

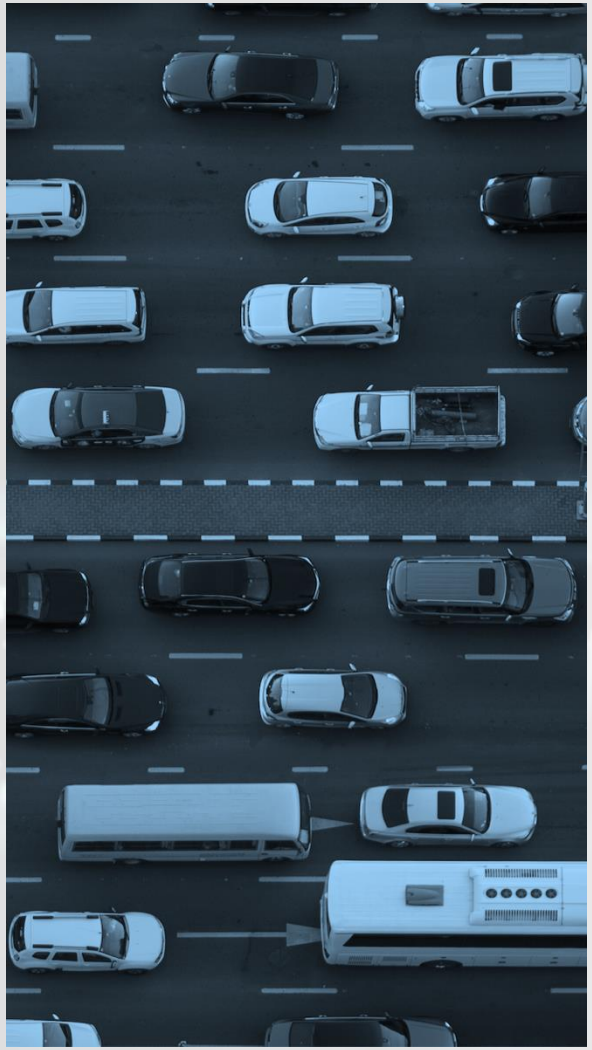
SMART ENERGY DECISIONS RESEARCH

The State of Vehicle Fleet Electrification

August 2021

Sponsored by nrg

A note from NRG



At NRG, we believe electric vehicle adoption is at a tipping point.

After a decade's running start, vehicle fleet electrification is on the verge of becoming mainstream. With transportation now the leading source of GHG emissions in the U.S., companies and cities are seeking new solutions to decarbonize their fleets to meet their net-zero sustainability goals. In turn, car and truck makers are investing hundreds of billions of dollars to add all-electric vehicles to their lineups.

Customers are taking notice. C-suite, fleet managers, and business owners are engaged, as evidenced by the results of this survey, where 86% of respondents expressed some level of interest in vehicle fleet electrification.



Danita Park, Director of EV and Commercial Development, NRG

For many organizations, the journey can be harder than it looks. We recommend these five steps:

- **Educate**. Understanding of EV offerings and advantages is uneven. Focus on C-suite, operations, and finance roles who may act as key decision makers in approving the transition.
- **Amass data**. Making the case for electrification depends in part on compiling reliable data of current fleet composition, energy spending, maintenance costs, and related factors.
- **Tell the story**. Use the data to guide incremental deployment, prioritized by analysis of which vehicles in the fleet are best to electrify both technically and economically.
- **Map out a plan**. Cross-functional teams can map out a multi-year process, testing first before rolling out EVs to replace legacy gas and diesel vehicles as they age out and EV alternatives become available.
- **Secure stakeholder alignment**. Converting an organization's fleet from one fuel to another will take cross-functional expertise and leadership.

Introduction



The past year may mark a historic juncture: the beginning of a permanent transition to electrified vehicles, away from fossil fuels. Witness the following trends:

Exceptional growth. In 2020, while demand for practically every other vehicle category was stifled by pandemic-induced recession, electric vehicle (EV) sales surged. Today, some 12 million passenger EVs ply the world's roads, according to Bloomberg NEF. Electrification is also making inroads to heavier transport roles. Over one million light commercial EVs are in service, including buses, delivery vans, and trucks.

Not when, but how. If they were uncertain before, fleet managers now appear more resolved. The question is no longer whether to electrify, but how best to do so. To be sure, the speed of this transition will depend on a host of public policy and market factors.

Rising pressure. Most of these factors are oriented toward more rapid vehicle fleet electrification (VFE). Policy moves to decarbonize are rising in most large economies, driving a new wave of subsidies and limits on fossil fuels. EV costs continue to fall, driven in part by better batteries but also by growing economies of scale.

More for less. Led by the Ford F-150 Lightning pickup, due in early 2022, a new generation of more affordable and capable electric pickups — along with derivative vans — could accelerate adoption. Recent DOE data suggests that lower energy costs and reduced maintenance needs make EVs 40% cheaper to operate. Further, BNEF predicts that in urban duty cycles, electric trucks of any size will soon be the cheapest option for many use cases.

Partners wanted. Yet even as the benefits to electrify become clearer, trusted partners are needed to help educate and guide decisions as they advance electrification efforts from passenger cars, to medium- and heavy-duty vehicles.

Advancing incrementally. Smart Energy Decisions' first study on ***The State of Vehicle Fleet Electrification*** finds that organizations are advancing toward electrification, driven by key priorities such as sustainability and environmental goals, as well as costs targets and reputational concerns. Early adopters are learning and iterating, moving from small niches to bigger ones, in advance of wider deployment.

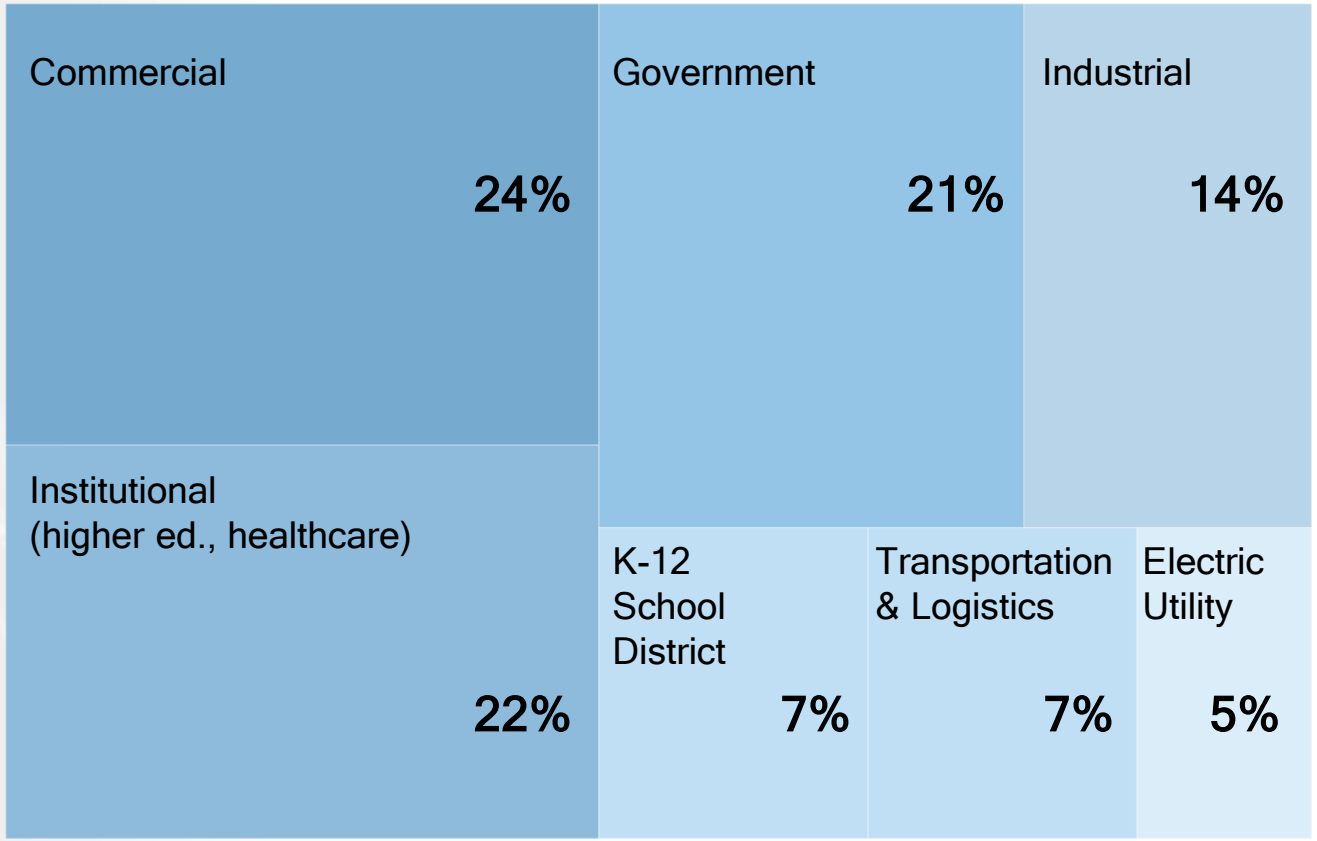
Methodology

In April 2021, we fielded an electronic survey to Smart Energy Decisions readers. A total of 228 participants from as many organizations responded (see next page).

Among all respondents, 195 expressed some level of interest in vehicle fleet electrification (VFE). Three types of organizations — commercial, institutional (including higher education and healthcare), and government — accounted for over two-thirds of the responses.

