

➤ The Economic Downsides of “Right-to-Repair”

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➤ Executive Summary

Consumer and industrial equipment has become increasingly sophisticated over the past decade. As machines have evolved alongside the technological revolution, they have become dependent on complex computing software and uniquely manufactured components. In recent years, there has been an effort to access the software and components embedded in these machines to repair or modify equipment independently rather than through authorized channels.

Whether it is known to owners or not, allowing access to equipment's central software and unique components often results in the product not complying with federal environmental or safety laws, potentially endangering equipment operators and bystanders. What is more, mandating that consumers be provided access to proprietary information compromises intellectual property as well as data privacy, and the expanded connectivity of smart products would engender an environment susceptible to data security risks. Requiring manufacturers to supply diagnostics and proprietary information more widely without safeguards that come with in-house repair or certified repair networks increases the risk of negative outcomes.

Some states have implemented laws allowing consumers access to software and parts to “repair” their equipment while bypassing established, authorized channels. Imposing a general “right-to-repair” at the federal level on manufactured goods would ultimately alter how manufacturers operate their businesses, and there is no guarantee that consumers would benefit, as manufacturers would be forced to change the way their products perform, altering both the cost and user experience of their products. A patchwork of state-level regulations would likewise force manufacturers to make drastic changes to the way their products look and perform, potentially leading to significant compliance costs.

The various iterations of “right-to-repair” seek to procure short-term consumer gains in the form of lower service fees, but at a steep cost: the very real damage to the environment, consumer safety and manufacturing innovation resulting from opening up unfettered access to complex equipment and devices.

➤ Introduction

“Right-to-repair,” or the ability for consumers to have access to information, service parts and diagnostic tools to alter goods, has permeated the legislative conversation at the federal and state levels over the past decade. As manufactured goods across all industries have become more complex and increasingly reliant on information technology, those same goods have become heavily regulated by a spectrum of U.S. federal agencies to ensure they achieve energy-efficiency goals, are more environmentally friendly, are safe and dependable and constitute reduced e-waste after their useful lifespan.

Original equipment manufacturers spend years developing and testing their goods to satisfy consumers' needs and preferences while simultaneously complying with government safety and energy standards. The investment of capital and time needed to ensure a product meets these standards is immense. Further, OEMs must ensure that their digital proprietary information embedded in a device is not subject to tampering or appropriation by a consumer, competitor or rogue agent.

There is a wide range of unintended and potentially harmful consequences that would arise if the most commonly introduced versions of “right-to-repair” go into effect. For products where “right-to-repair” applies, they often include intricately crafted hardware and software that the average consumer or independent technician is not trained to repair properly on their own, nor do they have the skills or tools necessary. Additionally, in many cases,

“right-to-repair” proposals require that OEMs provide tooling and documentation, but fail to account for variation in operational models, including those OEMs that do not themselves provide repair services due to the inefficiencies of repairing their complex products as compared to replacing them at their cost.

Virtually all devices house a microprocessor that governs a device’s performance. In the case of internal combustion engine controls, one of the microprocessor’s primary tasks is to ensure that the engine’s performance adheres to rules established by the Environmental Protection Agency adherent to the Clean Air Act of 1963.¹ For some machinery, the microprocessor accomplishes this by constraining speed and acceleration, and some equipment owners attempt to modify their engines to bypass these constraints and boost performance. This usually cannot be done without manipulating the emissions control software, and the EPA directs companies² to make it difficult or impossible for owners to defeat the emissions control equipment.

The evidence suggests that owners modify their equipment to defeat emissions limits with some frequency. For instance, one-third of all respondents in a 2019 survey³ of 770 equipment dealers reported that they had serviced equipment that had been modified illegally in some way, and that nearly half of those modifications involved changes that impaired or disabled emissions control equipment to improve performance. Since the early 2000s, the EPA has attempted to constrain the actions⁴ of motorcycle shops that install after-market equipment, which exists almost exclusively to help owners customize their motorcycles. These activities effectively serve to increase greenhouse gas emissions. As such, the push by the Federal Trade Commission and Congress to make manufacturers provide owners unfettered access to the elemental software of this equipment is incongruous with the Biden administration’s stated objective⁵ of reducing GHG emissions.

Equipment owners who modify their engines in the pursuit of enhanced speed or acceleration almost invariably end up compromising operator safety as well. Besides boosting speed and acceleration, some owners also seek to disable safety equipment if they feel it unduly constrains performance. Repairs performed by someone who is not trained properly can also result in potential safety risks. For these reasons, the U.S. Department of Transportation’s National Highway Traffic Safety Administration registered its objections⁶ to a proposed 2019 ballot initiative that would have required manufacturers to provide owners and third-party repair facilities with access to vehicle systems.

