STEERING THE ENVIRONMENTAL IMPACTS OF DRIVERLESS CARS

By Arthur Harrington and Sarah Schenck

Just as the conventional automobile played a massive role in shaping the physical and socioeconomic landscape of modern America, autonomous vehicles (AVs) will also have an enormous impact on land use and the environment. Policy makers have an opportunity to anticipate and shape the effects of this technological development on the environment rather than retroactively manage the unintended consequences.

Overview of AV technology and legislative landscape. In September 2016 the U.S. Department of Transportation issued its Federal Automated Vehicles Policy (Policy) in an effort to pave the way for safe design, development, testing, and deployment of AVs. The Policy includes guidance for AV manufacturers, developers, and other organizations on 15 safety assessment areas, a model state policy, and new regulatory tools and authority to assist policy makers in undertaking the challenges involved in regulating AVs. Because of the multiple definitions for the various levels of automation, it also standardizes these levels by adopting the definition of SAE International (initially established as the Society of Automotive Engineers): Level 0 (no automation), Level 1 (driver assistance), Level 2 (partial automation), Level 3 (conditional automation), Level 4 (high automation), and Level 5 (full automation).

Impacts of AVs on traditional environmental policies and recommended policy changes. *Smart growth.* The current approach to federal and state environmental regulation is often confined to one medium (e.g., water, air, solid waste). Rather than analyze the impacts of AV technology on each of these programs in isolation, smart growth should be used to examine comprehensively the impacts of AV technology across all existing environmental programs.

PLANNING FOR AUTONOMOUS VEHICLES CAN REDUCE ENVIRONMENTAL IMPACTS AND MAXIMIZE OPPORTUNITIES.

Smart growth covers a range of conservation strategies that help protect human health and the environment while making communities more attractive and socially diverse. In addition, smart growth promotes efficient and sustainable land development by optimizing the use of prior infrastructure investments and minimizing the footprint of the developed land.

The smart-growth initiative should include a requirement that city planners consider the impacts of AV technology on public transportation, parking requirements, and local street systems. City planners can use smart-growth techniques to consider how to encourage brownfield redevelopment in the face of AV technology and how to avoid the potential adverse impacts of increased miles traveled on land use and development. Local officials should consider developing special zoning requirements to anticipate the potential negative effects that large, centralized fleet operations and servicing areas may have on surrounding communities. Municipalities will have to rethink parking requirements for commercial and residential developments in local zoning ordinances in order to maximize efficient land use as the need for parking lots and structures decreases.

Mobile source planning for ozone nonattainment. Developing state implementation plans (SIPs) is an important requirement under the Clean Air Act for meeting the National Ambient Air Quality Standards (NAAQS). Transportation measures can be key components of SIP development, depending on the severity of nonattainment in a geographical or urban area. If the various transportation-related activities, programs, and strategies are included in a SIP, these voluntary measures become enforceable under federal law. The projected advancement of AV technology within the next two decades will be an important factor for states to consider during their SIP planning, given the long time horizon required for NAAQS attainment requirements.

Some of the SIP planning questions that EPA and state mobile source experts need to consider include whether AV technology could increase the number of vehicle miles traveled, and, if so, how to appropriately counteract this increase; how to ensure that AV technology encourages the use of more efficient vehicles; whether advancing the use of AV technology will reduce emissions because of more efficient traffic movements; whether the

Arthur Harrington (ajharrin@gklaw.com) and **Sarah Schenck** (sschenck@gklaw.com) are attorneys in the Environmental and Energy Strategies Group at Godfrey & Kahn, S.C., in Milwaukee, Wisconsin.

ability to interface with automated traffic controls will produce less emissions from idling at controlled intersections; whether reduced parking demands and the use of a centralized fleet will result in less mobile source emissions; and how AV technology will impact the use of mass transit and total emissions from mobile sources for SIP planning purposes.

Urban brownfield redevelopment. AV technology may also have a significant impact on the demand for urban brownfield redevelopment. AVs could stimulate additional urban sprawl, as commuters could use driving time to engage in other activities (such as work), driving down the demand for brownfield redevelopment. However, AVs are expected to reduce both road lane width and the need for parking in core urban areas. Surface parking lots and parking structures located in centralized urban areas frequently act as caps to contaminated properties. As AV fleets owned by companies such as Uber and Lyft or municipalities decrease the need for private ownership of vehicles, the amount of parking lots and structures needed in urban city centers will likely decrease. Redeveloping these brownfields could lead to denser city centers with additional green space.

Tax incentives and renewable energy policies. Federal and state policy makers must consider how AV technology will affect tax incentives for certain types of renewable energy vehicles as well as other energy policies.

I.R.C. § 30D provides a credit for qualified plug-in electric drive motor vehicles, including passenger vehicles and light trucks. All electric and plug-in hybrid cars purchased after 2010 may be eligible for a federal income tax credit of up to $7,500. However, there is a phase-out period for the manufacturer after it has sold 200,000 eligible plug-in electric vehicles. In addition, numerous states have provided incentives for hybrid electric vehicles.

With emerging AV technology, will electric charging stations and compressed natural gas stations be more efficient because they will be located at centralized facilities owned by mass fleet operators where such vehicles will be available on demand by users and automatically returned to such facilities? Will electric utilities with centralized base load facilities be better suited to encourage electric vehicles at those centralized locations near load centers? Will a whole new industry of renewable energy be fostered by centralized owners/operators of AV fleets available on demand? How will these factors affect the current tax and grant incentives focused on electric hybrid and charging stations?

Environmental justice. Using history as a guide, certain populations may be more likely than others to be adversely impacted by emerging AV technology. Policy makers must consider the potential adverse environmental and human health effects of AVs on local communities, particularly minority and low-income populations. If AV technology encourages urban sprawl, will it have a disparate impact on low-income communities of color as automobile advancements did in the twentieth century? If AV technology will be cost prohibitive for low-income communities, how can we adapt current mass transit models to incorporate AV technology? Will the affordability of land and the need for centralized locations cause large fleet operators to locate centralized facilities near disadvantaged communities, exacerbating the adverse impacts of mobile source emissions already experienced by these communities and further decreasing land values in these areas?

Careful consideration and diligent planning that contemplate lessons learned from the past can make the next transportation revolution an opportunity for all communities, while also minimizing the impact on the built and natural environment. ■

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