By management function, we saw three areas of responsibility most heavily represented: energy (28%); fleet (27%); and sustainability (22%).

The breadth of interest in this survey — shown by both public and private sector organizations — suggests interest is broad and active in VFE.



Q. Which of the following best describes your organization?

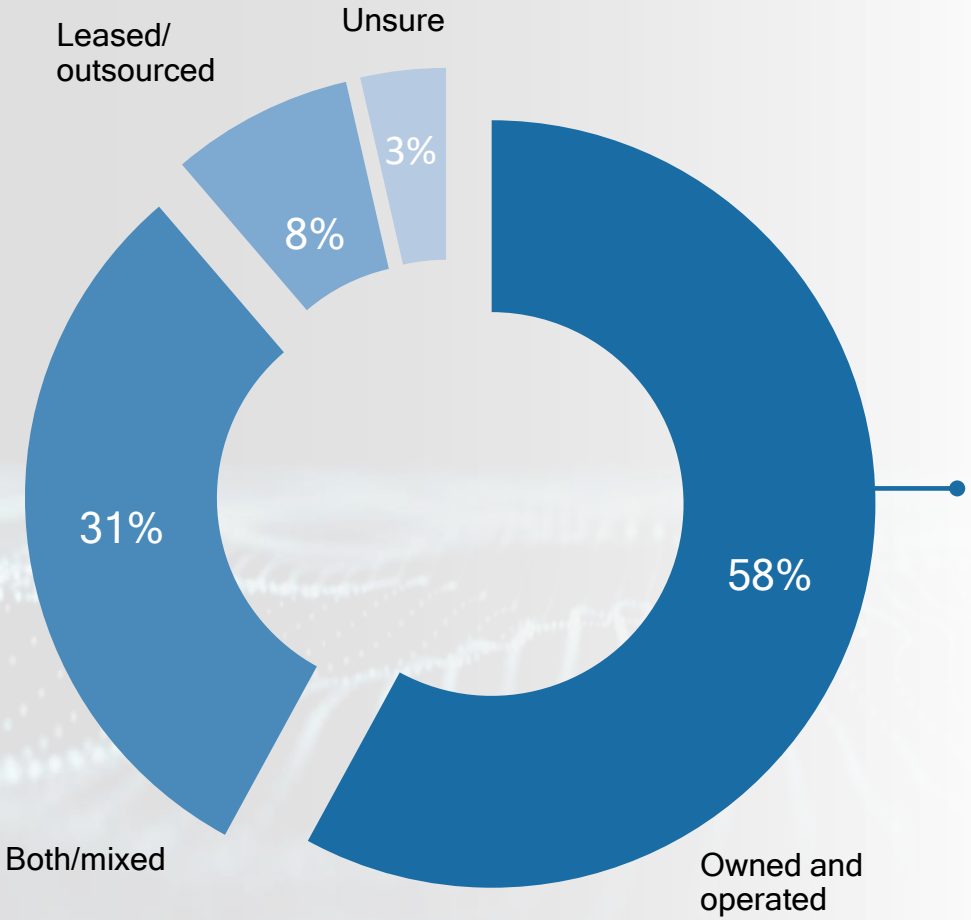
Responding organizations

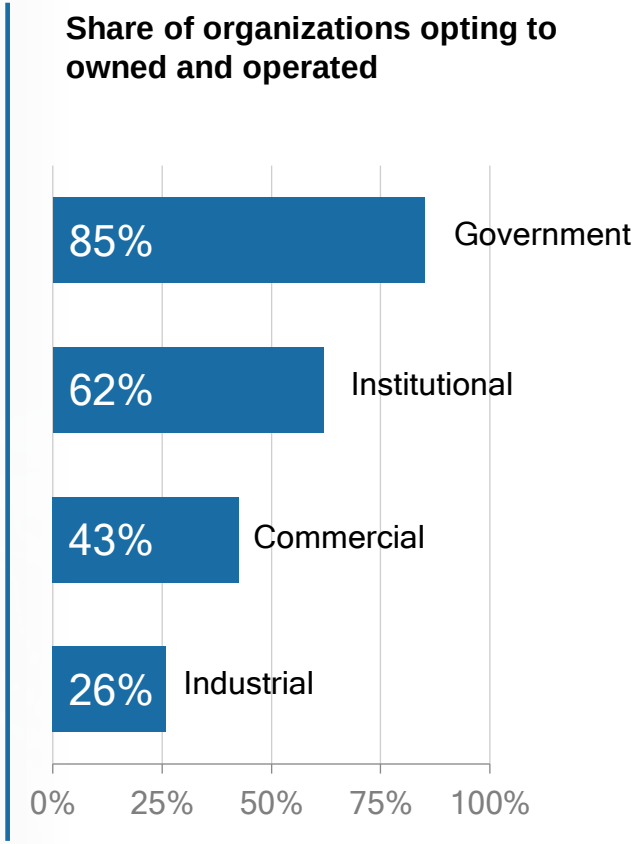
- 3M
- AbbVie
- Advance Auto Parts
- AIMS Companies
- Aisin World Corp. of America
- Alberta Energy
- Aldridge Electric
- Alectra Utilities
- Allegheny County
- Amazon.
- Amy's Kitchen
- Anne Arundel County, MD
- Aramark
- ARI
- Asurion
- Atlanta Public Schools
- Auburn Univ.
- Austin ISD
- AutoNation
- AutoZone
- Avis Budget Group
- Beck Group
- Becton, Dickinson and Co.
- Bekaert
- Bemidji State Univ.
- Best Buy Co., Inc.
- Blue Cross Blue Shield of Florida
- Boulder Valley School District
- Bow Valley College
- Bridgewater State Univ.
- Broadway Services Inc
- Brundage-Bone
- Bucknell Univ.
- California State Univ.
- CalPortland Company
- Casella Waste Systems
- Certco
- Chesapeake Public Schools
- Children's Hospital Colorado
- Cisco
- Citrix Systems
- City of Alexandria, VA
- City of Ames, IA
- City of Asheville, NC
- City of Aurora, CO
- City of Charleston, IL
- City of Charlotte, NC
- City of Cincinnati, OH
- City of Columbia, MO
- City of Culver City, CA
- City of Falls Church, VA
- City of Fort Collins, CO
- City of Holdingford, MA
- City of Irving, TX
- City of Kansas City, MO
- City of Miami Beach, FL
- City of Orlando, FL
- City of Richmond, BC
- City of Rochester, NY
- City of Santa Barbara, CA
- City of Santa Clara, CA
- City of Spicer, MN
- City of Steamboat Springs, CO
- City of Takoma Park, MD
- City of Toronto, ON
- City of Wichita, KS
- City of Winston-Salem, NC
- Climate Impact Capital
- CN Rail
- Colgate-Palmolive
- Collaborative Work Environment
- College of Charleston
- Columbia
- Consigli
- Constellis
- Couch Distributing
- Crowley
- Cumberland County Schools, NC
- Cummins
- Delta College
- Dillard's
- DISH Network
- Dollar General
- Dollar Tree/Family Dollar
- Duke Energy
- Eagle River Water & Sanitation District
- Emerald Skyline
- Emory Univ.
- Ephrata Manor/ UCC Homes
- Extreme Networks Inc
- FCA Fiat Chrysler Automobiles
- FedEx
- FedEx Ground
- Finlandia Univ.
- Fluor
- Ford Motor
- Franklin and Marshall College
- General Motors
- George Mason Univ.
- Georgia College & State Univ.
- Growmark
- GSA
- Guilford County Schools, NC
- Henkels & McCoy
- Hexion
- HHS LLC
- Hill-Rom, Inc.
- Hillsborough County, FL
- Hoffman Construction
- HP Inc.
- Humber College
- Hyatt Hotels
- IES Holdings
- Illinois State Univ.
- Iron Mountain
- Isothermal Community College
- James City County, VA
- JM Family Enterprises
- Johnson & Johnson
- Kingman Regional Medical Ctr.
- Kroger
- Lafayette College
- Lamar Community College
- LBA Realty
- Leyden H.S.
- Little Caesars
- Lockheed Martin
- Lockheed Martin Aeronautics
- Los Angeles Dept of Water & Power
- Lowe's Home Improvement
- Mansfield ISD
- Marriott International
- Merck & Co.
- Michael & Son Services
- Michigan State Univ.
- Mini's
- Mister Car Wash
- Mitsubishi International
- Mitsubishi Power
- Montclair Kimberley Academy
- Museum of Contemporary Art, San Diego
- Nestle
- Nike
- NOCO Energy
- Northbay Healthcare
- Northbrook
- Northern Virginia Comm. College
- Ohio State Univ.
- Optima Engineering
- Orange County Public Schools
- ORIX
- Oxford Properties Group
- Padnos
- Palmetto Electric Cooperative
- Park School of Baltimore
- Parkway School District, MO
- Patrick Henry Comm. College
- Pennsbury School District, PA
- Petroleum Wholesale
- Pikes Peak Community College
- Port of Seattle
- Portland Community College
- Portland Public Schools
- Preston Pipelines
- Principia
- Progressive Insurance
- Promediacorp
- PSE
- Raley's
- Ram Tool
- Rankin County School District, MS
- Republic National Distributing Company
- Robert Half International
- SAC Wireless
- San Diego Community College District
- Schaeffler Aerospace USA
- Schnuck Markets
- Sheetz
- Southwest Gas
- Spectrum
- Spinx
- St Johns County Public Works
- Staples
- Stark Area Regional Transit Auth.
- State of Connecticut
- State Univ. System Administration (SUNY)
- Summit Hotel Properties, Inc.
- Swissport International AG
- Temecula Valley USD
- Texas A&M Univ.
- Texas State Technical College
- Thames Valley Dist. School, ON
- Thomas Jefferson Univ.
- Titan America
- Town of Banff, AB
- Town of Hamden, CT
- Transdev Group
- Tree Island Steel
- Tufts Univ.
- UMass Dartmouth
- UNFI
- Unionville Chadds Ford School Dist, PA
- United Natural Foods
- U.S. Department of Veteran Affairs
- Univ. of California, Davis
- Univ. of Colorado, Boulder
- Univ. of Connecticut
- Univ. of Florida
- Univ. of Houston
- Univ. of Michigan, Flint
- Univ. of Nebraska, Lincoln
- Univ. of Pittsburgh
- Univ. of Texas, San Antonio
- UPS
- Utah State Univ.
- VA Medical Center - Reno
- Virginia Beach City Public Schools
- Virginia Tech
- Washoe County School Dist. NV
- Weber State Univ.
- Weis Markets
- West Fraser
- Wilbur-Ellis
- Windstream Services
- Wine Group
- YMCA of the Triangle Area, NC
- Young Living Essential Oils