Granting owners unfettered access to their equipment’s microprocessor also will open the door to cybersecurity issues. Requiring companies to allow owners to access and alter the central processor and software would render equipment more susceptible to cybersecurity attack and also make it easier for competitors—both domestic and abroad—to obtain the IP contained therein.

As discussed in the paper, there is little reason to believe that “right-to-repair” legislation will save consumers money by allowing them to bypass the manufacturers or an authorized service center. Rather, bypassing the proper channels for repair will come at a steep cost to quality, performance, consumer safety, the environment and the broader U.S. economy.

1 Congress, Clean Air Act, U.S. Government Publishing Office, Dec. 26, 2022, <https://www.govinfo.gov/app/details/COMPS-8160>

2 Environmental Protection Agency, *Regulations for Emissions from Heavy Equipment with Compression-Ignition (Diesel) Engines*, last modified Feb. 16, 2023, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression#Overview>

3 “Illegal Tampering,” Equipment Dealers Association, 2019, https://illegaltampering.com/wp-content/uploads/2019/10/Illegal-Tampering_8.5x11-1.pdf

4 Environmental Protection Agency, *National Enforcement and Compliance Initiative: Stopping Aftermarket Defeat Devices for Vehicles and Engines*, 2022, <https://www.epa.gov/enforcement/national-enforcement-and-compliance-initiative-stopping-aftermarket-defeat-devices>

5 White House. *National Climate Task Force*, <https://www.whitehouse.gov/climate/>

6 National Highway Traffic Safety Administration, Letter, July 20, 2020, https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/nhtsa_testimony_in_response_to_ma_committee_letter_july_20_2020.pdf

➤ Regulatory Background on “Right-to-Repair”

On July 9, 2021, President Biden signed an executive order titled “Promoting Competition in the American Economy.”⁷ The executive order encouraged the FTC to enact policies to limit the ability of OEMs to restrict nonauthorized entities from performing certain repairs. The executive order claimed that “powerful manufacturers” impose “unfair anticompetitive restrictions,” which “prevent farmers from repairing their own equipment.”⁸ However, even in 2021, farmers (and other end-users in a wide variety of industries) had access to the information, tools and parts necessary to repair virtually any malfunction occurring in a piece of equipment they own.

The FTC has indicated that it considers the existing constraints on the ability of consumers to circumvent repair safeguards to be problematic. For instance, a 2021 FTC study⁹ ascribed a myriad of ills to manufacturers limiting repairs, going so far as to suggest (albeit without evidence) that such limits disproportionately affect minority consumers and may contribute to inflation. Despite these allegations, it remains the case that a majority of OEMs provide a wide range of resources, including manuals, product guides, product service trainings, diagnostics tools and more that enable consumers and third-party repair businesses to maintain, diagnose and repair their products.

With a lack of clarity and direction at the federal level, states have begun examining and even enacting their own patchwork of “right-to-repair” legislation. In 2023, New York,¹⁰ Minnesota¹¹ and Colorado¹² enacted legislation to make it easier for consumers to alter their equipment. At the time of this report, 23 other states have also considered legislation that would force manufacturers to provide direct access to replacement parts, grant unfettered access to the central processor and further limit their ability to constrain what consumers can do with their product.¹³

➤ OEMs Already Provide the Necessary Diagnostic and Repair Tools to Consumers

The basis of the “right-to-repair” movement hinges on the notion that equipment owners do not have the capability to repair their own equipment and that they are prevented from being able to do so. However, this assertion effectively misconstrues the status quo. For instance, many OEM websites already provide the necessary information—when and where possible—to consumers; OEMs also make manuals, tools and parts available to consumers who wish to do their own repairs.

7 Executive Order No. 14036, “Promoting Competition in the American Economy,” *Code of Federal Regulations*, title 86 (July 14, 2021): 36987, <https://www.govinfo.gov/content/pkg/FR-2021-07-14/pdf/2021-15069.pdf>

8 Ibid., 36992

9 Federal Trade Commission, *Nixing the Fix: An FTC Report to Congress on Repair Restrictions*, May 2021, https://www.ftc.gov/system/files/documents/reports/nixing-fix-ftc-report-congress-repair-restrictions/nixing_the_fix_report_final_5521_630pm-508_002.pdf

10 Nicholas De Leon, “New York Right-To-Repair Law Promises Easier, Cheaper Electronics Repairs,” *Consumer Reports*, Jan. 6, 2023, <https://www.consumerreports.org/right-to-repair/new-york-right-to-repair-law-electronics-a1202339752/>

11 Elaine Povich, “Minnesota’s New ‘Right-To-Repair’ Law is the Broadest One Yet in the U.S.,” *Twin Cities Pioneer Press*, June 4, 2023, <https://www.twincities.com/2023/06/04/minnesotas-new-right-to-repair-law-is-the-broadest-one-yet-in-u-s/#:~:text=The%20so%2Dcalled%20%E2%80%9Cright%20to,and%20New%20York%20last%20year>

