

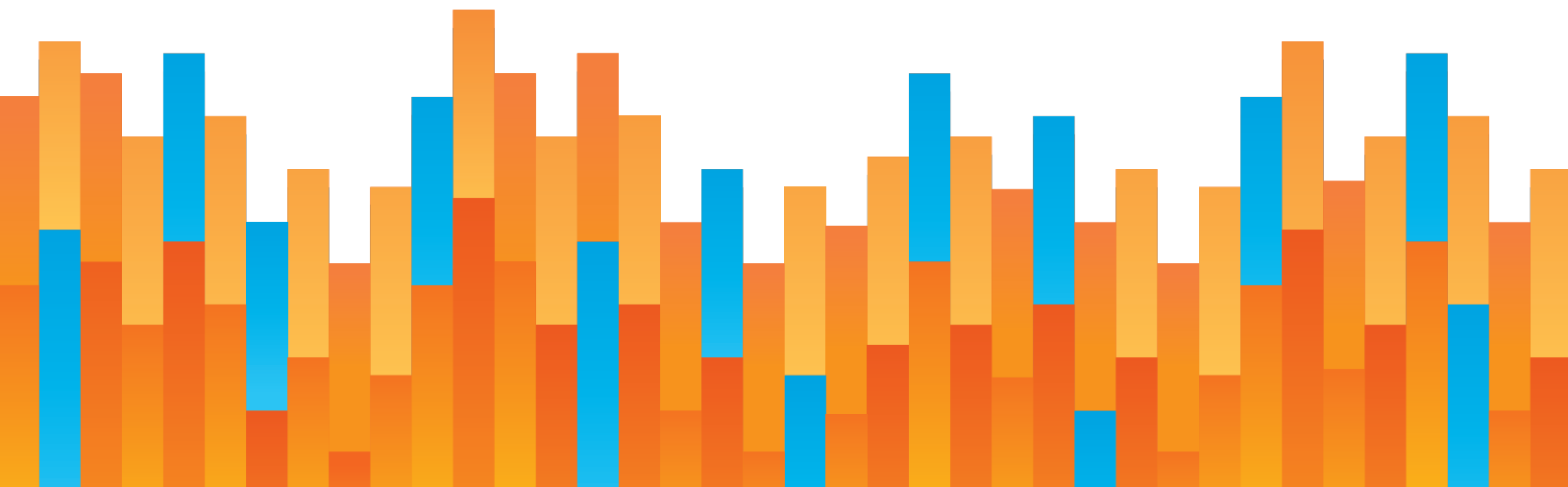


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WOULD A GREEN FISCAL STIMULUS HELP THE ENVIRONMENT AND THE ECONOMY?

by Julian Morris and Vittorio Nastasi

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PART 1

INTRODUCTION

The COVID-19 pandemic and associated shutdowns and stay-at-home orders have dealt a significant blow to the United States economy. U.S. GDP fell by an annualized rate of 30% during the second quarter of 2020¹ and unemployment rose above 14% in April but has been declining since then; at the end of October it was 6.9%.² In response, the federal government has passed numerous bills intended to stimulate the economy.

Between March and July, numerous policymakers and pundits published reports and proposals claiming that COVID-19 offers an opportunity to make the economy more equitable and environmentally friendly. Of particular note, President Joe Biden proposed a \$2 trillion plan that aims simultaneously to stimulate the economy, achieve net-zero carbon emissions by 2050, and create “millions of good, union jobs.” Even a small group of Republican senators wrote in support of significant additional subsidies to renewable energy.

¹ “GDP Second Quarter 2020,” U.S. Department of Commerce, Bureau Economic Analysis, *BEA.gov*, 30 Sep. 2020. <https://www.bea.gov/news/2020/gross-domestic-product-third-estimate-corporate-profits-revised-and-gdp-industry-annual>

² “The Employment Situation – October 2020,” U.S. Department of Labor, Bureau of Labor Statistics, *BLS.gov*, 6 Nov. 2020. <https://www.bls.gov/news.release/pdf/empsit.pdf>



Of particular note, President Joe Biden proposed a \$2 trillion plan that aims simultaneously to stimulate the economy, achieve net-zero carbon emissions by 2050, and create “millions of good, union jobs.”



This policy brief considers the main “green recovery” proposals and evaluates whether they would achieve their stated objectives. Part 2 summarizes the reports and proposals. Part 3 analyses a selection of the proposals and claims that underpin them. Finally, Part 4 offers some conclusions.

PART 2

GREEN RECOVERY POLICY PROPOSALS

Prior to the COVID-19 pandemic, numerous politicians and interest groups had advocated for “green economy” policies. For example, on February 9, 2019, Rep. Alexandria Ocasio-Cortez advanced House Resolution 109, which called for the creation of a “Green New Deal” the intention of which is to:

- achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers;
- create millions of good, high-wage jobs and ensure prosperity and economic security for all people of the United States;
- invest in the infrastructure and industry of the United States to sustainably meet the challenges of the 21st century;
- secure for all people of the United States for generations to come: clean air and water; climate and community resiliency; healthy food; access to nature; and a sustainable environment; and
- promote justice and equity by stopping current, preventing future, and repairing historic oppression of indigenous peoples, communities of color, migrant communities, deindustrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, people with

disabilities, and youth (referred to in this resolution as “frontline and vulnerable communities”³

While the Green New Deal received considerable support from Democrats in the House, it was defeated in the Senate by 57-0.⁴ Numerous groups subsequently argued that the COVID-19 pandemic justifies revisiting some of these policies.

In July, President (then presidential candidate) Joe Biden launched a proposal called Build Back Better that would spend approximately \$2 trillion in order to, “Create millions of good, union jobs rebuilding America’s crumbling infrastructure—from roads and bridges to green spaces and water systems to electricity grids and universal broadband—to lay a new foundation for sustainable growth, compete in the global economy, withstand the impacts of climate change, and improve public health, including access to clean air and clean water.”⁵ His plan also seeks to achieve net-zero carbon emissions no later than 2050, and a carbon pollution-free power sector by 2035.

Table 1 summarizes President Biden’s proposal along with two other prominent “green recovery” proposals from advocacy groups, academics, and politicians, namely: A Green Stimulus to Rebuild Our Economy, which was a proposal published on *Medium* on March 22 by a group of 11 progressive advocates from academia and non-profit research organizations,⁶ and Build Back Better, Faster, which was a proposal published in July by a coalition of alternative energy businesses and environmental groups.⁷ Additional details of these and other proposals are summarized in Appendix A.

³ H. Res. 109, 2019. <https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf>

⁴ Dino Grandoni and Felicia Sonmez, “Senate defeats Green New Deal, as Democrats call vote a ‘sham,’” *Washington Post*, 26 March. 2019. https://www.washingtonpost.com/powerpost/green-new-deal-on-track-to-senate-defeat-as-democrats-call-vote-a-sham/2019/03/26/834f3e5e-4fdd-11e9-a3f7-78b7525a8d5f_story.html

⁵ “The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future.” <https://joebiden.com/clean-energy/>

⁶ Johanna Bozuwa et al., “A Green Stimulus to Rebuild Our Economy,” *Medium.com*, 22 March 2020. https://medium.com/@green_stimulus_now/a-green-stimulus-to-rebuild-our-economy-1e7030a1d9ee

⁷ “Build Back Better, Faster,” E2, E4TheFuture and BW Research Partnership, *E2.org*, July 2020.

TABLE 1: SUMMARY OF MAIN GREEN STIMULUS PROPOSALS

	A Green Stimulus to Rebuild Our Economy	Joe Biden Build Back Better	Build Back Better, Faster
Total Proposed Spending	\$2 trillion “renewed annually at 4% of GDP per year (roughly \$850 billion)...”	\$2 trillion	\$99.2 billion
Building Energy Efficiency Upgrades and Retrofits	“Massively expand” the federal Weatherization Assistance Program and fund “state-level equivalent programs” and “community-based” programs	“Upgrade 4 million buildings and weatherize 2 million homes over 4 years”	\$60.7 billion in federal stimulus
Transit	“Create thousands of new jobs by offering grants and no-interest, no-match loans to local transit agencies and municipal governments”	“Provide all Americans in municipalities of more than 100,000 people with public transportation by 2030, including through subsidies to light rail, buses, cycling, and micro-mobility vehicles”	Not specified
Renewable Energy	“Create a national clean energy standard ... that applies to all power providers including rural electric cooperatives, climbing steeply to 100% carbon-free energy by 2030”	“Achieve a carbon pollution-free power sector by 2035”	\$36.1 billion in tax credits and \$1.5 billion in federal investments
Vehicle Rebates	Not specified	“Provide rebates to consumers to incentivize purchases of American made ‘clean’ vehicles”	Not specified
Appliance Rebates	“Create a cash for appliances program, funded at least \$1 billion, modeled on the Obama stimulus measure”	“Rebates and low-cost financing to electrify home appliances and install more efficient windows”	Not specified

PART 3

WHAT EFFECTS WOULD THE PROPOSED “GREEN RECOVERY” POLICIES HAVE?

The proposed green recovery policies described in Part 2 share some common features but differ in many of the specifics. This part begins, in section 3.1, by outlining the merits of fiscal intervention, both in general and focusing on the specific types of intervention discussed in Part 2. Section 3.2 follows with a more detailed assessment of specific proposals.

3.1

IS FISCAL INTERVENTION JUSTIFIED?

All the “green stimulus” proposals assume, explicitly or implicitly, that fiscal stimulus is necessary to address the COVID-related economic crisis. The most explicit discussion of this is in a brief by Noah Kaufman of Columbia University, which cites research that suggests the existence of an “output gap” of approximately \$3 trillion.⁸ An “output gap” is a

⁸ Noah Kaufman, “The Greenest Stimulus is One That Delivers Rapid Economic Recovery,” 5. <https://energypolicy.columbia.edu/sites/default/files/file-uploads/Green%20stimulus%20commentary,%20final%20design,%206.09.20.pdf>; see discussion in Appendix for more details.

theoretical concept that arises from the assumption that there is an optimal output level for the economy; the “gap” is then the deviation (positive or negative) from that optimum. (Actually, it is more complicated, since the optimum from which output deviates to generate a “gap” may refer to different things—but that doesn’t really matter for our purposes.⁹)

The COVID crisis has caused a substantial reduction in output and it certainly looks like there is currently an “output gap.” The question is: what policies are best suited to reducing that output gap?

3.1.1 CAN FISCAL STIMULI CREATE LONG-TERM GROWTH?

Kaufman argues that a short-term fiscal stimulus would reduce the output gap. In support of this argument, he claims that such a stimulus would generate an increase in output larger than the amount of the stimulus spending. This is called a “multiplier.”

The original concept of a fiscal multiplier can be traced to Richard Kahn, who in 1931 observed that each dollar spent by the government results in further spending by the recipient, and so on.¹⁰ As such, Kahn supposed that, under certain conditions, spending by the government can generate an increase in output greater than the amount initially spent—a multiplier.

This argument was extended by John Maynard Keynes who, in his 1936 *General Theory*, claimed that during a recession, spending declines because consumers expect their income to fall, which then becomes self-reinforcing as producers respond to lower demand by reducing output and laying off employees. Keynes argued that, in such circumstances, government should increase its spending to offset the decline in private consumption. Companies would respond by producing more and employing more people, bringing the economy back to full employment. Keynes even went as far as to advocate make-work programs:

⁹ See e.g. Michael T. Kiley, “Output Gaps,” Federal Reserve Board, 18 March 2012. <https://www.federalreserve.gov/pubs/feds/2010/201027/revision/201027pap.pdf>

¹⁰ Richard F. Kahn, “The Relation of Home Investment to Unemployment,” *The Economic Journal* 41 (162) (June 1931) 173-198.

If the Treasury were to fill old bottles with banknotes, bury them at suitable depths in disused coalmines which are then filled up to the surface with town rubbish, and leave it to private enterprise on well-tryed principles of laissez-faire to dig the notes up again (the right to do so being obtained, of course, by tendering for leases of the note-bearing territory), there need be no more unemployment and, with the help of the repercussions, the real income of the community, and its capital wealth also, would probably become a good deal greater than it actually is. It would, indeed, be more sensible to build houses and the like; but if there are political and practical difficulties in the way of this, the above would be better than nothing.¹¹

The assertion that filling in holes with money and licensing companies to dig them up “would be better than nothing” is troubling. Since nothing is produced as a result of such an exercise, all the labor and capital thereby expended is essentially wasted. Indeed, it is quite literally worse than nothing. Yes, there would be a temporary increase in GDP, since both the government and private sector have expended resources. But that temporary increase in GDP would come at the cost of other activities that could result in goods being exchanged in the market. In other words, there would be a significant *opportunity cost*. Indeed, even if the workers employed in burying and digging up the money would not have been doing anything else (because they had lost their jobs), not doing anything would still be better, since at least the capital employed in filling bottles, putting them in the ground and digging them up, would not be wasted.

In 1945, Friedrich Hayek published a stinging critique of the concepts underpinning Keynesian stimuli.¹² He began by observing that, in a market economy, prices emerge from millions of individuals each acting on their own particular knowledge. These prices act as signals to entrepreneurs, who respond by identifying better ways of supplying the felt needs and wants of their customers more efficiently and at lower cost. But because governments don’t have access to the knowledge held by the millions of dispersed individuals that make up the economy, their interventions tend to distort prices, leading entrepreneurs to produce too much of some goods and too little of other goods relative to what would have been the case if entrepreneurs were responding to market prices. So, while a temporary increase in government spending can result in a temporary increase in

¹¹ John Maynard Keynes, *The General Theory of Employment, Interest and Money* (London: 1936). Book 3, Chapter 10, Section 6, p.129.

