

**Supplemental Comments of
The BlueGreen Alliance**

**to the U.S. Environmental Protection Agency and the
National Highway Traffic Safety Administration**

**RE: Impact of Rulemaking on the Safer Affordable Fuel-Efficient Vehicles Rule for Model Years
2021-2026 for Passenger Cars and Light Trucks on American Jobs, Manufacturing, and the
Economy**

Docket No. NHTSA-2018-0067; EPA-HQ-OAR-2018-0283/ RIN: 2127-AL76 and 2060-AU09

**As Submitted to the Office of Information and Regulatory Affairs, Office of Management and
Budget**

February 11, 2020

For over a decade, innovation and investment to meet strong, globally competitive fuel economy and vehicle greenhouse gas standards has strengthened the U.S. auto industry, bolstered American manufacturing, and helped secure and add large numbers of high-quality American jobs. The BlueGreen Alliance (BGA) remains deeply concerned that significant weakening of these standards, as is contemplated in this final rulemaking, will threaten American competitiveness, retard innovation and investment, and put American manufacturing, jobs, and the communities that depend on them at risk.

Simply put, fuel economy and emissions standards are an American success story. In addition to saving consumers billions at the pump, strong, broadly agreed, long-term standards have aided and enhanced the auto industry's recovery from recession; they have helped guarantee that the next generation of vehicle innovation happens here in the United States; they have helped keep good-paying American jobs from being shipped overseas and enhanced the stability of the automotive sector, and its related industries—businesses that are deeply interwoven into American communities and American life.

In our various comments on the Environmental Protection Agency's *Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025* and on the *Notice of Proposed Rulemaking on the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 for Passenger Cars and Light Trucks (NPRM)*, along with supporting studies and research submitted to the docket, BlueGreen Alliance provided analysis detailing the thousands of companies and hundreds of thousands of manufacturing workers building the technology that contributes to meeting clean car standards. BlueGreen Alliance also outlined the potential jobs impact of reductions in demand for the innovative technology produced by these firms.

Analysis prepared by NERA Economic Consulting and Trinity Consultants on behalf of the Alliance of Automobile Manufacturers in March 2018, and subsequently submitted to the docket, seeks to contest our findings. This supplemental comment addresses the issues raised by the NERA/Trinity analysis, and provides new and additional evidence reinforcing our conclusion that a retreat from strong clean car standards is harmful to manufacturing and puts thousands of American jobs at risk.

Previous assessments of clean car standards, manufacturing, and jobs

In June 2017, BGA and the Natural Resources Defense Council (NRDC) published the report *Supplying Ingenuity II: U.S. Suppliers of Key Clean, Fuel-Efficient Vehicle Technologies*. This report was submitted in comments on the Midterm Evaluation, and resubmitted and referenced in BGA's technical comments submitted to docket on the Notice of Proposed Rulemaking.ⁱ

The report details the manufacturing facilities in the automotive supply chain nationwide that are manufacturing components and technology used in increasing fuel economy and cutting emissions in motor vehicles.

Supplying Ingenuity II found “more than 1,200 factories and engineering facilities in 48 states—and 288,000 workers—building technologies that reduce pollution and improve fuel economy for today's innovative vehicles, from family sedans to long-haul tractor trailers.”ⁱⁱ

The report argues that strong standards have enhanced job growth and improved the industry's global competitiveness as companies have invested in the United States to comply with fuel economy standards developed and enacted since 2007. It argues that weakening or stepping away from a strong trajectory of continued increases puts continued job gains and global technological leadership at risk.

In response to the BGA/NRDC study, the Alliance of Automobile Manufacturers commissioned NERA Economic Consulting and Trinity Consultants (hereafter “NERA”) to review and critique *Supplying Ingenuity II*. That study, *Review of Supplying Ingenuity II, Prepared by BlueGreen Alliance and Natural Resources Defense Council*,ⁱⁱⁱ was published in March 2018 and seeks to cast doubt both on the quantitative findings and the qualitative arguments of *Supplying Ingenuity II*. The NERA review was also submitted to the docket on the proposed rule.

As detailed in the following section, we find NERA's approach to the analysis and their conclusions deeply flawed. Subsequent analysis BlueGreen Alliance released in 2019—conducted with updated data—as well as the agencies' own analysis in the NPRM has only underscored the conclusions found in *Supplying Ingenuity II*—that stepping away from continued strong fuel economy improvement puts the growth of hundreds of manufacturers and tens of thousands of jobs at risk.

For all these reasons we urge the Office of Management and Budget to reject the draft final rule which fails to maintain a globally competitive trajectory of improvement in fuel economy and greenhouse gas emissions sufficient to safeguard United States manufacturing gains.

Discussion of the key elements of the NERA review follow. We are happy to submit this additional comment to the record.

Discussion of the NERA Review

The NERA review is broken into three chapters, the first, introducing the reports as we have done above, the second, discussing broader economic “relationships between employment and strong GHG emissions and CAFE standards,” and the third, directly addressing the manufacturing and jobs analysis carried out in *Supplying Ingenuity II* itself.