12 Emma Roth, “Colorado Governor Signs First Right-to-Repair Law for Farmers,” *The Verge*, April 27, 2023, <https://www.theverge.com/2023/4/27/23700448/colorado-right-to-repair-law-farmers-farming-equipment>

13 Brenna Goth, “State Right-to-Repair Proposals Pit Consumers Against Companies,” *Bloomberg Law*, March 1, 2023, <https://news.bloomberglaw.com/in-house-counsel/state-right-to-repair-proposals-pit-consumers-against-companies>

In 2018, the Association of Equipment Manufacturers and the Equipment Dealers Association released a statement of principles¹⁴ to help satisfy farmers' demand for repairability by 2021. The products and services that AEM and EDA members agreed to provide to consumers included manuals, product guides, product service demonstrations, training, seminars, clinics, fleet management information, onboard diagnostics via diagnostics port or wireless interface, electronic field diagnostic service tools—as well as training on how to use them—and publications with information on service, parts, operation and safety.

John Deere's chief technology officer noted in a 2021 interview¹⁵ that 98% of all possible repairs can already be done by their customers, and the 2% of repairs that are inaccessible to owners specifically deal with the equipment software, which directly controls emissions output. Last year, John Deere expanded the availability of self-repair diagnostics¹⁶ to customers, letting owners and independent repair shops obtain Customer Service ADVISOR, its diagnostics tool, through its website, which had been available previously through dealerships.

In early 2023, the American Farm Bureau Federation and John Deere released a Memorandum of Understanding¹⁷ that specified the company's commitment to repair access for farmers and independent repair facilities. The memorandum emphasized the need for customers to have the ability to maintain their tractors by ensuring the availability of specialty tools and repair manuals along with the ability to discern the diagnostic codes from the software that runs the tractors. The memorandum also seeks to ensure that the arrangement would not jeopardize safety controls or emissions standards nor compromise the manufacturer's IP.

Both Case IH¹⁸ and New Holland Agriculture¹⁹ have pages on their website dedicated to repair access, complete with resources for finding electronic service tools, manuals, parts and other materials needed for servicing equipment. Beyond agricultural equipment, electronic device manufacturers such as Samsung²⁰ and Apple²¹ have also expanded repair access for their customers, providing kits for a variety of different repairs and allowing access to the parts, tools and documentation that already exist for their established repair and logistical models. Other OEMs that do not have an established in-house or third-party repair program provide remote diagnostic services, backed by quick replacement at the part's actual cost.

The push for broad "right-to-repair" legislation is an inapt response to the efforts manufacturing companies have made to ensure customers are able to have their equipment replaced at cost or repaired by whomever they desire, whether that be through an authorized dealer, independent repair shop or self-repair. The debate tends to obscure the reality that most repairs can be completed by owners or third parties, and that manufacturers have taken steps to help clarify and expand precisely what their consumers can do on their own.

14 "AEM, EDA Announce Statement of Principles on 'Right to Repair,'" Association of Equipment Manufacturers, Feb. 1, 2018, <https://www.aem.org/news/aem-eda-announce-statement-of-principles-on-right-to-repair>

15 Nilay Patel, "John Deere Turned Tractors into Computers—What's Next?", The Verge, June 15, 2021, <https://www.theverge.com/22533735/john-deere-cto-hindman-decoder-interview-right-to-repair-tractors>

16 Deere & Company, "John Deere Expands Access to Self-Repair Resources," Cision PR Newswire, March 21, 2022, <https://www.prnewswire.com/news-releases/john-deere-expands-access-to-self-repair-resources-301506394.html>

17 American Farm Bureau Federation and Deere & Co., "Memorandum of Understanding," Farm Bureau, Jan. 8, 2023, https://www.fb.org/files/AFBF_John_Deere_MOU.pdf

18 Case IH, "Self-Repair," Case IH, accessed Sept. 29, 2023, <https://www.caseih.com/northamerica/en-us/service-support/self-repair>

19 New Holland Agriculture, "Self-Repair," New Holland Agriculture, accessed Sept. 29, 2023, <https://agriculture.newholland.com/en-us/nar/services-and-solutions/self-repair>

20 Rob Pegoraro, "Samsung 'Self-Repair' Program Adds Galaxy S22 Phones, Some Galaxy Books," PC Magazine, Jan. 17, 2023, <https://www.pcmag.com/news/samsung-self-repair-program-adds-galaxy-s22-phones-some-galaxy-books>

21 Alex Blake, "Got an M1 Mac? Apple Will Now Let You Repair It Yourself," Digital Trends Media Group, Dec. 21, 2022, <https://www.digitaltrends.com/computing/apple-expands-self-repair-program-m1-macs/>

➤ Allowing Uncertified Changes to Equipment Increases the Threat to the Environment

The EPA requires all equipment manufacturers to install machine parts that strictly limit emissions of nitrogen oxides, particulate matter and various other contaminants. These requirements extend to the equipment's use—the EPA has levied fines²² against companies for installing software that made engines EPA-compliant during emissions testing but later allowed for customers to modify the performance limitations. Requiring companies to allow consumers to enter equipment's microprocessor or access embedded software—which most iterations of proposed legislation would do—would lead to exactly the same sorts of alterations and the associated violations of EPA-mandated emissions limits.