¹² Friedrich Hayek, “The Use of Knowledge in Society,” *The American Economic Review*, 32 (4) (Sep. 1945).

demand and thereby lead to a temporary increase in output, over time it tends to result in malinvestment, which lowers the long-run rate of growth.



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Another problem with the Kahn-Keynes multiplier was identified by Milton Friedman, who in 1957 observed that people tend to smooth their income over time by borrowing and saving—and only increase their spending in response to an increase in “permanent income.”¹³ A temporary increase in income thus leads to a less than proportionate increase in spending.

In 1974, Robert Barro considered the effect that Friedman’s “permanent income hypothesis” had on stimulus spending.¹⁴ Barro observed that when governments engage in stimulus spending, they do so by issuing bonds. Since consumers know that in the future their taxes will rise in order to pay off those bonds, Barro posited that they will tend to save more and spend less, which will reduce even the short-term effectiveness of the stimulus. Barro also noted that stimulus spending creates uncertainty for businesses, which tends to reduce investment.

In its most extreme form, whereby the stimulus is entirely neutralized by changes in private consumption, this theorem is known as “Ricardian equivalence” after economist David Ricardo, who first proposed it in 1820. Critics of Barro argued that consumers are myopic

¹³ Milton Friedman, “Permanent Income Hypothesis,” *Theory of the Consumption Function* (Princeton: Princeton University Press for the National Bureau of Economic Research, 1957) Available at: <https://www.nber.org/chapters/c4405.pdf>

¹⁴ Robert J. Barro, “Are government bonds net wealth?” *Journal of Political Economy* 82 (6) (1974). 1095-1117.

and will not fully incorporate future taxation into their current spending decisions.¹⁵ But Barro and others countered that while myopia might reduce the effect, that does not mean the effect isn't real. Moreover, as University of Chicago economics professor John Cochrane has observed:

Stimulus is no longer an “always and everywhere” law, it’s at best a “if people don’t notice that deficits today mean taxes tomorrow” idea. This qualification has deep implications.

First, it means that a “stimulus” policy can only work by fooling people. Is wise policy really predicated on fooling people? Also, people are unlikely to be fooled over and over again. If that’s how stimulus works, you can’t use it too often.

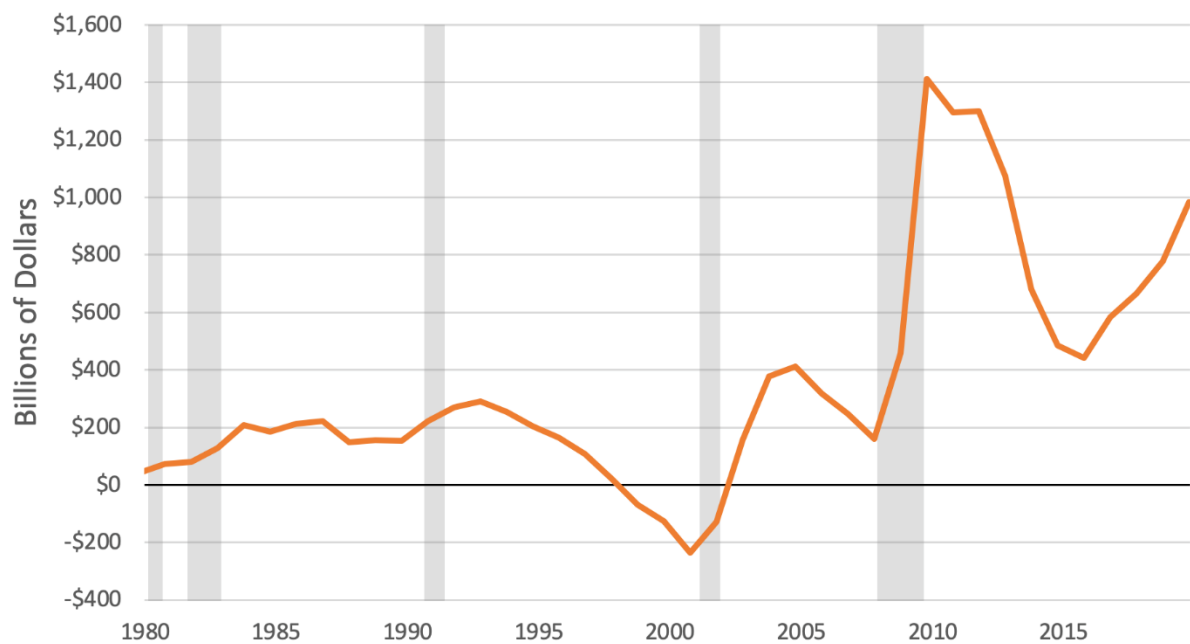
Second, it means that stimulus will work sometimes and not other times. Are American voters right now really unaware that larger deficits mean higher future taxes? ...

Third, if this is the reason that stimulus works, then the current policy attempt, consisting of stimulus now, but strong promises to address the deficit in the future, can have no effect whatsoever. If you think stimulus works by fooling people to ignore future tax hikes or spending cuts, then loudly announcing such tax hikes and spending cuts must undermine stimulus! Augustinian policy, “give me chastity, but not yet,” will not work. Casanova is needed.¹⁶

Finally, it is worth noting that in Keynes' formulation, fiscal stimulus was intended to be counter-cyclical: borrow during recessions and repay during periods of growth, thereby smoothing out the business cycle. But the U.S. government has not been following even this minimally prudent advice. As Figure 1 shows, since the early 1980s the federal government has maintained a deficit almost continuously. While it has periodically reduced the size of the deficit, it has only run a surplus for a brief period, during the late 1990s.

¹⁵ In fact, Ricardo also made this point in later writings. See Gerald P. O'Driscoll Jr., “The Ricardian Non-Equivalence Theorem,” *Journal of Political Economy* 85 (1), (Feb. 1977). 207-210.

¹⁶ John H. Cochrane, *Fiscal Stimulus, RIP*, Chicago: University of Chicago Graduate School of Business, Working Paper, 9 Nov. 2010.
https://faculty.chicagobooth.edu/john.cochrane/research/papers/stimulus_rip.html

FIGURE 1: FEDERAL DEFICIT SPENDING, 1980-2019

3.1.2 WHAT DOES THE EVIDENCE SAY ABOUT STIMULUS IN GENERAL?

A recent study by economists at the Federal Reserve Board of Chicago looked at the effect of COVID-19-related stimulus checks.¹⁷ A survey of 16,016 recipients found that on average consumers spent \$577 of the \$1,200 checks they received, implying a marginal propensity to consume (MPC) of 48%. However, they found that spending was heterogeneous, with consumers who live paycheck to paycheck spending on average about 68% of the funds they received immediately, while others spent only 23%. Consistent with the findings reported by the CRS, the researchers concluded that the stimulus would have been more effective if it had targeted consumers with the highest MPC.

¹⁷ Ezra Karger and Aastha Rajan, *Heterogeneity in the Marginal Propensity to Consume: Evidence from Covid-19 Stimulus Payments*, Chicago: Federal Reserve Board of Chicago, Working Paper No. 2020-15, May 2020.



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Since the multiplier effect is equal to $1/(1-MPC)$,¹⁸ the short-term multiplier of the recent stimulus checks for those receiving them would have been approximately 2. Had the checks only gone to those living paycheck to paycheck, it would have been approximately 4 for those recipients. It is hardly surprising that giving people money increases the amount that they spend, especially for those with no other source of income and limited ability to borrow. But such analyses of short-run multiplier effects do not address the long-term effects, either as a result of subsequent increased saving or as a result of distortions that occur due to the initial spending, so they are not really useful as a guide to policy.

Notably, while the IRS allocated stimulus checks totaling approximately \$267 billion,¹⁹ the Federal Reserve estimates that total consumer credit fell by approximately \$250 billion in the second quarter of 2020.²⁰ In other words, contrary to the claim that the stimulus checks had a multiplier effect, it appears that they essentially replaced private credit.

A review of multiplier studies in 2010 found that, on average, changes in consumption reduce the stimulus spending multiplier by between 30% in the short term and 90% in the

¹⁸ This is a straightforward mathematical result: $1+MPC+MPC^2+MPC^3+ \dots = 1/(1-MPC)$. (In mathematics this is known as a Taylor series.)

¹⁹ “How Many Coronavirus Stimulus Checks Have Been Sent Out So Far?” *PGPF.org*. Peter G. Peterson Foundation, 8 June 2020. <https://www.pgpf.org/blog/2020/05/how-many-coronavirus-stimulus-checks-have-been-sent-out-so-far>

²⁰ “Consumer Credit–G.19,” Federal Reserve, 7 Aug. 2020. Available at: <https://www.federalreserve.gov/releases/g19/20200807/g19.pdf>

long term.²¹ Meanwhile, a study the same year by the IMF found that while short-run stimulus could have a multiplier effect of as much as 1.2, it could be as low as 0.2, depending on how the stimulus was allocated. Moreover, the study estimated that “A permanent 10 percentage point increase in the U.S. debt to GDP ratio raises the U.S. tax burden and world real interest rates in the long run, thereby reducing U.S.... output by 0.3 to 0.6 percent.”

A 2011 survey in the *Journal of Economic Literature* reviewed studies evaluating the size of the fiscal multiplier and concluded that the multiplier is between 0.8 and 1.5.²² However, much depends on the specific model used to estimate the multiplier; models that assume consumers reduce their spending in response to a fiscal stimulus produce a multiplier below one (i.e. the stimulus reduces GDP), while models that assume consumers heavily discount future tax increases produce a multiplier of more than one. In other words, these models basically assume their conclusions. This is also broadly true for more recent studies.

A Congressional Research Service (CRS) analysis from 2019 found that the size of the multiplier effect of various policies could range from 0 to 1.8.²³ A multiplier of zero means that the policy reduces GDP by the amount spent—in other words the “stimulus” has the opposite effect to that intended. A multiplier of 1.8 means that GDP is increased by 80% more than the amount spent.



The CRS report found that the largest multiplier effects were associated with individual tax cuts and rebates targeted at lower income households.



²¹ Oliver Röhn, “New Evidence on the Private Saving Offset and Ricardian Equivalence,” Paris: OECD, OECD Economics Department Working Papers No. 762, 2010. <https://doi.org/10.1787/5kmft7qb5kq3-en>.

²² Valerie A. Ramey, “Can Government Purchases Stimulate the Economy?” *Journal of Economic Literature* 49 (3) (2011). 673–685. <http://www.aeaweb.org/articles.php?doi=10.1257/jel.49.3.673>

²³ Mark P. Keightley, “Fiscal Policy Considerations for the Next Recession” R45780, Congressional Research Service. 20 June 2019.

The CRS report found that the largest multiplier effects were associated with individual tax cuts and rebates targeted at lower income households. This is not surprising: such tax cuts likely lead consumers to believe that their “permanent income” (to use Friedman’s term) has increased, rather than receiving a random stimulus check, which is obviously temporary, and thus they’re likely to feel more comfortable spending it. Additionally, these tax cuts and rebates are also one of the least distorting ways to increase consumption and investment. By contrast, the report found that, except for their hiring incentives, corporate tax cuts and tax incentives had multiplier effects of less than one. Specifically, incentives for new investments were found to have a multiplier effect of about 0.3; in other words, for every \$1 spent on such incentives, long-run GDP would fall by about 70 cents.

One reason direct spending by government has a multiplier of less than one is that such spending both crowds out private investment and leads to less profitable investments than would have been the case if those investments had been made by the private sector. This is not because government officials are stupid or bad; it is because they do not face the same incentives as individuals in the private sector, who must justify their investments to shareholders and other investors. Thus, for example, economist Adam Michael at the Heritage Foundation notes:

ARRA funding financed projects such as new sidewalks to replace similar sidewalks built just five years earlier and a Nevada biomass plant intended to generate electricity, which was closed after the federal funds dried up. Better known malinvestments include the \$535 million loan to the failed solar manufacturer Solyndra and similarly sized grants to Abound Solar, which subsequently filed for bankruptcy, and First Solar, which laid off workers and paid out large sums to its executives following large federal investments. Not only did government stimulus projects crowd out other existing projects and their employment, instead of adding to them, moving employment to government priorities can add additional costs when the public money dries up and the industry must again reshuffle to meet private-sector demands.²⁴

In addition, a series of studies has found that fiscal stimuli tend to be harmful (i.e. have both short-run and long-run multipliers of less than one) when the economy already has a

²⁴ Adam N. Michel, *The False Promise of Stimulus Spending: Lessons from the Great Recession*, Backgrounder No. 3493, (Washington D.C.: Heritage Foundation, 6 May 2020).
<https://www.heritage.org/sites/default/files/2020-05/BG3493.pdf>

high debt-GDP ratio (over about 60%).²⁵ Since the U.S. debt-GDP ratio was about 79% at the end of 2019 and rose to over 100% during the first quarter of 2020,²⁶ it is highly likely that the “stimulus” will have had a negative economic effect. Meanwhile, a study by economists at Carlton University and the IMF considered the effects of an ongoing “stimulus” program that increases deficit spending by 0.5% of GDP, thereby adding 10% to long-run debt/GDP ratio and found that such a spending increase would *reduce* long-run growth by 0.4%.²⁷

3.1.3 EVIDENCE FROM PREVIOUS GREEN STIMULUS PROGRAMS

The Build Back Better, Faster (BBBF) report, proposed by a coalition of alternative energy businesses and environmental groups, claims that the fiscal stimuli it proposes would have a substantial multiplier effect. It does so by citing several studies that looked at the effect of investments from ARRA, stating for example that “It is estimated that these \$90 billion in strategic investments and incentives supported roughly 900,000 job-years from 2009 through 2015.”²⁸ The basis for this claim is an analysis undertaken by the Council of Economic Advisors in 2016, which *assumed* that ARRA had a multiplier effect—and then

²⁵ Oliver Röhn, *New Evidence on the Private Saving Offset and Ricardian Equivalence*, Economics Department Working Papers No. 762 (Paris: Organisation for Economic Cooperation and Development, 6 May 2010).

