What the Green New Deal Could Cost a Typical Household

A Framework to Estimate the Minimum Costs to Restructure American Society According to the Green New Deal for Five States

By Daniel Turner and Kent Lassman[*]

In early 2019, a handful of progressive Democrats galvanized their party around a set of ideas that—even if only partially implemented—would restructure vast areas of the American economy and radically refashion the American household with large and ongoing costs.

This set of proposals, called the Green New Deal (GND)—introduced in the 116th Congress as H. Res. 109 and S. Res. 59—has earned attention, depending on the source of commentary, either as an instrument of effective leadership for the 21st century or as an unserious ideological signaling exercise. In either case, it is difficult to read as a set of genuine policy proposals; it is perhaps better described as a far-reaching, aspirational set of guideposts for a resurgent progressive force in American politics.[1]

The GND actually has a long progressive pedigree. It was championed by statewide and national Green Party candidates for governor and president as early as 2006. Presidential candidate Jill Stein gave it prominence in 2012. The GND attracted early attention from scores of Democrats including nine presidential candidates and 12 United States Senators. In response, Republicans pushed for a vote on the GND in the Senate that failed to attract a single vote from Democrats, including the resolution's 12 cosponsors.[2]

While this paper focuses on the energy components of the GND, among other features, the GND would guarantee "a job with a family-sustaining wage, adequate family and medical leave, paid vacations, and retirement security" as well as high-quality health care, affordable and safe housing, affordable food, and access to nature. In a word, it promises a utopia.

At its root, the Green New Deal is a radical blueprint to de-carbonize the American economy. Carbon—whether contained in wood, coal, gas, or oil—is a byproduct of burning fuel. Eliminating these energy sources would have massive ramifications for the economy.

Regardless of its authors' intentions, our aim here is to examine the relative trade-offs associated with taking significant portions of the GND seriously. What would it actually mean to implement significant portions of proposal? Can we understand the effects at a household level in different regions of the country?

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To that end, the following analysis examines the transformation of electricity production, transportation and elements of shipping, as well as construction in five representative states that implementation of the GND would necessitate. It requires a considerable number of assumptions that we share in order to allow the reader to come to his or her own conclusions about the merits of the GND compared to alternative uses of scarce societal resources.

The sum of our analysis is not favorable for the GND's advocates. At best, it can be described as an overwhelmingly expensive proposal reliant on technologies that have not yet been invented. More likely, the GND would drive the American economy into a steep economic depression, while putting off-limits affordable energy necessary for basic social institutions like hospitals, schools, clean water and sanitation, cargo shipments, and the inputs needed for the production and transport of the majority of America's food supply. We do not include in this analysis estimates of the cost of the non-energy components of the GND. Those costs might dwarf the energy-related costs by an order of magnitude.

For each of five states, we provide a range of estimated costs as well as a best estimate.

Findings

At a minimum, the GND would impose large and recurring costs on American households.[3] We conclude that in four of the five states analyzed—Florida, New Hampshire, New Mexico, and Pennsylvania—the GND would cost a typical household more than $70,000 in the first year of implementation, approximately $45,000 for each of the next four years, and more than $37,000 each year thereafter. In Alaska, estimated costs are much higher: more than $100,000 in year one, $73,000 in the subsequent four years, and more than $67,000 each year thereafter.

Sum of Household Costs

State	Year 1 Household Costs	Annual Household Costs Years 2-5	Annual Household Costs Years 6 and Ever After
Alaska	$100,505	$73,092	$67,536
Florida	$73,010	$45,597	$37,832
New Hampshire	$72,463	$45,050	$37,454
New Mexico	$71,910	$44,497	$37,977
Pennsylvania	$72,439	$45,026	$38,506

Methodology

While the Green New Deal is a wide-ranging proposal, it ultimately amounts to an imposition of a significant set of constraints on the energy sector. At present, Americans consume energy from many different resources. In general, fossil fuels and some renewable fuels directly power most transportation, and much of the equipment in the industrial, commercial, and household sectors. The GND would likely reduce the net energy consumption by these sectors while shifting all energy demand either to the electric grid or toward self-contained renewable sources like solar panel arrays designed to power particular units. Implementation of the GND would shift energy consumption entirely to electric current from today's primary sources, including fossil fuels.