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Today's fleet: Owned and operated is the dominant model





Most organizations tend to own and operate their fleets, rather than lease.

Asked what share of their current fleet — including all fuel types — they owned, the large majority (89%) of respondents reported owning and operating at least part of their fleet, with more than half (58%) fully owning and operating.

By organization type, government fleets — often made up of specialized vehicles such as buses, snow plows, and garbage trucks — were most likely to own and operate: 85% reported doing so.

Fleet vehicles tend to have long life spans — a decade or more is not uncommon — before fully-depreciated vehicles are replaced. As such, decisions about the composition of today's fleets tend to lag current market conditions and fuel options.

Q. Is your organization's fleet currently: Owned and operated; Leased/outsourced; Both/mixed; Unsure.

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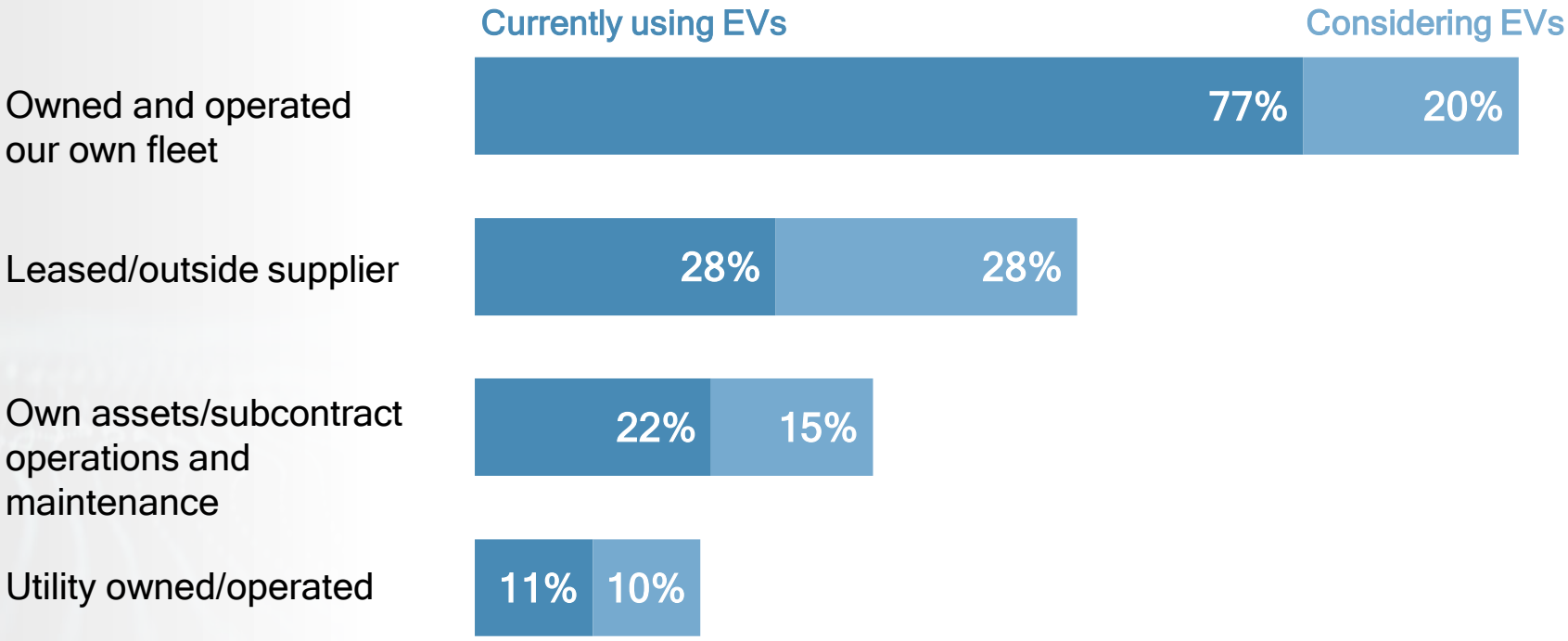
Future electric fleet: Owned and operated will continue to lead

Organizations' propensity to own and operate EVs tracks with existing fleet practices, despite the novel challenges of electrification — such as building out recharging infrastructure.

Owning and operating fleets will remain the favored model with the move towards electrification, according to 77% who now use EVs and a further 20% considering EVs.

Leasing is preferred by 28% who currently use EVs, and an additional 28% who are considering EVs — a higher percentage than for those considering owning and operating themselves.

The structure of EV incentives may be influencing these trends. Such subsidies flow to the buyer, which may contribute to the greater take-up of EVs by organizations that own and operate their fleets.

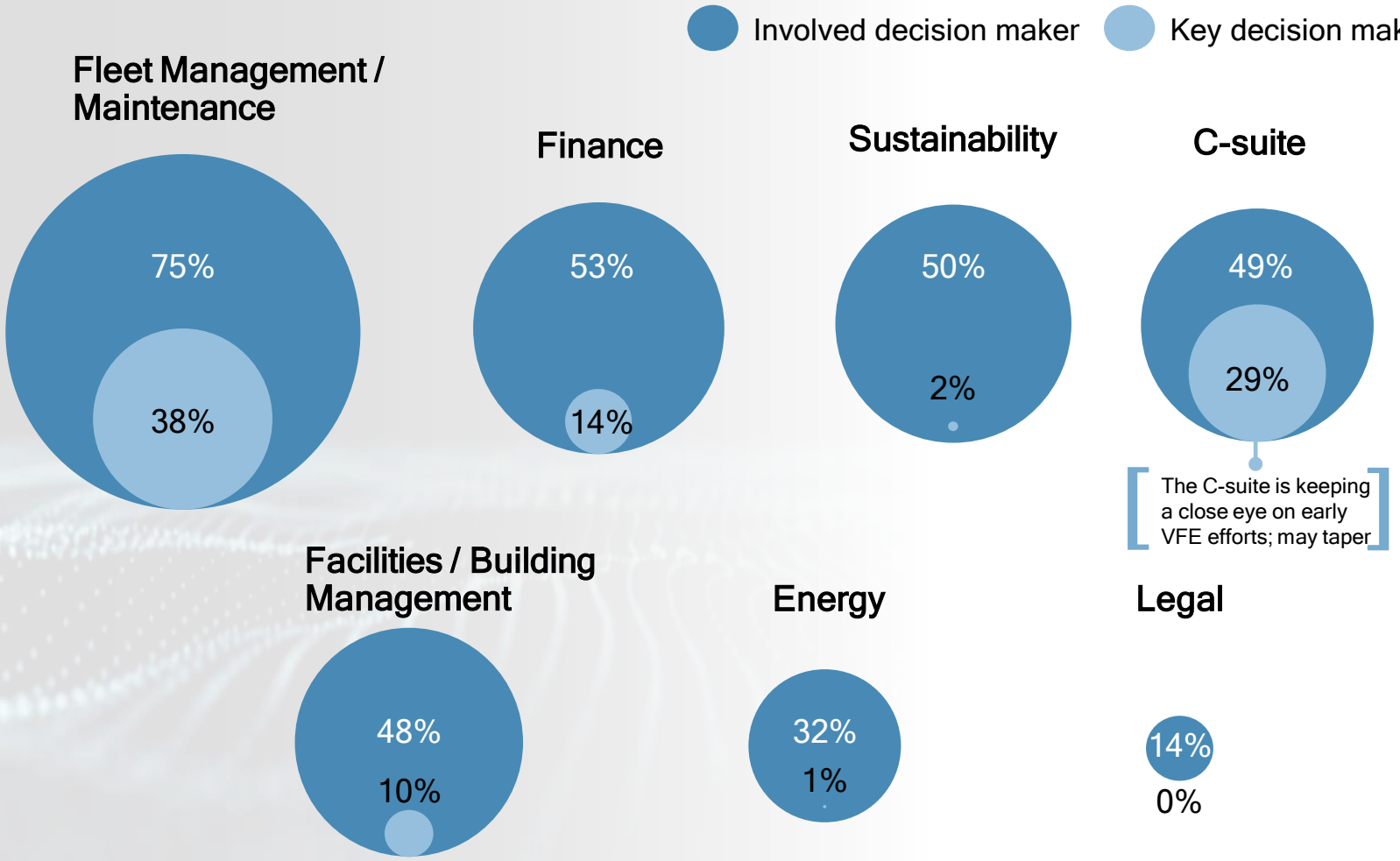


Q. Which of the following business model are you currently using and/or considering using in the future for vehicle fleet electrification? (Multiple responses accepted)

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Decision-making: Who is driving the process?