²⁶ “The Budget and Economic Outlook: 2020 to 2030,” Congressional Budget Office, Jan. 2020. <https://www.cbo.gov/publication/56073>; Phill Swagel, “CBO’s Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021,” Congressional Budget Office, 24 April 2020. <https://www.cbo.gov/publication/56335>

²⁷ Charles Freedman, Michael Kumhof, Douglas Laton, Dirk Muir, and Susanna Mursulab, “Global Effects of Fiscal Stimulus During the Crisis,” *Journal of Monetary Economics* 57 (5), July 2010. 506-526.

²⁸ “Build Back Better, Faster.” 6.

found that it had a multiplier effect.²⁹ As noted above, such circular reasoning is common in studies purporting to show a positive stimulus effect from stimulus spending.³⁰



It is no doubt true that ARRA led to an increase in spending on certain kinds of “green” technology, including electricity generation and distribution, energy efficiency, and so on—as can be seen in Table 2. It is also no doubt true that jobs were created as a result of this spending. However, it is another thing entirely to claim that these investments resulted in a net increase in either economic activity or jobs.



It is no doubt true that ARRA led to an increase in spending on certain kinds of “green” technology, including electricity generation and distribution, energy efficiency, and so on—as can be seen in Table 2. It is also no doubt true that jobs were created as a result of this spending. However, it is another thing entirely to claim that these investments resulted in a net increase in either economic activity or jobs. Indeed, the reports from the CEA provide no actual evidence whatsoever that the “clean energy” spending by the federal government under ARRA did any such thing.

²⁹ “A Retrospective Assessment of Clean Energy Investments in the Recovery Act,” Council of Economic Advisors, Feb. 2016. at p. 15: “The estimate of 900,000 job-years is calculated based on a macroeconomic multiplier similar to previous CEA ARRA analysis adjusted for changes in nominal GDP and the labor force.” Meanwhile, the earlier reports to which that report refers are described in a 2014 Final report on ARRA thus: “To estimate the effect of the Recovery Act on GDP, CEA applied a different fiscal multiplier to each component, and then aggregated the effects of each component to arrive at the overall GDP effect.” “The Economic Impact of The American Recovery and Reinvestment Act Five Years Later. Final Report to Congress,” Council of Economic Advisors, Washington, D.C.: Executive Office of the President of the United States, Council of Economic Advisors, Feb. 2014. 17.

³⁰ It is also noteworthy that the lead author of the CEA report, Christina Romer, had previously concluded that stimuli were ineffective during the Great Depression. Christina D. Romer, “What Ended the Great Depression?,” *The Journal of Economic History* 52 (4) (1992). 757-784.

A recent analysis of ARRA’s green spending by an international team led by David Popp of Syracuse University found that the short-term employment effects of the program were very modest—directly contradicting the CEA’s estimates.³¹ Meanwhile, although the longer-term effects on employment were larger, they came at a substantial cost. First is the financial cost: the program was estimated to have generated about 14.8 jobs per one million dollars. That’s about \$67,500 per job. Then there is the cost in terms of the broader effect on employment: the program mainly generated manual labor jobs in construction and waste management that paid below the median for manual labor jobs. A large proportion of these jobs also required more than a high school education.



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Moreover, when the authors disaggregated the effect of green ARRA spending by sector, they found that over the period 2013 and 2017, for each one million dollars spent, 2.86 jobs were created in “green employment,” 1.6 jobs in manufacturing, 2.36 jobs in construction, and 5.7 jobs in waste management.³² That’s a total of 12.52 jobs created. Meanwhile, the number of jobs in the “professional, scientific, technical and service sector” fell by 5.02 jobs per one million dollars. That implies a net increase of 7.5 jobs.³³

³¹ David Popp, Francesco Vona, Giovanni Marin, and Ziqiao Chen, “The Employment Impact of Green Fiscal Push: Evidence from the American Recovery Act,” Washington, D.C.: National Bureau for Economic Research, NBER Working Paper No. 27321 (June 2020.)

³² Ibid. at 37.

³³ The authors do not discuss this result, perhaps because several of the coefficients were not “significant.” But it should be noted that the coefficient in the baseline result for jobs created was only significant at the 10% level—and the regression that provided that result was not the best fit; the best fit regression found that only 10.24 jobs were created, but that coefficient was not significant even at the 10% level.

TABLE 2: CLEAN ENERGY

Spending by Category	Appropriations ^a	Through the end of 2009:Q4		Through the end of 2010:Q1	
		Obligations ^b	Outlays ^b	Obligations ^c	Outlays ^c
	Millions \$USD				
Energy Efficiency	19,935	11,903	1,152	15,559	2,203
Renewable Generation	26,598	2,028	1,994	2,970	2,934
Grid Modernization	10,453	2,666	72	3,283	101
Advanced Vehicles and Fuels Technologies	6,142	3,149	450	3,608	617
Traditional Transit and High-Speed Rail	18,113	8,834	1,804	10,056	2,733
Carbon Capture and Sequestration	3,400	425	4	963	13
Green Innovation and Job Training	3,549	2,197	123	3,015	428
Clean Energy Equipment Manufacturing	1,624	13	13	61	61
Other	408	148	12	239	38
Total^d	90,222	31,363	5,624	39,754	9,127

Notes: a. Appropriations include estimated cost of tax provisions through 2018:Q3.

b. include estimated costs of tax provisions through December 31, 2009

c. include estimated costs of tax provisions through March 31, 2010.

d. items may not add up to total due to rounding

Sources: Appropriations estimates from the Office of Management and Budget (OMB); agency Financial and Activity Reports to CMB through March 31, 2010; simulations from the Department of the Treasury (Office of Tax Analysis) based on the FY2011 budget. CEA, The Economic Impact of the American Recovery and Reinvestment Act of 2009, Supplement to the Third Quarterly Report: The ARRA and The Clean Energy Transformation.

https://obamawhitehouse.archives.gov/administration/eop/cea/factsheets-reports/economic-impact-arra-3rd-quarterly-report/supplement_greenjobs

One way to interpret these results is that ARRA's green spending imposed very large opportunity costs on society, both financially and in terms of human capital. Money spent on low-paying manual labor "green" jobs, many of which were of relatively short duration (such as the installation of solar panels and construction of wind generators) was diverted away from other potentially higher value investments that would have resulted in better paid and more sustainable jobs in other sectors.

Assessments of green subsidies in other countries have found similar and in some ways even more striking effects. A study by the government-funded Danish Economic Council in 2002 looked at the effect of policies that supported wind power during the 1990s and concluded:

Danish environmental and energy policies have stimulated the use of windmills in power generation, with the primary purpose of providing environment friendly electricity. Several policies have been used. For example, the owners of windmills receive a subsidy per kilowatt hour of electricity produced from their mills. Another example is the favourable tax treatment of windmill owners' income from the sale of electricity. Analyses in the chapter show that the windmills constructed in Denmark give rise to an economic loss with a net present value of DKK 3 billion.³⁴

A 2009 study by think tank CEPOS considered the effect of similar policies in Denmark from 1999 to 2006 and found that government subsidies to wind energy continued to have similar overall economic effects and noted specifically that the policies shifted employment from more productive to less productive employment.³⁵

A 2009 study by economists at the University Rey Juan Carlos in Madrid compared the actual average annual productivity increase of subsidies to “green jobs” in Spain with a counterfactual in which those subsidies were invested in other jobs. The authors found that for every “green job” created, 2.2 jobs were destroyed in other sectors.³⁶

In sum, the evidence from previous green stimulus programs suggests that in general such programs impose net economic costs on society and tend to divert resources from more productive, better paying jobs to less productive, less well paid jobs.³⁷ It seems most unlikely that this time would be very different. The prospect for “good green jobs” is not good. Meanwhile, if those jobs must be union jobs (as President Biden seems to want), the effects will likely be worse, as unionized labor tends to be considerably more expensive

³⁴ Dansk Økonomi forår 2002 – Konjunkturvurdering. Kommunerne og staten. Vurderinger af 90'ernes miljø- og energipolitik. English Summary available at <https://dors.dk/files/media/rapporter/2002/f02/summary.pdf>

³⁵ Henrik Meyer, *Wind Energy's Effects on Employment in Denmark*, (Copenhagen: CEPOS, 2009.) Available at: <https://cepos.dk/media/2547/wind20energy20-20the20case20of20denmark.pdf>

³⁶ Gabriel Calzada Álvarez, Raquel Merino Jara, Juan Ramón Rallo Julián, “Study of the effects on employment of public aid to renewable energy sources,” *Procesos de Mercado VII* (1) (2010). ISSN: 1697-6797-13. Available at: <https://www.juandemariana.org/system/tdf/investigacion/090327-employment-public-aid-renewable.pdf?file=1&type=node&id=16146&force=>

³⁷ See also: Andrew P. Morriss, William T. Bogart, Andrew Dorchak, and Roger E. Meiners, “Green Jobs Myths,” U Illinois Law & Economics Research Paper No. LE09-001 and Case Legal Studies Research Paper No. 09-15, 2009, Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1358423

than non-unionized labor,³⁸ so the productivity and economic effects would be more negative. Indeed, the likely effect would be an increase in expensive, low-productivity “green” jobs and a reduction in higher-productivity jobs in other sectors.

3.1.4 THE PECULIAR CASE OF STIMULUS SPENDING DURING A PANDEMIC

The standard Keynesian argument for stimulus spending is predicated on the assumption that unemployment is involuntary—that is to say, people would work if there were work available. But during a pandemic, and this pandemic in particular, unemployment has been both voluntary and mandatory. Many of those who lost their jobs did so because states and municipalities prohibited them from working.³⁹ Meanwhile, others have been unable to work due to justifiable fears of personal interactions, which made it uneconomic for certain businesses to operate as normal.

“

...during this pandemic in particular, unemployment has been both voluntary and mandatory.

”

Under such circumstances, conventional “stimulus” spending makes even less sense than it otherwise would. When people are unable to work due to prohibitions on working or pandemic-related fears, “stimulus” will not cause employment to rise, except perhaps marginally among those who are exempted from the prohibition or are able to work from home. Moreover, even the most “neutral” stimulus (such as the \$1,200 checks) will be

³⁸ The BLS estimated in 2014 that unionized labor costs were about 50% higher than non-unionized labor. See: “Employer costs for union workers averaged \$46.50 per hour worked in December 2014.” Bureau of Labor Statistics, U.S. Department of Labor, *The Economics Daily*, Available at: <https://www.bls.gov/opub/ted/2015/employer-costs-for-union-and-nonunion-workers-in-december-2014.htm>

³⁹ Marios Karabarbounis, Reiko Laski, James Lee and Nicholas Trachter, *The Effect of Lockdown Measures on Unemployment*, September 4, 2020, Richmond, VA: Federal Reserve Bank of Richmond. https://www.richmondfed.org/publications/research/coronavirus/economic_impact_covid-19_09-04-20; Jessica Gallant, Kory Kroft, Fabian Lange, and Matthew J. Notowidigdo, “Temporary Unemployment and Labor Market Dynamics During The Covid-19 Recession,” NBER Working Paper 27924, October 2020, Washington, D.C.: National Bureau of Economic Research. <http://www.nber.org/papers/w27924>

highly distortionary, since it will be spent primarily on products and services the sale of which remains possible. Thus, in locations that were still under shelter-at-home orders, the \$1,200 check “stimulus” presumably boosted online sales but did little to support the local businesses that have been unable to operate.

While a moral—and perhaps legal—case can be made that the government should compensate those who have lost their jobs and businesses due to the prohibitions put in place in order to stop COVID-19, this is entirely different from “stimulus” spending. In this context, the provision of loans to small businesses—such as those provided under the paycheck protection program—may make sense. But it would be wrong to conceive even of these as “stimulus”; they are more accurately categorized as a form of disaster relief, which is in fact how they are designated by the Small Business Administration.⁴⁰

3.2

WOULD ANY OF THE PROPOSED GREEN FISCAL STIMULI ACTUALLY STIMULATE (OR BE GREEN)?

Based on the foregoing, it seems highly optimistic to think that most of the green stimulus spending proposals outlined in Part 2 would result in a net increase in output. Indeed, in most cases the opposite is more likely. But there are also likely some exceptions. In this section, we discuss the specific stimulus proposals in light of the broader evidence discussed in section 3.1. We divide these into broadly four classes of proposal: indirect subsidies (tax incentives), direct subsidies (grants, loans, public procurement), building codes and energy efficiency standards, and deregulation.

3.2.1 INDIRECT SUBSIDIES: GREEN TAX INCENTIVES

One of the most popular forms of green spending in general over the past two decades has been tax credits for renewable energy, electric vehicles, and other programs. Tax credits are a form of indirect subsidy, since they do not involve a direct payment, unless they are refundable, but are instead deducted from taxes that would otherwise be owed.⁴¹

⁴⁰ “Coronavirus Relief Options,” *sba.gov*, U.S. Small Business Administration. <https://www.sba.gov/funding-programs/loans/coronavirus-relief-options> (24 Nov. 2020).