Benjamin Zycher of the American Enterprise Institute has analyzed the cost of electricity under the GND.[4] His study looks at current electricity generation and estimates what it would cost to replace all non-GND compliant electricity generation—such as coal, natural gas, petroleum, and nuclear—with wind and solar power. Zycher also looks at the cost of emissions, transmission, backup power, and land for the replacement capacity.

Zycher's analysis is understated because it does not calculate additional demand for electricity—the dynamic effects of policy changes—that would obtain as a result of GND implementation. Zycher's low-end estimate addresses the transformation of current power generation to GND power. Of course, other provisions of the GND would generate significant demand increases. In addition, Zycher's cost estimates extend indefinitely and would affect American households far into the future.

Energy research firm Wood Mackenzie estimates that the greening of the U.S. power sector would cost approximately $35,000 per household and take 20 years.[5] Wood Mackenzie estimate a total price tag of some $4.7 trillion, including around $1.5 trillion to add 1,600 gigawatts of wind and solar capacity and $2.5 trillion of investments in 900 gigawatts of storage. Another $700 billion is estimated for new high transmission power lines to move that electricity from sun-drenched deserts and windswept plains to the urban areas where it would be used.

Most provisions of the GND are so broad and open-ended that the list of potential programs necessary to implement the program is limited by the capacity of legislators to imagine a new government program. Therefore, it is impossible to calculate the whole or maximum cost of the GND. However, other parts of the GND are more precise, sufficiently so that an approximate minimum cost estimate is available.

In addition to increased costs due to electric generation compliant with the GND renewable mandate, the GND calls for:

1. The elimination of "pollution and greenhouse gas emissions from the transportation sector as much as is technologically feasible;"
2. "[U]pgrading all existing buildings in the United States and building new buildings to achieve maximal energy efficiency, water efficiency, safety, affordability, comfort, and durability, including through electrification;"[6]
3. Where technologically feasible, the elimination of the use of fossil fuels and other combustible, greenhouse gas-emitting energy sources.

This study evaluates the estimated cost of the GND in four specific categories across five model states. The categories are:

1. Additional electricity demand;
2. Costs associated with shipping and the logistics industry;
3. New vehicles; and
4. Building retrofits.

These cost estimates were made with the available data and analysis. However, they are only low-end approximations given the unprecedented scope of the GND. A key source, in addition to Zycher's analysis, was produced in early 2019 by Douglas Holtz-Eakin and Dan Bosch of the American Action Forum.[7] Of interest for our analysis, Holtz-Eakin and Bosch estimate the costs of a "low-carbon electricity grid" (at $5.4 trillion versus Zycher's $8.95 trillion annual expenditures) as well as the costs of a zero-emission transportation system, and a national policy for "green housing."

Taken together and married to our own analysis, these estimates develop a floor of expectations for the costs associated with the implementation of the GND in the near and intermediate term.

The five selected states demonstrate diverse climates, geography, economies, and populations.

- Alaska is a remote, sparsely populated, and cold state.
- Florida is one of the largest states in terms of population and economy, undoubtedly the economic powerhouse of the Southeast, in a warm climate.
- New Hampshire is a small state that is well connected with larger economies in the region in a cold climate.
- New Mexico is a small state in terms of population, but large geographically, is generally warmer, and is situated between significant large states by all metrics.
- Pennsylvania is a large state in terms of geography, economy, and population in a mild-colder climate and is well integrated with the largest regional economy in the United States.

Previous Analysis

Evaluating the impact of the GND in these states will provide a glimpse into the proposal's broader national impact and information similar states can use to infer their own cost estimates.