NERA's broad economic arguments fail to address *Supplying Ingenuity's* core economic case

A major portion of the NERA review seeks to rebut arguments around broader economic and consumer impact of clean car standards that are not part of BGA/NRDC's analysis in this report—and are subject to extensive debate by other stakeholders and experts in the record. *Supplying Ingenuity II* neither

undertakes, nor purports to undertake economic modeling. Instead, as discussed in the following section in more detail, it is an inventory of domestic manufacturing facilities in the advanced vehicle value chain. That being said, the NERA report at the same time fails to rebut what is *Supplying Ingenuity II*'s primary economic argument: that added innovation and investment to meet fuel economy standards both enhances and secures manufacturing job growth. Some key issues include:

- *Standards have strengthened the auto recovery.* NERA creates a strawman that misrepresents *Supplying Ingenuity II* as arguing that standards alone have driven automotive recovery. Our report very specifically does not make this claim. The report has a clear focus on how strong standards enhanced and secured the industry's recovery from the recession—in conjunction with policies that help ensure that new technology spurred by stronger standards is built domestically. As the report noted: “Rapid automotive innovation under the standards has also *aided* in the industry recovery itself, boosting the growth of a robust automotive supply chain and *enhancing* job gains across the industry” (emphasis added).^{iv}
- In so doing *Supplying Ingenuity II*'s builds on several previous and subsequent reports that quantitatively and qualitatively describe the added investment and enhanced competitiveness created by stronger fuel economy and GHG standards. These include:
 - *Driving Growth* (March 2010) from the Center for American Progress, NRDC, and the United Auto Workers, which modeled the connection between added fuel economy related vehicle content, added labor hours and added jobs—and it further demonstrated how these expected job gains can be enhanced or reduced by increases or declines in the share of content built domestically.^v
 - The report *How Fuel Efficiency is Driving Job Growth in the U.S. Auto Industry* (August 2012) from the NRDC, the National Wildlife Federation, and the Michigan League of Conservation Voters, looked at actual economic growth and employment data as the country was recovering from recession, and found that automobile industry job growth and job growth in auto-dependent states was outpacing the overall economy, bolstered by reinvestment and reopening of automotive facilities, often aggressively retooled to build new more fuel efficient vehicles and components.
 - Studies done between 2010 and 2012 predicted additional manufacturing growth in the range of 50,000 to 100,000 jobs by 2025-2030 as a result of one or both rounds of CAFE standards.^{vi}
 - Subsequent to *Supplying Ingenuity II*, our report *Driving Investment* (January 2018), detailed assembler investment from 2008 to 2017, and found that “while some of this \$76 billion investment at 107 facilities represents business as usual... much is driven by enhanced investment to meet globally leading fuel economy and greenhouse gas standards.” This additional investment included more rapid refreshes and roll out of innovative engines, more extensive retooling to incorporate lightweight materials, and the like.^{vii}

Consumer benefits, public support for clean car standards, and similar topics raised by NERA are addressed extensively in the record. NERA debates statistics BGA cites—such as consumer support for fuel economy improvement and willingness to pay for added efficiency—which are only mentioned briefly in citations of others work in *Supplying Ingenuity II*. Those experts have rebutted NERA's claims extensively in the record, and subsequently, for example a Consumer Reports study in August 2019 found that, “the administration's plan to freeze fuel efficiency standards would set consumers back about \$3,300 per vehicle in net costs.”^{viii}

- *Stepping away from strong standards negatively impacts investment in manufacturing and jobs in the automotive supply chain, regardless of the shares of electrified technology needed to meet the standard.* Similarly, NERA discusses at length the question of what technology is needed to meet the standards—a matter extensively debated by technology experts in the record and where competing estimates come from federal agencies themselves. *Supplying Ingenuity II* neither carries out nor purports to carry out any analysis in this realm. Our inventory of advanced vehicle component manufacturing includes both technologies to improve the efficiency of internal combustion engine vehicles and those supporting increasingly electrified propulsion systems.

BGA has subsequently analyzed the jobs and manufacturing impacts of the standards under both of the technology scenarios NERA discusses in our report, “*Tech@Risk*,” (August 2019).^{ix} That report found that scenarios that assume more electric and hybrid vehicle tech deployment mean more manufacturing investment under strong standards, and greater economic losses if rolled back.

Second, this argument underscores the reality that strong standards require investment both in improving internal combustion engines and in developing EV technology. We are deeply concerned that if standards are weakened to the extent contemplated in this rulemaking, that automakers will halt or dramatically slow investments in advanced internal combustion engines—creating significant slow downs for conventional component manufacturers while also making insufficiently aggressive investments in electric vehicle or hybrid deployment. The result of the divestment will be job loss, lost competitiveness across the advanced vehicle supply chain, and insufficient near-term fleet progress on efficiency and emissions.

Review of *Supplying Ingenuity II* central analysis

Supplying Ingenuity II does not carry out economic modeling. Instead it maps and analyzes a database of domestic manufacturing facilities in the automotive value chain. While the full data included in the database is proprietary, the names, locations, and products produced by the facilities included in the *Supplying Ingenuity II* analysis are publicly available and easily accessible in an interactive map online.^x Because this data reflects real facilities, it requires continuous updating and is never 100% accurate or complete at a given point in time. Nonetheless, BGA strives to maintain a high standard with respect to the overall representativeness of this resource.

Accordingly, we take NERA’s empirical critiques seriously. Some true errors (plants that have closed, or no longer make products related to fuel economy, for example) have been removed in ongoing updates of the dataset. Both the latest updated data, and the archived data used in *Supplying Ingenuity II* are available publicly.^{xi} However, while NERA does find minor errors in the dataset (undermining their claim that the data is not reviewable), the bulk of their critiques are either factually inaccurate, rely on cherry picked subsets of the data that are not representative, or do not meaningfully change the conclusions to be drawn from the data. Subsequent analyses done by BGA and others—and specifically addressing what NERA sees as weaknesses in this dataset—have only reinforced the findings in *Supplying Ingenuity II*.

The Supplying Ingenuity II database is broadly representative of the advanced vehicle supply chain. NERA seeks to argue that the dataset overstates the breadth of manufacturer engagement in meeting clean vehicle standards. We refute their key arguments below.