⁴¹ Refundable tax credits are direct subsidies to the extent and in the amount that the credit exceeds the amount of tax otherwise due.



The main argument proponents make for these tax credits is that they incentivize innovation in green technologies that have very high fixed costs.



The main argument proponents make for these tax credits is that they incentivize innovation in green technologies that have very high fixed costs. The contention is that subsidizing industries at an early stage in their development enables those industries to develop to a point at which they become cost competitive with other producers.

Thus, the renewable energy production tax credit (REPTC), which has been available in one form or another since 1992, has subsidized the output of new wind, biomass (and more recently other forms of renewable energy) projects for 10 years from completion.⁴² The subsidy was set at an initial rate of 1.5c/kWh in 1992 and adjusted annually for inflation; in 2019 it was revised up to 2.5c/kWh (but cut to only 40% of that amount for wind projects beginning construction in 2019).

A recent analysis by Lawrence Berkeley National Laboratory (LBNL) looked at the effect of another policy that motivated the installation of renewable energy, renewable portfolio standards (RPS), which require electricity producers to supply a minimum proportion of electricity generated by renewable energy. (RPSs are imposed by states and vary considerably in their obligations.) The LBNL analysis found that RPSs had contributed to an average reduction in the wholesale price of electricity by less than \$1.3/MWh, in 2017 dollars. To the extent that the electricity generators were able to benefit from the REPTC (and the vast majority will have been able to do so), each megawatt will have been subsidized at a rate of \$23/MWh.⁴³ So, on net the REPTC cost taxpayers about \$21/MWh, or 2.1c/kWh.

⁴² “The Renewable Electricity Production Tax Credit: In Brief,” Congressional Research Service. CRS Report R43453. 29 April 2020. <https://fas.org/sgp/crs/misc/R43453.pdf>

⁴³ A megawatt (MW) is 1,000 kilowatts (kW). The REPTC in 2017 was \$0.23/kWh. So, the subsidy per MWh = \$0.23 × 1000 = \$23.

As a long-term investment the REPTC does not look very pretty! But as a short-term stimulus it looks even worse: it can take many months or even years for a wind or solar power plant to become operational, so firms making new investments in wind and other renewable generation will likely not receive tax credits until long after the economic downturn that motivated the investment is over—but will continue to receive them for years during the economic upturn. Indeed, it is notable that the original REPTC was implemented during a recession—and has continued to be authorized for nearly 30 years!



...it can take many months or even years for a wind or solar power plant to become operational, so firms making new investments in wind and other renewable generation will likely not receive tax credits until long after the economic downturn that motivated the investment is over—but will continue to receive them for years during the economic upturn.



Tax incentives for electric vehicles (EVs) are another favorite green stimulus proposal. As with tax incentives for renewable energy, the rationale is that they enable EV manufacturers to innovate and achieve economies of scale, which leads to production cost reductions that enable producers eventually to sell EVs at a profit with no subsidy. But as with tax incentives for renewable energy, it is not clear that such subsidies actually have their desired intention.

Federal subsidies to EVs were first established in 2008 under the Energy Improvement and Extension Act, which established a tax credit of up to \$7,500 per vehicle. In addition, numerous states have also provided subsidies to EVs. For example, California offers a rebate of up to \$4,500 tax credit for EVs.⁴⁴ So, California residents could get a tax credit of up to \$12,000 for purchasing an EV.

⁴⁴ “State and Federal Electric Vehicle Incentives,” *cleanvehiclerebate.org*, California Clean Vehicle Rebate Project, <https://cleanvehiclerebate.org/eng/ev/incentives/state-and-federal> (24 Nov. 2020).

While electric vehicle technology has improved dramatically over the past 12 years, in most cases it is still more cost-effective to purchase a gasoline-powered vehicle, as we document in Appendix B. Relatedly, much of the initial demand for electric vehicles has come from wealthier consumers, many of whom likely purchased these vehicles in part at least as status symbols. To the extent that such demand exists, the federal and state tax credits are both unnecessary—since the consumers would likely have purchased the vehicles regardless of the tax credits—and amount to a large transfer from poorer consumers who were unable to purchase the vehicles. Meanwhile, in principle the scale necessary to achieve cost reductions could be achieved through the deployment of private capital, as it has in many other industries, without the need for additional tax credits.



While electric vehicle technology has improved dramatically over the past 12 years, in most cases it is still more cost-effective to purchase a gasoline-powered vehicle....



In sum, tens of billions of dollars in federal tax credits to renewable energy and EVs have not led to proportionate reductions in costs for consumers. But have they had environmental benefits that might justify the expenditures? Numerous studies have investigated this question. For renewable energy subsidies, a 2014 study published in the *American Economic Review* looked at reduction in greenhouse gas emissions and concluded that “Our key finding is that, despite tax revenue losses of \$10 billion per year in 2010, these provisions have a very small impact on GHG emissions and, in some cases, may actually increase emissions.”⁴⁵ For policies specifically targeted at electricity generation (both the REPTC and the investment tax credit), the authors found that the cost to reduce emissions of one ton of carbon dioxide was \$250, which is about five times the “social cost of carbon” estimated by the Intergovernmental Working Group convened by the EPA during

⁴⁵ Brian C. Murray, Maureen L. Cropper, Francisco C. de la Chesnaye, and John M. Reilly, “How Effective are US Renewable Energy Subsidies in Cutting Greenhouse Gases?” *American Economic Review: Papers & Proceedings* 104 (5) (2014). 569–574.

President Obama’s administration—and several orders of magnitude higher than more realistic estimates of the SCC.⁴⁶

3.2.2 DIRECT SUBSIDIES: GREEN GRANTS, LOANS, AND PUBLIC PROCUREMENT

Several of the green stimulus proposals advocate for the government to provide direct subsidies, either in the form of grants, interest free loans, or public procurement. The breadth of these proposed subsidies is wide; they include:

- giving grants and interest-free loans to accelerate U.S. manufacturing of electric cars and buses
- implementing direct government procurement of electric cars and school buses
- funding transit projects (light rail, cycling, pedestrian)
- funding ecosystem restoration
- funding water and wastewater infrastructure improvements
- expanding the federal Weatherization Assistance Program
- passing and implementing a “Green New Deal for Public Housing Act”⁴⁷

There is insufficient space in this brief to undertake a detailed assessment of all these proposals, but some general remarks are in order. First, in general, direct subsidies tend to be more distorting and less efficient than indirect subsidies. Indirect subsidies incentivize individuals and companies to make purchases that they otherwise would not make but at least those individuals and companies must still make decisions about the opportunity cost of such purchases. By contrast, direct subsidies replace this decentralized decision making with centralized decision making by government agencies. Since those centralized agencies have little if any knowledge of the particular circumstances and information held by market participants, the decisions will on average be worse for the consumer than those made by market participants.

⁴⁶ Julian Morris, *Climate Change, Catastrophe, Regulation and the Social Cost of Carbon*, Los Angeles: Reason Foundation, March 2018. <https://reason.org/policy-study/climate-change-catastrophe-regulation-and-the-social-cost-of-carbon>

⁴⁷ “A Green New Deal for American Public Housing Communities,” *dataforprogress.org*, Data for Progress. <https://www.dataforprogress.org/green-new-deal-public-housing>

Second, many of the proposed public investments relate to projects that experience suggests provide minimal benefits at substantial cost. For example, light rail transit provides little benefit in reducing congestion or emissions, but comes at a high cost. A 2019 report from the Federal Transit Administration indicated that the average operating cost of light rail systems is \$312 per hour compared to \$197 for rapid bus transit.⁴⁸ Moreover, transit systems are heavily subsidized because passenger fares are insufficient to cover operating expenses. On average, fares cover 21.9% of light rail operating costs compared to 28.3% for rapid bus transit.



...light rail transit provides little benefit in reducing congestion or emissions, but comes at a high cost. A 2019 report from the Federal Transit Administration indicated that the average operating cost of light rail systems is \$312 per hour compared to \$197 for rapid bus transit.



These added costs are not offset by reduced congestion or emissions. Transit system expansions may slightly reduce auto travel in the short run, but lower congestion levels can lead to “induced demand,” meaning increased travel due to lack of congestion, that offsets any initial benefits. A recent paper found that a 10% expansion in transit capacity reduced auto travel by an average of 0.7% in the short-run. In the long run, however, auto travel actually increased by an average of 0.4%.⁴⁹

Subsidies to transit are not only economically inefficient; they have few if any environmental benefits. While mass transit is often assumed to be less polluting than cars, a combination of low ridership levels and increasing relative fuel efficiency of passenger

⁴⁸ “National Transit Database: 2018 National Transit Summaries and Trends.” U.S. Department of Transportation. *DOT.gov*. Dec. 2019. https://cms7.fta.dot.gov/sites/fta.dot.gov/files/docs/ntd/data-product/134401/2018-ntst_1.pdf

⁴⁹ Justin Beaudoin and C.-Y. Cynthia Lin Lawell, “The effects of public transit supply on the demand for automobile travel.” *Journal of Environmental Economics and Management* 88 (March 2018). 447-467. <https://doi.org/10.1016/j.jeem.2018.01.007>

vehicles mean that is increasingly not the case.⁵⁰ A recent study from the Cato Institute, for example, compared energy consumption and greenhouse gas emissions per passenger-mile traveled using transit buses, cars, and light trucks (SUVs, pickups, full-sized vans). The study found that, on average, transit buses used approximately 3,400 British Thermal Units (BTUs) to move one passenger one mile in 2018. Meanwhile cars used an average 2,900 BTUs per passenger-mile, and light trucks used about 3,400 BTUs.⁵¹



Looking at CO₂ emissions, the study found that for each passenger-mile traveled transit buses emit more CO₂ than cars in 93 of the 100 largest urban areas.



Looking at CO₂ emissions, the study found that for each passenger-mile traveled transit buses emit more CO₂ than cars in 93 of the 100 largest urban areas. Likewise, light trucks emit less CO₂ than transit buses in 90 out of 100 of those areas. This trend is driven by a combination of greater fuel efficiency in personal vehicles and declining transit ridership. According to the study, the average number of people onboard transit vehicles has declined by nearly 20% since 2014.

Third, while some of the proposed investments may be desirable in principle, they are not good candidates for “stimulus spending.” For example, transportation infrastructure investment is generally a poor method for economic stimulus because funding tends to move slowly, and projects can take a long time to complete.⁵² Moreover, funds that can be

⁵⁰ Robert Poole, “Why the New House Transportation Bill Wouldn’t Achieve Its Environmental Goals.” *Reason.org*. Reason Foundation. 15 June 2020. <https://reason.org/commentary/why-the-new-house-transportation-bill-wouldnt-achieve-its-environmental-goals/>

⁵¹ Randal O’Toole, *Transit: The Urban Parasite*. Policy Analysis No. 889 (Cato Institute, Washington, DC, 20 April 2020.) <https://doi.org/10.36009/PA.889>.

⁵² Robert Poole and Baruch Feigenbaum, “Surface Transportation News: High-Speed Rail Proposal, Infrastructure Stimulus, and More,” *Reason.org*. Reason Foundation, 4 June 2020. <https://reason.org/transportation-news/high-speed-rail-proposal-infrastructure-stimulus-and-more/#c>

readily made available and spent are often not used in the most efficient or transformative ways.⁵³

While a case could be made for providing temporary funding for existing transit systems for reasons similar to those made for the private sector paycheck protection program, such funds should not be considered a stimulus, should focus on providing service for transit-dependent riders and, in the longer term, optimizing service to meet their needs.⁵⁴

Similarly, some of the proposals address genuine infrastructure needs, such as the substantial deficit in investment in water and wastewater infrastructure. In its most recent assessment, in 2015, the EPA estimated that spending more than \$450 billion would be necessary in order to modernize and expand existing water and wastewater infrastructure.⁵⁵ However, such spending is clearly more in the realm of long-term investment than short-term stimulus.



While there are many reasons for a lack of investment in improvements in water and wastewater infrastructure, an important factor is the dominance of public sector ownership and control.



While there are many reasons for a lack of investment in improvements in water and wastewater infrastructure, an important factor is the dominance of public sector ownership

⁵³ Baruch Feigenbaum, “Infrastructure Stimulus Hasn’t Worked In The Past and Won’t Work Now.” *Reason.org*. Reason Foundation. 24 April 2020. <https://reason.org/commentary/infrastructure-stimulus-hasnt-worked-in-the-past-and-wont-work-now/>

⁵⁴ Baruch Feigenbaum and Marc Joffe, “Mass Transit Stimulus Spending Should Be Limited to Providing Operations, Focus on Transit-Dependent Riders,” *Reason.org*, Reason Foundation. 26 March 2020. <https://reason.org/commentary/mass-transit-stimulus-spending-should-be-limited-to-providing-operations-for-transit-dependent-riders/> <https://reason.org/commentary/five-steps-to-guide-transportation-spending-and-planning/>

⁵⁵ “Drinking Water Infrastructure Needs Survey and Assessment,” U.S. Environmental Protection Agency, *EPA.gov*. March 2018. https://www.epa.gov/sites/production/files/2018-10/documents/corrected_sixth_drinking_water_infrastructure_needs_survey_and_assessment.pdf

and control. Over 80% of water systems in the U.S. are owned and operated by government. Investment decisions in these systems are inevitably driven by political factors and are not subject to market discipline. Crucially, investments in water infrastructure have a payback period of many years if not decades, whereas elections typically occur every four years, so politicians may be unwilling to make investments that would require raising local taxes for a project that would not generate a payback before they face re-election.