As shown in Figure 1, earlier analyses provide a range of new, annual costs expected for each household in each of our states from a low-end $24,820 in New Hampshire to upward of $89,000 in all our states. These estimates cover only three aspects of the GND proposals and do not include the dynamic effects of increased demand on the power grid, for example, from a fleet of electric cars or the transformation of all automobiles to zero-emission vehicles.

The cost estimates for the power grid and transportation system do not include the costs necessary to replace or retrofit machinery currently dependent on fossil fuels or other combustibles. Such an estimate would require an inventory of every machine of this type in the country, from propane-powered forklifts to natural gas stoves to diesel-powered tugboats, as well as cost estimates of all replacement technology capable of being indirectly powered by wind and solar and necessary to achieve parity in terms of their ability to perform the same work. Therefore, not counted in this analysis are road-building and maintenance equipment, tractors and other farm equipment, or the standard tools of heavy construction for, among other things, new buildings, windmills, solar and other alternative energy facilities.

Figure 1. Previous Estimates Produce Range of New Annual Household Costs – Electric Power, Transportation, Housing

State	Millions of Households[8]	Annual Household Costs – Zycher GND Power System	Wood Mackenzie – 20 Year Annual Cost for GND Power	Holtz-Eakin and Bosch Power System[9]	Holtz-Eakin and Bosch Net-Zero Emission Transportation (High Speed Rail)	Holtz-Eakin and Bosch Green Housing	Range of New Household Costs from Previous Analyses
Alaska	.25m	Not Available	$35,000	$39,000	$9,000 - $20,000	$12,000 - $30,000	$60,000 - $89,000
Florida	7.69m	$4,273	$35,000	$39,000	$9,000 - $20,000	$12,000 - $30,000	$25,273 - $89,000
New Hampshire	.53m	$3,820	$35,000	$39,000	$9,000 - $20,000	$12,000 - $30,000	$24,820 - $89,000
New Mexico	.77m	$4,508	$35,000	$39,000	$9,000 - $20,000	$12,000 - $30,000	$25,508 - $89,000
Pennsylvania	5.01m	$4,549	$35,000	$39,000	$9,000 - $20,000	$12,000 - $30,000	$25,549 - $89,000

Shipping and Logistics

Modern America is reliant upon global, hemispheric, and regional trade. Local economies (beyond a handful of experimental communities) exchange goods and services. We build, dig, grow, and ultimately ship things and it requires a great deal of energy to do so.

An estimate for the cost of the GND proposals on shipping and logistics starts with data on goods shipped to each of the model states by transportation methods for which we have data. However, basic economic theory suggests that due to increased costs for GND-compliant shipping, an elasticity of demand would reduce the use of these technologies, as higher prices drive away consumers. While this could inflate our estimates, we are confident that the costs for development and deployment of substitute shipping technologies far outweigh reduced demand for traditional shipping even after the expense of retrofitting it to the GND.

Our estimates exclude air cargo and relies exclusively on trucking, rail, and barge traffic for which data are available. The exclusion of air cargo would effectively eliminate the availability of off-season produce, the timely delivery of FedEx and Amazon packages and a great deal of U.S. mail delivery. Relative comparisons are made between current costs and estimated GND compliant costs by evaluating energy intensity of the total shipping in terms of BTUs.[10]

The Center for Transportation Analysis's Freight Analysis Framework database provides information on total ton-miles of freight by shipping mode by destination state.[11] These ton-miles also exclude any freight that is not GND-compliant, such as shipments of oil or coal.

Figure 2. Mode-Exclusive Million Ton-Miles by Destination State by Mode, Excluding Non-GND Compliant Freight (2017)

State	Trucking Ton-Miles	Rail Ton-Miles	Barge Ton-Miles
Alaska	2,506.9311	0.2459	1,068.5184
Florida	7,8737.1894	1,6593.0234	660
New Hampshire	4,216.5778	276.3823	N/A
New Mexico	10,142.5379	1,974.8886	N/A
Pennsylvania	62,771.9956	20,774.6559	1,933.3569

We assume that nearly all freight delivered to these states is through a combination of these modes or via air cargo. However, air cargo is not specified in the available data and therefore we assume no costs for bringing air cargo shipments into compliance with the GND. As a result, the cost estimates presented here are significantly lower than the likely costs.