- NERA argues that the scope of the database is too broad, including companies outside the light-duty vehicle supply chain—for example in manufacturing clean truck and van components—and outside the vehicle supply chain, such as manufacturing for electric vehicle charging infrastructure.
 - This broader scope is explicitly described in the report, and intentional. *Supplying Ingenuity II* updates a similar report *Supplying Ingenuity: U.S. Suppliers of Key Clean, Fuel-Efficient Vehicle Technologies* published in 2011.^{xii} The methodology of the two reports was designed to be as similar as possible, to allow better comparison of the results. Both studies were intended to review manufacturer engagement in improving fuel economy and cutting emissions in the vehicle sector as a whole. Over the period reviewed by these studies, the U.S. EPA and NHTSA have promulgated two rounds of light-duty vehicle standards and two rounds of MD/HDV standards, and the agencies continue to review and update standards across the sector.
 - While this study is frequently cited in discussion of the phase 2 light-duty vehicle standards, the broader analytical and policy scope of the report is clearly laid out in the methodology, and *Supplying Ingenuity II* is rigorous in discussing the impacts of leadership on clean vehicles writ large.
 - It is also the case that many component and subcomponent manufacturers serve both light and heavy-duty markets, but BGA’s dataset is able to distinguish between these firms and extract them as necessary.
- To support its case that the database as a whole is not representative of the automotive sector, NERA carries out an in-depth review of *Supplying Ingenuity II* data—but from California only.
 - While California is an important location of new automotive investment, any researchers familiar with the manufacturing sector are aware it is an obvious outlier relative to the established automotive manufacturing regions in the Midwest and Southeast. NERA’s choice to extrapolate from California data to critique a national automotive dataset is not only unconvincing but suggests the intent to mislead.—
 - NERA utilized California data to argue, inaccurately, that *Supplying Ingenuity II* data is skewed away from the key assembly, component, and subcomponent manufacturers in the core of the automotive supply chain, and relies too heavily on ancillary charging infrastructure, non-light duty, and non-fuel economy related technologies.
 - Below we show the breakdown of the major manufacturer categories NERA assessed for California, as well as for Ohio and for the dataset as a whole. They clearly show that California is indeed an outlier and that the dataset as a whole much more closely resembles Ohio than California. This relationship is even more obvious when the data is calculated by employment rather than number of facilities.

Table 1: Comparison of California, Ohio, and national data—percentage of facilities by place in supply chain

Tier	California	Ohio	United States
Assemblers/OEM	16.57%	10.00%	10.42%
Major Suppliers	37.14%	47.50%	41.03%
Parts & Materials	13.71%	25.00%	28.76%
Infrastructure	26.86%	17.50%	15.35%
R&D	5.71%	--	4.44%

Table 2: Comparison of California, Ohio, and national data—percentage of employment by place in supply chain

Tier	California	Ohio	United States
Assemblers/OEM	43.60%	20.87%	24.04%
Major Suppliers	27.39%	61.98%	50.03%
Parts & Materials	8.74%	10.39%	16.98%
Infrastructure	17.94%	6.76%	5.94%
R&D	2.34%	--	3.01%

Table 3: Share of facilities in certain non-light-duty categories

	California	Ohio	United States
Heavy Duty only	26.29%	18.75%	19.63%
Heavy Duty Infrastructure	5.14%	2.50%	2.91%
Conversion facilities	6.29%	1.25%	3.23%

Table 4: Share of employment in certain non-light-duty categories

	California	Ohio	United States
Heavy Duty only	20.34%	4.49%	12.06%
Heavy Duty Infrastructure	2.59%	1.38%	0.66%
Conversion facilities	1.77%	0.07%	0.43%

- In appendix A, we include company by company data for Ohio laid out similarly to the data NERA provided for California—to provide a more nuanced sense of *Supplying Ingenuity II*'s data.
- Importantly, BGA's data does not only identify manufacturers by tier, but by technology – both in the report, and online—allowing a much more nuanced review of what part of component supply chain these companies represent. Looking at the data in this way provides a vivid and concrete sense of why Americans should be concerned about reduced innovation and investments in key portions of the automotive supply chain. NERA's analysis ignores this data.

Report is conservative in its employment estimates. NERA argues that *Supplying Ingenuity II* overstates employment by attributing all of major facilities' employment to "clean tech."

- This is simply false. As is clearly stated in the report's methodology, company employment data is discounted in several different ways to estimate the share of employment attributable to fuel economy related technology. Indeed, relative to other common approaches to calculating employment in the auto sector this estimate is quite conservative:
 - Facilities included in the dataset must be the company's manufacturing (or in a few cases engineering or research and development) location—not in divisions such as headquarters or sales.

- The facility must make technologies connected to improving fuel economy or cutting emissions.
- As noted in the report, full employment at the facility is utilized only for companies solely focused on clean vehicle technologies. Only a portion of the employment at multi-product suppliers and assemblers is included in the total.
- Overall, the 288,000 jobs cited in the report represent about 60% of the nearly half a million total employees at the clean vehicle-related facilities included in the report, and less than a third of auto sector manufacturing employment at that time.
- There is a strong argument to be made that every job in the auto sector is connected in some way to improving efficiency across the fleet, and that all stand to be negatively impacted should the industry lose its clean technology edge. What we calculate in *Supplying Ingenuity II* however is a much more conservative number—those jobs most directly connected to clean technology manufacturing.

Subsequent research by BlueGreen Alliance, and by the agencies themselves, reinforces the conclusions of Supplying Ingenuity II.

- In August 2019, BlueGreen Alliance released a new report, *Tech@Risk: the Domestic Innovation, Technology Deployment, Manufacturing, and Jobs at Risk in Stepping Away from Global Leadership on Clean Cars*. Unlike *Supplying Ingenuity II*, *Tech@Risk* was tightly focused on calculating the potential manufacturing and jobs impacts of changes in stringency of the phase 2 light-duty vehicle standards. The report utilized a significantly more tightly tailored dataset, that:
 - Utilized the most recently updated data;
 - Included only those companies supplying the light-duty vehicle market;
 - Assessed impacts technology by technology, and only included companies manufacturing the technologies modeled in the SAFE rule analysis; and.
 - Assessed impacts under both the 2018 NPRM technology deployment scenario and a more conservative scenario similar to that used by EPA in the 2016 *Technical Assessment Report* and.
- Those results underscore *Supplying Ingenuity II*'s conclusions.
 - The 2019 *Tech@Risk* report again finds hundreds of specific companies and hundreds of thousands of workers building the technologies needed to improve fuel economy and cut greenhouse gas emissions. That includes, specifically:
 - 42 companies manufacturing advanced engine technology at 97 locations in the United States, employing approximately 149,000 American workers.
 - 16 companies manufacturing transmission technology at 32 locations in the United States, employing approximately 25,000 American workers.
 - 170 companies manufacturing hybrid and electric vehicle technology at 213 locations in the United States, employing approximately 69,000 American workers.
 - 85 companies manufacturing fuel-efficient accessories and advanced materials at 235 locations in the United States, employing approximately 83,000 American workers.
 - *Tech@Risk* also provides specific component technology and company lists in each category.
 - We resubmit *Tech@Risk* to the record, as Appendix B.