Q. Who at your organization is involved in the decision to electrify your vehicle fleet? (Select all that apply)

At the outset of a shift to fleet electrification, impacts — from vehicle purchasing and facility upgrades to operating costs — are least well understood. Accordingly, we see a wide mix of management roles involved in the decision to electrify.

This suggests that education is vital to build understanding and consensus across management roles, many of whom will be unfamiliar with the advantages and challenges of electrification.

Educating the C-suite is particularly important. Senior leaders show up as key decision makers, second only to fleet management/maintenance. That said, once EVs are normalized into the fleet, senior leadership involvement may diminish.

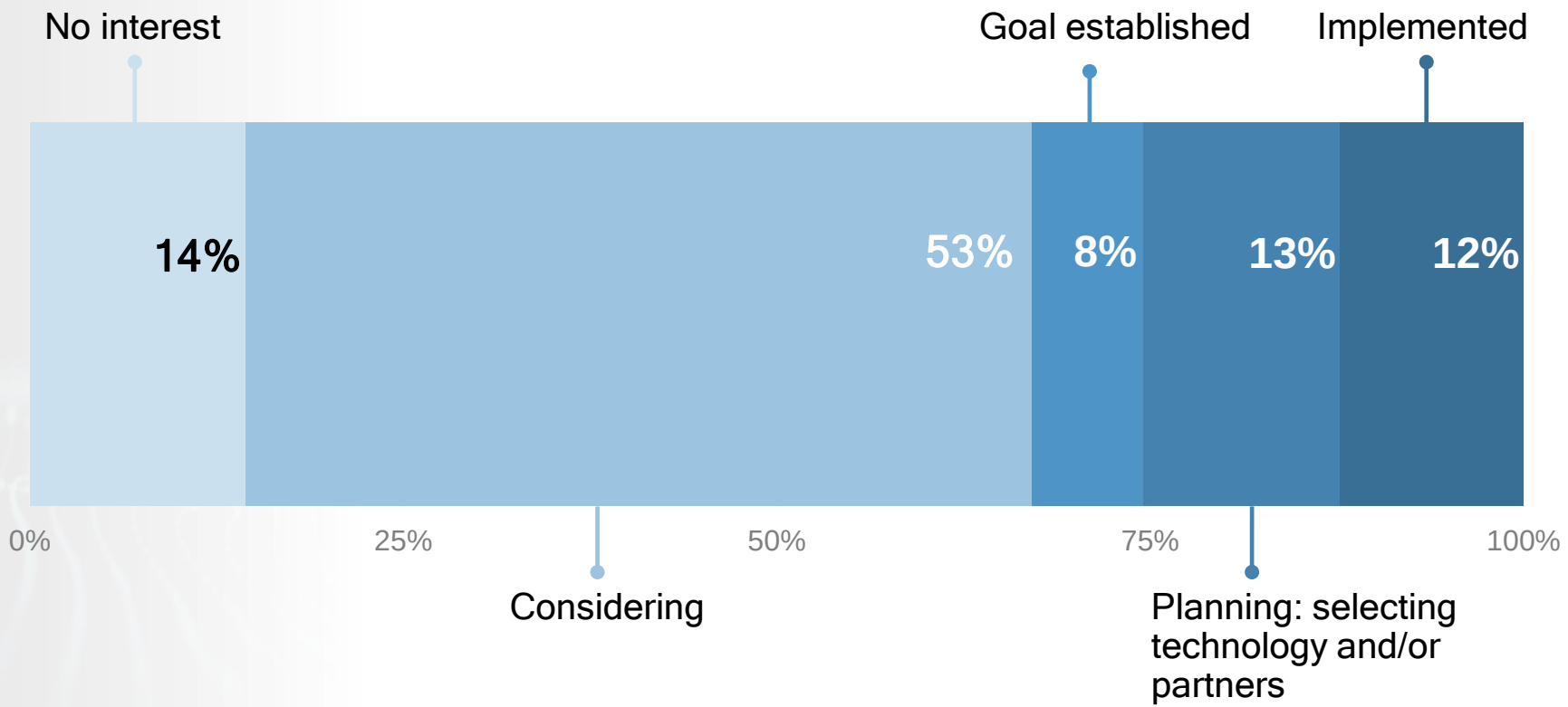
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The market is about to take off

VFE looks poised to advance at an unusually fast clip. Typically, technology adoption builds incrementally, with early adopters pioneering the shift, then the transition accelerates across the wider industry.

Among respondents, 12% have implemented EVs, falling into that early-adopter category. Overall, 86% are either considering or have begun to implement EVs. By type of organization, governments reported the highest rate of implementation, at 27% versus 12% overall. Institutional organizations came last, at 6%.

Given that EV options are, for now, limited to passenger vehicles, the wave of new electric pickups and heavier truck models due over the next 24 months suggest EV adoption could gain speed. Local, state, and federal incentives are likely to only accelerate this pace.

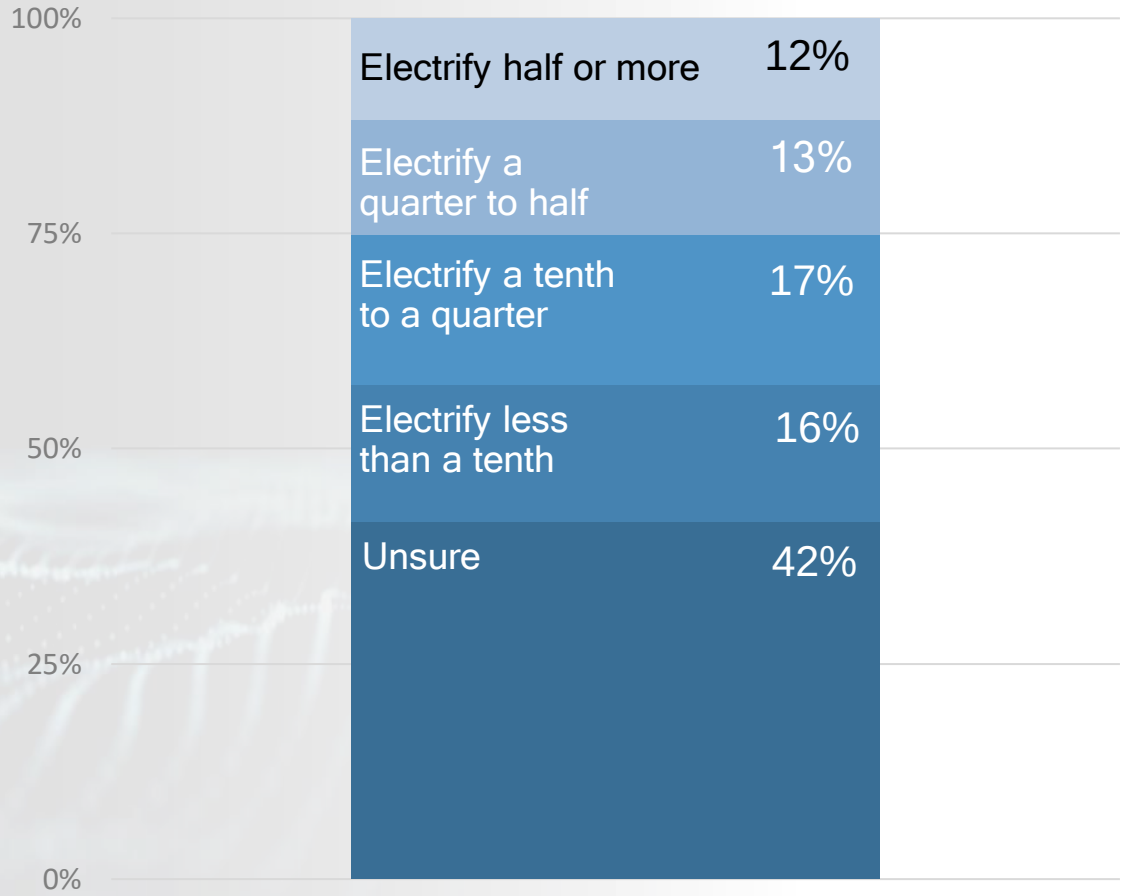


Q. What best describes where your organization is currently on the journey to vehicle fleet electrification?

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The destination remains uncertain for many



Q. Which best describes your organization's ambitions for vehicle fleet electrification in the next five years?

Even as electrification goals gain momentum, organizations appear to be rolling out the process incrementally.

Asked what share of their fleet they plan to electrify in the next five years, 12% expressed plans to convert over half of their fleet; 3% plan to fully electrify. At 30%, a larger share are aiming to electrify a tenth to a half of their fleet.

But the majority (58%) are either unsure, or plan to switch less than a tenth of their fleet. Tentativeness may be evidence that ambitious carbon goals are outpacing the realities of fleet transformation.

For now, given the limited mix of available EVs, acting on transition plans remains a challenge. Electric versions of some of the most widely used fleet vehicles, such as pickups and vans, are not yet available in volume.