The BTU intensity per ton-mile for trucking, rail, and barge traffic is drawn from an analysis by the U.S. Department of Energy.[12] Trucking is approximately four to five times as energy intensive as rail or barge (1,390 BTU per ton-mile for trucking versus 320 and 225 for rail or barge.)

The combination of ton-miles in Figure 2 with BTU intensity by mode gives us an estimate for the total annual energy consumption, in BTUs, for freight delivered to each model state for each mode of shipping. Figure 3, relying upon an estimate from the University of Pennsylvania for $32.24 for the production of a million BTUs from renewable sources, provides an estimate for increased shipping fuel costs due to GND implementation.[13] For purposes of illustration, we assume an extraordinary technological improvement in the development of renewable energy and have halved the cost estimate of a million BTUs to $16.12.

Figure 3. Mode-Exclusive Shipping Energy Consumed in Million BTUs (2017) and Annual Household Costs

State	Trucking BTUs (Millions)	Rail BTUS (Millions)	Barge BTUs (Millions)	Total BTUs (Millions)	Cost (Total BTUs x $16.12/million)	Cost Per Household
Alaska	3,484,634	78.688	240,416.6	3,725,129	$60 million	$240
Florida	109,444,693	5,309,767	148,554.7	114,903,015	$1.85 billion	$241
New Hampshire	5,861,043	88,442.34	0	5,949,485	$95.9 million	$181
New Mexico	14,098,128	631,964.4	0	14,730,092	$237.5 million	$308
Pennsylvania	87253074	6,647,890	435,005.3	94,335,969	$1.52 billion	$303

New Vehicles

A key pillar of the GND is replacing all existing combustible-powered vehicles with electric vehicles (EVs). Current projections are for EVs to be, on average, more costly than conventional vehicles. EV prices, like conventional gas vehicle prices, will also vary based on size and features. Perhaps the most critical differentiating feature for the near term is the type of battery available for the vehicle. EVs that charge faster and have a longer range will undoubtedly fetch higher market prices. However, for the purposes of our analysis, a conservative estimate for EV costs to consumers is used. The price of $39,500 is in line with the base MSRPs of the most popular EVs sold today.[14] To control for existing EVs, a ratio of 2.21 EVs per 1,000 residents is used to calculate total EVs in each state.[15]

Commercial cargo trucks are a different matter. There has not yet been similar adoption of EV technology in trucking. Further, prices of EV trucks are largely speculative at this time. For illustrative purposes (though not included in our analysis or conclusions), the prospective list price of an electric semi-tractor from Tesla is $180,000.[16] Needless to say, this price is speculative and in these five states there are more than 15 million commercial trucks on the road today. While the economic effects of the GND must account for commercial vehicles, our analysis does not include them, and is therefore a conservative estimate of new vehicle costs. However, a partial accounting is made for truck freight in the shipping analysis above.

These costs are just upfront purchase price seen by consumers. EVs will also impose costs through the necessary infrastructure retrofits to have sufficient charging capacity for these vehicles at homes, businesses, and other public places, each of which will cost many thousands of dollars.

Figure 4. Annual Cost of Replacing Existing non-GND Compliant Vehicles with Electric Vehicles

State	Total Cars	Total Non-GND Cars	Annualized Cost per EV For Each of Initial Five Years of Ownership[17]	Total Cost Per State to Immediately Replace Existing Fleet of Personal Vehicles	Annual Average Household Cost for Personal Vehicle Conversion
Alaska	183,259	181,629	$7,647	$1,388,917,000	$5,556
Florida	7,855,250	7,808,178	$7,647	$59,709,100,000	$7,765
New Hampshire	529,491	526,493	$7,647	$4,026,092,000	$7,596
New Mexico	661,197	656,566	$7,647	$5,020,760,000	$6,520
Pennsylvania	4,640,471	4,612,167	$7,647	$35,269,200,000	$7,040