- *Tech@Risk* not only provides a more recent snapshot of clean vehicle technology manufacturing facilities and jobs in the U.S., but goes beyond the 2017 *Supplying Ingenuity II* report to attempt to quantitatively estimate how changes in standards might impact clean vehicle technology manufacturers.
 - *Tech@Risk* combines an estimate of the portion of employment highly vulnerable to shifts in the market for clean vehicle technology^{xiii} with projected changes in utilization of that technology taken from NPRM technical analysis—in order to roughly estimate potential growth at these facilities under both technology deployment scenarios—and the projected lost growth & jobs should the standards be rolled back and these investments not take place.
 - The report finds 89,000 future jobs foregone at these facilities under the more conservative technology deployment scenario.
- EPA and NHTSA’s own analysis in the Notice of Proposed Rulemaking utilizes a different methodology, but finds a very similar conclusion.
 - The agencies calculate the difference in technology spending and content in vehicles under stronger and weaker standards. Under weakened standards, lower technology investment translates into lower content/lower value vehicles and into lower industry revenues. The agencies multiply those revenues by an industry standard percentage of manufacturing employment per dollar of revenues to calculate the change in labor hours.
 - In the NPRM the agencies found that approximately \$30B/year less in technology spending translated into around 60,000 fewer manufacturing jobs in the industry.
- Each of these forecasts is, necessarily, a rough estimate, but taken together, they double down on the fundamental message of *Supplying Ingenuity II*—that the added investment in innovation and manufacturing required and enabled by strong clean vehicle standards directly boosts manufacturing jobs in factories across the country, and significantly weakening those standards is likely to cost them.

Discussion of case studies and the economic impacts of regulation more broadly

In its case studies, *Supplying Ingenuity II* revisited Nexteer, a company that was also profiled in “Supplying Ingenuity” in 2011. Nexteer makes, amongst other products, electric power steering (EPS) which improves fuel economy relative to hydraulic steering systems. In its review, NERA acknowledged that Nexteer (which has added thousands of jobs since 2010 and grown to employ over 5,200 people and become the largest employer in Saginaw County, Michigan)^{xiv} is a significant economic success story, but they raise an important question regarding whether the standards in this case have driven job growth or simply job shifting as vehicles shift away from hydraulic steering to electric power steering. We do not disagree that some job shifting – or product shifting for the same workers—is certainly taking place, but the more rapid innovation driven by strong regulation in this sector tends to result in *net* gains, for which Nexteer is at least a partial case in point:

- At a macro level, as discussed above, the agencies own analysis shows that complying with stronger standards requires billions a year in additional technology spending. Utilizing the same technology deployment projections, *Tech@Risk* graphically shows the technology shift that this spending represents. Those data clearly demonstrate both technology gains and losses (including amongst 4, 5, 6 to 8 and 10-speed transmissions, as mentioned by NERA). The net impact found by all of these studies, however, is more technology deployed under stronger standards.
- Rapid innovation tends to result in *added* content and labor hours. Relative to ongoing production of established/commodity components, more rapid technological change to meet ambitious

standards means added research and development, product development and retooling, and often actual added componentry. It means greater diversity in components as both the older and newer technologies are manufactured for different parts of the fleet.

- Even in a case where a new technology may have equal or lesser total content, strong domestic demand for the emerging technology secures jobs as technology shifts, helping ensure that both the new and old product are built domestically, and that the ultimate phase out of the lagging product only means job shift, and not jobs lost to other markets completely.

Broader economic shifts driven by the standards are also net positive. In its review, NERA also discusses broader economic shifts driven by the standards and regulation more broadly. In particular, they adhere to a view that argues that regulation only changes the allocation of capital and jobs, rather than creating economic gains, and that the costs of the standards result in a variety of adverse affects. Costs of the standards and macro economic gains under the standards are discussed at length by a variety of commenters in the record, but we would briefly underscore several points here.

- The “compliance costs” of the standards are made up, primarily, of added investment in manufactured content. As BGA described in its report *Driving Investment*, these “costs” simultaneously represent critically needed added investment in America’s manufacturing plants, workers, and communities.
- These compliance costs are, indeed, translated into modestly higher vehicle prices, but those added costs are more than offset by vehicle fuel savings so that consumers see net savings.^{xv} Indeed, if they finance their vehicle, as most consumers do, they see more spending money in their pocket immediately as increases in monthly fuel savings exceed increases in monthly loan payments. At least for consumers, this is, if not a free lunch, at least a very good investment, and one reason consumers strongly support improvements to fuel economy.^{xvi}
- Put differently, in so far as the standards divert capital amongst possible uses, there is significant evidence that it does so in ways that privilege consumer economic benefits, and domestic innovation, capital investment and manufacturing, outcomes that are likely more economically beneficial—and publicly supported—compared to other potential uses undertaken by automakers in recent years such as share buy backs and offshore investment.
- NERA makes similar arguments with respect to the potential for research and development shifting to less profitable areas (to which we answer: this is precisely the market failure that standards address!) as well as with respect to export shifting and competitiveness. *Supplying Ingenuity II*’s primary competitiveness argument does not revolve around exports, however, but around imports. A retreat from globally competitive standards threatens *domestic* production for the domestic market—i.e. risks displacing American manufacturing and production with imports of technology and vehicles – in several ways.
 - First, strong, long term standards provide critical certainty that both automakers and multi- national companies in the automotive supplier sector need in order to make long term investments in R&D and manufacturing in the United States. Lagging standards and uncertainty create a real risk of driving innovation and investment out of the U.S. to markets that will continue to lead, both in the short-term and as critical next-generation of clean vehicle platforms are developed and deployed. Stepping back from strong standards not only threatens immediate investments in advanced components in the U.S., but increases the risk that the vehicles of the future will enter the US on a container ship.^{xvii}
 - Second, a significant threat to U.S. automotive jobs—which has unfortunately been demonstrated several times in practice—is the risk of falling behind other nations in