Few dispute that customers will take such steps if they are able to. For instance, Russ Ball, a sales manager at a John Deere dealership that services farmers in Nebraska, Colorado and Wyoming, commented²³ that “if they can change horsepower and they can change emissions, they are going to do it.”

Those who choose to alter their equipment may not intentionally set out to increase emissions when they attempt to service their own equipment, but the steps they take to fix their machine may still effectively raise emissions when the equipment is placed back in service. There is also considerable evidence that many who seek to do their own repairs want to do so precisely because their intent is to disable emissions controls and improve the vehicle's speed, acceleration and performance.

A 2019 survey²⁴ of 770 equipment dealers provides a snapshot of the prevalence of this type of illegal tampering. More than one-third of respondents said they have serviced equipment that had been modified illegally, and nearly half of those modifications involved changes that impaired or disabled emissions control equipment.

This reality is incongruous to the fact that supporters of “right-to-repair” legislation often insist that making it easier for consumers to do their own repairs would benefit the environment, claiming that cheaper maintenance costs would lead owners to keep their goods for a longer period of time, reducing waste. However, there is little evidence that “right-to-repair” would lengthen product cycles; in fact, the predilection of owners to boost horsepower and acceleration suggests that reduced product cycles²⁵ would be a more likely outcome. Modifications or inapt repair can be damaging²⁶ to the engine as well as the drive components. For instance, increasing the hydraulic pressure to gain more digging force on an excavator—a common modification on such machines—creates an imbalance for the entire machine.

Over the past few years, the EPA has strengthened its efforts²⁷ to stop aftermarket defeat devices that serve to bypass, override or delete emissions controls in on- and off-road engines, and in 2020, the agency implemented

²² Environmental Protection Agency, *Clean Air Act Vehicle and Engine Enforcement Case Resolutions*, last updated Jan. 31, 2023, <https://www.epa.gov/enforcement/clean-air-act-vehicle-and-engine-enforcement-case-resolutions>

²³ Jesse Bedayn, “11 States Consider ‘Right to Repair’ for Farming Equipment,” *The Associated Press*, Feb. 14, 2023, <https://apnews.com/article/farm-equipment-repairs-d5ea466725328d965a85a62130503d49>

²⁴ Equipment Manufacturers Association, *Modifications to Safety and Emissions Features in Off-Road Equipment*, accessed Sept. 29, 2023, https://illegaltampering.com/wp-content/uploads/2019/10/Illegal-Tampering_8.5x11-1.pdf

²⁵ Associated Equipment Distributors, *Letter on Right to Repair and What It Means for Entrepreneurs*, Sept. 14, 2022, <https://docs.house.gov/meetings/SM/SM21/20220914/115093/HHRG-117-SM21-Wstate-TaylorK-20220914.pdf>

²⁶ Dan Crummett, “Engine Enhancements: Performance Tuning Can Boost Power, Productivity, but Experts Warn of Quick Fixes,” *Progressive Farmer*, Jan. 6, 2020, <https://www.dtnpf.com/agriculture/web/ag/news/article/2020/01/06/performance-tuning-can-boost-power>

²⁷ Environmental Protection Agency, *National Enforcement and Compliance Initiative: Stopping Aftermarket Defeat Devices for Vehicles and Engines*, last updated Dec. 22, 2022, <https://www.epa.gov/enforcement/national-enforcement-and-compliance-initiative-stopping-aftermarket-defeat-devices>

an enforcement and compliance initiative²⁸ to that effect. Many owners and operators often seek to bypass these federally regulated emissions controls to enhance the performance of their equipment, resulting in excess emissions of nitrogen oxides, particulate matter and other pollutants. Not only do these alterations violate the Clean Air Act, but they can also create liability issues for OEMs due to their noncompliance with EPA regulations.

The potential impact of these actions on the environment is significant. The EPA estimates²⁹ that more than 500,000 tons of excess nitrogen oxides have entered the atmosphere since 2009 due to operators disabling or modifying emission controls in trucks. These attempts to evade emissions standards are prevalent across the auto, agriculture, construction, maritime and motorsport industries.

The impact on pollutants and GHGs is not the only potentially negative impact that “right-to-repair” legislation could have on the environment. For instance, New York’s recently enacted Digital Fair Repair Act³⁰ requires OEMs to make every part of each product covered by the law available for sale; it would also force companies to reorganize their operations and distribution networks. These changes would lead to increased emissions, as more parts would need to be produced, shipped and warehoused. Some products covered by the Digital Fair Repair Act are quite complex and have hundreds of components. This is especially true for companies that do not have existing in-house or third-party repair programs. Under “right-to-repair” requirements, they would need to create entirely new logistics and operations footprints, countering existing recycling, reuse and refurbishment programs.