Building Retrofits

The GND calls for maximum building efficiency. It explicitly envisions the retrofit of the current stock of structures in America. In the construction industry, retrofits of this kind are known as deep energy retrofits (DERs). The cost of a DER can vary considerably, given varying climates, building ages, uses, sizes, and other factors. A 2014 meta-analysis relied upon by the Department of Energy is the basis for our assumptions about residential construction. The average cost per a unit of housing for a DER is estimated at $40,420.[18] The maximum average cost of a DER for commercial buildings is estimated at $75 per square foot.[19]

Almost no data are readily available regarding industrial DERs, so we rely upon assumptions made in the underlying analyses. Therefore, we use an average maximum cost for large commercial buildings, $150 per square foot, as an estimated cost for industrial DERs.[20]

State-by-state data for total building square footage is also scarce. For this study, energy consumption totals per sector divided by average energy consumption per square foot, both in BTUs, determined total square footage in each model state. Consumption per square foot was not readily available for industrial buildings, so a modest increase in consumption per square foot was assumed over commercial buildings in order to derive total industrial square footage.

Data from the Energy Information Administration (EIA) show that energy consumption per square foot in 2015 was 38,400 BTUs for residences and 82,000 BTUs for commercial buildings.[21] Industrial consumption per square foot was assumed at 100,000 BTUs, given the increase in BTU consumption per square foot from residential to commercial.

Combining these figures with total 2016 energy consumption in BTUs per sector, obtained from EIA's state-by-state database,[22] produced estimates of total active square footage of buildings across all sectors.

Figure 5. Residential, Commercial, and Industrial Square Footage[23]

State	Residential Consumption in Million BTU	Residential Square Footage	Commercial Consumption in Million BTU	Commercial Square Footage	Industrial Consumption in Million BTU	Thousands of Industrial Square Feet
Alaska	38,800,000	1,010,416,667	42,800,000	521,951,220	320,900,000	3,209,000
Florida	478,300,000	12,455,729,167	449,700,000	5,484,146,341	393,500,000	3,935,000
New Hampshire	63,700,000	1,658,854,167	39,900,000	486,585,366	27,000,000	270,000
New Mexico	71,700,000	1,867,187,500	62,900,000	767,073,171	171,400,000	1,714,000
Pennsylvania	531,700,000	13,846,354,167	345,500,000	4,213,414,634	1,001,900,000	10,019,000

The total cost of implementing a DER for all existing buildings in the United States is estimated via two methods. For residential, total DER cost is calculated by obtaining census data on total housing units in each state in 2018 and multiplying this figure by the average residential unit DER cost of $40,420.[24] For commercial and industrial buildings, the average DER cost is obtained by multiplying estimated and assumed DER costs for commercial and industrial buildings, respectively, by total estimated square footage.

Figure 6. DER Investments under GND

State	Residential Units	Total DER Cost ($40,420/ unit)	Commercial (Sq. Ft.)	Cost ($75/ Sq. Ft.)	Thousands of Industrial Sq. Ft.	Cost ($150 per Sq. Ft.)
Alaska	318,336	$12,867,141,120	521,951,220	$39,146,341,463	3,209,000	$481,350,000,000
Florida	9,547,305	$385,902,068,100	5,484,146,341	$411,310,975,610	3,935,000	$590,250,000,000
New Hampshire	638,091	$25,791,638,220	486,585,366	$36,493,902,439	270,000	$40,500,000,000
New Mexico	943,208	$38,124,467,360	767,073,171	$57,530,487,805	1,714,000	$257,100,000,000
Pennsylvania	5,713,150	$230,925,523,000	4,213,414,634	$316,006,097,561	10,019,000	$1,502,850,000,000

Critically, the discussion of this paper is about the cost of transition to GND structures. Clearly, any benefits realized from more energy efficient buildings would reduce future operating costs and emissions.