efficiency innovation, and then seeing consumers flee domestically manufactured vehicles for imports when gas prices are volatile or high. More recently, this pattern has been broken as U.S. standards have reached rough parity with global benchmarks and the fleet has made significant fuel economy gains, including in larger vehicles. A rollback could return the industry to a lagging and more precarious status^{xviii}.

Finally, *Supplying Ingenuity II* was developed with the input and review of numerous labor, environmental, and industry stakeholders. Indeed, one of the reasons portions of our dataset are not public is that it includes data given to us by companies under non-disclosure agreements. NERA complains that the study is not formally peer reviewed, but in this *Supplying Ingenuity II* is no different from much of the manufacturer data the agencies use to set the rule. In the main, our data is not mathematical analysis, but a collection of concrete and publicly viewable data on real American factories and jobs as they are today in communities across the nation. These factories and jobs are what is at stake in protecting ongoing U.S. innovation and leadership to build the clean vehicles of today and tomorrow.

We are happy to submit this review of the NERA study to the record.

Appendix A: 2016/17 Ohio Data Utilized in Supplying Ingenuity II

Cong. Dist	Product Type	Company Name	City	State	LDV	HDV	Product
1	Parts & Materials	ADVICS Manufacturing Ohio, Inc.	Lebanon	OH	1		Anti-lock brake systems, electronic stability control, disc brake caliper assemblies, brake controller module for idle reduction system
1	Major Suppliers	Faurecia	Franklin	OH	1		Emissions control, mufflers, manifolds, catalytic converters, complete exhaust systems, lightweight components
1	Major Suppliers	Ford Motor Company: Sharonville Transmission	Sharonville	OH	1		6 or more speed transmission (a6)
1	Major Suppliers	Mitsubishi Electric	Mason	OH	1		High efficiency starter alternator
1	Major Suppliers	Powerex Pure Air Technology	Harrison	OH		1	Scroll compressor
1	Major Suppliers	Robert Bosch Battery Systems LLC	Springboro	OH	1		Nimh batteries for Fiat 500
2	Major Suppliers	Arconic	Chillicothe	OH	1	1	Lightweight aluminum wheels
2	Parts & Materials	Corvac Composites	Greenfield	OH	1		Lightweight composite air, water and sound management components
2	Major Suppliers	Workhorse Group Incorporated	Loveland	OH		1	Battery-electric power trains for medium duty trucks
3	Infrastructure	ArcelorMittal	Columbus	OH	1		Hot-dipped galvanized sheet
3	Infrastructure	CAR Technologies LLC	Columbus	OH	1		Battery validation for EVs
3	Major Suppliers	Parker Hannifin HYBRID DRIVE SYSTEMS DIVISION	Columbus	OH		1	Hybrid drive systems for heavy trucks, regenerative braking, hose and tube assemblies
3	Infrastructure	Plug Smart	Columbus	OH	1		Charging stations and other management
3	Major Suppliers	ToChi Technologies	Blacklick	OH	1		Transmissions for hybrid vehicles
4	Parts & Materials	BASF Catalysts, LLC	Elyria	OH	1	1	Production of nickel-cobalt-metal cathode material for lithium-ion batteries.
4	Major Suppliers	Dana Incorporated	Lima	OH	1	1	Light vehicle axles and driveshafts, driveshafts and axles for commercial vehicles
4	Major Suppliers	Ford Motor Company: Lima Engine Plant	Lima	OH	1		Ecoboost and other efficient engine assembly
4	Major Suppliers	Honda	Anna	OH	1	1	turbo, four cylinder and V-6 Earth Dreams Technology engines, Continuously Variable Transmission (CVT) pulleys
4	Assemblers/OEM	Honda	Marysville	OH	1		Car and motorcycle engines, assembly of honda accord (conventional + hybrids), acura ilx, motorcycles
4	Major Suppliers	Honda	Russells Point	OH	1	1	6 or more speed transmission (a5, a6)