Inevitably, the requirement would result in some consumers attempting ill-considered repairs that are unnecessary or redundant and could potentially put them at risk of injury. What is more, consumers misdiagnosing the problems with their goods will lead to the purchase and subsequent disposal of unneeded and unused parts. Advocates often insist that “right-to-repair” will address the problem of electronic waste—but electronic waste has been declining in the United States since 2015,³¹ largely because of innovation from equipment manufacturers.

➤ Manufacturers Have the Right to Protect Their IP and Proprietary Software

Allowing consumers to have access to a good’s software can potentially jeopardize manufacturers’ IP protections as well as create cybersecurity risks for consumers. One reason that manufacturers place limits on access to proprietary information for individuals and independent repair facilities is to minimize these potential hazards.

Technological advances in recent years have led to both radical improvements of existing devices as well as the introduction of a whole suite of new devices. For instance, consumers now have access to health and fitness monitors, home security devices, smart home appliances and vehicles that have most of their workings governed by a central processing unit.

While these new and radically improved products have benefited consumers greatly, this expansion of connectivity intensifies the need to protect collected data, for both consumer privacy and the protection of manufacturers’ IP. Unfettered proprietary access as specified in most “right-to-repair” legislation has the potential to undermine the guarantees that both consumers and businesses rely on.

²⁸ Patrick Gilbride, “Notification of Evaluation: EPA’s Fiscal Years 2020–2023 National Compliance Initiative: Stopping Aftermarket Defeat Devices for Vehicles and Engines.” Letter received by Lawrence Starfield, acting assistant administrator for the Office of Enforcement and Compliance Assurance, June 14, 2021, https://www.epa.gov/system/files/documents/2021-07/epaioig_notificationmemo_7-14-21_defeat.pdf

²⁹ Janice Chan and Lauren Tozzi, “Tampering & Aftermarket Defeat Devices,” EPA Presentation to Equipment Dealers Association, July 21, 2021

³⁰ Scott R. Axelrod, “New York Ends 2022 With Nation’s First Fair Repair Act,” *Governing*, Jan. 3, 2023, <https://www.governing.com/now/new-york-ends-2022-with-nations-first-fair-repair-act>

³¹ Geoffrey Giller, “Electronic Waste on the Decline, New Study Finds,” Yale School of the Environment, Dec. 1, 2020, <https://environment.yale.edu/news/article/electronic-waste-on-the-decline-new-study-finds>

The unauthorized repair of certain devices creates a greater risk for compromised information, due to either a lack of proper training or malicious action. Diagnostic tools provide access to the entire device, which often includes sensitive user information. Improper or insecure repair can result in the disabling of security features, making devices vulnerable to data theft. At worst, unrestricted access to user data can open the door for ill-intentioned unauthorized technicians to act malevolently.

In a veto request of the New York legislation, a group of electronics manufacturers noted³² that the legislation essentially requires independent repair to be treated the same as an authorized repair center—but without the same contractual protections and restrictions that afford service and security confidence. OEMs’ authorized technicians undergo training and certification as well as a vetting process to ensure that they possess both repair capabilities and proper discernment for protecting customer privacy.

Requiring certified technicians to service equipment is one way that manufacturers attempt to safeguard data collected by their products. For instance, the FTC’s *Nixing the Fix* report³³ notes that the Consumer Technology Association has made clear that manufacturers are maintaining their responsibility of product security by prohibiting certain repairs through independent shops or individuals. Both the FTC’s Internet of Things staff report³⁴ from 2015 as well as its *Start with Security*³⁵ guide recommends that companies make a substantial effort to ensure that service providers are capable of maintaining security, along with administering continued oversight. This is a sentiment that TechNet,³⁶ the national bipartisan network of innovation economy CEOs, has stressed repeatedly as well.

Because of the interconnectivity of devices, it is not just one product that becomes vulnerable to hacking, but all devices that share a network. In effect, this means that one tractor’s CPU that has been rendered more susceptible to infiltration by bad actors potentially puts all other tractors of the same model at risk.

The safety of consumers’ collective privacy and the U.S. economy are inextricably dependent on how decisionmakers in the government and industry approach the security of this integrated system, which includes devices used in schools, banks and hospitals, as well as those utilized in aircraft and emergency situations. The Information Technology Industry Council remarked³⁷ that these inadvertent increases in security risks could also extend to government customers.