Taken together, the estimated costs for retrofitting current residential, commercial, and industrial buildings is astronomical. Of our representative states, Alaska has the fewest residential structures and other square footage by orders of magnitude.

Yet, the combined investments to upgrade residential, commercial, and industrial building stock is a mind-boggling $533.4 trillion. (See Figure 7.) Therefore, for the purposes of public education, the key figure is the average cost of a DER for residential homes, $40,420.

Figure 7. Total DER Investments by Household

State	Residential DER Costs	Commercial DER Costs	Industrial DER Costs	Total DER Investments ($million)
Alaska	$12,867,141,120	$39,146,341,463	$481,350,000,000	$533,363
Florida	$385,902,068,100	$411,310,975,610	$590,250,000,000	$1,387,463
New Hampshire	$25,791,638,220	$36,493,902,439	$40,500,000,000	$102,786
New Mexico	$38,124,467,360	$57,530,487,805	$257,100,000,000	$352,755
Pennsylvania	$230,925,523,000	$316,006,097,561	$1,502,850,000,000	$2,049,782

Summary and Synthetic Estimates for Robustness

Figures 8, 9, and 10 summarize the findings of this study in order to put in context the tremendous costs of the GND. As a final set of calculations, we created synthetic estimates for the variables where multiple analyses exist: the household costs for the electric grid, electric vehicles, and retrofitting the nation's housing stock to comply with the GND.

Zycher's analysis varies by state for the electric grid, while Holtz-Eakin and Bosch offer a national average of $39,000 and Wood Mackenzie finds a national average of $35,000. The first synthetic variable, Synthetic Grid Estimate, takes the average of these three figures. For Alaska, only the latter two estimates are averaged; Zycher did not offer an estimate. For example, in Florida, Zycher estimates $4,273, Wood Mackenzie estimates $35,000, and Holtz-Eakin and Bosch estimate $39,000. The average or combined estimate is the sum of the figures divided by three, $23,091.

We present our own estimate to transform the auto fleet to EVs and include a range of likely expenses from Holtz-Eakin and Bosch for shifting the nation to high-speed rail. The synthetic transportation estimate is the mid-point of the range for high-speed rail combined with the household EV costs.

We also created a synthetic estimate for housing using the average DER cost of $40,240 and the range of likely outcomes found by Holtz-Eakin and Bosch of $12,000 to $30,000. Because there is no state variability in the data, the synthetic housing estimate is $27,413.

Figure 8. Average Household Costs

State	Annual Average Household Cost to Green Electric Power	Annual Average Shipping Cost Per Household	Annual Average Household Cost to Convert to EV – Authors' Estimate[25]	Holtz-Eakin and Bosch et. al. Estimate of Zero-Emission Transportation – Annual Cost for High-Speed Rail	Average Residential DER One-Time Cost	Holtz-Eakin and Bosch et. al. Green Housing Estimate – One-Time Cost
Alaska	$35,000 to $39,000	$240	$5,556	$9,000 to $20,000	$40,240	$12,000 to $30,000
Florida	$4,273 to $39,000	$241	$7,765	$9,000 to $20,000	$40,240	$12,000 to $30,000
New Hampshire	$3,320 to $39,000	$181	$7,596	$9,000 to $20,000	$40,240	$12,000 to $30,000
New Mexico	$4,508 to $39,000	$308	$6,520	$9,000 to $20,000	$40,240	$12,000 to $30,000
Pennsylvania	$4,549 to $39,000	$303	$7,040	$9,000 to $20,000	$40,240	$12,000 to $30,000

The synthetic estimates, when combined with the estimate for increased shipping expenses, produce a single figure for households in each state for the initial year of implementation. For each of the next four years, the household costs would fall by $27,413, the amount to implement a DER for every home. After five years, the expense associated with converting each household to EVs would fall away.

