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## GREEN TAX SOLUTIONS SYMPOSIUM

TAX POLICIES FOR CLEAN MANUFACTURING: IMPLEMENTING  
THE GREEN NEW DEAL

*Roberta Mann*



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# GREEN TAX SOLUTIONS SYMPOSIUM

## TAX POLICIES FOR CLEAN MANUFACTURING: IMPLEMENTING THE GREEN NEW DEAL

*Roberta Mann\**

### I. INTRODUCTION

The “Green New Deal” (GND) resolution proposed in Congress “recogniz[es] the duty of the Federal Government to create a Green New Deal.”<sup>1</sup> The GND resolution presents several goals, including achieving “net-zero greenhouse gas emissions through a fair and just transition for all communities and workers,” investment in “infrastructure and industry . . . to sustainably meet the challenges of the 21st century,” and the creation of “millions of good, high-wage jobs.”<sup>2</sup> The resolution contemplates “spurring massive growth in clean manufacturing in the United States and removing pollution and greenhouse gas emissions from manufacturing and industry as much as is technologically feasible, including by expanding renewable energy manufacturing and investing in existing manufacturing and industry.”<sup>3</sup> While reasonable minds can differ about the merits of the GND, it presents an excellent opportunity to consider how the United States’ manufacturing sector could be remade to meet environmental goals. This Article will assess the effect of the existing tax system on the specific goals of the GND outlined above and consider what changes could be made to

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<sup>1</sup> H.R. Res. 109, 116th Cong. (2019).

<sup>2</sup> *Id.* at 5.

<sup>3</sup> *Id.* at 8.

encourage clean manufacturing in the United States. The Article will also consider how tax changes could move the economy towards another of the GND’s goals: income equality.

Part II of the Article will focus on definitions. Manufacturing encompasses a large number of diverse industries. Clean manufacturing, as contemplated in the GND resolution, includes renewable energy equipment manufacturing as well as emission-reducing modifications to other industrial processes.<sup>4</sup> The GND’s emphasis on “good jobs” also requires defining “good jobs.” After considering definitional issues, Part III of the Article will continue with an examination of economic and labor trends in the United States, including the impact of tariffs on the U.S. manufacturing sector. Part IV of the Article will summarize the impact of existing tax laws on the U.S. manufacturing sector. The 2017 tax legislation, commonly known as the Tax Cuts and Jobs Act (TCJA), purported to encourage job creation in the United States, but the legislation made significant changes to the taxation of multinational corporations (MNCs), some of which may have had a negative effect on U.S. job creation.<sup>5</sup> After a summary of existing tax law and potential impacts, the Article will then analyze potential changes to U.S. tax law to better meet the goals of the Green New Deal.

## II. DEFINITIONS

### A. Manufacturing

If the goal is to increase clean manufacturing in the United States, we must define manufacturing—and “clean” manufacturing—before we consider how to incentivize those activities through the tax system. The U.S. Bureau of Labor Statistics (BLS) uses the North American Industry Classification System (NAICS) to identify twenty specific types of manufacturing industries, plus an additional “miscellaneous” category.<sup>6</sup> The

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<sup>4</sup> *Id.*

<sup>5</sup> See generally Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2054 (2017).

<sup>6</sup> Bureau of Labor Statistics, *Industries at a Glance: Manufacturing: NAICS 31-33*, U.S. DEPT LAB., <https://www.bls.gov/iag/tgs/iag31-33.htm> (last updated Nov. 20, 2019). The manufacturing sector consists of these subsectors:

- Food Manufacturing: NAICS 311

BLS broadly defines manufacturing to include “establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products” as well as “establishments that transform materials or substances into new products by hand or in the worker’s home and those engaged in selling to the general public products made on the same premises from which they are sold, such as bakeries, candy stores, and custom tailors.”<sup>7</sup>

Manufacturing thus excludes agriculture but may have some overlap with what are commonly understood as service industries. This broad definition poses some challenges when crafting tax policies to encourage

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- Beverage and Tobacco Product Manufacturing: NAICS 312
  - Textile Mills: NAICS 313
  - Textile Product Mills: NAICS 314
  - Apparel Manufacturing: NAICS 315
  - Leather and Allied Product Manufacturing: NAICS 316
  - Wood Product Manufacturing: NAICS 321
  - Paper Manufacturing: NAICS 322
  - Printing and Related Support Activities: NAICS 323
  - Petroleum and Coal Products Manufacturing: NAICS 324
  - Chemical Manufacturing: NAICS 325
  - Plastics and Rubber Products Manufacturing: NAICS 326
  - Nonmetallic Mineral Product Manufacturing: NAICS 327
  - Primary Metal Manufacturing: NAICS 331
  - Fabricated Metal Product Manufacturing: NAICS 332
  - Machinery Manufacturing: NAICS 333
  - Computer and Electronic Product Manufacturing: NAICS 334
  - Electrical Equipment, Appliance, and Component Manufacturing: NAICS 335
  - Transportation Equipment Manufacturing: NAICS 336
  - Furniture and Related Product Manufacturing: NAICS 337
  - Miscellaneous Manufacturing: NAICS 339

<sup>7</sup> *Id.*

manufacturing jobs, as many different incentives may be necessary to encourage this broad range of industries. In addition, some industries may be significantly impacted by the GND’s goal of zero-carbon emissions. For example, tax incentives for the Petroleum and Coal Products Industry subsector may be counterproductive to the zero-carbon emissions goal. In our examination of existing tax law, we will consider which industries have particularly benefited and which industries show the most potential for high-wage jobs. Moreover, there may not be a close connection between the emissions of a particular manufacturing subsector,<sup>8</sup> the wages paid to workers in that subsector, and the value added by the subsector to the economy.<sup>9</sup> In short, not all manufacturing is created equal.

### *B. Clean Manufacturing*

Clean manufacturing, as contemplated by the GND resolution, includes both improving existing manufacturing to reduce GHG emissions and pollution as well as renewable energy equipment manufacturing.<sup>10</sup> Understanding “clean” manufacturing first requires an understanding of the environmental impacts of existing manufacturing.

The first “whereas” clause of the GND resolution cites the Fourth National Climate Change Assessment report’s conclusion that human-caused greenhouse gas (GHG) emissions have resulted in significant human, environmental, and economic costs due to climate change.<sup>11</sup> These costs will

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<sup>8</sup> DOUG VINE & JASON YE, CTR. FOR CLIMATE & ENERGY SOL., *DECARBONIZING U.S. INDUSTRY 1* (2018) (noting that cement, steel, ammonia, and ethylene production account for 45 percent of industry’s CO<sub>2</sub> emissions).

<sup>9</sup> *Id.* (“The United States’ five largest energy-consuming industries—bulk chemicals, oil and gas, steel, paper, and food products—account for 56.5 percent of industrial energy use, but only 20.8 percent of product value.”). The highest value products in the manufacturing sector by percentage of GDP, according to the Bureau of Economic Analysis, are fabricated metal products (0.8%), machinery (0.8%), computer and electronic products (1.4%), motor vehicles (0.8%), aerospace product and parts (0.6%), food manufacturing (0.9%), and chemical products (1.8%) (8% is pharmaceutical manufacturing). *Industry Data: Underlying Detail of Industry Economic Accounts Data: GDP by Industry*, BUREAU ECON. ANALYSIS, <https://apps.bea.gov/iTable/iTable.cfm?reqid=56&step=2&isuri=1#reqid=56&step=2&isuri=1> (last visited Nov. 24, 2019).

<sup>10</sup> See H.R. Res. 109, 116th Cong. (2019).

<sup>11</sup> *Id.*

only increase in the future. Manufacturing industries are responsible for a significant portion of U.S. GHG emissions.<sup>12</sup> The Center for Climate and Energy Solutions found that the indirect and direct emissions from industry amounted to thirty percent of total U.S. GHG emissions in 2018.<sup>13</sup> The direct emissions from industry constitute the third largest source of GHG after transportation and electric power.<sup>14</sup> “[B]ulk chemicals, refining and iron and steel production were the three largest sources of energy-related carbon dioxide emissions, which account for around three-quarters of the sectors’ total (both direct and indirect) emissions.”<sup>15</sup> Production of glass, cement, and aluminum is also energy intensive.<sup>16</sup>

### 1. “Cleaning” Manufacturing

Existing manufacturing could reduce GHG emissions and pollution by improving supply chains, using renewable energy,<sup>17</sup> and encouraging “circularity.”<sup>18</sup> Tools for evaluating environmental sustainability of

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[T]he continued warming that is projected to occur without substantial and sustained reductions in global greenhouse gas emissions is expected to cause substantial net damage to the U.S. economy throughout this century, especially in the absence of increased adaptation efforts. With continued growth in emissions at historic rates, annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century . . . .

2 U.S. GLOB. CHANGE RESEARCH PROGRAM, FOURTH NATIONAL CLIMATE ASSESSMENT 26 (2018). “Impacts from climate change on extreme weather and climate-related events, air quality, and the transmission of disease through insects and pests, food, and water increasingly threaten the health and well-being of the American people, particularly populations that are already vulnerable.” *Id.* at 27.

<sup>12</sup> See VINE & YE, *supra* note 8, at 1–2.

<sup>13</sup> *Id.* at 2.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.* at 1.

<sup>17</sup> See DAVID GARDINER & ASSOCS., THE GROWING DEMAND FOR RENEWABLE ENERGY AMONG MAJOR U.S. AND GLOBAL MANUFACTURERS 3–4 (2017), [https://www.dgardiner.com/wp-content/uploads/2017/09/Renewable-Energy-and-Climate-Commitments-in-the-Manufacturing-Sector\\_FINAL9.19.2017FINAL.pdf](https://www.dgardiner.com/wp-content/uploads/2017/09/Renewable-Energy-and-Climate-Commitments-in-the-Manufacturing-Sector_FINAL9.19.2017FINAL.pdf).

<sup>18</sup> See VINE & YE, *supra* note 8, at 1 (“Options for reducing emissions in the industrial sector include: improved energy efficiency, developing and deploying new manufacturing techniques, switching to lower-emitting fuels, combined heat and power, carbon capture and storage, and more efficient use of resources.”).

manufacturing can generally be divided into two main approaches: first, assessing natural resource use, and second, assessing “the contribution of the manufacturing process to climate change . . . .”<sup>19</sup> When assessing natural resource use, the analysis should include “energy, water, and raw materials as well as the amount of waste that is being generated during the production of the product.”<sup>20</sup> Circularity implies that the waste generated at the end of the product’s life should also be considered—could the product be reused or recycled into another useful product? Reuse and recycling could also reduce the climate-changing CO<sub>2</sub> emissions from manufacturing.

Reducing CO<sub>2</sub> emissions from manufacturing, also called “decarbonizing,” was the subject of a recent report by McKinsey & Company. The report considered the opportunities and challenges to decarbonizing select global industries: cement, steel, ammonia, and ethylene production.<sup>21</sup> Uses of ethylene include the manufacture of various plastic products, herbicides, cosmetics, and textiles—and as a gas to ripen fruit.<sup>22</sup> The report found that forty-five percent of industry’s CO<sub>2</sub> emissions resulted from those four sectors, which are difficult to abate for four technical reasons.<sup>23</sup> First, forty-five percent of the CO<sub>2</sub> emissions result from feedstocks—that is, the essential raw material for creating those products.<sup>24</sup> Second, thirty-five percent of the emissions come from burning fossil fuels to create the high-temperature heat needed in the production process.<sup>25</sup> Changing the fuel may require changes to the existing furnace designs. Third, “industrial processes are highly integrated,” so it is difficult to alter just one

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<sup>19</sup> Nils Nörmann & Valerie Maier-Sperdelozzi, *Cost and Environmental Impacts in Manufacturing: A Case Study Approach*, 5 *PROCEDIA MANUFACTURING* 58, 61 (2016).

<sup>20</sup> *Id.*

<sup>21</sup> ARNOU DE PEE ET AL., MCKINSEY & CO., *DECARBONIZATION OF INDUSTRIAL SECTORS: THE NEXT FRONTIER* 2 (2018), <https://www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/how%20industry%20can%20move%20toward%20a%20low%20carbon%20future/decarbonization-of-industrial-sectors-the-next-frontier.ashx>.

<sup>22</sup> Nat’l Ctr. for Biotechnology Info., *Compound Summary: Ethylene*, U.S. NAT’L LIBR. OF MED., <https://pubchem.ncbi.nlm.nih.gov/compound/Ethylene#section=Use-and-Manufacturing> (last updated Oct. 26, 2019).

<sup>23</sup> DE PEE ET AL., *supra* note 21, at 6.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

part of the process.<sup>26</sup> Finally, “production facilities have long lifetimes, typically exceeding 50 years.”<sup>27</sup> Nonetheless, opportunities for reducing industrial CO<sub>2</sub> emissions exist. Carbon capture and storage (CCS) can fully abate emissions from production.<sup>28</sup> However, depending on the regional electricity cost structure, switching to zero-carbon electricity can be less expensive than CCS.<sup>29</sup> For ammonia and steel production, using hydrogen rather than fossil fuel as a feedstock can be less expensive than CCS.<sup>30</sup> Using recycled material can also reduce CO<sub>2</sub> emissions.<sup>31</sup> The McKinsey & Company report found that “producing material based on recycled products generally consumes less energy and feedstock than production of virgin materials. As an example, producing steel from steel scrap requires only about a quarter of the energy required to produce virgin steel.”<sup>32</sup> As noted above, the GND defines clean manufacturing to include not only “cleaner” manufacturing of various products, but also renewable energy equipment manufacturing.

## 2. Renewable Energy Equipment Manufacturing

The GND resolution specifically includes renewable energy equipment manufacturing as part of “clean” manufacturing.<sup>33</sup> Indeed, as attaining zero-carbon emissions in manufacturing requires electricity from renewable sources, renewable energy equipment is essential. An article in *Science* reviewed challenges associated with a net-zero emissions energy system:<sup>34</sup>

A successful transition to a future net-zero emissions energy system is likely to depend on the availability of vast amounts of inexpensive, emissions-free

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<sup>26</sup> *Id.* at 7.

<sup>27</sup> *Id.*

<sup>28</sup> *See id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*; Valentin Vogl et al., *Assessment of Hydrogen Direct Reduction for Fossil-Free Steelmaking*, 203 J. CLEANER PRODUCTION 736, 744 (2018).

<sup>31</sup> DE PEE ET AL., *supra* note 21, at 9.

<sup>32</sup> *Id.*

<sup>33</sup> H.R. Res. 109, 116th Cong. (2019).