In 2020, Massachusetts voted for a “right-to-repair” ballot initiative that would give independent mechanics access to diagnostics on new vehicles. There has been a lawsuit³⁸ filed to prevent the law from taking effect, and the NHTSA sent a letter³⁹ to vehicle manufacturers directing them to comply fully with federal safety obligations that conflict with Massachusetts’ law. The NHTSA letter points to the remote access to telematics as the primary safety concern, stating that it could allow “manipulation of systems on a vehicle” by bad actors and that “vehicle

32 Kate Lisa, “Both Sides of Right to Repair Bill Vie for Hochul’s Support,” Spectrum News 1, Aug. 2, 2022, <https://spectrumlocalnews.com/nys/central-ny/politics/2022/08/03/both-sides-of-right-to-repair-bill-vie--for-hochul-s-support>

33 Federal Trade Commission, *Nixing the Fix: An FTC Report to Congress on Repair Restrictions*, May 2021, https://www.ftc.gov/system/files/documents/reports/nixing-fix-ftc-report-congress-repair-restrictions/nixing_the_fix_report_final_5521_630pm-508_002.pdf

34 Federal Trade Commission, *FTC Report on Internet of Things Urges Companies to Adopt Best Practices to Address Consumer Privacy and Security Risks*, Jan. 27, 2015, <https://www.ftc.gov/news-events/news/press-releases/2015/01/ftc-report-internet-things-urges-companies-adopt-best-practices-address-consumer-privacy-security>

35 Federal Trade Commission, *Start with Security: A Guide for Business*, June 2015, <https://www.ftc.gov/system/files/documents/plain-language/pdf0205-startwithsecurity.pdf>

36 “TechNet Statement on Executive Order on Promoting Competition in the American Economy,” TechNet, July 9, 2021, <https://www.technet.org/media/technet-statement-on-executive-order-on-promoting-competition-in-the-american-economy/>

37 Air Conditioning, Heating and Refrigeration Institute, et al. “Electronics Manufacturers Veto Request for SB 4104,” Received by New York State Gov. Kathy Hochul; Scribd, June 29, 2022, <https://www.scribd.com/document/585282718/New-York-SB-4104-Veto-Request#>

38 “Automakers Fight Updated Massachusetts ‘Right-to-Repair’ Law,” CNET, Dec. 1, 2020, <https://www.cnet.com/roadshow/news/automakers-fight-updated-massachusetts-right-to-repair-law/>

39 National Highway Traffic Safety Administration letter advising on safety concerns related to a Massachusetts law, Aug. 22, 2023, <https://pirg.org/wp-content/uploads/2023/08/351-1.pdf>

crashes, injuries or deaths are foreseeable outcomes.” The letter also notes that some vehicle manufacturers indicated they would disable the telematics to prevent the new law from affecting their vehicles, although NHTSA believes this too would affect public safety negatively.

Firms Need to Protect Their IP

In addition to taking measures to ensure customer data is safe, manufacturers must also be able to protect any proprietary knowledge embedded in the machines they sell—that is, the product of their own innovation, research and development. “Right-to-repair” rules mandating a certain level of access to product information, particularly those that include access to the source code, can effectively force companies to divulge materials related to their IP, potentially allowing foreign companies (or their governments) the opportunity to replicate products and processes. While copyright and IP law protects companies to some degree, the broad extent of most proposed “right-to-repair” legislation across the states and federal government constitutes a threat to this protection.

Despite the common assertion that trade secrets would be exempt from disclosure, the legal implications of “right-to-repair” regarding copyright law are significant. “Right-to-repair” bills that require the disclosure of digital locks, which protect against unauthorized access and safeguard manufacturers’ IP, would conflict with a foundational aspect of copyright law—namely, that creators get to determine how their works get distributed.⁴⁰ The success of the digital marketplace can be attributed largely to copyright protections that creators rely on, incentivizing innovation through the protection of their IP.

Making repairs to hardware components may require the circumvention of digital rights management, which could leave the software in an unprotected state, and potentially infringe on the rights of the copyright owners of the software. While manufacturers continue to stress the importance of IP, the FTC has minimized the issue and all but ignored the issue in its report, *Nixing the Fix*.⁴¹ The potential of unforeseen visibility into a product software design harms both the consumer and manufacturers, and there is no evidence that suggests patent rights are an impediment to independent self-repair.

➤ Altering Equipment Poses a Dramatic Increase in Violating Safety Standards and Falling Out of Federal Compliance

Owners of consumer and industrial equipment often seek to make modifications to increase the performance of the machine in some way. For instance, managers or operators of farms or factories may think that altering their machines to operate above industry-regulated levels would boost their production. This also occurs with motorcycles,⁴² automobiles,⁴³ medical equipment⁴⁴ and a variety of other products.

⁴⁰ Devlin Hartline and Adam Mossoff, “State Right-to-Repair Laws Need to Respect Federal Copyright Laws: A Constitutional, Legal and Policy Assessment,” Hudson Institute, August 2022, <http://media.hudson.org.s3.amazonaws.com/State+Right-to-Repair+Laws+Need+to+Respect+Federal+Copyright+Laws.pdf>

⁴¹ Federal Trade Commission, *Nixing the Fix*, 24.