While it is not possible to express absolute confidence in the estimated costs for these provisions of the GND, the use of synthetic estimates reduces the risk of any one type of analysis skewing the results. Critics will undoubtedly highlight the variance in the data. However, variance is not a detriment when analyzing such a sweeping set of proposals. Rather, it is a mark of humility. Further, we contend that the conclusions drawn here are extremely modest, representing only the energy-related costs. The GND calls for universal health care and guaranteed employment among other social policies that would have tremendous transition costs.

Figure 9. Synthetic Estimates and Best Estimate of Household Costs

State	Annual Synthetic Grid Estimate	Annual Transportation Estimate – EV and High-Speed Rail	Synthetic Housing Estimate	Annual Average Shipping Cost Per Household	First Year Implementation Best Estimate to Transition Power, Shipping, Transportation and Construction to GND
Alaska	$52,796	$20,056	$27,413	$240	$100,505
Florida	$23,091	$22,265	$27,413	$241	$73,010
New Hampshire	$22,773	$22,096	$27,413	$181	$72,463
New Mexico	$23,169	$21,020	$27,413	$308	$71,910
Pennsylvania	$23,183	$21,540	$27,413	$303	$72,439

Figure 10. Sum of Average Household Costs

State	Year 1 Household Costs	Annual Household Costs Years 2-5	Annual Household Costs Years 6 and Ever After
Alaska	$100,505	$73,092	$67,536
Florida	$73,010	$45,597	$37,832
New Hampshire	$72,463	$45,050	$37,454
New Mexico	$71,910	$44,497	$37,977
Pennsylvania	$72,439	$45,026	$38,506

Conclusion

The Green New Deal is a plan to radically reshape the American economy and the landscape of a household economy. Every aspect of how we live and work would be affected by the proposal. The preponderance of goods essential for agriculture, transportation, and construction would be replaced. In short, it is not realistic. However, national political figures and perhaps even a growing movement of fellow citizens would like to implement it as a policy agenda.

All of the potential benefits, and social costs—such as massive increases in land use for the production of energy and food without fossil fuel inputs—are beyond the scope of this analysis. Yet we can conclude that the Green New Deal is an unserious proposal that is at best negligent in its anticipation of transition costs and at worst is a politically motivated policy whose creativity is outweighed by its enormous potential for economic destruction.