<sup>34</sup> Steven J. Davis et al., *Net-Zero Emissions Energy Systems*, 360 SCI. 1419, 1419 (2018).



electricity; mechanisms to quickly and cheaply balance large and uncertain time-varying differences between demand and electricity generation; electrified substitutes for most fuel-using devices; alternative materials and manufacturing processes including CCS for structural materials; and carbon-neutral fuels for the parts of the economy that are not easily electrified.<sup>35</sup>

Defining renewable energy equipment manufacturing also presents a challenge, including not only manufacturing of solar panels and wind turbines but also products that enable the use of renewable energy sources like batteries and smart-grid technology.<sup>36</sup> The Breakthrough Institute's report on clean energy innovation lists the following categories of investment in clean energy:

- Biofuels
- Biomass
- Waste-to-energy
- Geothermal
- Hydropower
- Wave and tidal energy
- Solar
- Wind
- Smart technologies including smart meters, energy efficiency devices and grid integration technology
- Electrified transport
- Electricity storage technology
- Fuel cells and hydrogen applications
- Carbon capture, storage, and utilization

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<sup>35</sup> *Id.* at 7.

<sup>36</sup> See generally Roberta F. Mann, *Lightning in a Bottle: Using Tax Policy to Solve Renewable Energy's Storage Challenges*, 20 J. ENVTL. & SUSTAINABILITY L. 71 (2013); Roberta F. Mann, *Smart Incentives for the Smart Grid*, 43 N.M. L. REV. 127 (2013).

- Advanced nuclear technology.<sup>37</sup>

The report notes that “the U.S. has shown over many decades an unparalleled capacity to nurture energy innovation.”<sup>38</sup> Renewable energy manufacturers located in the United States include Tesla, which makes electric cars<sup>39</sup> and battery storage,<sup>40</sup> GE, which makes wind turbines,<sup>41</sup> and SunPower, which makes solar panels.<sup>42</sup> U.S. companies Cisco Systems and Intel manufacture smart grid technology.<sup>43</sup> U.S. company Oracle provides energy data analytics.<sup>44</sup> As illustrated by the preceding list of U.S. companies engaged in clean manufacturing, the GND resolution’s goals rest on a solid existing foundation. While clean manufacturing exemplifies the GND’s concern about the environment, the resolution also has a strong focus on improving the lives of Americans by creating good jobs, as discussed next.

### 3. “Good Jobs”

The GND resolution implies the generally held assumption that manufacturing jobs are “good” jobs.<sup>45</sup> A “good” job implies high wages and reasonable working conditions.<sup>46</sup> Researchers have developed a framework, called the Psychology of Working Theory (PWT), that defines what makes a

<sup>37</sup> BREAKTHROUGH ENERGY, ADVANCING THE LANDSCAPE OF CLEAN ENERGY INNOVATION 47 (2019), [http://www.b-t.energy/wp-content/uploads/2019/02/Report\\_-Advancing-the-Landscape-of-Clean-Energy-Innovation\\_2019.pdf](http://www.b-t.energy/wp-content/uploads/2019/02/Report_-Advancing-the-Landscape-of-Clean-Energy-Innovation_2019.pdf).

<sup>38</sup> *Id.* at 2.

<sup>39</sup> I. Wagner, *Tesla’s U.S. Market Share—December 2018*, STATISTA, <https://www.statista.com/statistics/519579/market-share-of-tesla-in-the-united-states/> (last updated Aug. 22, 2019) (Tesla’s Model 3 sedan holds sixty percent of the U.S. electric car market).

<sup>40</sup> *Powerwall*, TESLA, <https://www.tesla.com/powerwall> (last visited Oct. 29, 2019).

<sup>41</sup> *Wind Turbines Overview*, GEN. ELECTRIC, <https://www.ge.com/renewableenergy/wind-energy/onshore-wind/turbines> (last visited Oct. 29, 2019).

<sup>42</sup> Press Release, SunPower, SunPower Begins a New Chapter in American Solar Manufacturing (Oct. 1, 2018), <https://newsroom.sunpower.com/2018-10-01-SunPower-Begins-A-New-Chapter-in-American-Solar-Manufacturing>.

<sup>43</sup> BREAKTHROUGH ENERGY, *supra* note 37, at 26.

<sup>44</sup> *Id.*

<sup>45</sup> See H.R. Res. 109, 116th Cong. (2019).

<sup>46</sup> See Ryan D. Duffy et al., *The Psychology of Working Theory*, 63 J. COUNSELING PSYCHOL. 127, 130 (2016).

“decent” job.<sup>47</sup> In the United States, a significant proportion of the new jobs that have been developed since the Great Recession qualify as “precarious work,” which is defined as “insecure, often-part-time, and time-limited.”<sup>48</sup> These jobs are “low-wage positions that are often limited to a circumscribed time period and do not offer benefits.”<sup>49</sup> Precarious work is not decent work. The researchers define decent work as containing the following elements:

- Working conditions free from physical, mental, or emotional abuse;
- Working hours that allow for free time and adequate rest;
- Organizational values that complement family and social values;
- Adequate compensation; and
- Access to adequate health care.<sup>50</sup>

According to the National Association of Manufacturers, in 2017, the average manufacturing worker earned \$84,832 annually, including the value of benefits.<sup>51</sup> Manufacturing workers appear to be significantly more highly compensated than the average worker, who reportedly (in nonfarming industries) earned an average of \$66,847 annually.<sup>52</sup> Considering wages alone, “the average manufacturing worker earned more than \$27 per hour.”<sup>53</sup>

The GND resolution specifically refers to the creation of “high-quality *union* jobs that pay prevailing wages.”<sup>54</sup> This goal harks back to the historical role of manufacturing in the U.S. economy. Historically, manufacturing jobs

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<sup>47</sup> *Id.* at 128.

<sup>48</sup> *Id.* at 130.

<sup>49</sup> *Id.*

<sup>50</sup> *Id.* at 130–31.

<sup>51</sup> *Facts About Manufacturing: The Top 18 Facts You Need to Know*, NAT'L ASSOC. MFRS., <https://www.nam.org/facts-about-manufacturing/> (last visited Oct. 25, 2019).

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

<sup>54</sup> H.R. Res. 109, 116th Cong. at 12 (emphasis added).

were unionized.<sup>55</sup> Unions fought for wages and working conditions by collective bargaining and the ability to withhold labor by striking.<sup>56</sup> Union membership is now at historic lows.<sup>57</sup> “In 2015, there were 7.6 million union members in the private sector, 4.4 million fewer than in 1983.”<sup>58</sup> Of those workers, 1.4 million are in manufacturing industries.<sup>59</sup> Just since 2000, the percentage of union membership in manufacturing declined from fifteen percent to below ten percent.<sup>60</sup> Nonunion workers only earn about eighty-two percent of union workers’ wages.<sup>61</sup>

There are many reasons for the decline in union jobs in the United States.<sup>62</sup> “As a percent of nonagricultural employment, union membership peaked at 35.4% in 1945.”<sup>63</sup> In 1947, the Taft-Hartley Act prohibited secondary boycotts and allowed states to enact right-to-work laws prohibiting employers from hiring only union employees.<sup>64</sup> The inflation of

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<sup>55</sup> Christopher Ingraham, *Union Membership Remained Steady in 2017: The Trend May Not Hold*, WASH. POST (Jan. 19, 2018, 1:21 PM), <https://www.washingtonpost.com/news/wonk/wp/2018/01/19/union-membership-remained-steady-in-2017-the-trend-may-not-hold/>.

<sup>56</sup> Joseph A. McCartin, Opinion, *The Strike That Busted Unions*, N.Y. TIMES (Aug. 2, 2011), <https://www.nytimes.com/2011/08/03/opinion/reagan-vs-patco-the-strike-that-busted-unions.html> (“Workers in the private sector had used the strike as a tool of leverage in labor-management conflicts between World War II and 1981, repeatedly withholding their work to win fairer treatment from recalcitrant employers.”).

<sup>57</sup> Ingraham, *supra* note 55.

<sup>58</sup> MEGAN DUNN & JAMES WALKER, U.S. BUREAU OF LABOR STAT., UNION MEMBERSHIP IN THE UNITED STATES 3 (2016), <https://www.bls.gov/spotlight/2016/union-membership-in-the-united-states/pdf/union-membership-in-the-united-states.pdf>.

<sup>59</sup> *Id.* at 5.

<sup>60</sup> *Id.*

<sup>61</sup> Press Release, Dep’t of Labor, Bureau of Labor Statistics, Union Members Summary (Jan. 18, 2019), <https://www.bls.gov/news.release/union2.nr0.htm>.

<sup>62</sup> See Dwyer Gunn, *What Caused the Decline of Unions in America?*, PAC. STANDARD (Apr. 24, 2018), <https://psmag.com/economics/what-caused-the-decline-of-unions-in-america>.

<sup>63</sup> GERALD MAYER, CONG. RESEARCH SERV., RL32553, UNION MEMBERSHIP TRENDS IN THE UNITED STATES 12 (2004).

<sup>64</sup> Taft-Hartley Act of 1947, Pub. L. No. 80-101, §§ 8(b)(4), 13(b), 61 Stat. 136, 141, 151 (codified at 29 U.S.C. §§ 158(b)(4)(i)(D), 164(b)); see also BENJAMIN COLLINS, CONG. RESEARCH SERV., RL42575, RIGHT TO WORK LAWS: LEGISLATIVE BACKGROUND AND EMPIRICAL RESEARCH 2 (2014).

the 1970s led to interest rate increases that increased the value of the dollar.<sup>65</sup> A high value dollar had the effect of reducing U.S. exports, with the collateral consequence of a decline in the manufacturing sector.<sup>66</sup> Unemployment rates reached 10.8% in 1982,<sup>67</sup> hitting the manufacturing sector particularly hard.<sup>68</sup> President Reagan's actions against the Professional Air Traffic Controllers Union in 1981 significantly impaired union bargaining power in the future.<sup>69</sup> In a later section, we will consider tax policy's effect on union membership. This part of the Article provided the definitions essential to analyzing policies to incentivize clean manufacturing and "good jobs." Part III will place manufacturing in context with labor and economic trends, including trade policies and infrastructure investment.

### III. MANUFACTURING: LABOR AND ECONOMIC TRENDS

The GND considers manufacturing jobs to be "good jobs" and seeks to increase those opportunities in the economy. This section will examine labor and economic trends to uncover possible ways to meet this goal. These trends include a decline in manufacturing employment, growing income and wealth inequality, and trade practices that have affected manufacturing businesses. In addition, deterioration of the nation's infrastructure has also impacted manufacturing.

Manufacturing employment in the United States has been in decline for the past fifty years, with peak employment of 19.4 million people in 1979,

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<sup>65</sup> See John Kemp, *Dollar Cycle May Be About to Turn, Supporting Oil Prices*, REUTERS (Jan. 4, 2019, 7:26 AM), <https://www.reuters.com/article/us-usa-dollar-kemp/dollar-cycle-may-be-about-to-turn-supporting-oil-prices-kemp-idUSKCN1OY136>.

<sup>66</sup> Jared Bernstein & Dean Baker, *The Strong Dollar Is Hurting U.S. Manufacturing*, WASH. POST (May 11, 2015, 9:00 AM), [https://www.washingtonpost.com/posteverything/wp/2015/05/11/the-strong-dollar-is-hurting-u-s-manufacturing-theres-a-lesson-in-there-for-the-tpp/?utm\\_term=.67168e63d501](https://www.washingtonpost.com/posteverything/wp/2015/05/11/the-strong-dollar-is-hurting-u-s-manufacturing-theres-a-lesson-in-there-for-the-tpp/?utm_term=.67168e63d501).

<sup>67</sup> Richard C. Auxier, *Reagan's Recession*, PEW RES. CTR. (Dec. 14, 2010), <https://www.pewresearch.org/2010/12/14/reagans-recession/>.

<sup>68</sup> Robert W. Bednarzik, *Layoffs and Permanent Job Losses: Workers' Traits and Cyclical Patterns*, 106 MONTHLY LABOR REV. 3, 4 (1983) ("[In] 1982, 51 percent of all layoffs and 28 percent of permanent job separations occurred in manufacturing industries.").

<sup>69</sup> McCartin, *supra* note 56.

compared to 12.4 million in 2018.<sup>70</sup> In 1953, nearly a third of the country’s workforce worked in manufacturing jobs, compared to less than ten percent today.<sup>71</sup> Manufacturing’s share of gross domestic product (GDP) declined in nominal terms “from 28.1 percent in 1953 to 12 percent in 2015,” although the share of “real” GDP has remained consistent over time.<sup>72</sup> Increases in productivity due to automation are the likely cause of the seemingly inconsistent decline in employment combined with stability of the real GDP share.<sup>73</sup> However, the job losses are real. The U.S. manufacturing sector lost 5.7 million jobs between 1998 and 2013, primarily due to growing trade deficits, especially with China, Mexico, and other low-wage nations, as well as the impact of the Great Recession.<sup>74</sup>

Manufacturing’s decline is not limited to the United States—loss of production activity has occurred in other advanced economies.<sup>75</sup> However, the United States still lags behind other parts of the developed world in how it treats workers. As reported in the *New York Times*, the United States is the only advanced industrial nation that does not have national laws guaranteeing paid maternity leave.<sup>76</sup> Only the United States and South Korea fail to guarantee paid sick leave.<sup>77</sup> European Union member nations guarantee at least four weeks paid vacation for workers, and Canada and Japan guarantee

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<sup>70</sup> Drew DeSilver, *Most Americans Unaware That as U.S. Manufacturing Jobs Have Disappeared, Output Has Grown*, PEW RES. CTR. (July 25, 2017), <https://www.pewresearch.org/fact-tank/2017/07/25/most-americans-unaware-that-as-u-s-manufacturing-jobs-have-disappeared-output-has-grown/>.

<sup>71</sup> *Id.*

<sup>72</sup> YiLi Chien & Paul Morris, *Is U.S. Manufacturing Really Declining?*, FED. RES. BANK OF ST. LOUIS: ON THE ECONOMY BLOG (Apr. 11, 2017), <https://www.stlouisfed.org/on-the-economy/2017/april/us-manufacturing-really-declining>.

<sup>73</sup> *Id.*

<sup>74</sup> ROBERT E. SCOTT, ECON. POLICY. INST., BRIEFING PAPER NO. 388, THE MANUFACTURING FOOTPRINT AND THE IMPORTANCE OF U.S. MANUFACTURING JOBS 9 (2015), <https://www.epi.org/files/2015/bp388-manufacturing-footprint.pdf>.

<sup>75</sup> SREE RAMASWAMY ET AL., MCKINSEY GLOB. INST., MAKING IT IN AMERICA: REVITALIZING US MANUFACTURING 6–7 (2017), <https://www.mckinsey.com/featured-insights/americas/making-it-in-america-revitalizing-us-manufacturing>.

<sup>76</sup> Steven Greenhouse, Opinion, *Yes, America Is Rigged Against Workers*, N.Y. TIMES (Aug. 3, 2019), <https://www.nytimes.com/2019/08/03/opinion/sunday/labor-unions.html>.