To overcome the perverse incentives that result from political control, it may be necessary to transfer ownership and management to the private sector.⁵⁶ This can potentially generate a double-whammy, as private operators tend to be more efficient and will typically see water and wastewater systems as an asset rather than a liability, so in many cases will be willing to pay significant sums even for degraded systems that require significant investment.

3.2.3 BUILDING CODES AND ENERGY EFFICIENCY STANDARDS

Several of the proposals call for mandating increased efficiency for homes, appliances, and vehicles. These are clearly not direct stimuli. Rather, they act to shift the incentives of market participants. For example, the “Green Stimulus to Rebuild Our Economy” proposal would require states to adopt stricter building energy codes and impose stricter fuel economy standards. The presumption underlying such proposals is that they would reduce energy consumption—thereby saving money and reducing emissions. However, the assumption that such top-down mandates are necessary to drive improvements in efficiency belies the evidence. Most improvements in energy efficiency and conservation have occurred as a result of competition between producers of goods and services. Such competition motivates producers to use resources more efficiently, in order to reduce costs and thereby offer consumers products at a lower price. In addition, competition drives producers to supply products that themselves use resources more efficiently, in order to meet consumer needs and wants.

⁵⁶ Geoffrey F. Segal and Adrian T. Moore, *Frequently Asked Questions About Water / Wastewater Privatization*, Los Angeles: Reason Foundation, 2003. <https://reason.org/wp-content/uploads/files/db5c3e3e5365eb334855d7d818ef53d9.pdf>



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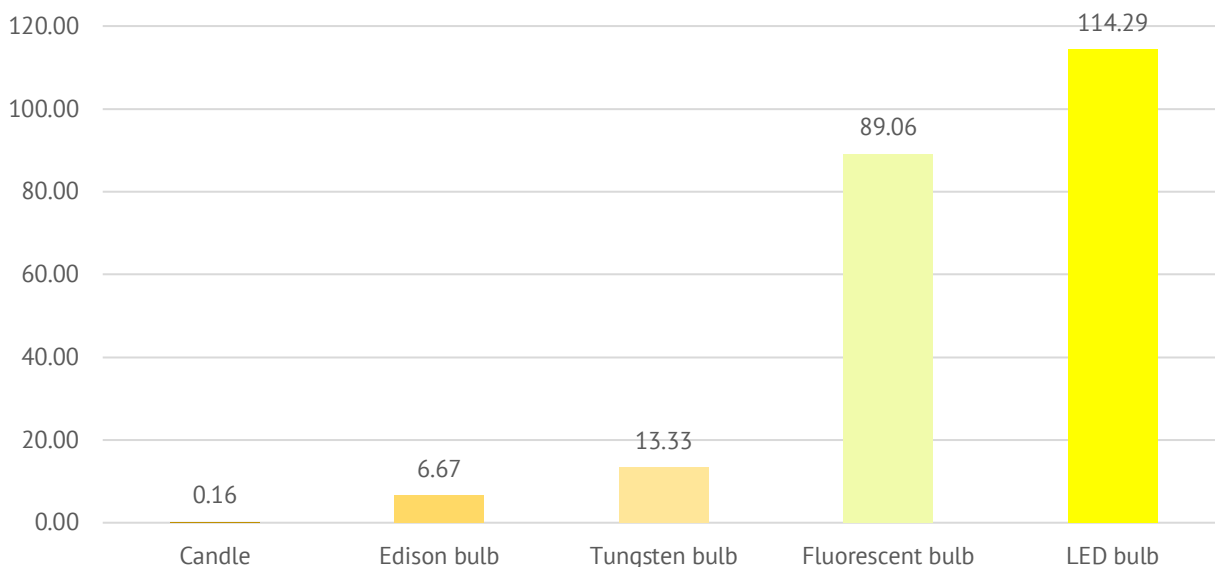


The history of development of modern lighting offers a good illustration of the importance of competition. The incandescent bulb was developed in a competitive race between various entrepreneurs, including Thomas Edison.⁵⁷ Subsequently incremental improvements, including the development of the tungsten filament, were also driven by competition between multiple producers. Like the incandescent bulb, the fluorescent bulb was developed over many years by competing entrepreneur-scientists.⁵⁸ The same is true for the LED lights, a technology that has been around for decades but only recently became a viable source of ambient lighting—and where competition continues to drive rapid innovation, leading to improvements in effectiveness, efficiency, and cost.⁵⁹ As a result of these improvements, over the past 150 years the efficiency of light sources has increased nearly 1,000 fold—as can be seen in Figure 2.

⁵⁷ Ernest Freeberg, *The Age of Edison*, (New York: Penguin Press, 2013).

⁵⁸ See e.g.: Rick D. Lair, “Florescent Lamp Development: A comprehensive history covering the 1930s and 1940s,” *edisontechcenter.org*, Edison Tech Center.
<http://www.edisontechcenter.org/fourescentlampdev.html>

⁵⁹ Jessie Lin, “Key trends in the development of LED lighting technology,” *Digitimes*, 3 April 2012.

FIGURE 2: EFFICIENCY OF LIGHT SOURCES (LUMENS PER WATT)

Source: Julian Morris, *Climate Change, Catastrophe, Regulation, and the Social Cost of Carbon*, Los Angeles: Reason Foundation, 2018.

Computers offer another example of the power of competition. Early computers were vast, heavy, expensive, and slow. The ENIAC, for example, occupied about 1,800 square feet, weighed 30 tons, consumed 160 kilowatts of energy, cost \$600,000 (in 1997 dollars), and was capable of processing only about 300 instructions per second.⁶⁰ Today it is possible to purchase a fully functioning computer (the Raspberry Pi Zero W) that processes about 870 million instructions per second,⁶¹ consumes less than one watt of power,⁶² has built-in wifi, can fit in the palm of one's hand, and costs only \$10.

These examples highlight the importance of competition as the driving force behind innovations leading to energy efficiency improvements. Figure 3 shows how such innovations have resulted not only in a reduction in energy use per unit of output in the U.S. but also a more rapid reduction in emissions of carbon dioxide (which also reflects the

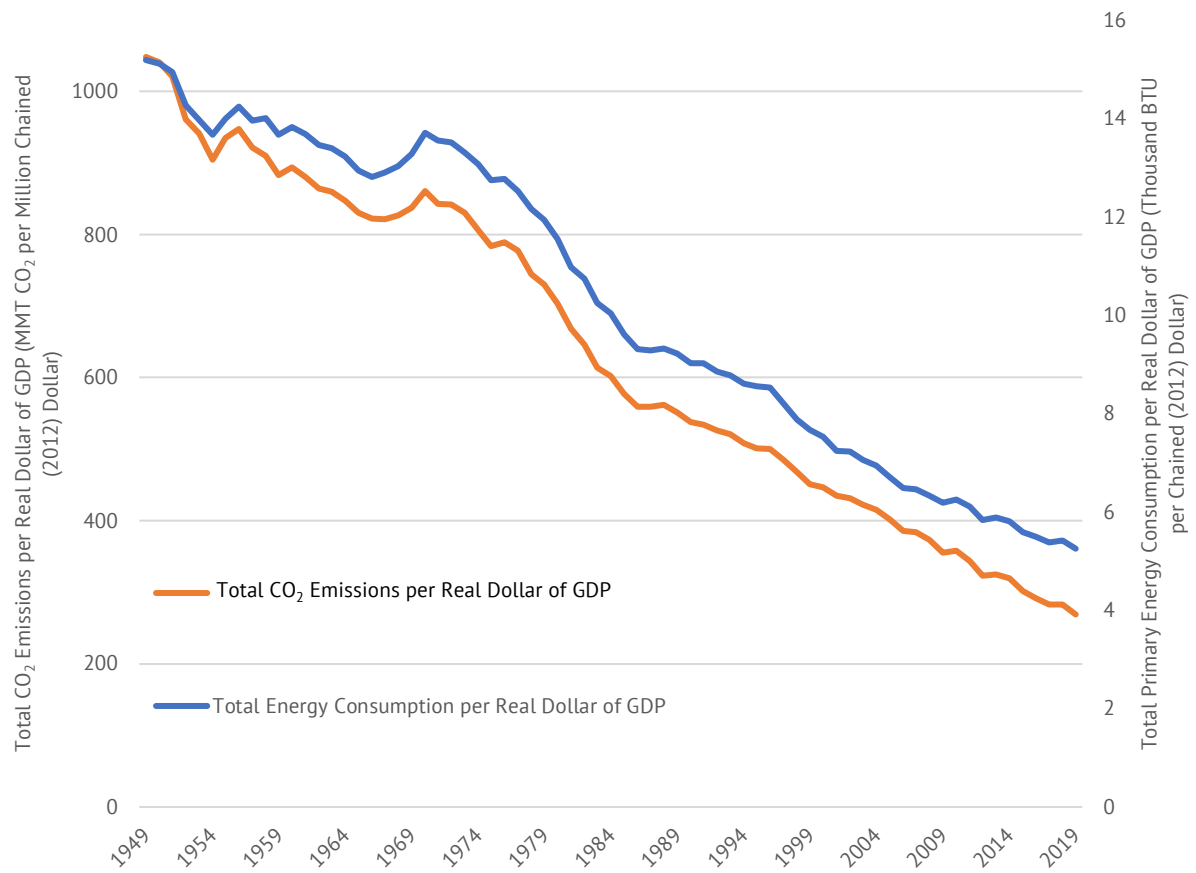
⁶⁰ See e.g.: Mary Bellis, "The History of the ENIAC Compute," *ThoughtCo.*, 13 Jan. 2020. <https://www.thoughtco.com/history-of-the-eniac-computer-1991601>; Carnegie Mellon University, Field Robotics Center. <https://www.frc.ri.cmu.edu/~hpm/book97/ch3/processor.list.txt>

⁶¹ Nick Heath, "Raspberry Pi Zero W: Hands-on with the \$10 board," *TechRepublic*, 28 Feb. 2017. <http://www.techrepublic.com/article/raspberry-pi-zero-wireless-hands-on/>

⁶² Ibid.; Alex Eames, "How much power does Pi Zero W use?" *RasPi.TV*, 1 March 2017. <http://raspi.tv/2017/how-much-power-does-pi-zero-w-use>; (0.18 amps at 5.19 volts = 0.93 watts)

shift from more carbon-intensive fuels, such as coal, to less carbon-intensive fuels such as natural gas, nuclear, and hydroelectricity).

FIGURE 3: ENERGY CONSUMPTION AND CO₂ EMISSIONS PER REAL DOLLAR OF GDP



Source: Energy Information Administration, August 2020 Monthly Energy Review

While mandates may have contributed in some cases to improvements in energy efficiency, in most cases they have not been a major driving force. Moreover, although mandates have resulted in efficiency improvements, they have likely reduced other innovations, with adverse effects for society. All companies subject to an efficiency mandate are effectively forced to divert resources toward compliance with the mandate and away from other investments that might have resulted in innovations of various kinds (including efficiency improvements). Since innovation is both cumulative and combinatorial, mandates that reduce the diversity of innovation almost inevitably result in a reduction in overall levels of beneficial innovation.



All companies subject to an efficiency mandate are effectively forced to divert resources toward compliance with the mandate and away from other investments that might have resulted in innovations of various kinds (including efficiency improvements).



Claims that mandatory improvements in product efficiency are necessary are often predicated on the assumption that consumers do not appropriately value efficiency when making product purchases. (In the context of energy use, this is often referred to as the “energy paradox.”) But this is belied by the evidence, which shows that consumers do rationally factor in the expected savings from more-efficient products when making purchasing decisions. For example, a 2015 study found a one-to-one correspondence between expected net savings resulting from fuel economy differences between otherwise similar automobile models and the price differential between those automobiles.⁶³

Unfortunately, mandatory efficiency improvements drive up the cost of new products for many consumers. As a result, some consumers who might have purchased a new product had it been less expensive might delay their purchase of a product made more expensive by the efficiency mandate, or, worse, not make a purchase at all.

Take air conditioners, for example. In locations where air conditioning is used for many days of the year, consumers are likely to be willing to pay for more-efficient units. But in places where air conditioners are used only rarely, consumers are less likely to be willing to pay more for more-efficient units because the net cost, taking into account the cost of electricity and the amount the unit will be used, does not justify such a purchase. Since air conditioning dramatically reduces mortality on very hot days,⁶⁴ it is important that the price

⁶³ James M. Sallee, Sarah West, and Wei Fan, “Do Consumers Recognize the Value of Fuel Economy? Evidence From Used Car Prices And Gasoline Price Fluctuations,” National Bureau of Economic Research: NBER Working Paper 21441, July 2015.

⁶⁴ Alan Barreca, Karen Clay, Olivier Deschenes, Michael Greenstone and Joseph S. Shapiro, “Adapting to Climate Change: The Remarkable Decline in the U.S. Temperature-Mortality Relationship over the 20th

of air conditioning units not be driven up unnecessarily. The DOE has partially taken this into consideration by issuing differential energy efficiency requirements for air conditioning units sold in different locations.⁶⁵ However, a better approach would be simply to remove such requirements altogether and allow consumers to make decisions concerning the desired efficiency of their air conditioners based on their expected use of the product. In areas where air conditioners are used rarely, consumers could then purchase less expensive, less efficient units, enabling them more cost-effectively to manage heat and humidity when necessary. Such a change would likely save lives.