Notes

[1] Recognizing the duty of the Federal Government to create a Green New Deal, H.R. 109/S. 59, 116th Congress, https://www.congress.gov/bill/116th-congress/house-resolution/109/text, https://www.congress.gov/bill/116th-congress/senate-resolution/59?q=%7B%22search%22%3A%5B%22green+new+deal%22%5D%7D&s=2&r=3.
[2] Vote summary, "On the Cloture Motion (Motion to Invoke Cloture on the Motion to Proceed to S.J. Res. 8 , Vote Number 52, 3/5 Vote Result: Cloture Motion Rejected March 26, 2019, 04:18 PM, https://www.senate.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?congress=116&session=1&vote=00052#top.
[3] Benefit-cost estimates rely on net present value (NPV) to provide analysts a tool to see how various benefits or costs change over time. Similarly, robust cost estimates utilize NPV analysis and costs are calculated as negative, future cash-flows. The various elements of the GND – from changes in housing stock, to vehicles, to the electric grid – would all require specialized and differing discount rates to find the NPV. This analysis is a composite of others' work as well as our own estimates and there is no single discount rate available that is sensible for either the component parts of the GND or the other cost estimates. As a result, we did not discount future costs. Admittedly, this may overestimate the effects of the GND in the out years but we are confident that the magnitude of the estimated costs are not affected by minor variances in discount rates or the NPV for the GND.
[4] Benjamin Zycher, *The Green New Deal: Economics and Policy Analytics*, American Enterprise Institute, 2019, https://www.aei.org/wp-content/uploads/2019/04/RPT-The-Green-New-Deal-5.5x8.5-FINAL.pdf.
[5] Nichola Groom, "Weaning U.S. power sector off fossil fuels would cost $4.7 trillion: study," Reuters, June 27, 2019, https://www.reuters.com/article/us-usa-carbon-report/weaning-u-s-power-sector-off-fossil-fuels-would-cost-4-7-trillion-study-idUSKCN1TS0GX.
[6] H.R.109.
[7] Douglas Holtz-Eakin, Dan Bosch, Ben Gitis, Dan Goldbeck, and Philip Rossetti, The Green New Deal: Scope, Scale, and Implications, American Action Forum, February 25, 2019, https://www.americanactionforum.org/research/the-green-new-deal-scope-scale-and-implications/.
[8] With 126.22 million households in the United States in 2017. "Number of households in the United States in 2017, by state (in millions)," Statista, https://www.statista.com/statistics/242258/number-of-us-households-by-state/.
[9] Holtz-Eakin and Bosch provide national estimate and an average household estimate. Presented here is the household estimate.
[10] A British thermal unit is a unit of measure for energy. One million BTUs is enough to dry about 50 loads of laundry.
[11] Freight Analysis Framework Data Tabulation Tool (FAF4), Center for Transportation Analysis, accessed July 10, 2019, https://faf.ornl.gov/faf4/Extraction2.aspx.
[12] Trucking and Rail BTUs per ton-mile: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, "Freight Transportation Demand: Energy-Efficient Scenarios for a Low-Carbon Future," Transportation Energy Futures Series, March 2013, https://digital.library.unt.edu/ark:/67531/metadc844590/m2/1/high_res_d/1072830.pdf.
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[13] Energy Cost Calculator, College of Agricultural Sciences, Cooperative Extension, Pennsylvania State University, accessed July 10, 2019, https://buffalo.extension.wisc.edu/files/2011/01/Energy-Cost-Calculator-for-Various-Fuels-PSU.pdf.
[14] Jeffrery Rissman, "The Future of Electric Vehicles in the U.S.," Energy Innovation Policy & Technology LLC, September 2017, https://energyinnovation.org/wp-content/uploads/2017/10/2017-09-13-Future-of-EVs-Research-Note_FINAL.pdf.
[15] Mark Kane, "State-By-State Look at Plug-In Electric Cars per 1,000 Residents," InsideEVs, December 1, 2018, https://insideevs.com/news/341522/state-by-state-look-at-plug-in-electric-cars-per-1000-residents/.
[16] Tesla Semi, Tesla website, accessed July 10, 2019, https://www.tesla.com/semi.

[17] The cost of an EV purchased for $39,500 can be amortized across five years with a typical low interest auto loan. We assume that each auto is purchased with ten percent down ($3,950) and $35,550 on credit at 2.9 percent. This generous formula creates an annual burden, in addition to the down payment, of $637.21 a month or nearly $7,647 a year. To simplify the analysis, we assume that the down payment is provided through a combination of new federal and state subsidies, and thus consumers are responsible for 90 percent of the purchase price.

[18] Brennan Less and Iain Walker, "A Meta-Analysis of Single-Family Deep Energy Retrofit Performance in the U.S.", Environmental Energy Technologies Division, Berkeley Lab, prepared for the U.S. Department of Energy
Office of Scientific and Technical Information, 2014, https://www.osti.gov/servlets/purl/1129577.

[19] Daniel S.Bertoldi, "Deep Energy Retrofits Using the Integrative Design Process: Are they Worth the Cost," Master's Projects and Capstones, University of San Francisco, spring 2014, https://repository.usfca.edu/capstone/22.

[20] Ibid.

[21] Energy Information Administration, Table CE1.1 Summary annual household site consumption and expenditures in the U.S.—totals and intensities, 2015," May 2018, https://www.eia.gov/consumption/residential/data/2015/cande/pdf/ce1.1.pdf. Energy Information Administration, Table E2. Major fuel consumption intensities (Btu) by end use, 2012, May 2016 https://www.eia.gov/consumption/commercial/data/2012/cande/pdf/e2.pdf.

[22] Energy Information Administration, Alaska End-use energy consumption 2017, estimates, accessed July 10, 2019, https://www.eia.gov/beta/states/states/ak/overview.

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