<sup>77</sup> *Id.*

at least two weeks.<sup>78</sup> In the United States, there is no guarantee of vacation leave at all, whether paid or unpaid.<sup>79</sup> According to the Organization for Economic Cooperation and Development (OECD), the United States has the lowest minimum wage as a percentage of the median wage of industrial countries.<sup>80</sup> Although union membership differs significantly among European nations, on average thirty-four percent of large-firm employees in goods-producing sectors (which includes manufacturing) were covered by a collective bargaining agreement in 2017.<sup>81</sup> Trade union density is at sixty-five percent in Sweden, Denmark, and Finland.<sup>82</sup> Perhaps not coincidentally, those countries regularly rank highly on happiness indices.<sup>83</sup>

According to a 2017 McKinsey Global Initiative Report, the manufacturing sector has “developed a two-tiered workforce, with jobs in the bottom tier steadily deteriorating in quality.”<sup>84</sup> “Since 1990, real wages for production workers have risen by only 0.1 percent annually for the sector as a whole.”<sup>85</sup> Approximately one-third of all manufacturing production workers rely on food stamps or other federal assistance programs.<sup>86</sup> Union workers enjoy greater access to medical care benefits and life insurance. According to the Bureau of Labor Statistics, ninety-four percent of union workers have access to medical care benefits and eighty-three percent have

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<sup>78</sup> ADEWALE MAYE, CTR. FOR ECON. & POLICY RESEARCH, NO-VACATION NATION, REVISED 3, 5 (2019), <http://cepr.net/images/stories/reports/no-vacation-nation-2019-05.pdf>.

<sup>79</sup> *Id.* at 3.

<sup>80</sup> *Minimum Relative to Average Wages of Full-Time Workers*, OECD, STAT, <https://stats.oecd.org/Index.aspx?DataSetCode=MIN2AVE> (last visited Oct. 25, 2019) (reporting that U.S. minimum wages are only twenty-four percent of median wages in 2017).

<sup>81</sup> ORG. FOR ECON. CO-OPERATION & DEV., OECD EMPLOYMENT OUTLOOK 2017, at 139 (2017).

<sup>82</sup> *Id.* at 132–34.

<sup>83</sup> *Finland Again Is the Happiest Country in the World*, WORLD HAPPINESS REP. (Mar. 20, 2019), <https://worldhappiness.report/news/finland-again-is-the-happiest-country-in-the-world/>.

<sup>84</sup> RAMASWAMY ET AL., *supra* note 75, at 5.

<sup>85</sup> *Id.*

<sup>86</sup> KEN JACOBS ET AL., U.C. BERKELEY CTR. FOR LABOR RESEARCH & EDUC., PRODUCING POVERTY: THE PUBLIC COST OF LOW-WAGE PRODUCTION JOBS IN MANUFACTURING 6 (2016), <http://laborcenter.berkeley.edu/pdf/2016/Producing-Poverty.pdf>.

access to life insurance.<sup>87</sup> Nonunion workers' access to these benefits was sixty-six percent for medical care and fifty-four percent for life insurance.<sup>88</sup> While “good” jobs provide benefits and adequate pay, these second-tier jobs may be contributing to excessive levels of inequality in the United States.

### *A. Inequality*

Referring to forty years of wage stagnation in the United States, the GND resolution notes that income and wealth inequality have increased to levels not seen since the 1920s.<sup>89</sup> A lack of “good jobs” for Americans may be the cause. A newsletter from the AFL-CIO noted, “Economic and wealth disparities [in the United States] are partially a result of declining rates of unionization, stagnation in wages, increasing health care costs, and tax policies that favor the wealthy.”<sup>90</sup> Researchers from the International Monetary Fund found that “[l]ower union density can increase top income shares by reducing the bargaining power of workers.”<sup>91</sup> Another study found that unions promote income equality even for nonunionized workforces.<sup>92</sup> The researchers speculated that “unions may have indirectly increased pay at firms nervous that their own employees might organize.”<sup>93</sup>

While workers' wages stagnated, executive compensation skyrocketed.<sup>94</sup> A report by the Economic Policy Institute noted that:

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<sup>87</sup> Press Release, Bureau of Labor Statistics, Employee Benefits in the United States—March 2019 (Sept. 19, 2019), <https://www.bls.gov/news.release/pdf/ebs2.pdf>.

<sup>88</sup> *Id.* at 8, 14.

<sup>89</sup> H.R. Res. 109, 116th Cong. (2019).

<sup>90</sup> DEP'T FOR PROF'L EMP., AFL-CIO, WORK IN FOCUS: A U.S. LABOR MARKET OVERVIEW 3 (2016), <https://dpeaflcio.org/wp-content/uploads/Work-in-Focus-2016.pdf>.

<sup>91</sup> Florence Jaumotte & Carolina Osorio Buitron, *Power from the People*, 52 FIN. & DEV. 29, 31 (2015).

<sup>92</sup> Susan Dynarski, *Fresh Proof That Strong Unions Help Reduce Income Inequality*, N.Y. TIMES (July 6, 2018), <https://www.nytimes.com/2018/07/06/business/labor-unions-income-inequality.html?module=inline>.

<sup>93</sup> *Id.*

<sup>94</sup> LAWRENCE MISHEL & JESSICA SCHIEDER, ECON. POL'Y INST., CEO COMPENSATION SURGED IN 2017, at 1 (2018), <https://www.epi.org/publication/ceo-compensation-surged-in-2017/>.



CEO pay continues to be very, very high and has grown far faster in recent decades than typical worker pay. Higher CEO pay does not reflect correspondingly higher output or better firm performance. Exorbitant CEO pay therefore means that the fruits of economic growth are not going to ordinary workers.<sup>95</sup>

For example, in 2018, in the automotive industry, GM CEO Mary Barra earned almost 300 times the pay of the company's average worker.<sup>96</sup> In the bulk chemicals industry, Dow DuPont CEO Edward Breen earned more than 250 times the pay of the company's average worker.<sup>97</sup> The steel industry was marginally more equitable, with Nucor CEO John Ferriola earning only about 150 times the pay of the company's average worker.<sup>98</sup> Interestingly, Nucor is the largest steel manufacturer in the United States, with 7,000 nonunion workers<sup>99</sup> creating new steel from recycled scrap in largely automated plants using electric (rather than coal-fired) furnaces.<sup>100</sup> U.S. Steel, the second largest producer of steel in the United States, has about 16,000 employees that belong to the United Steel Workers union.<sup>101</sup> Creating good jobs and increasing worker pay would reduce inequality in the economy.<sup>102</sup> Globalization has also impacted workers' pay and conditions. In particular, the trade policies followed by the current Trump administration,

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<sup>95</sup> *Id.* at 2.

<sup>96</sup> Karl Russell & Josh Williams, *The Highest-Paid C.E.O.s of 2018: A Year So Lucrative, We Had to Redraw Our Chart*, N.Y. TIMES (May 24, 2019), <https://www.nytimes.com/interactive/2019/business/highest-paid-ceos-2018.html> (In 2018, GM CEO Mary Barra earned \$22 million, 295 times more than the average worker at about \$77,000.).

<sup>97</sup> *Id.* (In 2018, Dow DuPont CEO Edward Breen earned \$19 million, 253 times more than the average worker at about \$75,018.).

<sup>98</sup> *Id.* (In 2018, Nucor CEO John Ferriola earned \$16 million, 151 times more than the average worker at about \$106,000.).

<sup>99</sup> Gregory P. Smith, *How Nucor Steel Rewards Performance and Productivity*, BUS. KNOW-HOW, <https://www.businessknowhow.com/manage/nucor.htm> (last updated Feb. 21, 2014).

<sup>100</sup> Benjamin Wallace-Wells, *In the New Heart of America's Steel Country—The South—Trump's Tariffs Barely Register*, THE NEW YORKER (Mar. 15, 2018), <https://www.newyorker.com/news/news-desk/in-the-new-heart-of-americas-steel-country-the-south-trumps-tariffs-barely-register>.

<sup>101</sup> *The ABCs of Bargaining*, UNITED STEEL WORKERS, [https://www.usw.org/workplaces/metals/2018-bargaining-materials/ABC\\_USS\\_d.pdf](https://www.usw.org/workplaces/metals/2018-bargaining-materials/ABC_USS_d.pdf) (last visited Oct. 29, 2019).

<sup>102</sup> *Income Inequality*, OECD DATA, <https://data.oecd.org/inequality/income-inequality.htm> (last visited Oct. 29, 2019) (Denmark, Sweden, and Finland (with high union density) all rank in the top ten for income equality, while the United States is near the bottom).

while ostensibly designed to help domestic industries, may have had the opposite effect, as discussed below.

### *B. Tariffs and Trade*

Manufacturing operates in a global economy, but individual countries can choose how freely they trade within that economy. The Trump administration has increased the use of tariffs on imported goods for the stated purpose of reducing the U.S. trade deficit.<sup>103</sup> “[T]he scale and scope of these recent unilateral U.S. tariff increases are unprecedented in modern times . . . .”<sup>104</sup> Since April 2018, retaliatory tariffs have been imposed on \$126 billion of U.S. exports.<sup>105</sup> While tariffs on imported goods might benefit domestic manufacturers whose products compete with imported goods,<sup>106</sup> retaliatory tariffs harm U.S. exporters.<sup>107</sup> Moreover, imported products form

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<sup>103</sup> BROCK R. WILLIAMS ET AL., CONG. RESEARCH SERV., R45529, TRUMP ADMINISTRATION TARIFF ACTIONS: FREQUENTLY ASKED QUESTIONS 2 (2019).

<sup>104</sup> *Id.* at 8.

<sup>105</sup> *Id.* at 7.

<sup>106</sup> *Id.* at 24.

<sup>107</sup> See Daniel Workman, *United States Top 10 Exports*, WORLD’S TOP EXPORTS (Oct. 22, 2019), <http://www.worldstopexports.com/united-states-top-10-exports/2001>. In 2018, the total gross domestic product (GDP) was \$20.494 trillion and exports accounted for 8.1% of total U.S. economic output. *Id.*

The following export product groups categorize the highest dollar value in American global shipments during 2018 . . .

1. Machinery including computers: US \$213.1 billion (12.8% of total exports)
2. Mineral fuels including oil: \$189.9 billion (11.4%)
3. Electrical machinery, equipment: \$176.1 billion (10.6%)
4. Aircraft, spacecraft: \$139.1 billion (8.4%)
5. Vehicles: \$130.6 billion (7.8%)
6. Optical, technical, medical apparatus: \$89.6 billion (5.4%)
7. Plastics, plastic articles: \$66.5 billion (4%)
8. Gems, precious metals: \$63.8 billion (3.8%)
9. Pharmaceuticals: \$48.4 billion (2.9%)

part of the supply chain for many domestic products.<sup>108</sup> For example, U.S. tariffs on imported washing machines may have benefited domestic washing machine manufacturers, but those manufacturers have complained about harm from tariffs on imported steel and aluminum.<sup>109</sup> The U.S. motor vehicle industry is also significantly vulnerable to the impact of both U.S. tariffs on supplies and retaliatory tariffs.<sup>110</sup> “Higher input costs for steel, tariffs on parts accounting for \$20 billion of annual imports, and retaliatory tariffs on assembled motor vehicle exports to China accounting for \$13 billion of annual exports will hurt the domestic motor vehicle industry.”<sup>111</sup>

In general, “U.S. tariffs are concentrated on products primarily used as inputs in the production of other goods . . . ; therefore the effects of the tariffs may be most pronounced in increased costs for U.S. producers.”<sup>112</sup> The Congressional Research Service reports that “[m]any U.S. firms have argued that imposing increased tariffs on imports from China will disrupt global supply chains and could undermine the competitiveness of U.S. firms.”<sup>113</sup>

In addition to potential harm to U.S. manufacturers, the tariff policy appears to have increased rather than decreased the trade deficit.<sup>114</sup> Pertinent (and contrary) to the goals of the GND, the tariff policy has also harmed renewable energy generation by increasing the cost of solar panels.<sup>115</sup>

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10. Organic chemicals: \$40.2 billion (2.4%)

America’s top exports accounted for over two-thirds (69.5%) of the overall value of its global shipments in 2018.

*Id.*

<sup>108</sup> *Id.*

<sup>109</sup> WILLIAMS ET AL., *supra* note 103, at 11.

<sup>110</sup> *Id.* at 16, 25.

<sup>111</sup> *Id.* at 25.

<sup>112</sup> *Id.* at 15.

<sup>113</sup> *Id.* at 32.

<sup>114</sup> Jim Tankersley & Ana Swanson, *In Blow to Trump, America’s Trade Deficit in Goods Hits Record \$891 Billion*, N.Y. TIMES (Mar. 6, 2019), <https://www.nytimes.com/2019/03/06/us/politics/us-trade-deficit.html>.

<sup>115</sup> Brian Eckhouse et al., *President Trump Slaps Tariffs on Solar Panels in Major Blow to Renewable Energy*, TIME (Jan. 22, 2018), <https://time.com/5113472/donald-trump-solar-panel-tariff/>.

Moreover, the Solar Energy Industries Association reported that “[a]fter seven years of steady, historic growth, the [2018] census reported an overall decline of 8,000 solar jobs compared to 2017.”<sup>116</sup>

### C. Infrastructure Impacts

A robust manufacturing sector requires modern physical and digital infrastructure. Physical infrastructure, including roads, bridges and ports, is “necessary to connect supply chains” in more efficient ways and to export products.<sup>117</sup> The same is true for digital infrastructure like high-speed broadband and mobile technology.<sup>118</sup> A commentator noted that “America is essentially in an infrastructure collapse that is having dire effects on manufacturing.”<sup>119</sup> The National Association of Manufacturers stated “[m]anufacturing workers in the United States, and all Americans, should refuse to settle for infrastructure that lags behind the rest of the world.”<sup>120</sup> America’s infrastructure suffers from a lack of investment. The American Society of Civil Engineers (ASCE) gave U.S. infrastructure overall a D+ grade.<sup>121</sup> In 2016, the ASCE estimated that the projected U.S. gap in infrastructure investment through 2040 to be over \$5 trillion.<sup>122</sup> The surface

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<sup>116</sup> *Tariffs Take a Bite out of American Solar Jobs*, SOLAR ENERGY INDUS. ASS’N (Feb. 12, 2019), <https://www.seia.org/blog/tariffs-take-bite-out-american-solar-jobs>.

<sup>117</sup> Darrell M. West & Christian Lansang, *Global Manufacturing Scorecard: How the US Compares to 18 Other Nations*, BROOKINGS (July 10, 2018), <https://brookings.edu/research/global-manufacturing-scorecard-how-the-us-compares-to-18-other-nations/>.

<sup>118</sup> *Id.*

<sup>119</sup> Michael Collins, *As Infrastructure Crumbles, So Does U.S. Manufacturing*, INDUSTRY WK. (Oct. 29, 2018), <https://www.industryweek.com/economy/infrastructure-crumbles-so-does-us-manufacturing>.

<sup>120</sup> NAT’L ASS’N OF MFRS., *BUILDING TO WIN 5* (2019), [https://www.nam.org/wp-content/uploads/2019/05/IIHR.BTW\\_2019.v08.pdf](https://www.nam.org/wp-content/uploads/2019/05/IIHR.BTW_2019.v08.pdf).

<sup>121</sup> *America’s Infrastructure Grade*, AM. SOC’Y OF CIVIL ENGINEERS, <https://www.infrastructurereportcard.org/americas-grades/> (last visited Sept. 13, 2019).