4	Assemblers/OEM	Honda of America Manufacturing, Inc.	East Liberty	OH	1		Suvs, acuras
4	Major Suppliers	Tower Automotive Operations USA LLC	Bellevue	OH	1		Vehicle frames and structures
5	Parts & Materials	AK Tube LLC (Subsidiary of AK Steel Corp.)	Walbridge	OH	1	1	Carbon and stainless steel tubing for exhaust and emissions control components
5	Infrastructure	ArcelorMittal	Pioneer	OH	1		Laser welded blanks
5	Parts & Materials	Bulk Molding Compounds	Perrysburg	OH	1		Glass reinforced polyester thermoset compounds, bulk molding compound
5	Major Suppliers	Cooper Tire	Findlay	OH	1		Doe grant to improve fuel efficiency of tires
5	Major Suppliers	Dana Incorporated	Maumee	OH	1	1	Light vehicle axles and driveshafts, engine and transmission thermal management systems, fuel cells, EV and hybrid thermal management systems, hub systems, driveshafts and axles for commercial vehicles
5	Parts & Materials	FCA US LLC: Toledo Machining Plant	Perrysburg	OH	1		Steering columns, torque converters
5	Major Suppliers	GKN Driveline	Bowling Green	OH	1		Constant velocity jointed (CVJ) sideshafts, all-wheel drive axles, differentials for transmissions and axles, EV and hybrid axles, integrated drive systems and transmissions
5	Major Suppliers	Johnson Controls Inc.	Holland	OH	1	1	Absorbent glass mat batteries to handle start/stop systems
5	Major Suppliers	Kuss Filtration Inc	Findlay	OH		1	Air, fuel and hydraulic filtration system components
5	Parts & Materials	Pro-Tec Coating	Leipsic	OH	1	1	High strength steel
5	Major Suppliers	Tenneco	Napoleon	OH	1	1	Integrated suspension modules, electronic suspension systems, passive axle, seat and cabin damping, lightweight components
5	Major Suppliers	Tower Automotive Operations USA LLC	Bluffton	OH	1		Medium stamping facility: body structures and assemblies
6	Parts & Materials	Aleris Rolled Products	Uhrichsville	OH	1	1	Recycled aluminum sheet for automotive and other industries
6	Major Suppliers	Boltaron Inc (Simona Group)	Newcomerstown	OH		1	Specialized pvc, pvc-alloy and cpvc performance sheet for: dashboard components, seat parts, gap covers, sidewall panels, air ducts, light housing, window reveals, moldings
6	Parts & Materials	Colfor Manufacturing, Inc. (American Axle and Manufacturing, Inc.)	Malvern	OH	1	1	Forged and finished machined transmission shafts, hypoid drive pinions, propeller shafts, transmission gears and wheel spindles
6	Parts & Materials	Colfor Manufacturing, Inc. (American Axle and Manufacturing, Inc.)	Minerva	OH	1	1	Forged and finished machined transmission shafts, hypoid drive pinions, propeller shafts, transmission gears and wheel spindles

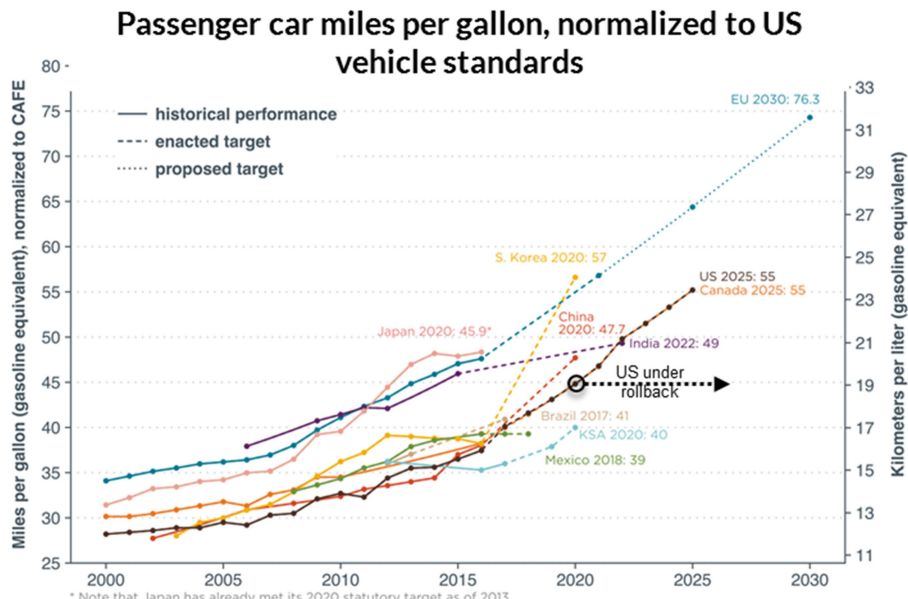
6	Infrastructure	Detroit Diesel Remanufacturing (Daimler Trucks North America LLC)	Byesville	OH		1	Remanufacturing: diesel truck engines and components, cylinder heads, water pumps
6	Infrastructure	Detroit Diesel Remanufacturing (Daimler Trucks North America LLC)	Cambridge	OH		1	Engine remanufacturing
6	Infrastructure	Refractory Specialties, Inc. (a Unifrax Company)	Sebring	OH	1	1	Insulation for thermal oxidizers, catalytic enclosures, diesel particulate filter (DPF) regenerators, exhaust systems, secondary combustion chambers
6	Infrastructure	Specialty Ceramics, Inc. (a Unifrax Company)	Columbiana	OH	1	1	Ceramic fiber insulation for use in heat shield insulation, brake pad reinforcement, catalytic converter support mats, and filtration media for air bag inflators
6	Infrastructure	VacuForm, Inc. (a Unifrax Company)	Sebring	OH	1	1	Alumina-silica ceramic fiber for noise reduction and high temperature insulation applications
7	Infrastructure	SGB-SMIT	Louisville	OH	1	1	Public wireless charging stations
8	Infrastructure	AK Steel	Middletown	OH	1	1	Hot and cold-rolled steels, electrogalvanized and enameling steels, hot dip galvanized steels
8	Major Suppliers	AK Steel	West Chester	OH	1	1	High strength, lightweight steel
8	Assemblers/OEM	Navistar Inc	Springfield	OH		1	Medium duty hybrid truck assembly
9	Major Suppliers	Faurecia	Toledo	OH	1		Emissions control, mufflers, manifolds, catalytic converters, complete exhaust systems, lightweight components
9	Assemblers/OEM	FCA US LLC: Toledo Assembly Complex	Toledo	OH	1		Jeep assembly
9	Major Suppliers	Ford Motor Company: Cleveland Engine Plant No. 1	Brook Park	OH	1		3.5-liter v6 ecoboost engine & 3.7 l duratech engine
9	Assemblers/OEM	Ford Motor Company: Ohio Assembly	Avon Lake	OH	1	1	Light and medium duty vehicle assembly
9	Major Suppliers	General Motors: Toledo Transmission	Toledo	OH	1		6 or more speed transmission (a6, a8 forthcoming)
9	Parts & Materials	Von Roll USA	Cleveland	OH	1		Battery and fuel cell materials
10	Major Suppliers	Dmax Ltd. (Joint venture of General Motors and Isuzu Diesel Services of America, Inc.)	Moraine	OH		1	Heavy duty pickup and full size van diesel engines
10	Parts & Materials	MAHLE Behr	Dayton	OH	1	1	Battery cooling components
10	Major Suppliers	Tenneco	Kettering	OH	1	1	Integrated suspension modules, electronic suspension systems, passive axle, seat and cabin damping, lightweight components
11	Infrastructure	ArcelorMittal	Cleveland	OH	1		Semi-finished slabs, hot-rolled, cold-rolled, hot-dipped galvanized sheet
11	Major Suppliers	Arconic	Cleveland	OH	1	1	Wheels for trucks, buses, trailers