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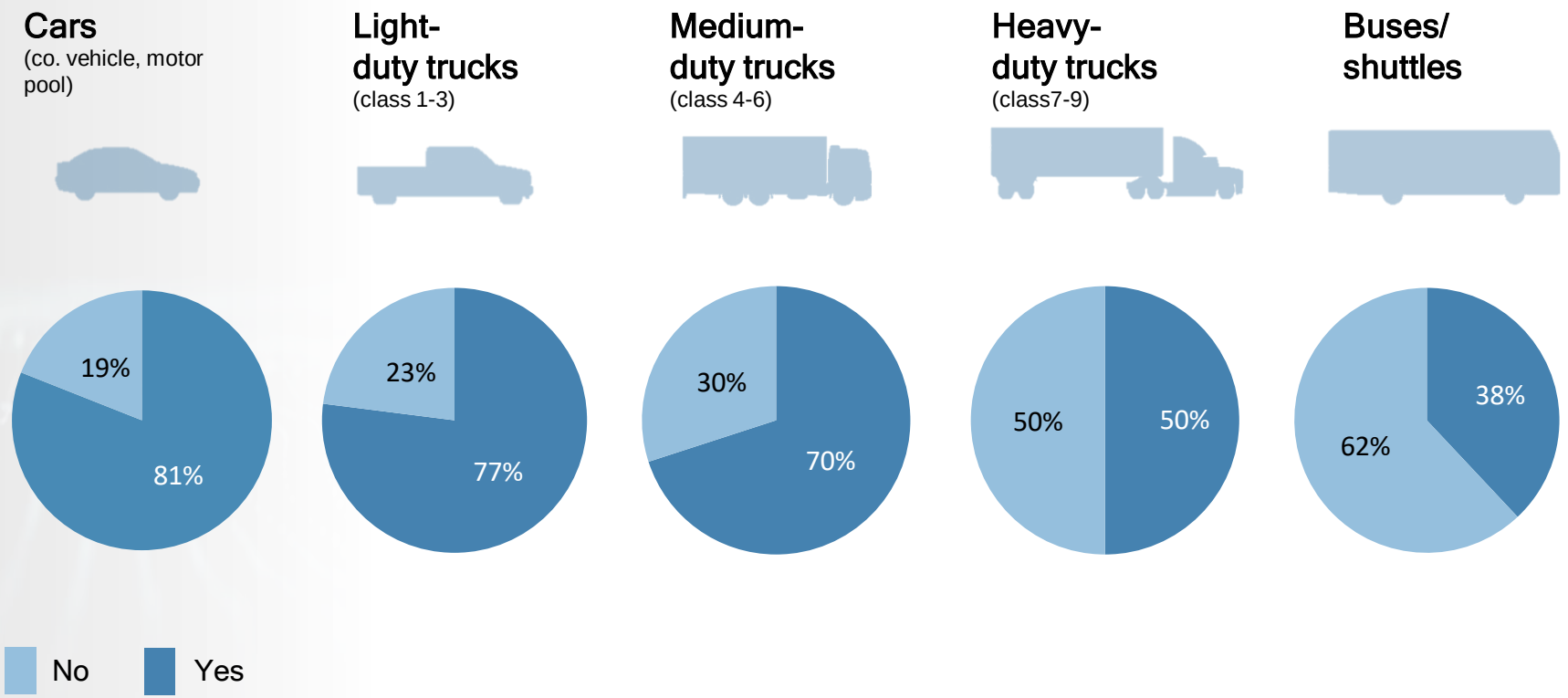
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Today's fleet: Cars, light- and medium-duty trucks dominate

Across all vehicle types and including all fuel types (gasoline, diesel and electric), a snapshot of today's fleets underscores the market need to for heavier electric vehicles.

A substantial majority of respondents reported having cars (81%), light-duty trucks (77%), and medium-duty trucks (70%) in their fleets. A smaller share reported having heavy-duty trucks (50%) or buses/shuttles (38%).

The uncertainty for electrification grows proportionally with vehicle size. Today, there are scores of electric car models in production or arriving soon. For light-duty trucks a handful of new offerings, led by the Ford F-150 Lightning pickup, are due through 2022. But for heavier trucks, the outlook for electric options is more difficult to predict.



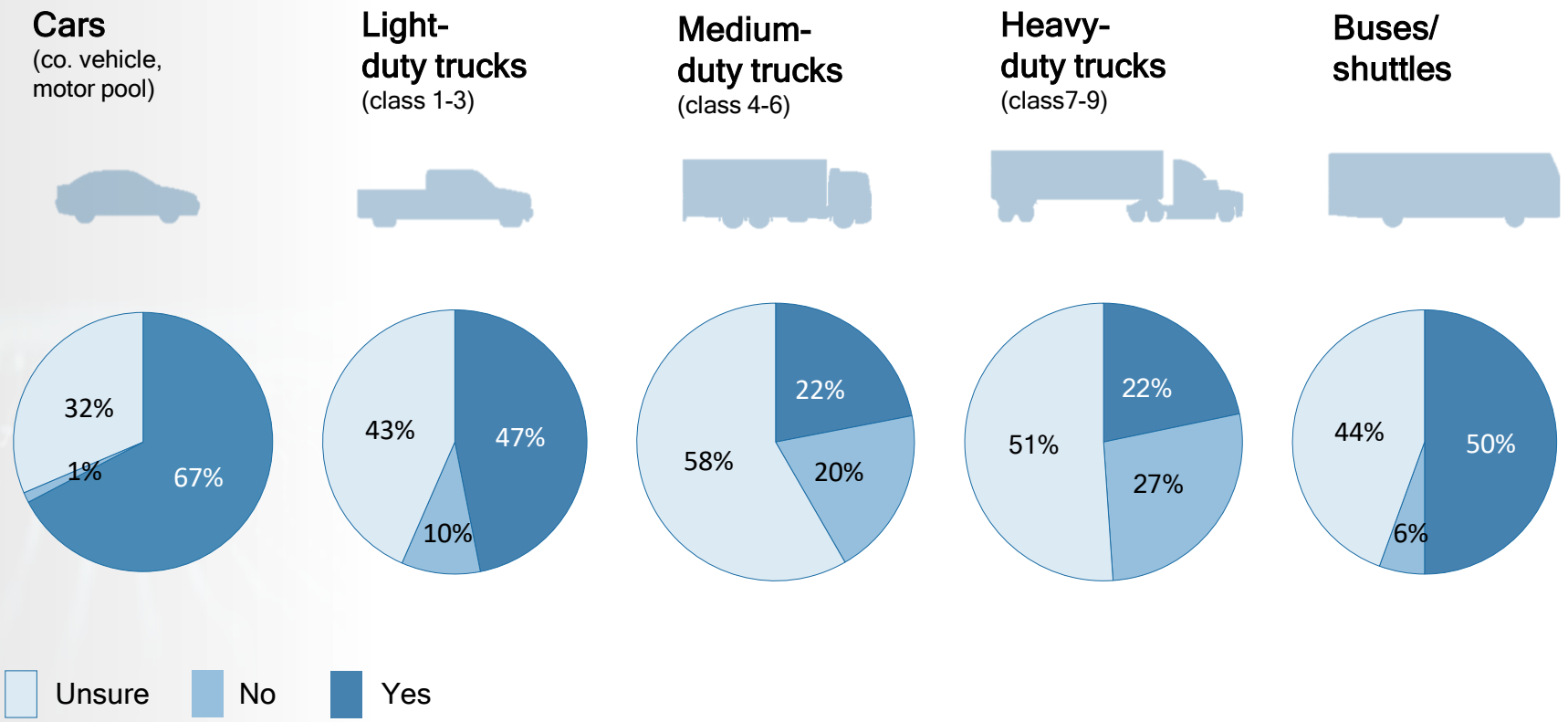
Q. What types of vehicles are currently in your fleet? (Select all that apply)

Tomorrow's fleet: Optimism offset by uncertainty

Looking ahead, organizations' plans to electrify track with market availability of vehicles. Electric car models are multiplying quickly, falling in price and improving in performance. Accordingly, over two-thirds of respondents expect to electrify their cars in the next five years.