<sup>122</sup> AM. SOC’Y OF CIVIL ENGINEERS, *FAILURE TO ACT: CLOSING THE INFRASTRUCTURE GAP FOR AMERICA’S ECONOMIC FUTURE 5* (2016), <https://www.infrastructurereportcard.org/wp-content/uploads/2016/05/ASCE-Failure-to-Act-Report-for-Web-5.23.16.pdf>.

transportation sector creates the bulk of the gap (over eighty percent), with an estimated annual investment gap of over \$100 billion per year.<sup>123</sup>

Infrastructure investments could create millions of short-term jobs, in addition to improving manufacturing efficiency and productivity.<sup>124</sup> “[M]anufacturers increasingly raise concerns about rising transportation costs and insufficient infrastructure. More than seventy percent of manufacturers do not believe the state of our nation’s infrastructure is positioned to respond to the competitive needs of a growing economy.”<sup>125</sup> Congestion results from inadequate surface infrastructure. Congestion has environmental as well as economic impacts. Researchers at the University of California found that CO<sub>2</sub> emissions could be reduced by using congestion mitigation strategies, noting that “if . . . the stop-and-go velocity pattern of vehicles could somehow be smoothed out so an average speed could be maintained, significant CO<sub>2</sub> emission reductions could be achieved.”<sup>126</sup> In April 2019, President Trump agreed with members of Congress to pursue a \$2 trillion infrastructure plan.<sup>127</sup> However, in May 2019, the President walked out of an infrastructure meeting and declared that negotiations with Democrats would not continue while they were investigating him.<sup>128</sup> Despite the obvious benefits of improving and maintaining America’s infrastructure, the political barriers to investment remain high.

This part has examined labor and economic trends affecting the manufacturing industry. The manufacturing industry has been in decline for four decades. Manufacturing jobs, traditionally high paying with worker protections, now are not all “good jobs.” The disparity between worker and executive pay has increased together with the general increase in economic inequality in the United States. The Trump administration’s tariff policy has exacerbated the trade deficit and hurt exporting industries. Inadequate public

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<sup>123</sup> *Id.* at 12.

<sup>124</sup> NAT’L ASS’N OF MFRS., *supra* note 120, at 9.

<sup>125</sup> *Id.* at 7.

<sup>126</sup> Matthew Barth & Kanok Boriboonsomsin, *Real-World Carbon Dioxide Impacts of Traffic Congestion*, 2058 J. TRANSP. RES. BOARD 163, 167 (2010).

<sup>127</sup> Annie Karni et al., *Trump and Democrats Agree to Pursue \$2 Trillion Infrastructure Plan*, N.Y. TIMES (Apr. 30, 2019), <https://www.nytimes.com/2019/04/30/us/politics/trump-infrastructure-plan.html>.

<sup>128</sup> Ella Nilsen, *Trump Walked Away from Infrastructure Negotiations Before They Really Began*, VOX (May 22, 2019, 3:10 PM), <https://www.vox.com/policy-and-politics/2019/5/22/18635824/trump-infrastructure-week-pelosi-schumer>.

investment in infrastructure also poses a challenge to the manufacturing sector by making it not only more difficult to get goods to market but also to obtain supplies for production. Part IV will explore the impact of current tax law on the environment in general and manufacturing in particular.

#### IV. TAX LAW

This part begins the exploration of how tax law can affect the environment generally and the manufacturing sector in particular. The first section discusses the potential effect of carbon taxes. The second section examines the impact of existing tax provisions on the manufacturing sector, with an emphasis on how these provisions have affected domestic manufacturing jobs. The TCJA made several changes to preexisting tax law that impact the manufacturing sector, particularly with respect to international provisions. The third section focuses on tax incentives that may apply to clean manufacturing.

##### *A. Tax Law and the Environment*

As noted earlier in Part I of this Article, the GND resolution seeks to achieve net-zero carbon emissions. Scholars have considered the impact of taxes on the environment.<sup>129</sup> Economic activity can have local, regional, or global environmental consequences. Pollution knows no national boundaries, and, in particular, greenhouse gas (GHG) emissions affect global climate whatever their source.<sup>130</sup> In 2013, the National Academy of Science considered the effects of U.S. tax policy on greenhouse gas emissions, as directed by Congress in the Energy Improvement and Extension Act of 2008.<sup>131</sup> The study considered targeted tax provisions, like the production tax

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<sup>129</sup> See, e.g., Roberta Mann, *Waiting to Exhale?: Global Warming and Tax Policy*, 51 AM. U. L. REV. 1135 (2002); Leo P. Martinez, *Structural Impediments to Tax Reform: The Environment as Case Study*, 14 FLA. TAX REV. 45 (2013).

<sup>130</sup> See Edward Wong, *China Exports Pollution to U.S., Study Finds*, N.Y. TIMES (Jan. 20, 2014), <https://www.nytimes.com/2014/01/21/world/asia/china-also-exports-pollution-to-western-us-study-finds.html>.

<sup>131</sup> Energy Improvement and Extension Act of 2008, Pub. L. No. 110-343, § 117, 122 Stat. 3807, 3831; NAT'L RESEARCH COUNCIL OF THE NAT'L ACADEMIES, EFFECTS OF U.S. TAX POLICY ON GREENHOUSE GAS EMISSIONS (William D. Nordhaus et al. eds., 2013) [hereinafter GHG STUDY].

credit for renewable electricity, and broad-based tax provisions, like the home mortgage interest deduction.<sup>132</sup> The researchers found that the tax system had little impact on GHG emissions, largely because of design flaws in the renewable energy subsidies.<sup>133</sup> The study noted “current tax expenditures and subsidies are a poor tool for reducing GHG emissions.”<sup>134</sup> Furthermore, “international spillover effects (e.g., shifts in trade flows due to tax treatment differences) can offset or even reverse the expected direct effects of these policies.”<sup>135</sup> Finally, the researchers found that:

[T]ax policy can make a substantial contribution to meeting the nation’s climate-change objectives, but that the current approaches will not accomplish that. In order to meet ambitious climate change objectives, a different approach that targets GHG emissions directly through taxes or tradeable allowances will be both necessary and more efficient.<sup>136</sup>

The GND resolution does not mention carbon taxes, although such a policy could be effective in both reducing GHG emissions as well as raising revenue to meet the GND’s ambitious goals. A \$21.22 tax (in 2013 dollars) per ton of CO<sub>2</sub> emitted by fossil fuel combustion could meet the U.S. GHG emission reduction targets under the 2015 Paris Agreement.<sup>137</sup> Researchers estimated that a \$50 per ton tax imposed beginning in 2020 would raise net revenues by about \$2.1 trillion (in current dollars) over the 2020–2029 period.<sup>138</sup>

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<sup>132</sup> GHG STUDY, *supra* note 131, at 5–7.

<sup>133</sup> *Id.* at 3–7.

<sup>134</sup> *Id.* at 10.

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

<sup>137</sup> Yunguang Chen & Marc A.C. Hafstead, *Using a Carbon Tax to Meet US International Climate Pledges 2–3* (Res. for the Future, Discussion Paper RFF DP 16-48, 2018) (in 2013 dollars). In 2016, fossil fuel combustion accounted for ninety-four percent of U.S. CO<sub>2</sub> emissions and seventy-six percent of U.S. GHG emissions. JONATHAN L. RAMSEUR & JANE A. LEGGETT, CONG. RESEARCH SERV., R45625, ATTACHING A PRICE TO GREENHOUSE GAS EMISSIONS WITH A CARBON TAX OR EMISSIONS FEE: CONSIDERATIONS AND POTENTIAL IMPACTS 2 (2019).

<sup>138</sup> JOSEPH ROSENBERG ET AL., TAX POLICY CTR., DISTRIBUTIONAL IMPLICATIONS OF A CARBON TAX 13 (2018), [https://www.taxpolicycenter.org/sites/default/files/publication/155473/distributional\\_implications\\_of\\_a\\_carbon\\_tax\\_5.pdf](https://www.taxpolicycenter.org/sites/default/files/publication/155473/distributional_implications_of_a_carbon_tax_5.pdf).

Putting a price on carbon and GHG emissions is not without controversy. A U.S. carbon tax could raise prices of U.S. goods more than the prices of goods manufactured abroad, potentially creating a competitive disadvantage for some domestic businesses. Certain businesses may become less profitable, lose market share, and reduce jobs. The National Association of Manufacturers (NAM) outlined the potential disadvantages of a carbon tax in a 2013 report, arguing that “[t]he negative impact of a carbon tax on manufacturing output would be significant, with output from energy-intensive manufacturing sectors dropping as much as 15.0 percent and output from non-energy-intensive manufacturing sectors dropping as much as 7.7 percent.”<sup>139</sup> NAM further estimated that “a carbon tax would lead to lower real wage rates because companies would have higher costs and lower labor productivity,” resulting in a potential decline in workers’ incomes (relative to baseline levels) by as much as 8.5%.<sup>140</sup> The NAM study, which did not take into account the significant changes to the tax system in 2017, assumed that carbon tax revenues would be used for deficit reduction and to reduce personal income tax rates.<sup>141</sup>

A recent Congressional Research Service report discussed the implications of imposing a price on carbon, reviewing a number of legislative proposals and economic studies.<sup>142</sup> It noted that “[a]ll of the carbon tax legislative proposals in recent Congresses have proposed some manner of revenue recycling, specifically directing the carbon tax revenue to support specific policy objectives.”<sup>143</sup> Two main targets for carbon tax revenue recycling are: (1) mitigation of adverse economy-wide impacts, such as decline in GDP; and (2) mitigation of disproportionate distributional impacts.<sup>144</sup> Many economic analyses have found that a carbon tax (before

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<sup>139</sup> NAT’L ASS’N OF MFRS., ECONOMIC OUTCOMES OF A U.S. CARBON TAX 1 (2013).

<sup>140</sup> *Id.*

<sup>141</sup> *Id.* at 3.

<sup>142</sup> RAMSEUR & LEGGETT, *supra* note 137, at 2.

<sup>143</sup> *Id.* at 11.

<sup>144</sup> *Id.*



revenue recycling) would have a regressive effect.<sup>145</sup> If energy-producers and manufacturers pass a carbon tax through to consumers, lower-income households in particular would likely face a disproportionate impact (i.e., regressive outcome), because a larger percentage of their income is used to pay for energy needs, such as electricity, gasoline, or home heating oil.<sup>146</sup> A combination of the two approaches is certainly possible. In a 2018 study, economic models estimated that a carbon tax's impacts on the lowest-income household quintile could be counteracted with approximately ten percent of the revenue, thus allowing for ninety percent of the revenue to be used to address the economy-wide impacts from the carbon tax.<sup>147</sup>

Concerns about the international competitiveness of the U.S. manufacturing sector under a carbon tax, while valid, may be exaggerated. A study by the Congressional Budget Office (CBO), found that:

Under a broad-based carbon tax or cap-and-trade program, some of the reduction in U.S. carbon dioxide emissions would probably be offset by increases in foreign emissions that would not otherwise have occurred . . . . Industries with substantial total emissions, high trade ratios, and high emission intensities are the most likely to generate substantial leakage.<sup>148</sup>

As described in the above quote, the term “leakage” refers to carbon intensive activities shifting to jurisdictions which do not have carbon pricing, thereby reducing the climate mitigating impact of the carbon price. The study found that the industries most likely to suffer leakage were “petroleum and coal products (refining); chemicals; mining; primary metals, nonmetallic mineral products; food; agriculture, forestry, and fisheries; paper; and computer and electronic products.”<sup>149</sup> Another study, which looked at a carbon price of \$15 per ton of CO<sub>2</sub>, projected the largest leakage rates among manufacturing industries to be for the petroleum and coal products industry (27 percent); the chemicals, rubber, and plastics industries (11 percent); the nonferrous

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<sup>145</sup> See, e.g., Justin Caron et al., *Distributional Implications of a National CO<sub>2</sub> Tax in the U.S. Across Income Classes and Regions: A Multi-Model Overview*, 9 CLIMATE CHANGE ECON. 1840004-1 (2018), <https://www.worldscientific.com/doi/pdf/10.1142/S2010007818400043>.

<sup>146</sup> *Id.* at 3.

<sup>147</sup> *Id.* at 4.

<sup>148</sup> Bruce Arnold, *International Trade and Carbon Leakage* 1 (Cong. Budget Office, Working Paper No. 08, 2013).

<sup>149</sup> *Id.* at 6.

primary metals industry (9 percent); the ferrous metals industry (8 percent); and the nonmetallic mineral products industry (6 percent).<sup>150</sup> The industries with the greatest leakage potential are also those that would face the greatest competitive disadvantage from carbon pricing, if the leakage concern is not addressed.<sup>151</sup> The leakage concern can be ameliorated by using border tax adjustments, in this context called a border carbon adjustment (BCA). “A BCA would apply a tariff to emission-intensive, imported goods such as steel, aluminum, cement, and certain chemicals.”<sup>152</sup> Recent congressional carbon price proposals included a BCA to address emission-intensive imports.<sup>153</sup> However, in another study, researchers found that if the U.S. unilaterally adopted a \$15 price per ton of CO<sub>2</sub> emitted, only one percent of U.S. production would shift overseas.<sup>154</sup> Based on this finding, “attempting to ‘protect’ energy-intensive U.S. manufacturing firms from international competitive pressures through various policies may have only a limited impact on these firms,” and no protective action may be necessary.<sup>155</sup> In addition, as discussed above, the Trump administration has already imposed significant tariffs on imported steel and aluminum.

### *B. Taxes and Manufacturing*

This section explores how the existing tax system affects manufacturing. In general, the manufacturing sector is quite happy with current tax law. The National Association of Manufacturers (NAM), a leading lobbying group for the manufacturing sector, published a wish list for tax reform in 2015.<sup>156</sup> Their desires included a lower corporate tax rate,

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<sup>150</sup> Liwayway Adkins et al., *Carbon Pricing with Output-Based Subsidies: Impact on U.S. Industries over Multiple Time Frames* 32 fig.4, 41 tbl.9 (Res. for the Future, Discussion Paper RFF DP 12-27, 2012).

<sup>151</sup> *See id.* at 25–26, 29.

<sup>152</sup> RAMSEUR & LEGGETT, *supra* note 137, at 9.

<sup>153</sup> *See id.*

<sup>154</sup> Joseph E. Aldy & William A. Pizer, *The Competitiveness Impacts of Climate Change Mitigation Policies* 3 (Nat’l Bureau of Econ. Research, Working Paper No. 17705, 2011).

<sup>155</sup> *Id.* at 20.

