of economic activity associated with the direct and indirect effects of a change in autonomous spending by governments or firms will ultimately generate total economic activity of $1.40.

The requirements matrices allow us to assess the impact of a change in autonomous spending on the *gross output* of every industry, including both intermediate goods sold to other producers and final goods sold to consumers. If we are interested in computing the total impact of an initial stimulus on GDP, we need estimates of *value added* in each industry, which subtract off the costs of intermediate outputs.

To that end, we obtain measures of both gross output and value added by industry from the BEA for each year, and use these to calculate industry-specific ratios of value added to output. Thus, we can take the gross output figures derived from our model and convert them into estimates of value added, which we can then sum across industries in order to obtain an estimate of the total impact on GDP in that year.

Appendix B: Matrix Algebra of I-O Modeling

In algebraic terms, we let the direct requirements matrix be denoted by A, the dimension of which is 71-by-71. The entry in the ith row and the jth column of A indicates how many dollars of industry i's output need to be purchased by industry j in order to produce one dollar of j's output.

Suppose we want to consider the direct economic effect of spending a certain amount of money on purchasing the product of industry j. We can model this spending with a vector X consisting of a single column and 71 rows, where the entry in the jth row, which we denote by x_j, is the amount that we want to spend on product j (and the entries in every other row are zero, if we are not purchasing anything else).

Premultiplying X by the matrix A gives us the product vector AX, which shows how much input we require (in dollars) from each of the industries in order to produce x_j dollars of industry j's output. (Simple matrix algebra shows that the entries of AX will be equal to the entries in the jth column of A multiplied by the scalar x_j.)

However, this calculation only provides us with a partial picture of the total impact that the initial influx of autonomous spending represented by vector X will have on the economy. This is because each of the industries that provide the inputs to allow industry j to produce its output will itself have to purchase inputs from other industries, and each of *those* industries will have to purchase *its* own inputs, and so on. The *direct* effect of the spending represented by vector X will be AX, but the inputs needed to produce AX will be given by A^2X, the inputs needed to produce A^2X by A^3X, and so on.

Therefore, the total effect on the economy, *direct* effects plus *indirect* effects, will be given by the infinite sum:

$$AX + A^2X + A^3X + A^4X + \dots$$

Through algebraic manipulation, it can be shown that this sum is equal to

$$(I-A)^{-1}X$$

where the matrix $(I-A)^{-1}$ is known as the *total requirements matrix* or the *Leontief inverse matrix*.

The entry in the ith row and jth column of the total requirements matrix gives the total amount of production (in dollars) by industry i that is brought about when industry j produces one dollar of final output. Thus, multiplying this matrix by the spending vector X gives the total economic impact of that initial stimulus.

Appendix C: Modeling Effects of Clean Energy Spending

One difficulty in using I-O models to study the impacts of clean energy policy is that "clean energy" is not an identifiable industry in the BEA's classification scheme, nor are individual types of renewables, such as wind, solar, or geothermal. This makes it challenging to know how we ought to represent the spending induced by such policies in our I-O framework.

To deal with this problem we draw on the work of Garrett-Peltier (2016)[25], who proposes a technique known as the *synthetic industry approach*. This consists of modeling renewable energy industries that do not appear in the national accounts as "linear combinations" of some subset of those that do, based on data from other sources about the composition of activities in those renewable sectors.

For example, Garrett-Peltier observes that in the early 2000s,

> "[The European Wind Energy Association] administered a survey of various European firms in the wind energy industry, eliciting data on the components and costs of wind turbine production. The EWEA publication shows that for wind turbine manufacturing, the various components and their shares of total costs are as follows:
>
> 37% machinery
>
> 26% construction
>
> 12% fabricated metal products
>
> 12% plastic products
>
> 7% scientific/technical services
>
> 3% mechanical power transmission equipment
>
> 3% electronic connector equipment"[26]

Thus, spending an additional dollar on wind turbines can be thought of as equivalent to spending an additional $0.37 on machinery, $0.26 on construction, $0.12 on fabricated metal products, $0.12 on plastic products, $0.07 on scientific/technical services, $0.03 on mechanical power transmission equipment, and $0.03 on electronic connector equipment. So while wind turbine manufacturing is not an industry that appears in the BEA accounts, we can represent it by means of a *synthetic industry*, or a weighted average of industries that are observable (with weights that sum to one).

Garrett-Peltier provides coefficients that can be used to construct synthetic industry representations of a number of different energy sectors, both renewable and nonrenewable. We use her coefficients for modeling expenditures on biomass, coal, oil and gas, hydropower, solar, storage (for which we use her coefficients for spending on "smart grids"), and wind. To model expenditures on nuclear power, we draw on cost information from Black and Veatch (2012).[27]

Endnotes

1. Energy Innovation; October 25, 2021; "Importance of Tax Credits and Role They Can Play (Without CEPP) in Cutting Power Sector Emissions." Available at https://energyinnovation.org/wp-content/uploads/2021/10/Importance-of-Tax-Credits-and-Role-They-Can-Play.pdf.