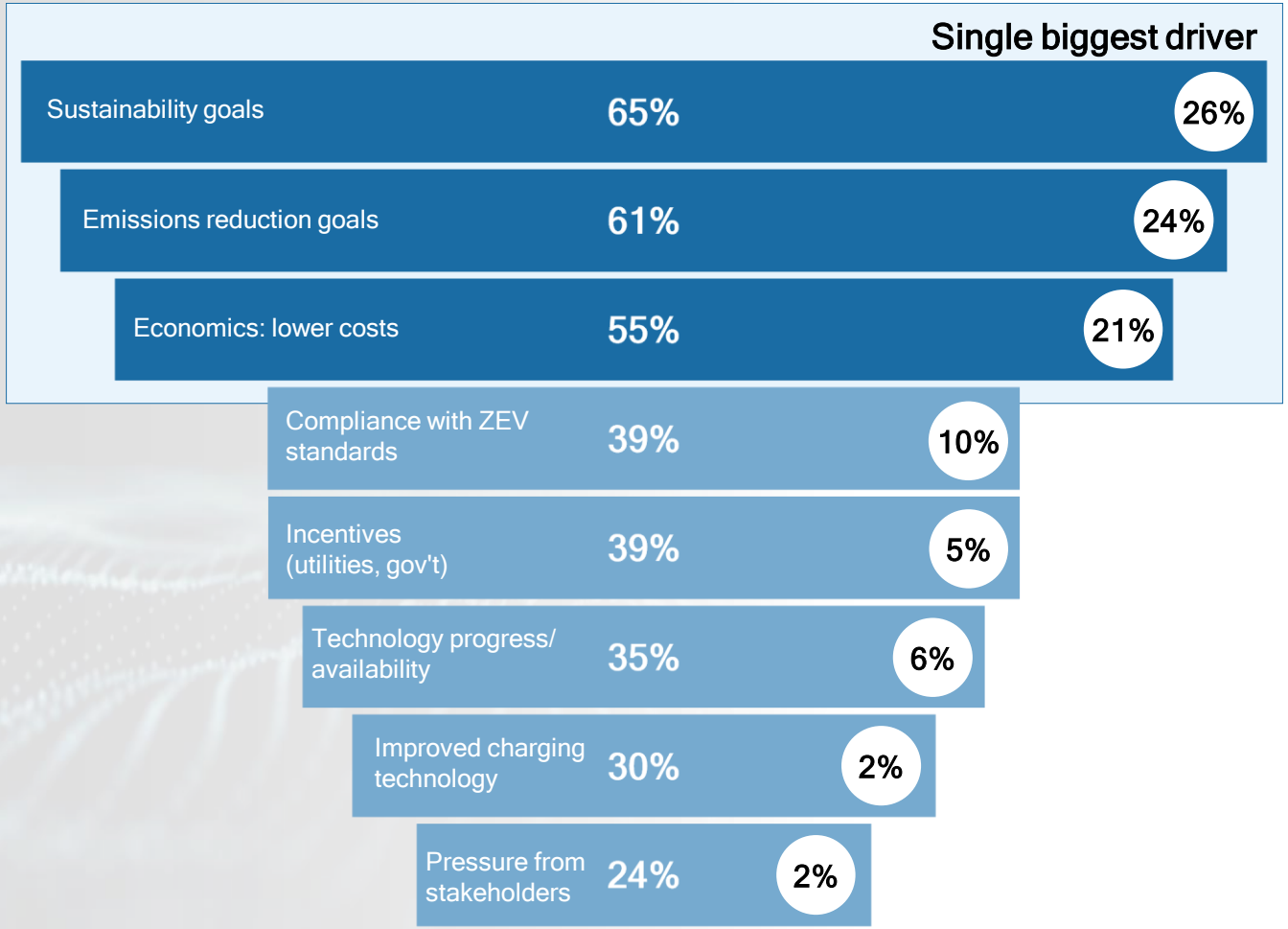
However, as is common with new technology, uncertainty is substantial across all vehicle classes. For cars, nearly a third remain unsure. For all other vehicle types, closer to half are unsure of the shift.

The outlook for electrification of heavier electric trucks is least clear, leading to polarized expectations. For medium- (20% 'No') and heavy-duty trucks (27% 'No'), a similar share report they will not electrify. Yet optimism is evident too: around a quarter of respondents expect to electrify these classes.



Q. For each type of vehicle currently in your fleet, indicate if you intend to electrify that type in the next five years.

Drivers: Goals top costs as chief reason to electrify



Q. What are your top reasons for implementing or considering the implementation of vehicle fleet electrification? (Select all that apply); What is your single biggest reason? (Select one).

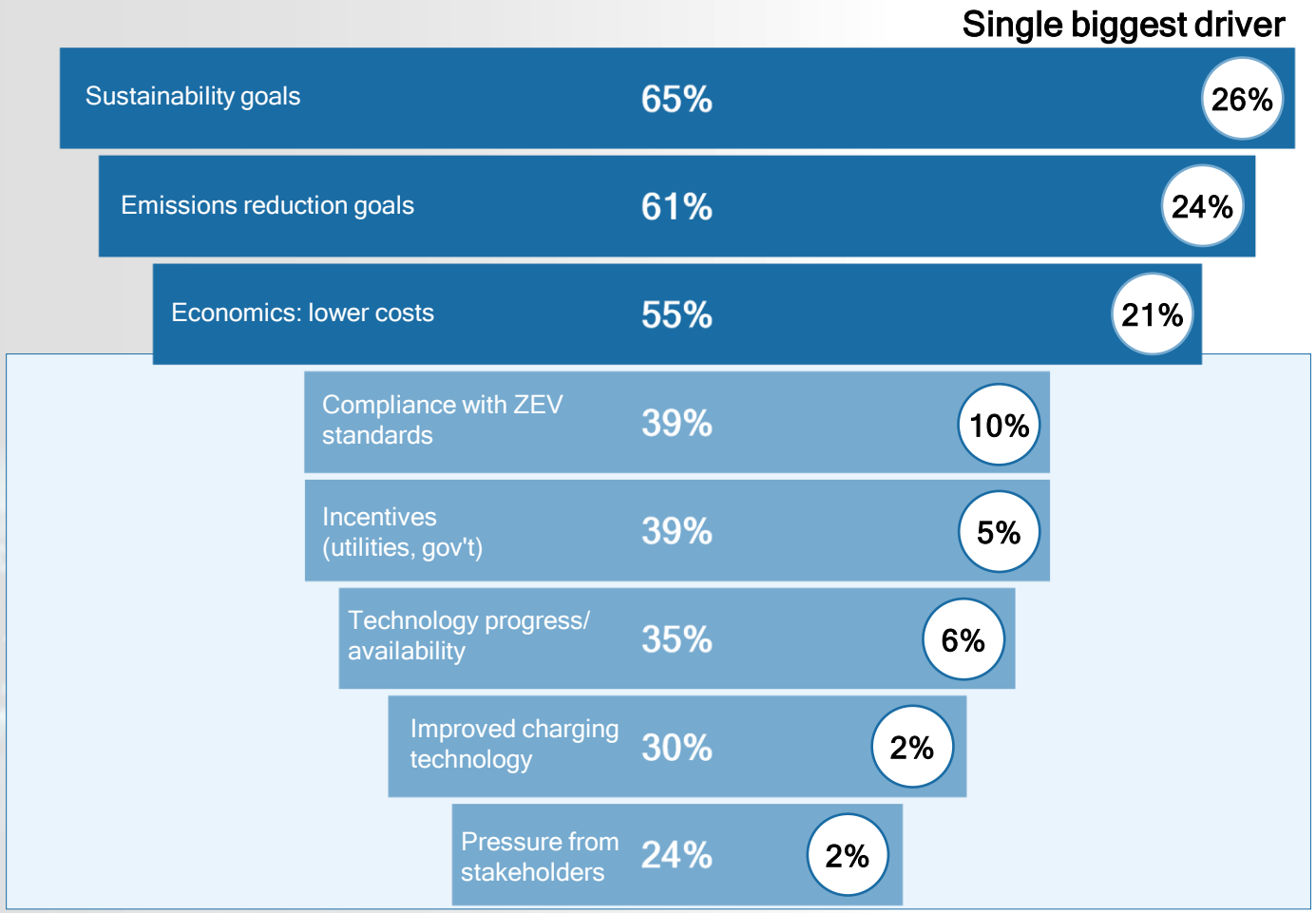
Across all categories of energy-related investment, cost savings are perennially the top driver. Thus it's eye-opening that, for this investigation of VFE trends, environmental drivers emerged as the top priorities.

To be sure, costs still factor in highly — particularly among commercial operators, where it was the top driver. However, with local, state, and federal mandates multiplying to lower both carbon and conventional emissions, EVs offer a promising path to do so, while potentially also lowering operating costs.

Accordingly, goals around sustainability and emissions reductions were cited most widely by all respondents, and as the single-biggest driver by the largest share. A second tier of drivers reinforces these top three drivers (next page).

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Drivers: Compliance and technology maturity add to push



Q. What are your top reasons for implementing or considering the implementation of vehicle fleet electrification? (Select all that apply); What is your single biggest reason?

Dig down a little deeper, and the secondary factors driving electrification tend to fall in line with the top three.