<sup>156</sup> *See* NAT’L ASS’N OF MFRS., *COMPETING TO WIN: TAX IN FOCUS* (2015).

lower taxes on pass-through entities, a more “territorial” international tax system, and incentives for capital investment.<sup>157</sup> In December 2017, TCJA fulfilled most of their wishes. The corporate tax rate declined from thirty-five percent to twenty-one percent.<sup>158</sup> A new pass-through deduction reduced effective tax rates on pass-through entities.<sup>159</sup> The international tax system was overhauled, although it did not effectively become territorial.<sup>160</sup> Finally, TCJA expanded incentives for capital investment.<sup>161</sup>

However, these tax law changes did not further the GND’s goal of creating good jobs.<sup>162</sup> Although NAM reported case studies of TCJA creating new jobs,<sup>163</sup> other sources reported that the majority of corporate tax savings from TCJA went to buy back shares from stockholders.<sup>164</sup> Corporations have announced almost \$1 trillion in share buybacks since the enactment of TCJA.<sup>165</sup> Only 4.3% of workers received either a one-time bonus or wage

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<sup>157</sup> *Id.* at 3–5.

<sup>158</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13001, 131 Stat. 2054, 2096 (2017) (codified at § 11).

<sup>159</sup> *Id.* § 11011, 131 Stat. at 2063 (codified at § 199A).

<sup>160</sup> Ken Brewer & Albert Liguori, *Reading Between the Lies: The TCJA and U.S. Competitiveness*, 163 TAX NOTES 405, 407 (Apr. 15, 2019) (“The truth is that the new U.S. tax system is not a territorial system . . .”).

<sup>161</sup> Tax Cuts and Jobs Act § 13201, 131 Stat. at 2105 (codified at § 168) (temporary 100% bonus depreciation allowed for qualifying property placed in service from September 27, 2017 through December 31, 2026). *Id.* § 13101, 131 Stat. at 2101 (codified at § 179) (increase in expensing election limitation for qualifying property).

<sup>162</sup> Admittedly, furthering the goals of the GND, which was proposed by Democrats more than a year after enactment of TCJA, was not contemplated by the Republican originators of TCJA.

<sup>163</sup> *Tax Reform Helps Create 170 Jobs in Ohio and Indiana*, NAT’L ASSOC. OF MFRS.: POL’Y & LEGAL (July 22, 2019), <https://www.nam.org/tax-reform-helps-create-170-jobs-in-ohio-and-indiana-5509/>.

<sup>164</sup> Thomas Heath, *A Year After Their Tax Cuts, How Have Corporations Spent the Windfall?*, WASH. POST (Dec. 14, 2018, 5:22 PM), [https://www.washingtonpost.com/business/economy/a-year-after-their-tax-cuts-how-have-corporations-spent-the-windfall/2018/12/14/e966d98e-fd73-11e8-ad40-cdf0e0dd65a\\_story.html?utm\\_term=.46d20698cef9](https://www.washingtonpost.com/business/economy/a-year-after-their-tax-cuts-how-have-corporations-spent-the-windfall/2018/12/14/e966d98e-fd73-11e8-ad40-cdf0e0dd65a_story.html?utm_term=.46d20698cef9); Jim Tankersley & Matt Phillips, *Trump’s Tax Cut Was Supposed to Change Corporate Behavior. Here’s What Happened*, N.Y. TIMES (Nov. 12, 2018), <https://www.nytimes.com/2018/11/12/business/economy/trumps-tax-cut-was-supposed-to-change-corporate-behavior-heres-what-happened.html>.

<sup>165</sup> *Key Facts: How Corporations Are Spending Their Trump Tax Cuts*, AM. FOR TAX FAIRNESS (Apr. 8, 2019), <https://americansfortaxfairness.org/key-facts-american-corporations-really-trump-tax-cuts/>.

increase.<sup>166</sup> Less than a quarter of corporations surveyed in a study by researchers reported that they planned to increase capital investment as a result of TCJA changes.<sup>167</sup>

Indeed, some commentators assert that the international tax law changes in the TCJA actually discourage U.S. manufacturing.<sup>168</sup> TCJA added four significant provisions to the international tax system: (1) a deduction for dividends received from certain foreign subsidiaries;<sup>169</sup> (2) a minimum tax on global intangible low-taxed income (GILTI);<sup>170</sup> (3) a deduction for foreign-derived intangible income (FDII);<sup>171</sup> and (4) a base erosion and antiabuse tax (BEAT).<sup>172</sup> TCJA also made a change to the rules for sourcing income from inventory manufactured by the taxpayer, requiring that income from the sale of manufactured inventory be entirely sourced where production occurs.<sup>173</sup> In general, the source of income is important for tax purposes for two reasons: first, the United States does not impose tax on foreign source income earned by foreign taxpayers, and second, only foreign source income generates foreign tax credits for domestic taxpayers.<sup>174</sup> Prior to the change in the sourcing rules under TCJA, taxpayers could use a “50/50” safe harbor rule in the regulations, which would allocate half of gross

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<sup>166</sup> *Id.*

<sup>167</sup> Michelle Hanlon et al., *Tax Reform Made Me Do It!* 4 (Nat’l Bureau of Econ. Research, Working Paper No. 25283, 2018).

<sup>168</sup> Natalie Kitroeff, *Tax Law May Send Factories Abroad, Critics Say*, N.Y. TIMES (Jan. 8, 2018), <https://www.nytimes.com/2018/01/08/business/economy/gop-says-tax-bill-will-add-jobs-in-us-it-may-yield-more-hiring-abroad.html>; Martin A. Sullivan, *Where Will the Factories Go? A Preliminary Assessment*, 158 TAX NOTES 570 (Jan. 29, 2018).

<sup>169</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 14101, 131 Stat. 2054, 2189–90 (2017) (codified at § 245A).

<sup>170</sup> *Id.* § 14201, 131 Stat. at 2208–12 (codified at § 951A).

<sup>171</sup> *Id.* § 14202, 131 Stat. at 2213–16 (codified at § 250).

<sup>172</sup> *Id.* § 14401, 131 Stat. at 2226 (codified at § 59A).

<sup>173</sup> *Id.* § 14303, 131 Stat. at 2225 (codified at § 863(b)); see David L. Koontz & Jeffery M. Kadet, *Effects of the New Sourcing Rule: ECI and Profit Shifting*, 159 TAX NOTES 1119 (2018) (analyzing the impact of this change).

<sup>174</sup> Koontz & Kadet, *supra* note 173, at 1119.

income to production and the other half to sales activity.<sup>175</sup> Therefore, under the prior rule, inventory produced in the United States and sold abroad would only result in half of the income being considered U.S. source. The new rule encourages taxpayers to move production abroad to minimize income subject to U.S. taxation.

Tax planning for MNCs before TCJA generally focused on minimizing the amount of income subject to U.S. taxation, because the U.S. corporate tax rate at thirty-five percent was higher than most other countries.<sup>176</sup> U.S. taxation could be minimized by shifting profits to foreign entities and by maximizing the use of deductions and credits against U.S. source income.<sup>177</sup> After TCJA, the planning calculus may have changed. The new dividends received deduction allows MNCs to bring foreign earned income into the United States without U.S. tax consequences.<sup>178</sup> The minimum tax under GILTI was designed to limit profit-shifting. The FDII provision was designed to encourage exports. However, according to analysis by the Congressional Budget Office (CBO), the GILTI and FDII provisions, acting “[t]ogether, may increase corporations’ incentive to locate tangible assets abroad.”<sup>179</sup> While the GILTI provision may limit profit-shifting, it taxes “shifted” income at 10.5%, which is obviously lower than the prevailing corporate tax rate of twenty-one percent.<sup>180</sup> Moreover, the FDII deduction creates an effective 13.25% rate on certain income from exports.<sup>181</sup> The amount of income that is taxed at a lower rate is determined by a formula which includes a variable called qualified business asset investment

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<sup>175</sup> Treas. Reg. § 1.863-3(b)(1) (as amended in 2006); see Koontz & Kadet, *supra* note 173, at 1124.

<sup>176</sup> Kari Jahnsen & Kyle Pomerleau, *Corporate Income Tax Rates Around the World, 2017*, TAX FOUND. (Sept. 7, 2017), <https://taxfoundation.org/corporate-income-tax-rates-around-the-world-2017/>.

<sup>177</sup> JANE G. GRAVELLE & DONALD J. MARPLES, CONG. RESEARCH SERV., R45186, ISSUES IN INTERNATIONAL TAXATION: THE 2017 REVISIONS (P.L. 115-97), at 6–7 (2019).

<sup>178</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 14101, 131 Stat. 2054, 2189–90 (2017) (codified at § 245A).

<sup>179</sup> CONG. BUDGET OFFICE, THE BUDGET AND ECONOMIC OUTLOOK: 2018 TO 2028, at 109–10 (2018).

<sup>180</sup> I.R.C. § 250(a)(1)(B). The effective tax rate is reduced because there is a fifty percent GILTI deduction under § 250(a)(1)(B).

<sup>181</sup> See *id.* § 250(a)(1)(A). The 37.5% deduction under § 250(a)(1)(A) results in a 13.25% effective tax rate.

(QBAI).<sup>182</sup> Under the formula, if QBAI decreases, the FDII deduction increases.<sup>183</sup> Holding domestic tangible business assets increases QBAI, and therefore decreases the FDII deduction.<sup>184</sup> Therefore, the CBO concluded that “[b]y locating more tangible assets abroad, a corporation is able to reduce the amount of foreign income that is categorized as GILTI. Similarly, by locating fewer tangible assets in the United States, a corporation can increase the amount of U.S. income that can be deducted as FDII.”<sup>185</sup> Arguably, then, multinational manufacturing firms will locate tangible assets abroad. If tangible assets leave the United States, jobs will likely follow. However, this is not a simple calculation. Economist Martin Sullivan of *Tax Notes* called the complexity of the U.S. international tax rules “absurd” and noted that the absurdity “might be acceptable if it fine-tuned some lofty policy objective. But no, while seemingly providing the precision of a guided missile, it really is just driving us around town in bewildering circles, arbitrarily dropping us off in unexpected places.”<sup>186</sup> Somewhat more optimistically, other commentators noted that “[o]n balance, the TCJA appears to have made a substantial move toward making taxes a neutral factor in the site selection decision for foreign-based multinationals and a positive factor (favoring the United States) in the site selection decision for U.S.-based multinationals.”<sup>187</sup>

Leaving the bewildering world of international tax provisions behind, it is worth noting that enhanced incentives for capital investment may not help American workers. Capital investment includes automation. An often cited goal of taxation is to match the timing of deductions to the income generated

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<sup>182</sup> I.R.C. § 951A(d)(1).

<sup>183</sup> See Zheli He, *Trading Tangible for Intangible: The Incentives Created by GILTI and FDII in the TCJA*, U. PA.: PENN WHARTON BUDGET MODEL (Sept. 10, 2018), <https://budgetmodel.wharton.upenn.edu/issues/2018/9/10/trading-tangible-for-intangible-the-incentives-created-by-gilti-and-fdii-in-the-tcja>.

<sup>184</sup> *Id.*

<sup>185</sup> CONG. BUDGET OFFICE, *supra* note 179, at 110.

<sup>186</sup> See Martin A. Sullivan, *A New GILTI Spreadsheet for Policy and Planning*, 164 TAX NOTES 641 (July 29, 2019).

<sup>187</sup> Brewer & Ligouri, *supra* note 160, at 411.

by the expenditure.<sup>188</sup> Therefore, if the purchase of equipment generates income over a number of years, the cost of that equipment should be spread over the years during which it generates income. The cost of the equipment is called a capital expenditure, and the deduction of that cost over the income-generating life of the capital expenditure is called depreciation. TCJA increased the availability of expensing of certain capital expenditures, that is, the entire cost may be deducted in the year of the purchase. The salary of human workers must be deducted each year. If a robot can replace several human workers and continue to earn income for the firm for several years, the firm can in effect deduct several years of wages at once. Due to the time value of money, a deduction is worth more the earlier it can be taken. For example, assume that a business replaces three workers, each earning \$20,000 per year, with a robot costing \$180,000. Workers' salaries are deductible when paid, so the business could take a \$60,000 deduction each year for the salaries.<sup>189</sup> If the business is a corporation, it pays taxes at a twenty-one percent rate.<sup>190</sup> A \$60,000 deduction will thus produce a reduction in tax liability of \$12,600 each year. The present value of a three-year stream of \$12,600 annuity (because the reduction in tax is equivalent to a payment), at an assumed interest rate of five percent per year, is \$34,314.<sup>191</sup> In contrast, the robot purchase would be immediately deductible under either § 168(k) or § 179. A \$180,000 deduction would reduce tax liability by \$37,800, a difference of more than \$3,000 from the present value of the deduction for the workers' salaries. As noted above, one of the reasons for the decline in manufacturing employment is increasing automation, and TCJA will likely accelerate that trend.

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<sup>188</sup> See, e.g., BORIS I. BITTKER ET AL., FEDERAL INCOME TAXATION OF INDIVIDUALS ¶ 12.01 (3d ed.), Westlaw (database updated 2019) (explaining the Supreme Court's reasoning in *Comm'r v. Idaho Power*, 418 U.S. 1 (1974)).

<sup>189</sup> I.R.C. § 162(a).

<sup>190</sup> *Id.* § 11.

<sup>191</sup> *Present Value of an Ordinary Annuity Table*, ACCOUNTINGTOOLS, <https://www.accountingtools.com/articles/2017/5/16/present-value-of-an-ordinary-annuity-table> (last visited Dec. 1, 2019).

### C. Taxes and Clean Manufacturing

#### 1. Research and Development Tax Incentives

Businesses want to reduce costs. Efficiency in manufacturing tends to reduce costs, so using more energy-efficient manufacturing equipment and processes should not need incentives from the tax system. New, cleaner manufacturing equipment would generally be eligible for expensing, as noted above. Research and development costs for cleaner manufacturing may also be eligible for tax benefits, like research and development (R&D) costs generally.<sup>192</sup> Under currently effective rules, taxpayers can choose to treat research and development costs as a deduction or credit.<sup>193</sup> In addition, there is a specific energy research tax credit.<sup>194</sup> NAM's wish list included enhanced R&D tax incentives, noting that "[t]he R&D tax credit is a proven incentive for spurring private-sector investment in R&D and creating domestic, high-wage jobs."<sup>195</sup> While tax incentives for R&D can benefit manufacturing firms, as currently structured, they suffer from complexity. The taxpayer contemplating use of the R&D tax incentives must determine whether to take the deduction or the credit. The R&D credit is actually four different credits: the "regular" research credit, an alternative simplified credit, a basic research credit, and the aforementioned energy research credit.<sup>196</sup> These benefits interact: a taxpayer may claim no more than the basic and energy research credits, plus either the regular credit or the alternative simplified credit.<sup>197</sup> "Any research tax credit claimed must be subtracted from deductible research expenses."<sup>198</sup> Criticisms of the R&D tax credit include its uneven and inadequate incentive effects, a lack of refundability, and an ambiguous definition of qualified research that fosters disputes between the Internal Revenue Service and companies over the legitimacy of claims for the credit.<sup>199</sup> TCJA also affected planning for R&D expenditures.<sup>200</sup> In particular, the immediate expensing of R&D under § 174 is no longer allowed after 2021.<sup>201</sup>

The energy research credit mentioned above is somewhat simpler than the other R&D credits. It applies to the full amount of payments made to

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<sup>192</sup> See I.R.C. § 174 (providing a deduction for R&D expenditures); see also *id.* § 41 (providing a tax credit for R&D expenditures).