Efficiency standards can have other perverse effects. Take the mandated reductions in water flow for shower heads. To comply with federal rules,⁶⁶ new shower heads typically incorporate regulators to limit the flow of water to 2.5 gallons/minute. Many consumers prefer more powerful showers and remove these regulators.⁶⁷ It is likely that some consumers who remove the regulators entirely might, if given the option, choose to regulate water flow at a rate that still enables them to take a satisfying shower—but that option has largely been precluded by the mandated rules. As a result, consumers face a binary choice: leave the mandated regulator in, or remove it (and regulate water flow using a variable valve, if installed).

Energy efficiency mandates have also had perverse effects. The gradual phase-out of incandescent bulbs led initially to greater use of compact fluorescent (CF) bulbs, which have different light and performance characteristics than incandescent bulbs. The light emitted by CF bulbs is typically cooler, which creates a less relaxing atmosphere.⁶⁸ In addition, although CF bulbs often are rated with a longer life than incandescent bulbs, frequently turning a CF on and off tends to shorten its life considerably.⁶⁹ As a result, for

Century,” National Bureau of Economic Research: NBER Working Paper, January 2015. Available at: http://www.econ.yale.edu/~js2755/Climate_Adaptation_BCDGS.pdf

⁶⁵ 10 CFR 430, Appendix S of Subpart B.

⁶⁶ Ibid.

⁶⁷ Ernest Istook, “Thanks to the EPA, Even If You Like Your Shower, You Can’t Keep It,” *CNSNews*, 24 March 2015. *Cnsnews.com*. <http://www.cnsnews.com/commentary/ernest-istook/thanks-epa-even-if-you-your-shower-you-cant-keep-it>

⁶⁸ YunHee Park, “Color temperature’s impact on task performance and brainwaves of school-age children,” *J Phys Ther Sci*. 27 (10) (2015). 3147–3149.

⁶⁹ Joseph Calamia, “Are Compact Fluorescent Lightbulbs Really Cheaper Over Time?” *Spectrum.ieee.org*, IEEE Spectrum, March 11, 2011. Available at: <http://spectrum.ieee.org/green-tech/conservation/are-compact-fluorescent-lightbulbs-really-cheaper-over-time>

applications where a bulb is used frequently but for short durations, CFs can turn out to be a much less cost-effective solution for consumers. Meanwhile, some consumers responded to the adverse effects of cycling by leaving CFs on continuously, thereby likely at least in part mitigating the energy saving benefits. By mandating the phase-out of incandescent bulbs, the DOE likely imposed unnecessary costs on consumers.



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As the lightbulb example shows, a narrow focus on “energy efficiency” can result in perverse outcomes. In practice, consumers are interested in many different product characteristics and are typically willing to make trade-offs between the energy consumption of a product and its other characteristics.

Fuel Economy Standards

Take vehicles, for example. It is often lamented that “fuel economy” did not improve significantly during the course of the 20th century prior to the introduction of Corporate Average Fuel Economy (CAFE) standards in 1978. But this ignores that engine efficiency did increase dramatically prior to 1978. The reason “fuel economy” (i.e. miles per gallon) did not increase much is that the power, size, and weight of vehicles rose, as manufacturers added features that made them faster, more luxurious, and safer. The same happened between 1981 and 2003: although CAFE standards for passenger cars rose from 22 mpg to 27.5 mpg over that period, average fuel economy of passenger vehicles and light trucks rose only slightly, from 20.5 to 20.8 mpg, but average power nearly doubled, from 102 to

197 horsepower, average weight rose by nearly 25%, from 3,201 lbs to 3,974 lbs, and average time to accelerate from 0 to 60 mpg fell by nearly 30%.⁷⁰

New vehicles sold in the U.S. must comply with increasingly stringent fuel economy standards. A primary purpose of these standards has, since their inception, been to promote conservation of resources. However, the cost per barrel of oil “saved” by the CAFE standards developed by the previous Administration would likely have been well over \$100—and could be closer to \$500.⁷¹ Moreover, as the National Highway Traffic Safety Administration notes in its Preliminary Regulatory Impact Analysis for the then-proposed Safe and Affordable Fuel Economy (SAFE) rulemaking:

When the U.S. becomes self-sufficient in petroleum supply—which is now anticipated to occur within a decade—the entire value of increased payments by U.S. petroleum users that results from relaxing CAFE and CO₂ standards will become a transfer within the U.S. economy.⁷²

At that point, the initial purpose of CAFE standards is entirely obviated.

More recently, that purpose has been extended to the reduction of harmful emissions, especially of greenhouse gases (GHGs). However, even assuming that it is desirable to increase vehicle fuel efficiency and/or reduce GHG emissions at a rate higher than would be achieved through innovation in a competitive market, fuel economy standards are a very inefficient way to achieve those goals. Numerous researchers have compared the efficiency of CAFE standards with alternatives such as higher gasoline and diesel taxes and find that taxes are far more efficient.⁷³ Fuel taxes incentivize consumers to buy more-efficient

⁷⁰ “The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax,” Congressional Budget Office, 2003. 8. Available at: https://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/49xx/doc4917/12-24-03_cafe.pdf

⁷¹ Julian Morris and Arthur Wardle, “CAFE and ZEV Standards: Environmental Effects and Alternatives,” Reason Foundation, 2017. https://reason.org/wp-content/uploads/2017/08/cale_zev_standards_environment_alternatives.pdf

⁷² “Preliminary Regulatory Impact Analysis: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Year 2021 – 2026 Passenger Cars and Light Trucks,” NHTSA and EPA, *NHTA.gov*, July 2019. 1068. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ld_cafe_co2_nhtsa_2127-al76_epa_pria_181016.pdf

⁷³ See e.g.: “The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax,” Congressional Budget Office, 2003; David Austin and Terry Dinan, “Clearing the Air: The Costs and Consequences of Higher CAFE Standards and Increases in Gasoline Taxes,” *Journal of Environmental Economics and Management* 50 (3)

vehicles and thereby incentivize manufacturers to produce more-efficient vehicles in ways that match consumer preferences rather than by seeking to comply with footprint-based fuel economy standards. By increasing the effective cost per mile traveled, fuel taxes reduce any rebound effect resulting from the purchase of more-fuel-efficient vehicles. Fuel taxes also result in higher scrappage rates for less-efficient vehicles—in other words, they reverse the negative effect created by fuel economy standards. In total, fuel economy standards such as CAFE likely cost three to four times as much to achieve similar gains in fuel economy and emissions reduction as a fuel tax.⁷⁴



Numerous researchers have compared the efficiency of CAFE standards with alternatives such as higher gasoline and diesel taxes and find that taxes are far more efficient.



Given the potentially very large economic costs and minimal environmental benefit of increasing fuel economy standards, it seems utterly absurd that they are being promoted as part of a “green stimulus.”

Building Energy Codes

Voluntary building standards and warranties can provide significant benefits. For example, they can provide the purchasers, occupants, and other users of buildings with reassurance that the building has been constructed safely using suitable materials, conforming to current best practices. Likewise, voluntary standards can help overcome informational asymmetries regarding the energy efficiency of a building, enabling developers to recoup investments in energy efficiency enhancements such as insulation and high-efficiency heating and A/C systems.

(2005). 562-582; Mark R. Jacobsen, “Evaluating U.S. Fuel Economy Standards in a Model with Producer and Household Heterogeneity,” *American Economic Journal: Economic Policy* 5 (2) (2013). 148-87; and Soren T. Anderson and James M. Sallee, “Designing Policies to Make Cars Greener: A Review of the Literature,” National Bureau of Economic Research: NBER Working Paper No. 22242, May 2016.

⁷⁴ Mark R. Jacobsen, Christopher R. Knittel, James M. Sallee, and Arthur A. van Benthem, *Sufficient Statistics for Imperfect Externality-Correcting Policies*, Manuscript: University of California at Berkeley.



... when standards become codified in law as mandates they can impede innovation (since houses will be built to code rather than pushing boundaries) and tend to drive up the cost of new buildings, which reduces the turnover of the housing stock.



But when standards become codified in law as mandates they can impede innovation (since houses will be built to code rather than pushing boundaries) and tend to drive up the cost of new buildings, which reduces the turnover of the housing stock. As such, codes may actually slow down the rate of improvements in safety, energy efficiency, and other characteristics. A 2016 study by economist Arik Levinson published in the *American Economic Review* evaluated the effects of California’s building codes, which since 1978 have included mandatory energy efficiency components.⁷⁵ Levinson found that while houses in California use less energy than houses in other states, the difference in energy use is smaller in houses built after 1978 than for houses built before the introduction of the codes.⁷⁶

This does not bode well for President Biden’s proposal to mandate that new commercial buildings meet a “net zero” carbon emission standard by 2030. Such a mandate would drive up the cost of construction of such buildings enormously. As a result, far fewer commercial buildings would be constructed. This would apply not only in greenfield sites: there would be less incentive to tear down and replace older buildings. Since new buildings tend to be more energy efficient than older buildings, such a mandate could have the effect of increasing net energy use and associated emissions.

⁷⁵ Arik Levinson, “How Much Energy Do Building Energy Codes Save? Evidence from California Houses.” *American Economic Review* 106 (10) (2016). 2867–2894.

⁷⁶ Ibid. 2889.

3.2.4 DEREGULATION

Some of the proposals advocate reducing or even removing unnecessary regulatory barriers to the implementation of certain kinds of energy technology. For example, the “Green Stimulus to Rebuild Our Economy” proposes to expedite the environmental review process for clean energy, storage, high voltage transmission, charging stations, and other low-carbon infrastructure projects.⁷⁷ Biden’s “Build Back Better” plan suggests upgrading, “electrical grids by cutting regulations to expedite permitting and take advantage of existing rights of way.”⁷⁸ These proposals seem eminently sensible. Indeed, much more could be done to reform regulations that impede the implementation of innovative energy projects.⁷⁹

3.3

PRIVATE ECONOMIC BENEFITS

The BBBF report claims that subsidies to the production and distribution of electricity and energy efficiency would generate private economic benefits. As such, an obvious question arises: if there are such good returns to be had, why would the private sector not be making the investments?

The estimates of economic benefits and jobs in the BBBF report are highly dependent on the assumptions used in the modeling. For example, the report assumes a natural gas price of \$3.12/million BTUs.⁸⁰ Over the past year, the price of natural gas has averaged \$2.04/million BTUs.⁸¹ And over the past five years, it has averaged \$2.64. Moreover, the price of natural gas has experienced a secular decline for most of the past two decades. While it is possible that the price of gas will rise somewhat, it seems wholly inappropriate

⁷⁷ Johanna Bozuwa, et al. “A Green Stimulus to Rebuild Our Economy.”

⁷⁸ “The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future.” <https://joebiden.com/clean-energy/>

⁷⁹ Julian Morris, *Reason Foundation Comment: Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act. CEQ-2019-0003 (85 FR 1684)*, Los Angeles: Reason Foundation, March 10, 2020. <https://reason.org/commentary/comment-national-environmental-policy-act-ceq-2019-0003-85-fr-1684/>

⁸⁰ “Build Back Better, Faster.” 31.

⁸¹ “Henry Hub Natural Gas Spot Price.” US Energy Information Administration, *EIA.gov*. 25 Nov. 2020. <https://www.eia.gov/dnav/ng/hist/rngwhhdd.htm>

to assume that it will on average be 20% higher during the course of the next five years than it was during the course of the past five years.

This is not inconsequential: the price of natural gas significantly affects the relative cost-effectiveness of alternative energy sources, as well as the cost-effectiveness of energy efficiency investments. If natural gas is more expensive, then renewable generation and energy efficiency enhancements become relatively more economically efficient, and vice versa. Indeed, it seems plausible that a large proportion of both the purported savings from increasing installation of new wind and solar generation and from energy efficiency enhancements come from the relatively high price of natural gas assumed by BBBF.

The International Energy Agency points out that low oil prices (which are correlated to natural gas prices) reduce the incentive to improve energy efficiency.⁸² It then goes on to argue that these low prices are themselves a justification for intervention; but it does so for environmental reasons, not economic reasons. The reality is that low energy prices have significant economic benefits. In addition, low natural gas prices would likely help continue the shift toward lower carbon dioxide emissions.

3.4

BETTER WAYS TO INCENTIVIZE ENERGY EFFICIENCY AND LOWER CARBON SOURCES OF ENERGY

“

Economists have for decades argued that consumption taxes are a more effective way to incentivize consumers to use less energy and motivate manufacturers to improve the energy efficiency of their products.

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Economists have for decades argued that consumption taxes are a more effective way to incentivize consumers to use less energy and motivate manufacturers to improve the

⁸² Fatih Birol, “Put Clean Energy at the Heart of Stimulus Plans to Counter the Coronavirus Crisis,” International Energy Agency, 14 March 2020. <https://www.iea.org/commentaries/put-clean-energy-at-the-heart-of-stimulus-plans-to-counter-the-coronavirus-crisis>

energy efficiency of their products. As noted above, estimates suggest that fuel taxes would achieve fuel efficiency improvements at a cost one quarter to one third that of fuel economy standards. Likewise, a carbon tax would be considerably more efficient than mandates and subsidies as a means of incentivizing consumers to use lower carbon sources of energy.