11	Infrastructure	Axiom Integrated Fuel Systems	Cleveland	OH	1		Natural gas conversion of f250 pickups and ram
11	Major Suppliers	Eaton	Cleveland	OH	1	1	Variable valve lift combustion engine technologies
12	Major Suppliers	American Showa, Inc. (US Subsidiary of Showa Corp.)	Sunbury	OH	1		Automotive and motorcycle suspension, shock absorbers and hydraulic power steering components
12	Major Suppliers	Xperion	Heath	OH		1	CNG tanks for heavy duty trucks-new plant w 3m
12	Major Suppliers	Yutaka Technologies, LLC	Cardington	OH	1		Torque converters, catalytic converters, and exhaust systems
13	Major Suppliers	Arconic	Barberton	OH	1	1	Lightweight fasteners and extruded drive shafts, wheels, aluminum in engine blocks, bumpers, hoods and trunks, crash management systems
13	Parts & Materials	Delphi Packard Electric	Warren	OH	1	1	Plastics and resins
13	Assemblers/OEM	General Motors: Lordstown Complex	Warren	OH	1		Chevrolet Cruze
13	Assemblers/OEM	Myers Motors LLC	Tallmadge	OH	1		Specialty plug-in electric vehicle assembly (incl 3 wheelers)
14	Parts & Materials	ATC Lighting & Plastics	Andover	OH	1	1	Exterior lighting, turn signals
14	Parts & Materials	InsightFuel (merger of AFV Natural Gas Fuel Systems and CNG Plus)	Twinsburg	OH		1	Alternative fuel conversions and systems; tube assemblies and components for CNG fuel(ing) systems
14	Major Suppliers	Parker Hannifin	Cleveland	OH		1	Run wise hybrid drive for CNG fueled garbage truck
15	Parts & Materials	American Showa, Inc. (US Subsidiary of Showa Corp.)	Blanchester	OH	1		Power steering pumps and power steering gear boxes
15	Parts & Materials	Cooper Standard	New Lexington	OH	1		Fluid handling systems
15	Assemblers/OEM	PACCAR (Kenworth)	Chillicothe	OH		1	Heavy duty truck assembly, T680, T700
15	Infrastructure	Retriev Technologies	Lancaster	OH	1		Hydrothermal recycling of lithium-ion batteries.
15	Major Suppliers	Vanner Inc.	Hilliard	OH		1	Inverters, idle reduction, electrical components, battery chargers, hybrid solutions for truck and bus
16	Parts & Materials	3M Industrial Tapes and Adhesives Division	Medina	OH	1	1	Tapes and adhesives; lightweight bonding solutions instead of fasteners and welding; labels
16	Parts & Materials	Aluminum Line Products	Westlake	OH		1	Aluminum and stainless steel service center for bodies and trailers
16	Parts & Materials	G&S Titanium	Wooster	OH	1	1	Titanate capacitor for power electronics
16	Major Suppliers	GrafTech International Ltd.	Parma	OH	1		Fuel cells
16	Major Suppliers	LG Fuel Cell Systems	North Canton	OH	1		Fuel cells

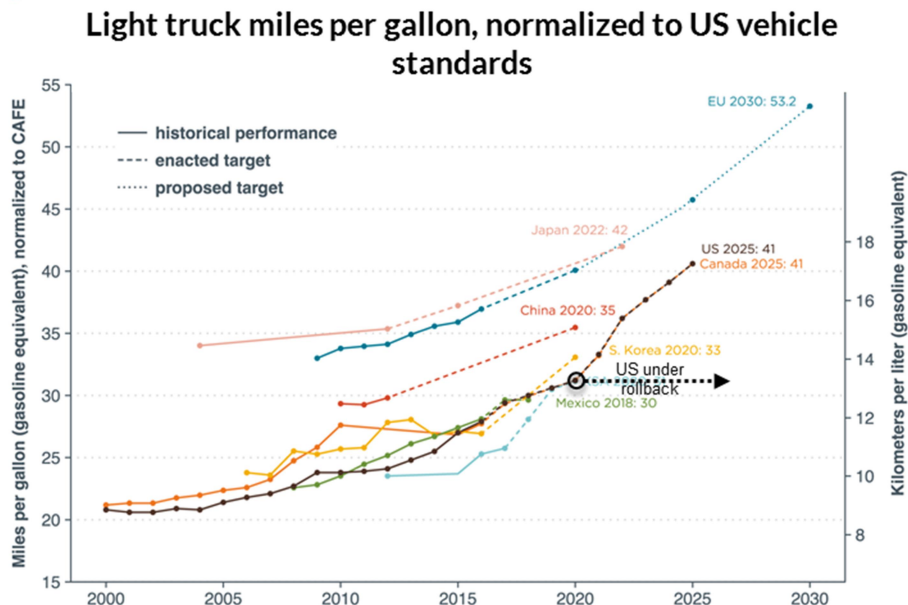
Appendix B: *Tech@Risk* is attached separately

Appendix C: *Comparison of vehicle emissions standards globally*

The charts below from the International Council on Clean Transportation (ICCT) compare vehicle emissions standards globally. BGA has superimposed an arrow reflecting the approximate trajectory of US standards under the flatline of standards proposed in the NPRM.