<sup>193</sup> *Id.*



nonprofit organizations exempt from taxation under § 501(a) and “organized and operated primarily to conduct energy research in the public interest.”<sup>202</sup> The organization conducting energy research must have a minimum of five contributing members, and none of them may account for more than half of the total payments for qualified research received by the organization in a calendar year.<sup>203</sup> Payments for research done by certain small firms is also eligible, provided that the taxpayer does not own fifty percent or more of the stock of the small firm performing the research (if the firm is a corporation), or hold fifty percent or more of the small firm’s capital and profits (if the firm is a noncorporate entity such as a partnership).<sup>204</sup> In addition, the firm performing the research must have an average of 500 or fewer employees in one of the two previous calendar years.<sup>205</sup> Note that the energy research credit is not limited to renewable energy. The next section addresses tax incentives for producing energy.

## 2. Energy Tax Incentives

Energy tax incentives include a panoply of other tax benefits that apply to various energy sources. This section will discuss incentives for fossil

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<sup>194</sup> *Id.* § 41(a)(3).

<sup>195</sup> NAT’L ASS’N OF MFERS., *supra* note 120, at 6.

<sup>196</sup> I.R.C. § 41(a).

<sup>197</sup> GARY GUENTHER, CONG. RESEARCH SERV., RL31181, RESEARCH TAX CREDIT: CURRENT LAW AND POLICY ISSUES FOR THE 114TH CONGRESS, at 18 (2015).

<sup>198</sup> *Id.*

<sup>199</sup> *Id.*

<sup>200</sup> Daniel F. Laughlin, *The TCJA’s Effect on Future R&D Tax Credit Planning*, TAX ADVISER (Jan. 10, 2019), <https://www.thetaxadviser.com/newsletters/2019/tcja-effect-research-development-tax-credit-planning.html>.

<sup>201</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13206, 131 Stat. 2054, 2111 (2017) (codified at § 174).

<sup>202</sup> I.R.C. § 41(f)(6)(A)(i).

<sup>203</sup> *Id.* § 41(f)(6)(A)(iii).

<sup>204</sup> *Id.* § 41(b)(3)(D)(i)–(ii).

<sup>205</sup> *Id.* § 41(b)(3)(D)(iii).

energy, carbon sequestration, and renewable energy, with a focus on the GND's goals of reducing carbon emissions.

The Code has provided incentives for fossil energy for over 100 years. In 2017, federal tax incentives for fossil energy totaled an estimated \$4.6 billion (25.8% of total federal tax benefits for energy).<sup>206</sup> In the same year, an estimated \$11.6 billion of federal tax incentives supported renewable energy (65.2% of total federal tax benefits for energy).<sup>207</sup> The GND resolution contemplates “meeting 100 percent of the power demand in the United States through clean, renewable, and zero-emission energy sources.”<sup>208</sup> Obviously, subsidizing carbon-emitting fossil fuels is inconsistent with that goal. Scholars and policymakers have called for the elimination of fossil fuel subsidies.<sup>209</sup> President Obama included “elimination of fossil fuel subsidies in each of his budget proposals to Congress.”<sup>210</sup> The existing tax provisions that subsidize fossil fuel production are:

1. Expensing intangible drilling costs, which include costs such as wages, fuel, and supplies “incident to and necessary for the drilling of wells and the preparation of wells for the production of oil or gas”;<sup>211</sup>
2. Percentage depletion for oil, gas, and mineral fossil fuels, which allows certain taxpayers to deduct a percentage of their income derived from the property, unlike usual cost recovery rules which limit the deduction to the amount invested in the property;<sup>212</sup>

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<sup>206</sup> MOLLY F. SHERLOCK, CONG. RESEARCH SERV., R44852, THE VALUE OF ENERGY TAX INCENTIVES FOR DIFFERENT TYPES OF ENERGY RESOURCES 5–7 (2019).

<sup>207</sup> *Id.* at 9.

<sup>208</sup> H.R. Res. 109, 116th Cong. (2019).

<sup>209</sup> *See, e.g.*, Mann, *supra* note 129, at 1218–19.

<sup>210</sup> HAMILTON PROJECT, BROOKINGS INST., 15 WAYS TO RETHINK THE FEDERAL BUDGET, at 34 (Michael Greenstone et al. eds., 2013).

<sup>211</sup> I.R.C. § 263(c); Treas. Reg. § 1.612-4(a) (1965).

<sup>212</sup> *Id.* §§ 613, 613A.

3. Accelerated geological and geophysical expenditure amortization, under which costs incurred to obtain and accumulate data that will serve as the basis for acquiring and retaining mineral properties by taxpayers exploring for minerals, including gas and oil, must be amortized over two years;<sup>213</sup>
4. Expensing of coal exploration and development costs;<sup>214</sup>
5. Capital gains treatment for royalties earned by owners of coal resources, thereby reducing the tax rate paid on such royalties;<sup>215</sup>
6. Deduction for tertiary injectants, which are products used to recover oil from wells, including gas injection;<sup>216</sup>
7. Exception for passive loss limitations for working interests in oil and gas properties, which allows owners of working interests in oil and gas properties to deduct all losses without regard to income from the properties, unlike other passive investments;<sup>217</sup>
8. Enhanced oil recovery credit, which taxpayers can use instead of the deduction for tertiary injectants and also includes intangible drilling costs if the taxpayer does not take the deduction described in item 1 above;<sup>218</sup>
9. Credit for oil and gas produced from marginal wells, which produce a limited amount of oil and gas;<sup>219</sup> and
10. Master limited partnership treatment, which exempts certain publicly traded partnerships from entity-level tax, thereby

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<sup>213</sup> *Id.* § 167(h).

<sup>214</sup> *Id.* § 617.

<sup>215</sup> *Id.* § 631.

<sup>216</sup> *Id.* § 193; see *Tertiary Recovery*, SCHLUMBERGER: OILFIELD GLOSSARY, [https://www.glossary.oilfield.slb.com/en/Terms/t/tertiary\\_recovery.aspx](https://www.glossary.oilfield.slb.com/en/Terms/t/tertiary_recovery.aspx).

<sup>217</sup> *Id.* § 469(c)(3).

<sup>218</sup> *Id.* § 43.

<sup>219</sup> *Id.* § 451.

reducing the tax burden for investors and making it easier to obtain equity financing.<sup>220</sup>

### 3. Carbon sequestration tax incentives

Use of fossil energy in manufacturing may be consistent with the goals of the GND resolution provided that the carbon emissions can be sequestered. The Bipartisan Budget Act of 2018 enhanced the existing tax credit for carbon sequestration, which is codified at § 45Q.<sup>221</sup> The revised credit promotes investment in carbon capture, utilization, and sequestration (CCUS or CCS) projects by expanding the credit to include all carbon oxides (CO<sub>x</sub>), which is important for emissions from steel production facilities.<sup>222</sup> The revision also increases the value of the tax credit to thirty dollars per ton for CO<sub>x</sub> used in enhanced oil recovery (EOR) and sequestered in secure geologic storage or sequestered in a utilization project.<sup>223</sup> Without EOR or a utilization project, the credit is between twenty dollars to fifty dollars per ton for secure geologic storage.<sup>224</sup> The credit is now available for CO<sub>x</sub> captured through direct air capture technology.<sup>225</sup> Perhaps most importantly, the credit is now transferable to the person that purchases the carbon oxide to dispose of it, use it as a tertiary injectant, or utilize it.<sup>226</sup> The Internal Revenue Service has requested comments on regulations under § 45Q, seeking comments on the types of contractual arrangements that investors anticipate with parties who capture, dispose of, or utilize qualified CO.<sup>227</sup>

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<sup>220</sup> *Id.* § 7704(d)(1)(E).

<sup>221</sup> Bipartisan Budget Act of 2018, Pub. L. No. 115-123, § 41119, 132 Stat. 64, 162 (codified at § 45Q).

<sup>222</sup> Michael L. Platner, *Implementation of Recent Amendments to the 45Q Carbon Sequestration Tax Credit*, NAT'L L. REV. (May 3, 2019), <https://www.natlawreview.com/article/implementation-recent-amendments-to-45q-carbon-sequestration-tax-credit>.

<sup>223</sup> *Id.*

<sup>224</sup> *Id.*

<sup>225</sup> See PETER FOLGER, CONG. RESEARCH SERV., R44902, CARBON CAPTURE AND SEQUESTRATION (CCS) IN THE UNITED STATES 12, 19 (2018).

<sup>226</sup> *Id.* at 10, 21.

<sup>227</sup> I.R.S. Notice 2019-32, 2019-21 I.R.B. 1187.

The revised credit may enhance the economic viability of CCS. To date, however, carbon sequestration technology is not cost-effective.<sup>228</sup> A coal company executive called CCS “just cover for politicians, both Republican and Democrats who say ‘Look what I did for coal,’ knowing all the time that it doesn’t help coal at all.”<sup>229</sup> Only one coal-fired electrical plant in the United States is currently using CCS, and it is located within 100 miles of an oil field that uses the CO<sub>2</sub> for EOR.<sup>230</sup> A commentator noted that CCS “is still leaps and bounds away from economic sustainability without a carbon tax or high oil prices [to make EOR economic].”<sup>231</sup> One could also question why we continue to support the fossil fuel industry with subsidies, even if the subsidies are for CCS, when public dollars might be better spent in transitioning to a new energy economy. Doug Koplow of EarthTrack wrote, “The effect of these subsidies is to prop up carbon-intensive industries such as oil and gas extraction while undermining the competitive position of low-carbon alternatives.”<sup>232</sup>

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<sup>228</sup> See Roger O’Neill, *The Questionable Economic Feasibility of Carbon Capture Technology*, COMPETITIVE ENTER. INST. (June 29, 2017), <https://cei.org/blog/questionable-economic-feasibility-carbon-capture-technology>. More recently, an analysis of a proposed new CCS project cited as one of the proposal’s major flaws, “It overlooks how the deployment of carbon-capture technology around coal-fired generation remains a mostly academic, unaffordable exercise . . . .” KARL CATES & DENNIS WAMSTED, INST. FOR ENERGY ECON. & FIN. ANALYSIS, NOVICE COMPANY’S CARBON CAPTURE PITCH OFFERS FALSE HOPE, FISCAL RISK TO FARMINGTON, N.M. 2 (2019), [http://ieefa.org/wp-content/uploads/2019/07/Novice\\_Company%E2%80%99s\\_Carbon\\_Capture\\_Pitch\\_Offers\\_False\\_Hope\\_July\\_2019.pdf](http://ieefa.org/wp-content/uploads/2019/07/Novice_Company%E2%80%99s_Carbon_Capture_Pitch_Offers_False_Hope_July_2019.pdf).

<sup>229</sup> Emily Holden, *Pruitt Will Launch Program to “Critique” Climate Science*, ENERGY & ENV’T NEWS (June 30, 2017), <https://www.eenews.net/stories/1060056858> (quoting Robert Murray, chief executive officer of Murray Energy); see Matthew Dessem, *Court Finds John Oliver Has the Right to Hire a Giant Squirrel Named “Mr. Nutterbutter” to Insult Coal Barons*, SLATE (Feb. 24, 2018, 9:08 PM), <https://slate.com/culture/2018/02/court-finds-john-oliver-has-the-right-to-hire-giant-squirrels-to-insult-coal-barons.html>.

<sup>230</sup> FOLGER, *supra* note 225, at 12.

<sup>231</sup> O’Neill, *supra* note 228.

<sup>232</sup> Douglas Koplow, *The Trouble with Q: Why the U.S. Should Not Be Subsidizing Carbon Capture and Sequestration*, EARTH TRACK (Aug. 5, 2016, 12:50 PM), <https://www.earthtrack.net/blog/trouble-q-why-us-should-not-be-subsidizing-carbon-capture-and-sequestration>.

#### 4. Renewable Energy Tax Credits

The United States has had renewable energy tax credits on and off since the late 1970s.<sup>233</sup> While fossil energy tax incentives are mostly permanent (although they have been reduced over the years), the renewable energy tax incentives are mostly temporary and have repeatedly expired.<sup>234</sup> The on-again, off-again nature of the renewable energy tax incentives has probably restricted the growth of renewable energy resources, although state policies such as renewable portfolio standards have supported the industry.

The existing renewable energy tax incentives are the investment tax credit (ITC),<sup>235</sup> mostly used for solar energy projects, and the production tax credit (PTC),<sup>236</sup> mostly used for wind energy.<sup>237</sup> Since 1992, the ITC for solar and geothermal energy has been a permanent credit, for ten percent of the cost of qualifying projects.<sup>238</sup> As noted below, the ITC for solar is currently higher than ten percent.

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<sup>233</sup> Energy Tax Act of 1978, Pub. L. No. 95-618, § 301, 92 Stat. 3174, 3194 (creating a temporary ten percent tax credit for business energy property and equipment using energy resources other than oil or natural gas).

<sup>234</sup> See MOLLY F. SHERLOCK, CONG. RESEARCH SERV., IF10479, THE ENERGY CREDIT: AN INVESTMENT TAX CREDIT FOR RENEWABLE ENERGY 1 (2018).

<sup>235</sup> I.R.C. § 48. The Joint Committee on Taxation estimated that \$2.5 billion of the total \$2.8 billion revenue loss from the ITC in 2018 was attributable to solar. SHERLOCK, *supra* note 234, at 2.

<sup>236</sup> I.R.C. § 45.

<sup>237</sup> MOLLY F. SHERLOCK, CONG. RESEARCH SERV., R43453, THE RENEWABLE ENERGY PRODUCTION TAX CREDIT: IN BRIEF 5 (2018).

<sup>238</sup> Energy Policy Act of 1992, Pub. L. No. 102-486, § 1916, 106 Stat. 2776, 3024 (making the credits for solar and geothermal permanent).

**Table 1. Energy Credit: Summary of Current Law**

Eligible Technology	Credit Rate	Expiration Date (End of Year)
Solar, Fiber Optic Solar, Fuel Cells, Small Wind	30%	2019
	26%	2020
	22%	2021
Microturbines, Combined Heat and Power, Geothermal Heat Pump	10%	2021
Solar, Geothermal Energy	10%	Permanent

**Notes:** Credit expiration dates are start-of-construction deadlines. For nonpermanent credits, property generally must be placed in service by December 31, 2023. Wind property may be eligible for the Section 45 PTC, and elect to receive the ITC in lieu of PTC through 2019.

Source: MOLLY F. SHERLOCK, CONG. RESEARCH SERV., IF10479, THE ENERGY CREDIT: AN INVESTMENT TAX CREDIT FOR RENEWABLE ENERGY 1 (2018).

The PTC, in contrast, is a per-kilowatt-hour tax credit for electricity generated using qualified energy resources.<sup>239</sup> To qualify for the credit, the electricity must be sold by the taxpayer to an unrelated person.<sup>240</sup> The credit can be claimed for a ten-year period once a qualifying facility is placed in service.