2. Kelly Sheehan (Sierra Club); March 3, 2022; "Our Addiction to Fossil Fuels Is Driving Inflation." Available at https://www.sierraclub.org/sierra/our-addiction-fossil-fuels-driving-inflation?amp.

3. Courtney Bourgoin, John Coequyt, Christian Fong, Russell Mendell, Uday Varadarajan (RMI); May 24, 2022; "Accelerated Clean Energy Development Could Save Americans $5 Billion Annually, Protecting Against Inflation and Rising Natural Gas Prices." Available at https://rmi.org/clean-energy-development-could-save-billions/?utm_campaign=organic&utm_content=1653400569&utm_medium=social&utm_source=twitter.

4. See Appendices A and B for more detail on "input-output analysis," the methodology underlying our model, and Appendix C for an explanation of how the model handles the renewable energy sector in particular.

5. U.S. Department of the Treasury (April 2017), "Overview and Status Update of the 1603 Program." Available at https://www.treasury.gov/initiatives/recovery/Documents/Status%20overview.pdf.

6. See https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/1603-program-payments-for-specified-energy-property-in-lieu-of-tax-credits.

7. For a detailed discussion of these provisions see Brownstein Client Alert (November 15, 2021), "Build Back Better Act: Tax Policy Summary and Analysis." Available at https://www.bhfs.com/Templates/media/files/insights/Build%20Back%20Better%20Act%20-%20Tax%20Policy%20Summary%20and%20Analysis.pdf.

8. https://www.jct.gov/CMSPages/GetFile.aspx?guid=c18fa669-9b7f-479b-931e-a735e77bce95

9. Drew D'Alelio, Maria Jiang, Joe Langer, Noah Lerner, Eric Pan, Joel Puritz (Clean Energy Finance Forum); May 16, 2022; "Current Challenges to Tax Equity (Part Three). Available at https://www.cleanenergyfinanceforum.com/2022/05/16/current-challenges-to-tax-equity-part-three.

10. Mark Bolinger, Ryan Wiser, and Naim Darghouth (2010). "Preliminary evaluation of the Section 1603 treasury grant program for renewable power projects in the United States." Energy Policy, 38(11), pp. 6804-6819.

11. Michelle Davis (Wood Mackenzie); "Solar tax equity is more competitive than ever," available at https://www.woodmac.com/news/editorial/solar-tax-equity-competition/.

12. Available at https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/1603-program-payments-for-specified-energy-property-in-lieu-of-tax-credits.

13. "Tax equity covers 35% of the cost of a typical solar project, plus or minus 5%." Keith Martin (Norton Rose Fulbright); December 14, 2021; "Solar Tax Equity Structures." Available at https://www.projectfinance.law/publications/2021/december/solar-tax-equity-structures/.

14. However, we also face the limitation that some portion of this spending is likely due to projects that also would have taken place even without the credits.

15. Again, it is important to note that 4.3 million is our estimate of the impact of adding a Direct Pay option to the BBB agenda suite of tax credits, and not to the impact of those credits themselves relative to a situation in which they are not enacted.

16. See Appendix A for a discussion of the distinctions between direct, indirect, and induced jobs in an input-output modeling framework.

17. See again Brownstein Client Alert (November 15, 2021), "Build Back Better Act: Tax Policy Summary and Analysis." Available at https://www.bhfs.com/Templates/media/files/insights/Build%20Back%20Better%20Act%20-%20Tax%20Policy%20Summary%20and%20Analysis.pdf. For purposes of estimating the total amount of private investment that would be induced by clean energy credits in our modeling exercise, we assume that whenever credits offer a "base amount" and a "bonus amount," then half of the expenditures would be on the former and half on the latter.

18. The industry categories here correspond to two-digit North American Industry Classification System (NAICS) codes, also known as "sectors."

19. Note that figures may not exactly sum to total due to rounding.

20. Note that annual figures may not exactly sum to total due to rounding.

21. In April 2021, the Biden Administration announced a goal of reducing U.S. emissions to about half of 2005 levels by the year 2030. See "Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies" (April 22, 2021). Available at https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.

22. For further background on I-O modeling, see Ronald E. Miller and Peter D. Blair (2009), Input-Output Analysis: Foundations and Extensions, 2nd Ed. Cambridge, U.K.: Cambridge University Press.

23. Bureau of Economic Analysis Input-Output Accounts Data. Available at https://www.bea.gov/industry/input-output-accounts-data.

24. Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Bracken Hendricks (2014), "Green Growth: A U.S. Program for Controlling Climate Change and Expanding Job Opportunities," available at

25. Heidi Garrett-Peltier (2016), "Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model," Economic Modelling 61, 439-447.

26. Garrett-Peltier (2016), 441.

27. Black and Veatch (2012). "Cost and Performance Data for Power Generation Technologies: Prepared for the National Renewable Energy Laboratory." Available at https://refman.energytransitionmodel.com/publications/1921. Using Fig. 1 on pg. 11 as a starting point, we choose the following weights for our synthetic nuclear industry: 25 percent construction; 10 percent fabricated metal products; 10 percent machinery; 10 percent computer and electronic products; 10 percent electrical equipment, appliances, and components; 15 percent miscellaneous professional, scientific, and technical services; and 20 percent management of companies and enterprises.