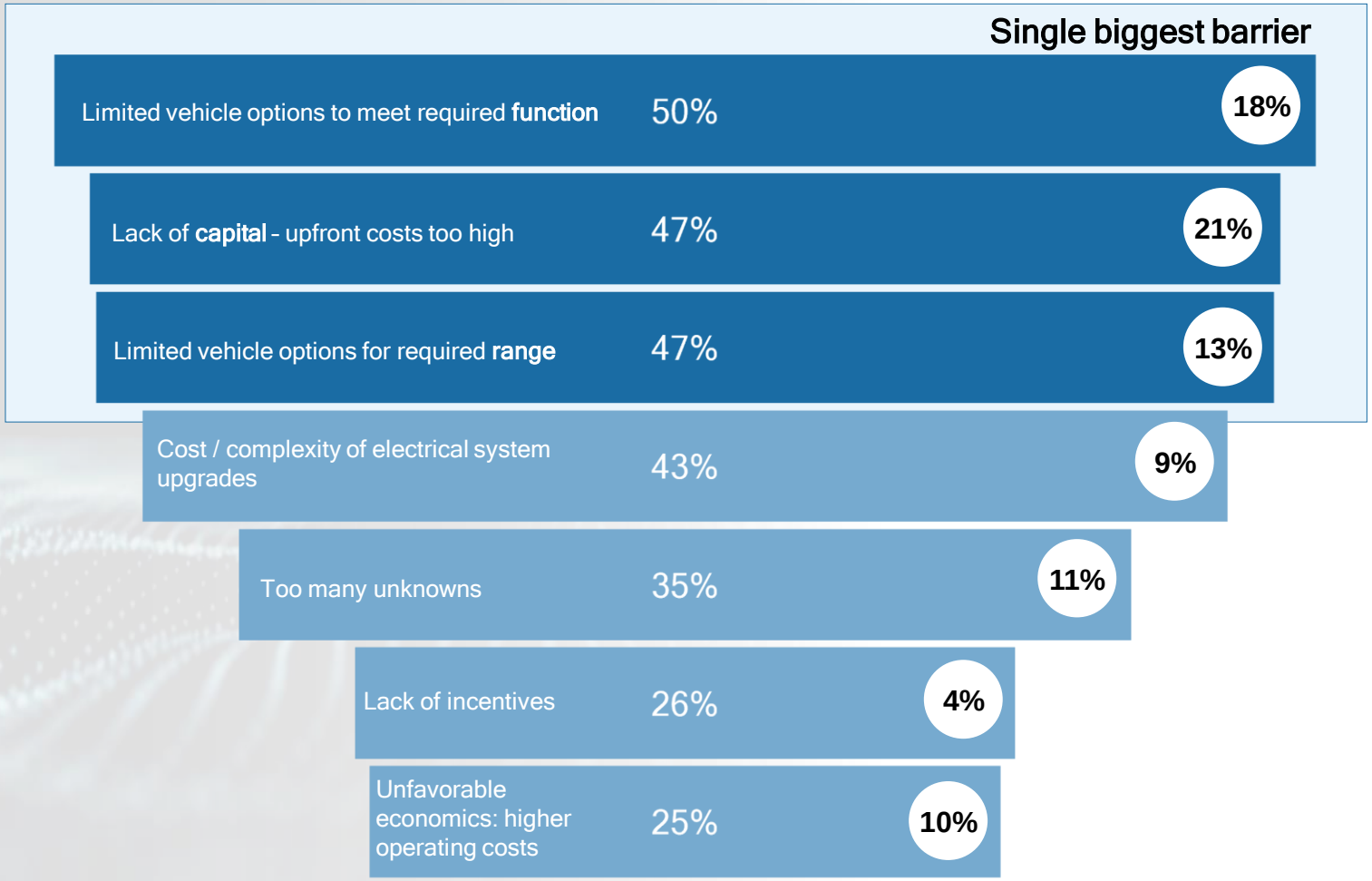
Cited by 39% of respondents, compliance, for example, ladders up to sustainability and emissions goals, as emissions targets evolve from recommendations to regulations. Likewise, at 24%, pressure from stakeholders acts as a primer to wider goals.

Evolving technology plays a key role, too, with around a third of respondents pointing to technology readiness and improved charging technology as key drivers.

Rising availability of EV models, steady progress building out recharging networks, and recent studies showing lower operating costs for EVs may be lifting confidence.

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Barriers: Range and functional limits amplify cost concerns



Q What are the top barriers to implementing or considering the implementation of vehicle fleet electrification? (Select all that apply): What is your single biggest barrier? (Select one).

Among those surveyed, the single biggest barriers among businesses echo concerns often cited by consumers considering their first EVs: high upfront costs (21%) followed by a pair of limitations, required function (18%) and required range (13%).

Steep upfront capital costs may drive interest in leased and third-party ownership and operating models.

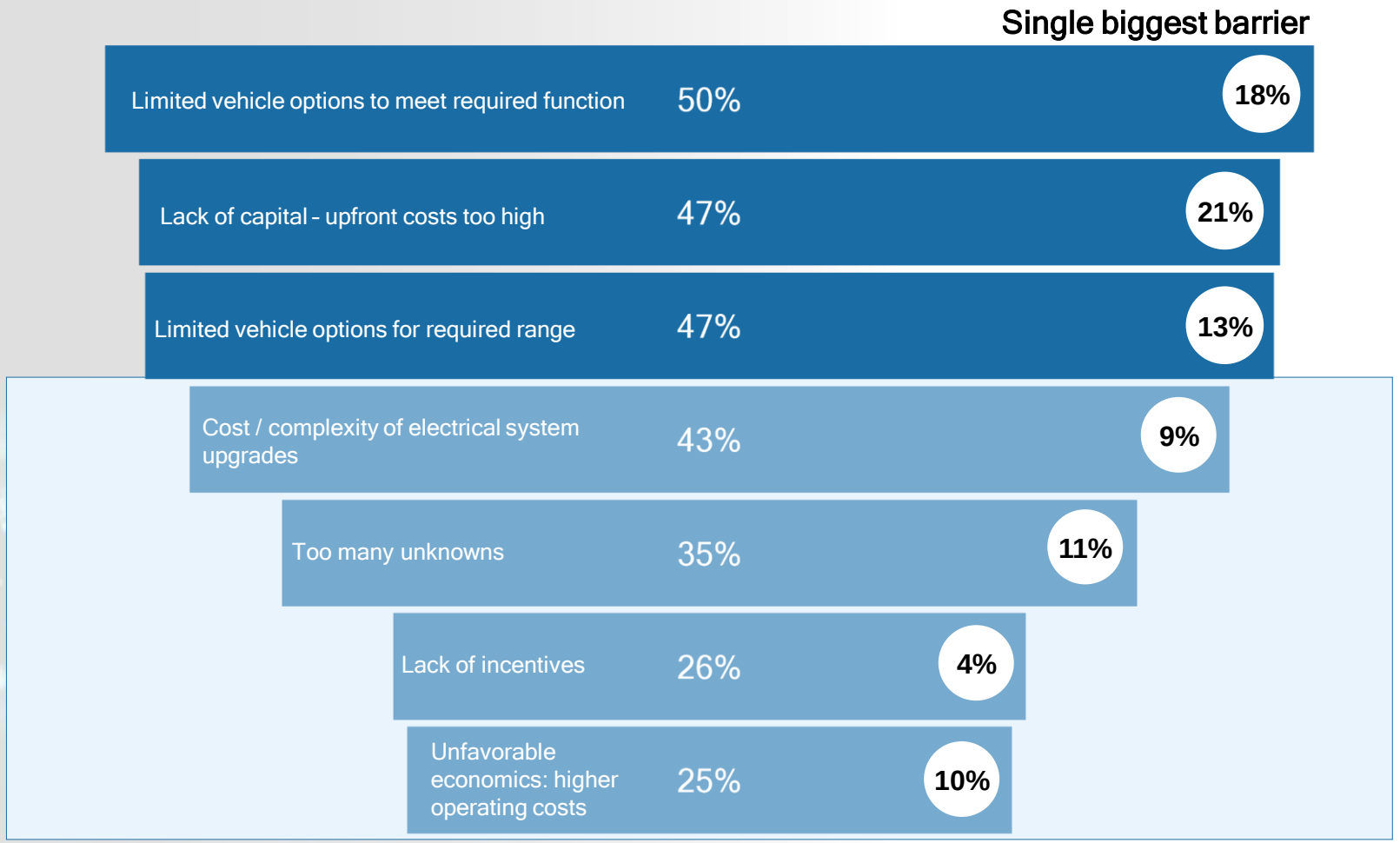
Longer term, all of these factors are improving rapidly, thanks to ongoing gains in battery capacity, as well as a wave of automakers rushing new models to market.

The launch of the Ford F-150 Lightning pickup, for example, instantly transforms the nascent e-pickup market, shifting the spotlight away from Rivian and Tesla's luxe offerings to more affordable, utilitarian, mass-market models.

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Barriers: Unknown costs for charging upgrades and operations



Q What are the top barriers to implementing or considering the implementation of vehicle fleet electrification? (Select all that apply): What is your single biggest barrier? (Select one).

A second tier of barriers adds nuance to widely-held cost concerns. A lack of incentives was cited by 26% of respondents, suggesting a slice of the market will move ahead should federal and state subsidies resurge.

While the outlook for falling price and rising mix of EV models is growing brighter, upfront costs to build or upgrade electrical infrastructure with fast chargers (typically Level 2 or 3) remains significant and difficult to predict; 43% cited this as a barrier.

Related, a quarter of respondents pointed to higher operating costs as a worry. However, recent Energy Dept. data suggests this concern may be unfounded: Maintenance costs for a light-duty battery-electric vehicle run 6.1¢ per mile, 40% less than for a conventional internal combustion engine.