⁴² Andrew Cherney, “Easiest Ways to Increase Your Motorcycle’s Power,” Motorcycle Cruiser, April 12, 2019, <https://www.motorcyclecruiser.com/easiest-ways-to-increase-your-motorcycles-power/>

⁴³ Andre Nalin, “15 Mods to Make a Car Go Faster (and 5 Things That Don’t Work),” HotCars, Feb. 6, 2022, <https://www.hotcars.com/hacks-to-make-a-car-go-faster-and-things-that-dont-work/#hack-ecu-tuning>

⁴⁴ “The Right to Repair is Wrong for Patients,” AdvaMed, <https://www.advamed.org/industry-updates/policy-issues/right-to-repair-wrong-for-patients/>

However, the central processor in machines with internal combustion engines that regulates speed and acceleration does so for environmental and safety reasons. Owners and operators that tamper with equipment safety features to boost productivity put themselves at risk for potential harm due to improper operation and could potentially open up questions of liability. According to the previously mentioned survey of equipment dealers, of those that saw modified equipment, 54% reported that safety features had been removed, impaired or disabled.

In addition to modified engines, owners making modifications to smaller devices and electronics can also pose safety risks. There are a variety of health- and fitness-related devices, such as medical devices and smart watches, that can affect consumers' well-being and safety directly. Opening up repair to this kind of equipment could have dangerous implications if done improperly. Safety equipment and features could be prone to failure at critical moments. Applications that are designed to measure barometric pressure, water depth or heart rate could become compromised through repair done by someone lacking the proper training.

Moreover, in the FTC's *Nixing the Fix* report, manufacturers offer examples of repairs that contain parts, such as high-energy lithium batteries, that if handled erroneously, could result in injury. Not only do mishandled parts pose a potential for harm, but some repairs require climate-controlled environments that would be difficult for most independent repair facilities and individuals to replicate. Operating certain devices without proper safety precautions and equipment can increase that risk of injury.

➤ A Patchwork of State Laws Will Make Compliance Difficult and Burdensome

Regulating the performance and safety of an ever-growing range of equipment differently across states makes little sense in practice or compliance. However, states have begun to consider and adopt their own versions of "right-to-repair" legislation, causing more confusion for both consumers and OEMs. In 2022, two states passed legislation related to "right-to-repair": Colorado enacted the Consumer Right to Repair Powered Wheelchairs⁴⁵ and New York passed the Digital Fair Repair Act.⁴⁶ In the first five months of 2023, 22 states⁴⁷ have proposed "right-to-repair" legislation, covering a variety of devices from agricultural equipment to wheelchairs to mobile electronics to home appliances, and Minnesota had its legislation become law.

The interests of states vary greatly due to different geographic regions having different needs, which presents a problem when attempting to enact "right-to-repair" legislation; the existence of multiple differing bills not only creates inconsistencies for manufacturers but also presents numerous possibilities for these laws to be at odds with federal law, specifically regarding the environment but also copyright and cybersecurity.

Gov. Hochul made significant changes to New York's Digital Fair Repair Act prior to signing it into law to address safety and security concerns. The changes⁴⁸ eliminated provisions that required manufacturers to grant access to security codes, exempted digital devices that are business-to-business or business-to-government sales and deleted provisions that would have mandated the disclosure of IP.

⁴⁵ HB22-1031, 73rd General Assembly, 2022 Reg. Sess. (Colorado 2022), <https://leg.colorado.gov/bills/hb22-1031>

⁴⁶ "Governor Hochul Signs the Digital Fair Repair Act Into Law," New York State Governor, Dec. 29, 2022, <https://www.governor.ny.gov/news/governor-hochul-signs-digital-fair-repair-act-law>

⁴⁷ Nathan Proctor, "20 States File Right to Repair Bills as Momentum Grows," PIRG, Feb. 7, 2023, <https://pirg.org/articles/20-states-file-right-to-repair-bills-as-momentum-grows/>

⁴⁸ "Memorandum Filed with Senate Bill 4104-A," State of New York Executive Chamber, Dec. 28, 2022, <https://d12v9rtnomnebu.cloudfront.net/diveimages/FIHtbaRWAAEdwvdv.jpeg>

California's recently introduced Right to Repair Act⁴⁹ would apply to a wider variety of manufactured goods, with the threshold for coverage being determined by the wholesale price of the product. Under the bill, manufacturers would be required to provide repair support for less expensive products for three years and seven years for more expensive goods. The bill also requires OEMs to supply service literature as well as repair tools or parts, along with the necessary means to disable any security locks.

When multiple states offer competing legislation to regulate an industry, the result is that the state with the costliest regulatory regime often becomes the de facto standard for the nation, since manufacturers typically find it costly to meet varying compliance requirements across states and choose the one that would allow them to operate in every state. Jeffrey Westling, director of technology and innovation policy at the American Action Forum, suggested⁵⁰ that laws adding additional obligations for producers will produce additional regulatory compliance costs inevitably.