Source: Underlying chart: ICCT, emphasis arrow showing rollback added by BlueGreen Alliance



Source: Underlying chart: ICCT, emphasis arrow showing rollback added by BlueGreen Alliance

icct

Updated April 2018
Details at www.theicct.org/chart-library-passenger-vehicle-fuel-economy

ⁱ BlueGreen Alliance, “Technical Comments on the Impact on Jobs, Manufacturing, and the Economy of the Notice of Proposed Rulemaking on the Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021-2026 for Passenger Cars and Light Trucks,” October 2018. Available online:

https://www.edf.org/sites/default/files/BGA_Technical_Comments_SAFE_Rule.pdf

ⁱⁱ Natural Resources Defense Council and BlueGreen Alliance, *Supplying Ingenuity II: U.S. Suppliers of Key Clean, Fuel-Efficient Vehicle Technologies*, June 2017. Available online:

<https://www.bluegreenalliance.org/resources/supplying-ingenuity-ii-u-s-suppliers-of-key-clean-fuel-efficient-vehicle-technologies/>

ⁱⁱⁱ NERA Economic Consulting, Trinity Consultants, “Review of *Supplying Ingenuity II*, Prepared by BlueGreen Alliance and Natural Resources Defense Council,” March 2018.

^{iv} Ibid.

^v Natural Resources Defense Council, Center for American Progress, United Auto Workers, *Driving Growth: How Clean Cars and Climate Policy Can Create Jobs*, March 2010. Available online:

<https://www.nrdc.org/sites/default/files/drivinggrowth.pdf>

^{vi} BlueGreen Alliance, “Sound Vehicle Standards & Policies Drive Strong Job Growth”, 2016. Available online: <https://www.bluegreenalliance.org/resources/sound-vehicle-standards-policies-drive-strong-job-growth/>

^{vii} BlueGreen Alliance, *Driving Investment: How Fuel Efficiency Is Rebuilding American Manufacturing*, January 2018. Available online: <https://www.bluegreenalliance.org/resources/driving-investment-how-fuel-efficiency-is-rebuilding-american-manufacturing/>

^{viii} Consumer Reports, “The Un-SAFE Rule: How a Fuel-Economy Rollback Costs Americans Billions in Fuel Savings and Does Not Improve Safety,” August 2019. Available online: <https://advocacy.consumerreports.org/wp-content/uploads/2019/08/The-Un-SAFE-Rule-How-a-Fuel-Economy-Rollback-Costs-Americans-Billions-in-Fuel-Savings-and-Does-Not-Improve-Safety-2.pdf>

^{ix} BlueGreen Alliance, *Tech@Risk: The Domestic Innovation, Technology Deployment, Manufacturing, And Jobs At Risk In Stepping Away From Global Leadership On Clean Cars*, August 2019. Available online:

<https://www.bluegreenalliance.org/resources/techrisk-the-domestic-innovation-technology-deployment-manufacturing-and-jobs-at-risk-in-stepping-away-from-global-leadership-on-clean-cars/>

^x BlueGreen Alliance Foundation, *Visualizing Manufacturing and Jobs in the Clean Economy* (interactive dataset and map). Available online: <https://www.bgafoundation.org/programs/visualizing-the-clean-economy-autos/>

^{xi} Both datasets can be explored here: <https://www.bgafoundation.org/programs/visualizing-the-clean-economy-autos/>

^{xii} Natural Resources Defense Council, National Wildlife Federation, United Auto Workers, *Supplying Ingenuity U.S. Suppliers of Clean, Fuel-Efficient Vehicle Technologies*, August 2011. Available online:

<https://assets.nrdc.org/sites/default/files/SupplierMappingReport.pdf>

^{xiii} Again, in *Tech@Risk*, “vulnerable” employment at a company is usually only a portion of full manufacturing employment, though the precise method and degree of discounting is somewhat different from that used in *Supplying Ingenuity II*.

^{xiv} Natural Resources Defense Council and BlueGreen Alliance, *Supplying Ingenuity II: U.S. Suppliers of Key Clean, Fuel-Efficient Vehicle Technologies*, May 2017. Available online: <https://www.bluegreenalliance.org/wp-content/uploads/2017/05/Supplying-Ingenuity-vFINAL-low-res.pdf>

^{xv} Consumer Reports, “The Un-SAFE Rule: How a Fuel-Economy Rollback Costs Americans Billions in Fuel Savings and Does Not Improve Safety,” August 2019. Available online: <https://advocacy.consumerreports.org/wp-content/uploads/2019/08/The-Un-SAFE-Rule-How-a-Fuel-Economy-Rollback-Costs-Americans-Billions-in-Fuel-Savings-and-Does-Not-Improve-Safety-2.pdf>

^{xvi} Consumer Federation of America, “Consumer Attitudes Towards the Rollback and Freeze of Fuel Economy Standards,” May 2019. Available online: <https://consumerfed.org/wp-content/uploads/2019/05/Consumer-Attitudes-Toward-Fuel-Efficiency-Report.pdf>

^{xvii} Motor & Equipment Manufacturers Association (MEMA), “RE: Notice of Proposed Rulemaking on the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 for Passenger Cars and Light Trucks,” September 24, 2018. Available online: <https://www.mema.org/sites/default/files/resource/MEMA%20Testimony%20EPA%20NHTSA%20MTE%20Sept%2024%202018%20Final.pdf>.

^{xviii} Ceres, “Economic Effects on U.S. Automakers and Suppliers of Retaining or Weakening 2025 National Program Fuel Economy Standards” (May 2018) available online: https://www.ceres.org/sites/default/files/reports/2018-06/Ceres%20analyst%20brief%20spring%202018%206_1.pdf