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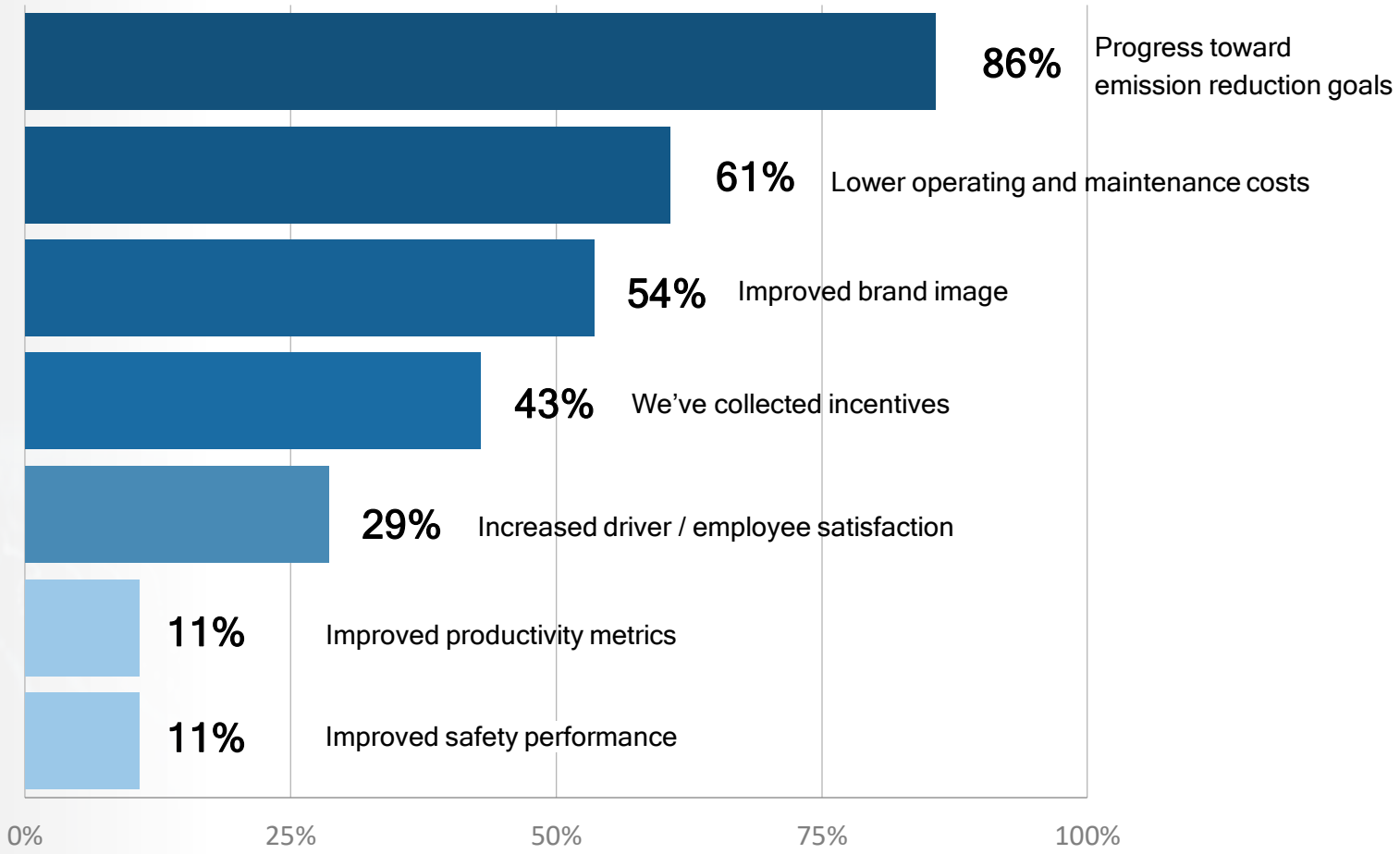
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Benefits: Lower costs, emissions make it worth the ride

The experiences of those who have implemented VFE offer a promising counterpoint to the anticipated barriers shared by those who haven't yet deployed. Lower operating and maintenance costs, for instance, were reported by 61% of respondents.

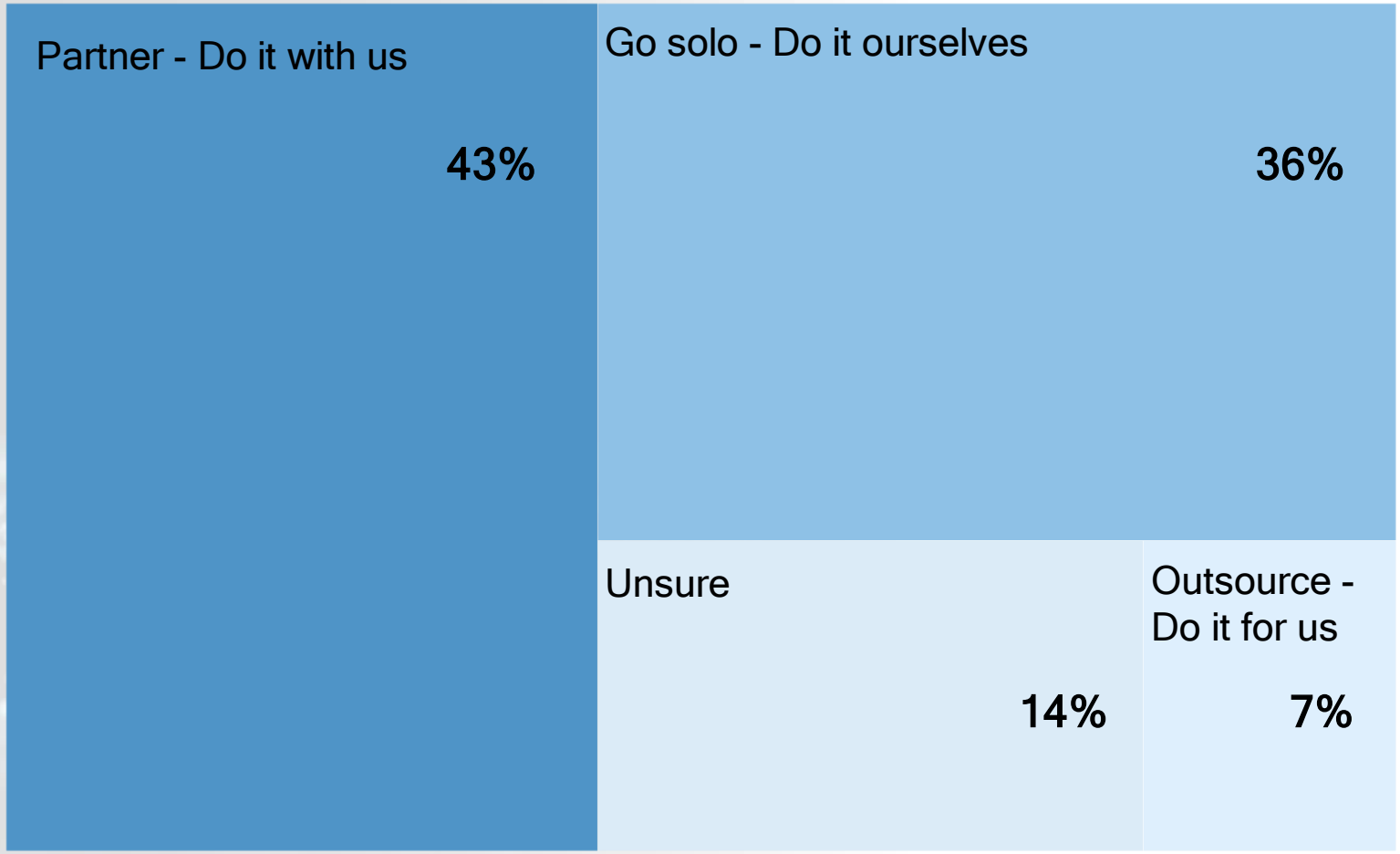
Benefits to the bottom line are compounded by a range of environmental and soft gains. Progress towards emissions reductions goals are cited by a large majority; over half report gains to brand image; and more than a quarter cite increased satisfaction among drivers and employees.

The findings reinforce themes from earlier in the report that while the deployment process of VFE can be a challenging learning curve, the experience can deliver meaningful gains in costs and environmental goals.



Q. Among those who have already implemented VFE, which of the following benefits have you already realized as a result of implementation? (Select all that apply)

The road ahead: Traveling with a partner is preferred



Q. What type of support do you require to implement vehicle fleet electrification?

For managers of today's vehicle fleets, the ins and outs of ownership and operations are familiar. Yet electrifying these same fleets adds multiple fronts of uncertainty.

Even seasoned pros are recognizing the transition could be harder than it looks: from evaluating unproven EV models; to financing their purchase and related facilities upgrades; to long-term learnings about maintenance, energy costs, and asset longevity.

This cluster of unknowns tilts half of our respondents to look for outside help, whether via a partner (43%) or by outsourcing fully (7%). By type of role, the strongest support for partnering comes from fleet and sustainability leaders. Another 14% are on the fence, unsure of how to proceed near term. Just over a third aim to go it alone, a response most often given by those in the government sector.

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Conclusions



Key dynamics have converged that may mark 2021 as the start of a permanent shift toward electrification of commercial fleets. This survey captures the key dynamics that are driving this transition. Among a group of first movers who are advancing incrementally, we see these trends:

- **Sustainability**. Targets to cut carbon and other emissions are the top drivers of interest, consideration, and planning for vehicle fleet electrification. This observation is a first for Smart Energy Decisions studies: to date, cost savings have always been the primary driver.
- **Savings**. Organizations are finding meaningful reductions in total cost of ownership. Respondents rank cost savings as second only to sustainability as a top driver.
- **Unknowns**. Respondents are unclear about available models and underlying technology trends, and therefore are unsure how much of their fleet can be electrified. These uncertainties point to the need both for greater education and to recruit a trusted advisor.
- **Stakeholder complexity.** Fleet management is being added to the usual decision-making mix of stakeholders from energy, sustainability, finance, and facilities that are typically involved with energy-related projects,
- **Green rewards**. Beyond reduced costs, real benefits from electrification are accruing in the form of lower emissions and improved reputation.
- **Co-pilots**. Given the complexity of these factors, most respondents are looking to collaborate with an expert advisor to guide vehicle fleet electrification strategies and implementation.

Acknowledgments

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For more information, contact John Failla, Founder & Editorial Director, at john@smartenergydecisions.com.



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