<sup>239</sup> I.R.C. § 45(a)(2)(A).

<sup>240</sup> *Id.*

**Table 2. PTC Credit Rate and Eligible Renewable Technologies  
2018**

	<b>Credit Rate (per kWh)</b>	<b>Qualifying Technologies</b>
<b>Full Credit</b>	2.4¢	Wind (construction beginning before 2017), Closed-Loop Biomass, Geothermal
<b>Half Credit</b>	1.2¢	Open-Loop Biomass, Small Irrigation Power, Municipal Solid Waste, Qualified Hydropower, Marine and Hydrokinetic
<b>60% Credit</b>	1.44¢	Wind (construction beginning in 2018)

**Source:** IRC Section 45.

Source: MOLLY F. SHERLOCK, CONG. RESEARCH SERV., IF10479, THE ENERGY CREDIT: AN INVESTMENT TAX CREDIT FOR RENEWABLE ENERGY 2 (2018).

As noted earlier, the “subsidy” approach is not the most efficient way to promote renewable energy. Subsidies reduce the cost of energy, which encourages energy consumption. Unlike a carbon tax, the tax credit approach does not focus incentives on the least costly alternative, instead picking technology “winners.” Unlike a carbon tax, tax credits reduce tax revenues. Really, the only reason to “like” renewable energy tax credits is that they do *something* to promote clean energy. Although not an optimal policy tool, renewable energy tax credits have given renewable energy a toehold in the economy.<sup>241</sup> The next section will shift gears and look at another one of the GND’s goals—creating good jobs.

<sup>241</sup> See Barack Obama, *The Irreversible Momentum of Clean Energy*, 355 SCI. 126, 128 (2017) (“Public policy—ranging from Recovery Act investments to recent tax credit extensions—has played a crucial role, but technology advances and market forces will continue to drive renewable deployment.”).



#### D. Taxes and “Good Jobs”

Can tax policy create “good” jobs? In addition to the ability of firms to move operations to right-to-work states, judicial decisions have weakened unions. In 2018, the Supreme Court limited the ability of public-sector unions to require nonunion members to pay for the benefits of collective bargaining, although the case does not apply to private-sector unions.<sup>242</sup> It is unlikely that tax law alone can solve the problem of the decline of unions, but current law certainly does not help. Before the enactment of TCJA, workers could deduct union dues as unreimbursed employee business expenses.<sup>243</sup> Unreimbursed business expenses are classified as miscellaneous itemized deductions, which before the enactment of TCJA could be used to reduce a worker’s taxable income to the extent that the total amount of miscellaneous itemized deductions exceeded two percent of the worker’s adjusted gross income.<sup>244</sup> Under the TCJA, miscellaneous itemized deductions may not be taken until after 2025.<sup>245</sup> In short, today union dues are not deductible.

Workers’ wages are deductible by businesses regardless of the level of benefits provided by the business.<sup>246</sup> An additional benefit for hiring employees could be provided by the so-called pass-through deduction in § 199A, enacted as part of the TCJA. Section 199A allows noncorporate business owners to deduct twenty percent of their “qualified business income.” Part of the admittedly complex determination<sup>247</sup> of the deductible amount is based on the W-2 wages paid by the business.<sup>248</sup> Only payments to

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<sup>242</sup> *Janus v. AFSCME*, 138 S. Ct. 2448, 2460 (2018); see also Adam Liptak, *Supreme Court Ruling Delivers a Sharp Blow to Labor Unions*, N.Y. TIMES (June 27, 2018), <https://www.nytimes.com/2018/06/27/us/politics/supreme-court-unions-organized-labor.html>.

<sup>243</sup> I.R.C. § 162 (2017).

<sup>244</sup> *Id.* § 62(a) (2018).

<sup>245</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 11045, 131 Stat. 2054, 2088 (2017).

<sup>246</sup> I.R.C. § 162(a).

<sup>247</sup> See Rodney P. Mock & David G. Chamberlain, *Section 199A: Job Creator or Tax Giveaway?*, 161 TAX NOTES 1309, 1311 (2018) (describing § 199A as a “labyrinth” and noting that “Congress certainly did not make the provision simple”)

<sup>248</sup> I.R.C. § 199A(b)(2).

people classified as employees count as “W-2” wages;<sup>249</sup> therefore, the deduction may encourage businesses to hire employees. One commentator noted that “the most coherent policy rationale for [the § 199A deduction] involves Congress’s desire to encourage and reward ‘job creators.’”<sup>250</sup> However, the § 199A deduction has been the subject of vigorous critiques, one commentator calling it “Congress’s worst tax idea ever.”<sup>251</sup> The Joint Committee on Taxation, in its explanation of the provision, noted:

The provision reflects Congress’s belief that a reduction in the corporate income tax rate does not completely address the Federal income tax burden on businesses. While the corporate tax is a tax on capital income, the tax on income from noncorporate businesses may fall on both labor income and capital income. Treating corporate and noncorporate business income more similarly to each other under the Federal income tax requires distinguishing labor income from capital income in a noncorporate business.<sup>252</sup>

Referring to this Joint Committee on Taxation explanation, another commentator opined that the § 199A deduction would “fuel wealth inequality.”<sup>253</sup> The commentator concluded that the “essence of 199A . . . is that the owners of capital are more important and more entitled to tax relief than people who earn substantial money by their own efforts.”<sup>254</sup> The conclusion and recommendations section will explore some ideas from the past that could be used to create future good jobs without creating additional inequality, which, as discussed in the next section, can cause harm to workers as well as society as a whole.

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<sup>249</sup> See Treas. Reg. § 1.199A-2(b)(2) (2019).

<sup>250</sup> Mock & Chamberlain, *supra* note 247, at 1309.

<sup>251</sup> Edward D. Kleinbard, *Congress’ Worst Tax Idea Ever*, THE HILL (Mar. 25, 2019, 9:00 AM), <https://thehill.com/opinion/finance/434998-congress-worst-tax-idea-ever>; see also Patrick Driessen, *Congress’s Passthrough Parity Story: Big Hat, Stray Cattle*, 164 TAX NOTES FED. 1419 (2019) (discussing other critiques).

<sup>252</sup> STAFF OF JOINT COMM. ON TAXATION, JCS-1-18, GENERAL EXPLANATION OF PUBLIC LAW 115-97, at 20 (2018).

<sup>253</sup> Peter J. Reilly, *Pass-Through Deduction (199A) Will Fuel Wealth Inequality*, FORBES (Dec. 27, 2018, 8:32 PM), <https://www.forbes.com/sites/peterjreilly/2018/12/27/pass-through-deduction-199a-will-fuel-wealth-inequality/#6dd8184a6248>.

<sup>254</sup> *Id.*

### *E. Taxes and Inequality*

High levels of inequality harm all parts of society.<sup>255</sup> Econometric analysis by OECD researchers found that rising inequality in the United States reduced GDP, in large part because of lack of educational opportunities for lower-income youth.<sup>256</sup> Western Europe and the United States had similar levels of inequality in 1980 but now the United States' level of inequality is dramatically higher than Europe's.<sup>257</sup> "While the top 1% income share was close to 10% in both regions in 1980, it rose only slightly to 12% in 2016 in Western Europe while it shot up to 20% in the United States."<sup>258</sup> Moreover, the bottom fifty percent income share in the United States decreased from more than twenty percent in 1980 to thirteen percent in 2016.<sup>259</sup> The World Inequality Report also noted educational inequalities in the United States, but cited the effect of the "tax system that grew less progressive despite a surge in top labor compensation since the 1980s, and in top capital incomes in the 2000s."<sup>260</sup>

TCJA provided disproportionate benefits to the upper reaches of the income spectrum.<sup>261</sup> What effect do corporate taxes have on executive compensation? As noted earlier, executive pay has skyrocketed. Executives' control of corporate finances means that limitations on deductibility of executive compensation results in reduction of cash balances, at the expense

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<sup>255</sup> Christopher Ingraham, *How Rising Inequality Hurts Everyone, Even the Rich*, WASH. POST (Feb. 6, 2018, 6:00 AM), <https://www.washingtonpost.com/news/wonk/wp/2018/02/06/how-rising-inequality-hurts-everyone-even-the-rich/>.

<sup>256</sup> Federico Cingano, *Trends in Income Inequality and Its Impact on Economic Growth* 28–29 (OECD Soc., Emp't & Migration Working Paper No. 163, 2014).

<sup>257</sup> FACUNDO ALVAREDO ET AL., WORLD INEQUALITY REP. 2018, at 6 (2018), <https://wir2018.wid.world/files/download/wir2018-summary-english.pdf>.

<sup>258</sup> *Id.*

<sup>259</sup> *Id.*

<sup>260</sup> *Id.*

<sup>261</sup> Josh Bivens & Hunter Blair, *The Likely Economic Effects of the Tax Cuts and Jobs Act (TCJA)*, ECON. POL'Y INST. (June 1, 2018), <https://www.epi.org/publication/the-likely-economic-effects-of-the-tax-cuts-and-jobs-act-tcja-higher-incomes-for-the-top-no-discernible-effect-on-wage-growth-for-typical-american-workers/>.

of shareholders.<sup>262</sup> Moreover, attempts to curtail executive compensation by limiting the deductibility of such compensation have backfired. Enacted in 1993, § 162(m) limited the ability of a business to deduct executive compensation to \$1 million annually per executive.<sup>263</sup> The provision contained a rather large loophole: performance-based compensation (e.g., stock options) were excluded from the limitation.<sup>264</sup> According to the Economic Policy Institute, from 1978 to 2017, inflation-adjusted compensation based on realized stock options of the top CEOs increased 1,070%.<sup>265</sup> “The increase was more than 61 percent greater than stock market growth and substantially greater than the 11.2 percent growth in a typical worker’s annual compensation over the same period.”<sup>266</sup> This data shows that the United States is moving in the wrong direction to help workers. However, it should be noted that the TCJA did expand the definition of “covered executive” in § 162(m) and, most importantly, eliminated the exceptions for commissions and performance-based compensation from the definition of compensation subject to the \$1 million deduction limit.<sup>267</sup> Despite this modest improvement to deductibility of executive compensation, a more progressive tax system is needed to tax higher-income Americans (like corporate executives) at higher rates, thereby reducing inequality.

#### *F. Taxes and Infrastructure*

As noted earlier, despite rhetoric about improving infrastructure, the government appears unwilling to act. Adequate infrastructure is essential to

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<sup>262</sup> Tobias Bornemann et al., *Do Corporate Taxes Affect Executive Compensation?* 6, 27 (June 20, 2019) (unpublished manuscript), <https://ssrn.com/abstract=3403486> (“Hence, any policy attempt to reduce executive compensation by changing the corporate tax code might not be successful because of executives’ labor market power.”).

<sup>263</sup> Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 13211(a), 107 Stat. 312, 469 (codified as amended at I.R.C. § 162(m)).

<sup>264</sup> See Treas. Reg. § 1.162-27(e) (as amended in 2015) (explaining the exception for qualified performance-based compensation).

<sup>265</sup> MISHEL & SCHIEDER, *supra* note 94, at 8.

<sup>266</sup> *Id.* at 4.

<sup>267</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13601, 131 Stat. 2054, 2155 (2017); see Notice 2018-68, 2018-36 I.R.B. 418 (providing guidance on the implementation of the changes to § 162(m)).

a strong manufacturing sector, but the United States spends less on infrastructure today, as a percentage of gross domestic product (GDP), than at any point in the last fifty years.<sup>268</sup> The United States funds its surface transportation system with a dedicated tax on motor fuels, which goes into the Highway Trust Fund (HTF).<sup>269</sup> The federal tax on gasoline is \$0.184 per gallon, unchanged since 1993.<sup>270</sup> A study by the American Association of State Highway and Transportation Officials (AASHTO) and the American Public Transit Association (APTA) estimated that \$163 billion of investment would be required annually for the next six years.<sup>271</sup> Without additional investment, American businesses will face costs from transportation delays and vehicle repairs of up to \$430 billion through 2020, reducing productivity and competitiveness.<sup>272</sup>

A sustainable approach to funding transportation infrastructure could be accomplished in a number of different ways. “Congress could eliminate the HTF and force surface transportation to compete with other federal programs for annual funding. This approach . . . is used by most other developed countries.”<sup>273</sup> Congress would then have greater flexibility to allocate funding among different transportation modes and between transportation and nontransportation uses. Switching from fuel taxes to a vehicle-miles-travelled (VMT) tax could arguably increase available infrastructure funds, but would potentially penalize drivers of fuel-efficient vehicles, contrary to a policy of encouraging efficiency and reducing GHG emissions. Increasing gas tax rates could modify behavior consistent with environmental concerns

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<sup>268</sup> U.S. SEN. COMM. ON FIN., THE COMMUNITY DEVELOPMENT AND INFRASTRUCTURE BIPARTISAN TAX WORKING GROUP REPORT (2015).

<sup>269</sup> Roberta F. Mann, *Sustainably Funding Transportation Infrastructure: Tax Fuel or Miles?*, 31 AUSTL. TAX F. 609, 611 (2016).

<sup>270</sup> *Id.*

<sup>271</sup> Mark Niquette, *Highway Funds Are So Low in States that Even Republicans Want Higher Taxes*, BLOOMBERG (Dec. 10, 2014, 12:01 AM), <https://www.bloomberg.com/news/articles/2014-12-10/highway-funds-so-low-in-states-that-even-republicans-see-taxes>.

<sup>272</sup> AM. SOC’Y OF CIVIL ENGINEERS, FAILURE TO ACT: THE ECONOMIC IMPACT OF CURRENT INVESTMENT TRENDS IN SURFACE TRANSPORTATION INFRASTRUCTURE 5 (2011), [https://www.asce.org/uploadedFiles/Issues\\_and\\_Advocacy/Our\\_Initiatives/Infrastructure/Content\\_Pieces/failure-to-act-transportation-report.pdf](https://www.asce.org/uploadedFiles/Issues_and_Advocacy/Our_Initiatives/Infrastructure/Content_Pieces/failure-to-act-transportation-report.pdf).

<sup>273</sup> See Mann, *supra* note 269, at 637.

of pollution and climate change. Finally, the solution might encompass more than one of these options in combination.

## V. CONCLUSIONS AND RECOMMENDATIONS

Part IV of this Article has explained the current tax system's impact on clean manufacturing and the goals of the GND. Although tax policy cannot accomplish all of the GND's goals alone, it can play an important role. This final part will consider some changes that could further the goals of the GND resolution, including reducing inequality, promoting clean manufacturing, and creating "good" jobs.