But while these policies are more efficient, they are still costly. The Tax Foundation estimates that a \$50 per ton carbon tax would reduce GDP by about 0.4% and lead to the loss of over 400,000 full time equivalent jobs.⁸³ These effects could be offset by reducing other taxes. Indeed, if corporate taxes or payroll taxes were reduced by a sufficient amount that total government revenue remains unchanged, there could be net economic benefits. However, there is no guarantee that other taxes would in fact be reduced.



Corporate taxes, in particular, reduce investment in innovation, which is the main driver of economic growth.



Since the economic benefits from a revenue-neutral carbon tax come from cutting taxes on corporate or personal income, it would be possible to obtain even greater benefits simply by reducing those taxes. Corporate taxes, in particular, reduce investment in innovation, which is the main driver of economic growth. In terms of stimulating innovation—including innovation in energy efficiency and low-carbon technologies—the better approach might be simply to reduce the level of corporate taxation and remove all the current distortions (especially tax expenditures and credits), with the possible exception of the R&D tax credit.

Nonetheless, there may be practical political reasons to adopt an approach that continues to provide some differential support for certain technologies. Such an approach is supported by the Clean Capitalist Leadership Council, which has advocated for what it calls

⁸³ Kyle Pomerleau and Elke Asen, *Carbon Tax and Revenue Recycling: Revenue, Economic, and Distributional Implications*, Washington, D.C.: Tax Foundation, 2019. <https://taxfoundation.org/carbon-tax/>

tax-exempt “clean asset bonds and loans” or CABLs.⁸⁴ The idea is simple, yet powerful. In essence, interest on qualifying CABLs would not be subject to taxes, so investors would require a lower rate of return relative to bonds and loans subject to taxes. This would reduce the cost of debt by about 30%, which in turn would not only decrease the cost of eligible clean energy and products, but also increase the return on equity. Effectively, CABLs would attract new investors to both the tax-free debt, and the up-leveraged equity, and also attract new customers and more market share for cheaper clean solutions.

CABLs improve on current energy sector tax credits in important ways. First, tax credits constrict the clean energy market to big, specialized investors, and freeze out most of the rest of us. Only the highest income tax payers can use all the tax credits generated by big energy projects. Most of the credits are thus used by sophisticated firms large enough to deal with the complexity of tax equity trading bankers and lawyers, who take much of the subsidy. CABLs offer a much simpler investment proposition, and so invite participation from every investor, big or small, in tax-free debt or up-leveraged equity, as they prefer.

Second, CABLs cost the government less in present value of lost revenue, in two ways. Tax credits load all the tax expense at the front end of the project. CABLs spread out the tax expense over the term of the debt. More importantly, CABLs offset the tax expense on interest, by increasing the returns on, and tax revenue from, equity. Average U.S. equity returns (and tax revenues) are higher than average U.S. debt returns (and tax revenues) by some 340% for each dollar invested. CABLs give up tax revenues on the debt side where returns are low, but for profitable businesses they harvest increased tax revenues on the equity side, where returns can be high. This effect is particularly important for energy projects, where every project is effectively a separate company, issuing its own new debt and equity. By contrast, existing tax credits do not generate any offsetting tax revenue, and have no such leverage effect.

In a similar vein, the authors of the CABL proposal, Rod Richardson and Wayne Winegarden, have proposed that tax exempt bonds could be a better alternative to COVID-relief spending. They describe such a system in a comment published by Reason Foundation:⁸⁵

⁸⁴ CCLC, *Tax-Exempt Clean Asset Bonds & Loans (CABLs)*, Amagansett, NY: Clean Capitalist Leadership Council, CCLC Policy Brief 3, Sept. 2019. <https://f85.0cd.myftpupload.com/wp-content/uploads/Policy-Brief-3-Tax-Exempt-Clean-Asset-Bonds-Loans-CABLs.pdf>

⁸⁵ Rod Richardson and Wayne Winegarden, *A Better Alternative to More Coronavirus Stimulus Spending and Loan Programs*, Los Angeles: Reason Foundation, July 13, 2020. <https://reason.org/commentary/a-better-alternative-to-more-coronavirus-stimulus-spending-and-loan-programs/>

The point of any economic recovery policy at this time should be to empower a return to inclusive, robust, private free enterprise, not to deepen dependence on distortionary government spending and lending, which inevitably crowds out private investors and picks undeserving winners. Lenders of last resort should not be made the lenders of first resort. Central banks and governments should not replace private debt markets. Congress should seek to encourage private, not government, lending and investment.

Private, tax-exempt debt could help accomplish exactly that. Based on the current gap between similarly-rated taxable private bonds and tax-exempt government bonds, tax-exempt private bonds would drive down most firms' borrowing costs by around 30 percent. Tax-exempt private loans could reduce the cost of debt by up to 21 percent (the corporate income tax rate burden that we'd lift). Private, tax-exempt bonds and loans would offer a simple fiscal tool that firms, large and small, could use to drive down their costs of debt and to obtain affordable capital that could help them recover from the COVID-19 recession.

To address this we propose a temporary program that authorizes the issuance of private, tax-exempt CoVictory Bonds and Loans (CVBLs) for a two-year recovery period. This would be a far less expensive, more inclusive, and cost-effective stimulus package per dollar of new investment than the CARES Act. It would not be backed by, or spend, taxpayers' money.

If the tax-exempt program allows up to five-year loan terms, then, by our calculations, \$1 trillion of such debt would only reduce the government tax revenues by between \$30 billion to \$40 billion—without figuring in any added tax revenue from dynamic impacts. It costs way less to stimulate private, rather than government, investment. And from the taxpayer's perspective, simply forgiving the tax on interest costs is far less expensive or problematic than forgiving loan principal, as the CARES Act allows.

As World War II Victory Bonds did at that time, CoVictory Bonds and Loans could rally everyone—from mom and pop shops to big institutional investors—to help come together to privately finance a collaborative American victory over the COVID-19 recession.

What we're proposing here, and calling CoVictory Bonds and Loans, needs to be carefully distinguished from ordinary tax-exempt state and local debt, which at the simplest level encourages bigger government versus more free enterprise. It also needs to be differentiated, most importantly, from CARES Act federal lending, much more of which is definitely under consideration by Washington policymakers.

CONCLUSIONS

While the evidence regarding the short-term effects of fiscal stimuli in general are ambiguous, the long-term effects tend to be negative. So as a general rule, “stimuli” per se are not desirable. This is especially true for “stimuli” implemented by countries with high debt/GDP ratios, which is the case today in the United States.

When it comes to “green stimuli” the story is even worse. As Kaufman has noted:

Today, anyone who closely followed the climate debates of the early Obama administration may be having déjà vu, as the attention devoted to climate legislation in 2019 is diverted to a “green stimulus.” The specifics differ, because clean energy technologies are in a different place with a different set of needs, but proposals today draw from the same playbook as in 2009: subsidies for clean energy technologies, improvements to the electricity grid, “shovelready” infrastructure projects, and funding for building retrofits.⁸⁶

The evidence, as we have documented, shows that subsidizing such projects does not stimulate the economy. To the contrary, it is economically harmful. Subsidies crowd out more-productive investments, reducing the rate of innovation and economic growth, and lead to lower-paid, less-productive jobs at the expense of higher-paid, more-productive jobs. The consequences are far from trivial. A recent Hoover Institution study by economists

⁸⁶ Kaufman, “The Greenest Stimulus is One That Delivers Rapid Economic Recovery.” 5.

Timothy Fitzgerald, Kevin Hassett, Cody Kallen, and Casey B. Mulligan found that President Biden's "ambitious plans to further cut the nation's carbon emissions" would reduce total factor productivity by 1%-2%.⁸⁷



While COVID and the responses to it have had devastating economic consequences, and a plausible argument can be made for government providing restitution to businesses that were prevented from operating as a result of government actions, so-called "green" stimulus spending would be economically harmful and do little to protect the environment.



While COVID and the responses to it have had devastating economic consequences, and a plausible argument can be made for government providing restitution to businesses that were prevented from operating as a result of government actions, so-called "green" stimulus spending would be economically harmful and do little to protect the environment. It is likely that the only really effective "stimulus" is to reduce taxes on productive inputs, i.e. on capital and labor, while credibly committing to reduce future government spending. In addition, the tax base should be broadened by eliminating as far as possible distortionary tax deductions, incentives, rebates, and credits. In other words, policies that would actually stimulate the economy are almost the precise opposite of most of those proposed by advocates of green stimulus programs. If the commitment to reduce spending in the future is credible, individuals would perceive the change as an increase in their permanent income. This would result in increased spending and investment, leading to higher rates of innovation and economic growth, making the policy self-fulfilling. Moreover, the higher rates of economic growth would generate increased tax revenue, which would partly offset the reductions associated with reduced rates.

⁸⁷ Timothy Fitzgerald, Kevin Hassett, Cody Kallen, and Casey B. Mulligan, "An Analysis of Vice President Biden's Economic Agenda: The Long Run Impacts of Its Regulation, Taxes, and Spending," Hoover Institution, 2020.
https://www.hoover.org/sites/default/files/research/docs/president_bidens_economic_agenda_hassett.pdf



Perhaps as or more important than the removal of perverse taxes and subsidies is the removal of excessively burdensome restrictions on economic activity, which hinder investments in innovative technologies that have the potential to reduce the use of scarce natural resources and emissions to the environment.



Perhaps as or more important than the removal of perverse taxes and subsidies is the removal of excessively burdensome restrictions on economic activity, which hinder investments in innovative technologies that have the potential to reduce the use of scarce natural resources and emissions to the environment. Some of the proposals discussed herein do include elements of such deregulation—such as the proposal to expedite permitting for electricity grids and expediting environmental reviews for clean energy projects. But the same proposals advocate for all sorts of additional regulatory burdens that would likely more than offset the benefits of the deregulation.

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From 2011 to 2018, Morris was vice-president of research at Reason Foundation. From 2001 to 2010, he was executive director of International Policy Network and a visiting professor at the University of Buckingham. From 2004 to 2010, he ran the environment and technology programme at the Institute of Economic Affairs in London.

Morris graduated from Edinburgh University with a degree in economics and subsequently obtained Masters degrees from University College London and Cambridge University, and a law degree from the University of Westminster.

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APPENDIX A: THE PROPOSALS

A.1

PROPOSALS FROM ADVOCACY GROUPS AND ACADEMICS

A.1.1 THE PEOPLE'S BAILOUT

In March, a group calling itself The People's Bailout called for "an inclusive bailout, by and for the people."⁸⁸ The core of the group's demands is captured in this declarative statement:

The COVID-19 pandemic demands swift and unprecedented action from the federal government. The depth of the crisis and the scope of the response mean that choices being made right now will shape our society for years, if not decades to come. As policymakers take steps to ensure immediate relief and long-term recovery, it is imperative that they consider the interrelated crises of wealth inequality, racism, and ecological decline, which were in place long before COVID-19, and now risk being intensified. This is a time to be decisive in saving lives, and bold in charting a path to a genuinely healthier and more equitable future through a just recovery.

⁸⁸ "People's Bailout." *ThePeoplesBailout.org*, Sunrise Movement. <https://thepeoplesbailout.org/>

The People's Bailout is sponsored by 13 groups ranging from the environmental activist organization Greenpeace to the Service Employees International Union (SEIU) and progressive political action committee MoveOn. The group listed five principles by which it sought to achieve these goals, which broadly reflect the agenda of its blue-green alliance. Of particular relevance is Principle 4: "Make a down payment on a regenerative economy, while preventing future crises:"

*While we urgently need a large, short-term stimulus to protect the health and economic security of those on the front lines of the COVID-19 crisis, it is imperative that policymakers **also plan for a large, medium-term stimulus** to counteract the economic downturn and ensure a just recovery. This stimulus should **create millions of good, family-sustaining jobs** with high-road labor standards; counter systemic inequities by directing investments to the working families, communities of color, and Indigenous communities who face the most economic insecurity; and tackle the climate crisis that is compounding threats to our economy and health.*

*All three goals can be achieved simultaneously with public investments to **rebuild our infrastructure**, replace lead pipes, expand wind and solar power, **build clean and affordable public transit**, weatherize our buildings, build and repair public housing, manufacture more clean energy goods, restore our wetlands and forests, **expand public services that support climate resilience**, and support regenerative agriculture led by family farmers. Critically, stimulus packages should include conditions for industries to implement high-road labor standards, workforce development, and reductions in climate emissions and toxic pollution. The response to one existential crisis must not fuel another.⁸⁹*

A.1.2 A GREEN STIMULUS TO REBUILD OUR ECONOMY

On March 22, a group of 11 progressive advocates from academia, non-profit research organizations, and pressure groups co-authored an article on *Medium* entitled "A Green Stimulus to Rebuild Our Economy." As good environmentalists, they mostly recycled plans that had originally been developed by The People's Bailout, though their menu of policy interventions mainly focused on climate-change-related goals.

⁸⁹ Ibid.