In the case of "right-to-repair," the costliest standard—which is rarely the optimal one from a regulatory perspective—would likely reign across the country. Incongruent stipulations relating to which products and product components are covered by legislation affect manufacturers' ability to adhere to the various iterations of the laws. The age range of devices for which legislation applies also has the potential to increase compliance costs and legal exposure for manufacturers significantly.

➤ **“Right-to-Repair” Will Not Reduce Costs for Consumers**

Many companies have effectively implemented what economists refer to as a two-part pricing model, where they bundle a one-time charge for the actual goods produced with an ongoing service contract. “Right-to-repair” advocates contend that separating the good from the service would engender more consumer choice, more competition in the repair marketplace and cost savings for consumers. However, that is not an accurate representation of how the repair marketplace works, and it is not axiomatic—as “right-to-repair” advocates often argue—that bundling purchasing and service is bad for consumers.

The manufacturer or its authorized dealer has an inherent advantage in the repair market. This is for both the safety of the consumer and protection of the OEM. An authorized repair center must typically make a considerable investment both in training and in inventory to ensure that it can satisfy its customers adequately. This includes keeping in stock the necessary parts to make a repair, training employees, keeping certifications up to date and ensuring their facility remains in compliance with both the OEM and the state.

Farm equipment service providers typically hold several million dollars' worth of spare parts and equipment, which is necessary because manufacturers do not find it financially feasible to quickly deliver parts directly to individual customers and would rather deliver parts to their authorized dealers or service providers at scale. This also ensures repairs are made much more quickly. For many industries, the cost of a delay in repair can accrue by thousands of dollars an hour, making repairs urgent.

A common complaint about the current repair landscape is the high cost, and “right-to-repair” advocates assert that requiring manufacturers to sell the full assortment of diagnostic equipment and repair materials directly to the consumer and third-party servicers, at a fair and reasonable price determined by the government, would save consumers money. However, this is unlikely to be the case. Many companies bundle the cost of the

⁴⁹SB244, 2023-2024 Reg. Sess. (California 2023). <https://legiscan.com/CA/text/SB244/id/2664497>

⁵⁰Jeffrey Westling, “An Update on Right to Repair,” American Action Forum, Jan. 31, 2023, <https://www.americanactionforum.org/insight/an-update-on-right-to-repair/#ixzz7uYFDS9dS>

physical equipment with an ongoing service contract. This allows them to keep a lower cost for the primary product while also making a profit through providing reliable service. If the latter were to cease being profitable, we would expect to see an increase in the price of equipment.

Bundling two complementary products together can be beneficial, which means that its effective prohibition—which is what right-to-repair imposes—hurts consumers, according to a recent study.⁵¹ The authors conclude that “right-to-repair” “compromises manufacturer profit, reduces consumer surplus and exacerbates the environmental impact.”⁵²

“Right-to-repair” legislation would not only impact consumers, but also authorized dealerships, which are independently owned small businesses. Per their contracts with OEMs, authorized dealers are able to purchase service materials at a discounted price because they are buying a high volume and keeping stock available to meet the immediacy of customers’ needs. By requiring manufacturers to sell directly to the consumer, this disincentivizes dealers to keep parts in stock and potentially results in an increased wait time for owners seeking repair.

Not only would consumers not save money under such an outcome, but they would also suffer from a variety of other unforeseen consequences. For instance, the requirement that replacement parts be provided at or near cost (and sometimes at no cost) would decimate the OEM network, since they would no longer have a cost advantage in providing parts to their customers. The demise of a robust network would leave many owners without a reliable and efficient place to get a repair—especially in rural communities. This could increase costs for customers significantly, as delays in placing equipment back in service directly affect a business’s bottom line.

➤ Conclusion

The various iterations of “right-to-repair” seek to procure short-term consumer gains in the form of lower service fees, but at a steep cost: the very real damage to the environment, consumer safety and manufacturing innovation resulting from opening up unfettered access to complex equipment and devices.

Real-world experience has shown that consumers consistently seek to alter their equipment to boost performance, in direct violation of important environmental and safety regulations. Allowing consumers access to proprietary systems to make these alterations exposes manufacturers’ IP. And undermining OEMs’ product-plus-service bundle will imperil local dealers and dramatically increase repair times.

Manufacturers are producing increasingly advanced products that benefit consumers—both individuals and businesses—throughout the economy. “Right-to-repair” threatens to slow these gains.

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⁵¹ Jin, Chen, et al, “Right to Repair: Pricing, Welfare, and Environmental Implications,” *Management Science* 69, no. 2 (February 2023): 1017–1036, <https://doi.org/10.1287/mnsc.2022.4401>.

⁵² Ibid.



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