### A. Reducing Inequality

A strongly progressive tax rate structure could reduce inequality. Although the U.S. tax system has a progressive rate structure, it has become less progressive since the enactment of the TCJA.<sup>274</sup> Progressivity can be defined as how much the tax system increases the share of after-tax income received by lower-income households and reduces the share received by upper-income households, thereby tending to equalize effective income. Alexandria Ocasio-Cortez, a member of Congress, proposed increasing the tax rate on incomes over \$10 million to seventy percent.<sup>275</sup> This proposal is not unprecedented. As recently as 1981, the top individual tax rate was seventy percent on incomes above \$108,300 (filing single).<sup>276</sup> That would be equivalent to \$475,000 today.<sup>277</sup> To compare, a single individual with a

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<sup>274</sup> Eric Toder, *Despite the Tax Cuts and Jobs Act, the Federal Tax System Is Becoming More Progressive over Time*, TAX POLICY CTR.: TAXVOX (Sept. 18, 2018), <https://www.taxpolicycenter.org/taxvox/despite-tax-cuts-and-jobs-act-federal-tax-system-becoming-more-progressive-over-time>. (“For over a decade, legislative changes and real income growth have combined to ensure that the US tax system became more progressive over time. Last year’s Tax Cuts and Jobs Act, however, interrupted that trend and made the tax code less progressive.”).

<sup>275</sup> Glenn Kessler, *Ocasio-Cortez 70-Percent Tax Rate: Not So Radical?*, WASH. POST (Jan. 31, 2019, 3:00 AM), <https://www.washingtonpost.com/politics/2019/01/31/ocasio-cortez-percent-tax-rate-not-so-radical/>.

<sup>276</sup> *Federal Individual Income Tax Rates History*, TAX FOUND. (2013), [https://files.taxfoundation.org/legacy/docs/fed\\_individual\\_rate\\_history\\_nominal.pdf](https://files.taxfoundation.org/legacy/docs/fed_individual_rate_history_nominal.pdf).

<sup>277</sup> Kessler, *supra* note 275.

taxable income of \$475,000 would be taxed at a top marginal rate of thirty-five percent in 2019.<sup>278</sup> An individual with \$10 million of income would be taxed at the top marginal rate of thirty-seven percent.<sup>279</sup> In 2012, when Congress was considering allowing the top marginal rate to increase from 35% to 39.6%, a Congressional Research Service report analyzed the historic effect of top marginal rates on economic growth.<sup>280</sup> The report concluded that:

[C]hanges over the past 65 years in the top marginal tax rate and the top capital gains tax rate do not appear correlated with economic growth. The reduction in the top tax rates appears to be uncorrelated with saving, investment, and productivity growth. The top tax rates appear to have little or no relation to the size of the economic pie. The top tax rate reductions, however, appear to be associated with the increasing concentration of income at the top of the income distribution.<sup>281</sup>

Top tax rates are lower now “than at any time between 1932 and 1986.”<sup>282</sup> Taxes and transfers significantly redistribute income across the developed world.<sup>283</sup> Increasing the progressivity of the U.S. tax system could both ameliorate income inequality and provide revenue for incentives targeted to providing good jobs.

### *B. Promoting Clean Manufacturing*

Achieving a strong clean-manufacturing sector will require some changes to how manufacturing businesses are taxed. Carbon pricing would most efficiently incentivize a clean-manufacturing sector. In addition to discouraging “dirty” manufacturing processes, carbon pricing would allow the most efficient technologies to emerge. For example, as described previously, the Code contains incentives for carbon capture and storage, but

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<sup>278</sup> Rev. Proc. 2019-44, 2019-47 I.R.B. 1093.

<sup>279</sup> *Id.*

<sup>280</sup> See generally THOMAS L. HUNGERFORD, CONG. RESEARCH SERV., R42729, TAXES AND THE ECONOMY: AN ECONOMIC ANALYSIS OF THE TOP TAX RATES SINCE 1945 (2012).

<sup>281</sup> *Id.* at 17.

<sup>282</sup> Leonard E. Burman, *Taxes and Inequality*, 66 TAX L. REV. 563, 579 (2013).

<sup>283</sup> See generally Isabelle Joumard et al., *Tackling Income Inequality: The Role of Taxes and Transfers*, 12 OECD J.: ECON. STUD. 37 (2012).

using renewable energy may achieve the same carbon reductions at a lower cost.

TCJA expanded the current deductibility of capital expenditures for business equipment. As discussed above,<sup>284</sup> expensing business equipment, while it may lead to a short-term increase in investment, tends to favor equipment over employees. Limiting expensing and targeting benefits to clean manufacturing equipment, in contrast to the current system, could grow the clean-manufacturing sector. The incentive could be modeled on the current R&D incentive, which only applies to incremental investment. If the equipment increased efficiency and decreased carbon emissions, it could be eligible for expensing or an investment tax credit.

The R&D tax credit could be streamlined and targeted specifically to clean manufacturing. While the R&D tax credit contains an energy R&D element, that could be expanded to include clean-manufacturing equipment.

Finally, infrastructure improvements could be encouraged and funded by tax policy. Infrastructure in the United States is underfunded because it relies in large part on a dedicated funding source—fuel taxes. Fuel tax revenues are decreasing due to increasing fuel efficiency of the automotive fleet. While in theory tax policy could incentivize public-private partnerships for infrastructure funding, infrastructure provides social benefits that are not easily captured by the private partners.<sup>285</sup> Public-private partnerships require an anticipated revenue stream from vehicle tolls or similar project-related revenues. Expanding the use of tolling to raise transportation infrastructure financing faces a number of obstacles, including hostility of the trucking industry, concerns about diversion of traffic to adjacent free roads, uncertainty about revenue projections, and the high cost of collection (estimated at between eight and twelve percent of amount collected).<sup>286</sup> Increasing the gas tax rate would be the simplest and most efficient way of fully funding transportation infrastructure.<sup>287</sup> The United States has by far the

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<sup>284</sup> See *supra* Part IV.

<sup>285</sup> For a critique of private-public infrastructure, see Mann, *supra* note 269, at 643.

<sup>286</sup> ROBERT S. KIRK & WILLIAM J. MALLET, CONG. RESEARCH SERV., R42877, FUNDING AND FINANCING HIGHWAYS AND PUBLIC TRANSPORTATION 22 (2013).

<sup>287</sup> *Id.* at 18–22.



lowest fuel tax rates of any developed country.<sup>288</sup> The current fuel taxes, at \$0.184 per gallon for gasoline and \$0.244 for diesel fuel, are not indexed for inflation.<sup>289</sup> If the gasoline and diesel fuel taxes had been indexed for inflation since the last time the taxes were increased in 1993, in 2015 “the rates would be \$0.31 per gallon for gasoline and \$0.412 per gallon for diesel.”<sup>290</sup> Every cent added to federal motor fuel taxes raises about \$1.5 billion per year.<sup>291</sup> Of course, if a robust carbon tax were implemented, that could replace the gas tax. In any event, revenues for infrastructure should not be limited to a specified funding source.

### C. Creating “Good Jobs”

The GND resolution’s call for creation of new jobs has a close connection to the goals of clean manufacturing and income parity. In a sense, the social safety net provided by government and funded by all taxpayers is a form of corporate welfare. According to Professor Thomas Kochan, “[employers] benefit from minimizing their own labor costs while society picks up the tab for their lack of investment in human capital: slow economic growth, unemployment, welfare, and so on.”<sup>292</sup> Kochan called for a compact between business, labor, and government to create high-quality jobs that provide adequate compensation, training opportunities, and employee representation.<sup>293</sup> However, government action can correct market failures even in the absence of such a compact.<sup>294</sup>

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<sup>288</sup> *Motor Fuel Tax Rates for Selected Countries as of December 2013*, FED. HIGHWAY ADMIN.: OFFICE OF HIGHWAY POLICY INFO. (Aug. 2014), <https://www.fhwa.dot.gov/policyinformation/statistics/2013/in1.cfm>.

<sup>289</sup> STAFF OF THE JOINT COMM. ON TAXATION, 114TH CONG., LONG-TERM FINANCING OF THE HIGHWAY TRUST FUND 13 (Comm. Print 2015).

<sup>290</sup> *Id.*

<sup>291</sup> KIRK & MALLETT, *supra* note 286, at 3.

<sup>292</sup> Thomas A. Kochan, *A Jobs Compact for America’s Future*, 90 HARV. BUS. REV. 64, 64 (2012).

<sup>293</sup> *Id.*

<sup>294</sup> Eduardo Porter, *Government Must Play a Role Again in Job Creation*, N.Y. TIMES (May 10, 2016), <https://www.nytimes.com/2016/05/11/business/economy/as-jobs-vanish-forgetting-what-government-is-for.html>.

Government could provide incentives to private employers to create jobs. In 1977–1978, the federal New Jobs Tax Credit (NJTC) was a broad-based incentive designed to help spur recovery after a recession.<sup>295</sup> The NJTC provided the credit to firms in which employment rose by more than two percent and paid up to half of the first \$4,200 in wages for each newly hired employee. Analysis indicated that while the NJTC may have substantially affected some firms, most firms either did not know about the program or were not influenced by it.<sup>296</sup> Therefore, the researchers concluded that “traditional monetary and fiscal policies are better suited to dealing with cyclical problems.”<sup>297</sup> However, Congress tried this approach again in 2010, enacting the Hiring Incentives to Restore Employment (HIRE) Act, which provided a tax credit for hiring individuals who were unemployed or entering employment from outside the labor force.<sup>298</sup> Unlike the NJTC, the HIRE Act did not explicitly limit the incentive to hiring in growing businesses, and therefore was viewed as less successful at job creation.<sup>299</sup> More recently, the federal Work Opportunity Tax Credit (WOTC) provides up to forty percent of the first-year wages paid to employees in certain targeted groups who have traditionally faced barriers to employment, including veterans, ex-felons, and SNAP recipients.<sup>300</sup> States also provide job-creation tax incentives, as detailed by the National Conference of State Legislatures.<sup>301</sup> Targeted hiring credits may stigmatize the intended beneficiaries in the eyes of employers, who may be reluctant to hire employees considered to be risky, damping the effects of the credits.<sup>302</sup>

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<sup>295</sup> Jeffrey M. Perloff & Michael L. Wachter, *The New Jobs Tax Credit: An Evaluation of the 1977–78 Wage Subsidy Program*, 69 AM. ECON. REV. 173, 173 (1979); see also David Neumark, *Job Creation Policies and the Great Recession*, FED. RES. BANK OF S.F. ECON. LETTER (Mar. 19, 2012).

<sup>296</sup> Perloff & Wachter, *supra* note 295, at 178–79.

<sup>297</sup> *Id.*

<sup>298</sup> Neumark, *supra* note 295, at 2.

<sup>299</sup> *Id.* at 2–3.

<sup>300</sup> See I.R.C. § 51(a), (d).

<sup>301</sup> *Job Creation Tax Credits—50 State Table*, NAT’L CONF. STATE LEGISLATURES (2013), <http://www.ncsl.org/research/financial-services-and-commerce/job-creation-tax-credits.aspx>.

<sup>302</sup> Neumark, *supra* note 295, at 3.

A bill introduced by Senator Jeff Merkley particularly targets clean-energy jobs.<sup>303</sup> Entitled the “Good Jobs for 21st Century Energy Act,” the bill would create a new “jobs in energy” tax credit.<sup>304</sup> However, the proposed legislation does not specifically create jobs, but rather provides an investment tax credit for renewable energy facilities that obtain certification of meeting labor standards.<sup>305</sup> It also extends several renewable energy tax credits that expired in 2017.<sup>306</sup> A new work credit could specifically target job creation in clean manufacturing.

Finally, tax incentives could help with retraining workers for jobs in a new clean economy. The Lifetime Learning Credit provides a limited benefit of up to \$2,000 per taxpayer, per year.<sup>307</sup> It is a nonrefundable credit for twenty percent of eligible education costs.<sup>308</sup> It phases out at relatively low income levels.<sup>309</sup> Making the Lifetime Learning Credit refundable would expand workers’ access to education. The expansion could be targeted to clean manufacturing training. Another tax benefit allows workers to exclude up to \$5,000 from their taxable income if employers provide education assistance.<sup>310</sup> The amount of exclusion could be increased and targeted to clean manufacturing training. Once again, the TCJA has limited workers’ ability to deduct the costs of skill enhancing training by eliminating the miscellaneous itemized deduction through 2025.

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<sup>303</sup> Press Release, Senator Jeff Merkley, Merkley, Trumka, Senate Democrats Announce Major New Legislation to Create Good-Paying Jobs in the Transition to Clean Energy (July 18, 2019), <https://www.merkley.senate.gov/news/press-releases/merkley-trumka-senate-democrats-announce-major-new-legislation-to-create-good-paying-jobs-in-the-transition-to-clean-energy-2019>.

<sup>304</sup> *Id.*

<sup>305</sup> *Id.*

<sup>306</sup> *Id.*

<sup>307</sup> I.R.C. § 25A(c).

<sup>308</sup> *Id.*

<sup>309</sup> *Id.* § 25A(d).

<sup>310</sup> *Id.* § 127(a).

#### D. Conclusion

Tax policy can be an important tool for creating good, clean manufacturing jobs. Congress gave corporate America a big gift in TCJA by reducing the corporate tax rate from thirty-five percent to twenty-one percent.<sup>311</sup> The corporate tax cut increased corporate profits and at the same time made targeted tax benefits less valuable.<sup>312</sup> There were no strings attached to the tax cut, just stated hopes that good jobs would emerge. While the unemployment rate is at historic lows, many workers still cannot make ends meet.<sup>313</sup> The data suggest that financial security evades even many of those who are working.<sup>314</sup> About one-third of U.S. adults faced financial insecurity last year and often struggled to pay unexpected expenses.<sup>315</sup> Family income for thirty percent of adults varies from month-to-month, creating hardship for about ten percent of families.<sup>316</sup> “One-sixth of workers have irregular work schedules imposed by their employer, and one-tenth of workers receive their work schedule less than a week in advance.”<sup>317</sup> Over twenty percent of workers are not able to pay their monthly bills on time.<sup>318</sup> Last year, about one-third of U.S. adults relied on “gig” work or side jobs to bolster their incomes.<sup>319</sup> Implementing some or all of the suggestions found in this Article might help those workers. Implementing the Green New Deal would not only help workers, but also the planet.

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<sup>311</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13001, 131 Stat. 2054, 2096 (2017) (codified at § 11).

<sup>312</sup> Brian Faler, *Big Businesses Paying Even Less Than Expected Under GOP Tax Law*, POLITICO (June 13, 2019, 5:12 PM), <https://www.politico.com/story/2019/06/13/Big-businesses-pay-less-tax-law-1364591>. Corporate tax benefits are less valuable because a deduction reduces a tax liability by the amount of the deduction multiplied by the marginal tax rate. Thus, a \$10,000 deduction is worth \$3,500 at a thirty-five percent tax rate, but only \$2,100 at a twenty-one percent tax rate.

<sup>313</sup> See BD. OF GOVERNORS OF THE FED. RESERVE SYS., REPORT ON THE ECONOMIC WELL-BEING OF U.S. HOUSEHOLDS IN 2017 (2018), <https://www.federalreserve.gov/publications/files/2017-report-economic-well-being-us-households-201805.pdf>.

<sup>314</sup> *Id.*

<sup>315</sup> *Id.* at 2.

<sup>316</sup> *Id.*

<sup>317</sup> *Id.*

<sup>318</sup> *Id.*

<sup>319</sup> *Id.* at 19.