The authors suggest a modest initial \$2 trillion stimulus and continued funding at 4% of GDP annually until, “the economy is fully decarbonized and the unemployment rate is below 3.5%.”⁹⁰ The range of issues the group addresses in these principles and related proposals is vast and includes:

- Housing, buildings, civic infrastructure, and communities
- Transportation workers, systems, and infrastructure
- Labor, manufacturing, and just transition for workers and communities
- Energy system workers and infrastructure
- Farmers, food systems, and rural communities
- Green infrastructure, public lands, and the environment
- Regulations, innovation, and public investment
- Green foreign policy

Of the proposals they advocate, those of most relevance are:

- Funding and subsidies for building retrofits and energy efficiency improvements
- Reforms and funding incentives to encourage higher-density development and affordable housing in proximity to transit systems
- Funding and subsidies for transit system maintenance, upgrades, and repairs
- Subsidies for domestic consumption and production of green vehicles and appliances
- Creation of a national clean energy standard to achieve 100% carbon-free energy by 2030
- Funding for deployment of clean energy sources and to support displaced workers in the fossil fuel industry

A.1.3 THE COLUMBIA PROPOSAL

On June 9, Noah Kaufman of Columbia University’s Center for Global Energy Policy published a proposal titled “The Greenest Stimulus is One That Delivers Rapid Economic

⁹⁰ Johanna Bozuwa, et al., “A Green Stimulus to Rebuild Our Economy,” *Medium.com*. 22 March 2020. https://medium.com/@green_stimulus_now/a-green-stimulus-to-rebuild-our-economy-1e7030a1d9ee

Recovery.”⁹¹ His underlying proposition is that the COVID-19 pandemic and the political response has caused an “output gap” that justifies a Keynesian fiscal intervention. Kaufman argues that such fiscal intervention should be timely, targeted, and temporary:

(1) timely, so benefits hit the economy quickly; (2) targeted, so funds are provided to the individuals and businesses most likely to spend it quickly; and (3) temporary, to minimize concerns about federal debt that could counteract the expansionary incentives of the stimulus. Following these best practices leads to spending with high “multipliers,” whereby the funds received by individual and businesses are rapidly spent again and again throughout the economy, creating an increase in economic activity that far exceeds the original spending. For instance, sending checks to lower-income households (instead of wealthier households) leads to a stimulus with higher multipliers because they are more likely to increase their spending as a result of the payments.

Kaufman then goes on to assert that:

There is no shortage of climate-friendly measures that satisfy best practices for economic stimulus, simultaneously creating temporary jobs and long-term value. Over three million Americans work in the energy efficiency, solar, wind, nuclear, and alternative fuel vehicle industries. These are among the country’s fastest growing sectors: over three-quarters of new electricity generating capacity comes from solar and wind energy. Even President Trump’s team—no fan of climate action—compiled a list of 50 shovel-ready infrastructure projects in 2017 that included at least 16 that could be described as climate friendly, including projects related to mass transit, transmission, grid modernization, and improved hydropower production.

Unlike the other proposals discussed, Kaufman emphasizes that “many categories of climate-friendly spending are critical for decarbonization plans but are not the best candidates for conventional economic stimulus legislation.”⁹² He still supports such measures—but does so as part of a longer-term plan to decarbonize the economy, and explicitly not as part of a “green stimulus.”

⁹¹ Kaufman, “The Greenest Stimulus is One That Delivers Rapid Economic Recovery,” 5.

⁹² “People’s Bailout.”

A.1.4 BUILD BACK BETTER, FASTER

In July, E2, E4TheFuture and BW Research Partners, a coalition of alternative energy businesses and environmental groups, published a report titled “Build Back Better, Faster” that calls for “a robust federal clean energy stimulus totaling \$99.2 billion—with targeted and strategic investments in energy efficiency, renewable energy, and grid modernization.”⁹³ The report claims that over five years, “such an investment in our shared future would create 860,300 full time direct, indirect and induced jobs that will last for at least five years (a total of 4.3 million job-years). A stimulus of this level and the jobs it would create would also generate more than \$66 billion in GDP each year for the next five years—resulting in \$330 billion in economic activity, more than triple the amount of investment. These are jobs that would support sustainable wages and help bring the U.S. economy out of the severe recession.”

Specifically, BBBF called for the following investments:

Energy Efficiency. \$60.7 Billion in Federal Stimulus Will Result In:

- *737,200 direct, indirect, and induced jobs each year for five years as a result of accelerating building energy efficiency upgrades and retrofits*
- *\$44.1 billion in total earnings or income each year for five years*
- *\$51.3 billion in overall added value to the national economy each year for five years*

Renewable Energy | \$13.1 Billion in Forgone Tax Revenue & Investments Will Result In:

- *50,000 in direct, indirect, and induced jobs per year for five years through the development of solar, wind, and other renewable energy generation projects*
- *\$1 billion in total tax revenues, including \$850 million in state and local taxes per year for five years*
- *\$7.6 billion in overall added value to the national economy each year for five years*

Grid Modernization | \$25.4 Billion in Federal Stimulus & Various Initiatives Will Result In:

- *73,100 direct, indirect, and induced jobs each year for five years*
- *\$5.3 billion in total earnings per year for five years*
- *\$7.2 billion in overall added value to the national economy each year for five years.*

⁹³ “Build Back Better, Faster.”

A.2

PROPOSALS FROM POLITICIANS

A.2.1 HOUSE DEMOCRATS' LETTER TO NANCY PELOSI AND KEVIN MCCARTHY:

On July 1st, 60 Democrat members of the House of Representatives signed a joint letter urging party leaders to address climate change in future stimulus legislation.⁹⁴ The letter outlined five principles for economic stimulus: investment in green jobs, environmental justice, stricter labor standards, environmental restoration, and a “Climate Test” to ensure that “all stimulus investments are consistent with keeping global warming as close as possible to 1.5 degrees Celsius.”

A.2.2 JOE BIDEN'S BUILD BACK BETTER PLAN

In July, President (and then-presidential candidate) Joe Biden released a \$2 trillion “Build Back Better” plan that aims to simultaneously stimulate the economy and achieve net-zero emissions no later than 2050 and a carbon pollution-free power sector by 2035.⁹⁵ The plan includes investment in infrastructure, the auto industry, energy, housing, and building standards.

Infrastructure:

- Leverage existing federal grant and loan programs to spark a “second great railroad revolution” that will “reduce pollution, connect workers to good union jobs, slash commute times, and spur investment in communities that will now be better linked to major metropolitan areas”
- Provide all Americans in municipalities of more than 100,000 people with public transportation by 2030, including through subsidies to light rail, buses, cycling, and micro-mobility vehicles
- Upgrade and repair water and wastewater infrastructure

⁹⁴ Rep. Barragán, Nanette Diaz., et al. Letter to Speaker Pelosi and Minority Leader McCarthy: 1 July 2020. <https://barragan.house.gov/wp-content/uploads/2020/07/2020-07-01.Green-Stimulus-Letter-Final.pdf>

⁹⁵ “The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future.” <https://joebiden.com/clean-energy/>

- Conserving and restoring wetlands
- Expand broadband access to every American

Auto Industry: “Create 1 million new jobs in the American auto industry, domestic auto supply chains, and auto infrastructure, from parts to materials to electric vehicle charging stations, positioning American auto workers and manufacturers to win the 21st century; and invest in U.S. auto workers to ensure their jobs are good jobs with a choice to join a union.” Specifically:

- Procure American-made “clean” vehicles for federal, state, tribal, postal, and local fleets
- Provide rebates to consumers to incentivize purchases of American-made “clean” vehicles
- Install 500,000 electric vehicle charging stations
- “Accelerate research on battery technology and support the development of domestic production capabilities”
- Convert all school buses to American-made zero-emissions buses
- Establish “ambitious” fuel economy standards based on negotiations with workers and their unions, environmentalists, industry, and states

Energy: “Move ambitiously to generate clean, American-made electricity to achieve a carbon pollution-free power sector by 2035. This will enable us to meet the existential threat of climate change while creating millions of jobs with a choice to join a union.” Specifically:

- Tax incentives for promote clean energy
- Leverage carbon-pollution free energy sources like nuclear and hydropower.
- Upgrade electrical grids by cutting regulations to expedite permitting and take advantage of existing rights of way
- Invest in carbon capture and sequestration technologies

Housing and building standards: “Upgrade 4 million buildings and weatherize 2 million homes over 4 years, creating at least 1 million good-paying jobs with a choice to join a union; and also spur the building retrofit and efficient-appliance manufacturing supply chain by funding direct cash rebates and low-cost financing to upgrade and electrify home

appliances and install more efficient windows, which will cut residential energy bills.” Specifically:

- Upgrade four million commercial buildings to improve efficiency
- Rebates and low-cost financing to electrify home appliances and install more efficient windows
- Establish stricter building performance standards and impose a net-zero emissions standard for all new commercial buildings by 2030
- Construct 1.5 million new energy efficient homes and public housing units
- Upgrade public school buildings to address environmental health risks and improve energy efficiency.

A.2.3 SOME SENATE REPUBLICANS SUPPORT BBBF PROPOSAL

In July, a group of seven Republican senators cosigned a letter to Senate Majority Leader Mitch McConnell advocating for the inclusion of clean energy funding in future COVID relief legislation.⁹⁶ They specifically cited the BBBF proposal, repeating its assertion that the clean energy sector had been particularly hard-hit by the pandemic, and advocated for the policies discussed in that proposal, including investments in renewables, nuclear, carbon capture, energy efficiency, advanced transportation, and energy storage. The senators claimed that federal investment in clean energy would sustain that growth, generate “strong taxpayer returns,” and create new jobs.

⁹⁶ Rep. Tom Tillis, et al., Letter to Majority Leader McConnell: 23 July 2020. <https://assets.documentcloud.org/documents/7001051/Senate-Letter-7-23-20.pdf>

APPENDIX B: ELECTRIC VEHICLE TAX INCENTIVES

Table B1 compares pairs of similar vehicles.⁹⁷ Where possible, vehicles from the same manufacturer were used; that was not possible in the case of the Tesla Model 3, so we chose a Honda Accord Hybrid E-XL, which is a similar size to the Tesla and has many similar higher-end attributes (the big differences, apart from the drivetrains, are that the Tesla has much higher torque and hence more rapid acceleration, but the Honda has a much longer range—over 600 miles on one tank of fuel, compared to the Tesla’s 250 miles on one charge). To simplify the comparison, we used an estimate of the monthly payment on the vehicles and estimates of the average combined fuel economy and, for the electric vehicles, fuel economy equivalent produced by [thecarconnection.com](https://www.thecarconnection.com), and we used the current U.S. average gas price (\$2.17/gallon). We then looked at three alternative scenarios regarding the annual mileage driven: 10,000, 15,000, or 20,000 miles.

⁹⁷ Cost comparisons from: https://www.thecarconnection.com/car-compare-results/bmw_8-series_2019-vs-bmw_i8_2019; https://www.thecarconnection.com/car-compare-results/audi_e-tron_2019-vs-audi_q8_2019?trims=404328,402976; https://www.thecarconnection.com/car-compare-results/honda_accord_2020-vs-tesla_model-3_2020?trims=411359,416485

As can be seen, in the 10,000 and 15,000 mile/years scenarios, the conventional (or in the case of the Honda, hybrid) vehicles had a lower total annual cost. Only if the vehicles are driven 20,000 miles or more would consumers likely experience cost savings by purchasing an electric vehicle. Since on average Americans drive about 11,000 miles per year, for most Americans it would not make sense to purchase an electric vehicle. As Table B2 shows, even if the average gas price were to rise to \$3/gallon, the conventional or hybrid vehicle is still better value for people who drive less than about 15,000 miles a year.

TABLE B1: VEHICLE COST COMPARISON AT A GAS PRICE OF \$2.17/GALLON

Model	Price*	Monthly payment	Energy cost/100 miles	Total Annual Cost		
				10,000 miles	15,000 miles	20,000 miles
BMW 8	\$113,400	\$2,023	\$10.85	\$25,361	\$25,904	\$26,446
BMW i8	\$137,675	\$2,458	\$3.15	\$29,810	\$29,968	\$30,125
Audi Q8	\$63,356	\$1,123	\$12.06	\$14,682	\$15,284	\$15,887
Audi e-tron	\$70,312	\$1,247	\$2.93	\$15,257	\$15,404	\$15,550
Honda Accord Hybrid E-XL	\$32,170	\$536	\$4.52	\$6,884	\$7,110	\$7,336
Tesla Model 3 Standard	\$35,000	\$583	\$1.66	\$7,162	\$7,244	\$7,327

TABLE B2: VEHICLE COST COMPARISON AT A GAS PRICE OF \$3/GALLON

Model	Price*	Monthly payment	Energy cost/100 miles	Total Annual Cost		
				10,000 miles	15,000 miles	20,000 miles
BMW 8	\$113,400	\$2,023	15.00	\$25,776	\$26,526	\$27,276
BMW i8	\$137,675	\$2,458	4.35	\$29,931	\$30,148	\$30,366
Audi Q8	\$63,356	\$1,123	16.67	\$15,143	\$15,976	\$16,809
Audi e-tron	\$70,312	\$1,247	4.05	\$15,369	\$15,572	\$15,775
Honda Accord Hybrid E-XL	\$32,170	\$536	6.25	\$7,057	\$7,370	\$7,682
Tesla Model 3 Standard	\$35,000	\$583	2.29	\$7,225	\$7,340	\$7,454

*Prices are “invoice” prices for all vehicles except the Honda Accord and Tesla Model 3, for which MSRP is used because invoice prices were not given for the Tesla.

Federal EV credits are limited to 200,000 vehicles per manufacturer. Tesla reached that limit in 2019, so in principle it now competes unsubsidized with other vehicles. However, numerous states still offer large subsidies to EVs. But in spite of these subsidies, Tesla sold a total of only 192,250 vehicles in the U.S. in 2019, giving it a market share of 1.12%, almost identical to its 2018 market share.⁹⁸ Meanwhile, in 2019, Honda sold 267,570 Accords in the U.S. alone.

⁹⁸ Krzysztof Wozniak, "Tesla Sales Data & Trends for the U.S Automotive Market," *CarSalesBase.com*.
<https://carsalesbase.com/us-tesla/>

