

IRA Activation Guide: Fleet Electrification

March 2023

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The IRA is a gamechanger for companies that own, operate, or rely on vehicles and aim to reduce their transportation emissions while creating financial value for their businesses



Logistics



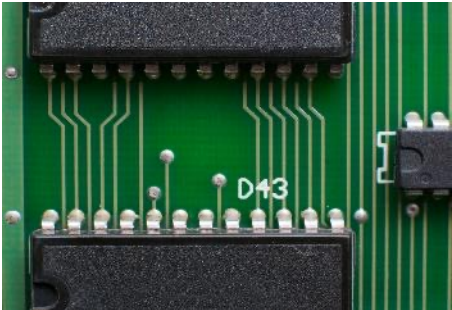
Transportation



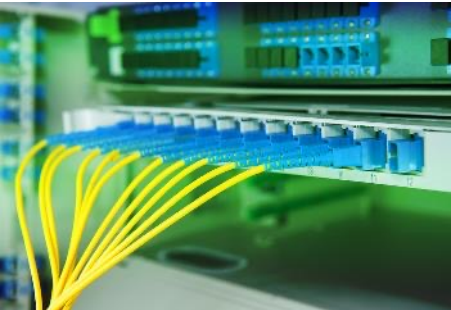
Retail



Consumer Products



Technology



Telecommunications



Waste Management



Construction

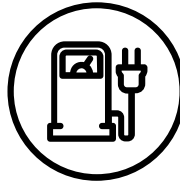
Companies in these industries tend to own the largest commercial fleets, but any company that owns, operates, or relies on vehicles can benefit from the IRA for fleet decarbonization – including those who work with upstream and downstream transportation partners

Sources: Deloitte Analysis, [2022 Largest 500 Commercial Fleets](#)

§45W and §30C are key provisions for companies' transition to clean vehicles, offering up to \$40,000 for commercial clean vehicles and up to \$100,000 for alternative fueling property



§45W: Credit for Qualified Commercial Clean Vehicles



§30C: Alternative Fuel Vehicle Refueling Property Credit

PROVISION

Provides a tax credit for up to \$40,000 per vehicle for new purchases of commercial clean vehicles (BEV, PHEV, FCEV), depending on vehicle weight and hybrid vs. BEV.

Provides a tax credit for 6% or 30% of the cost (credit capped at \$100,000) of refueling and charging stations for alternative fuels such as electricity, hydrogen, and biodiesel.

KEY TAKEAWAYS

- Covers pure battery electric vehicles (BEVs), hybrids (PHEVs), and fuel cell (hydrogen) powered vehicles (FCEV)
- Does not include restrictions related to income and North American manufacturing and assembly, such as those included in consumer vehicle credit (§30D)
- Total cost of ownership for battery electric vehicles may now be lower than that of diesel trucks, particularly for shorter/local routes, which will accelerate electrification
- Fuel cell trucks will likely still be more expensive than ICE trucks in the near-term

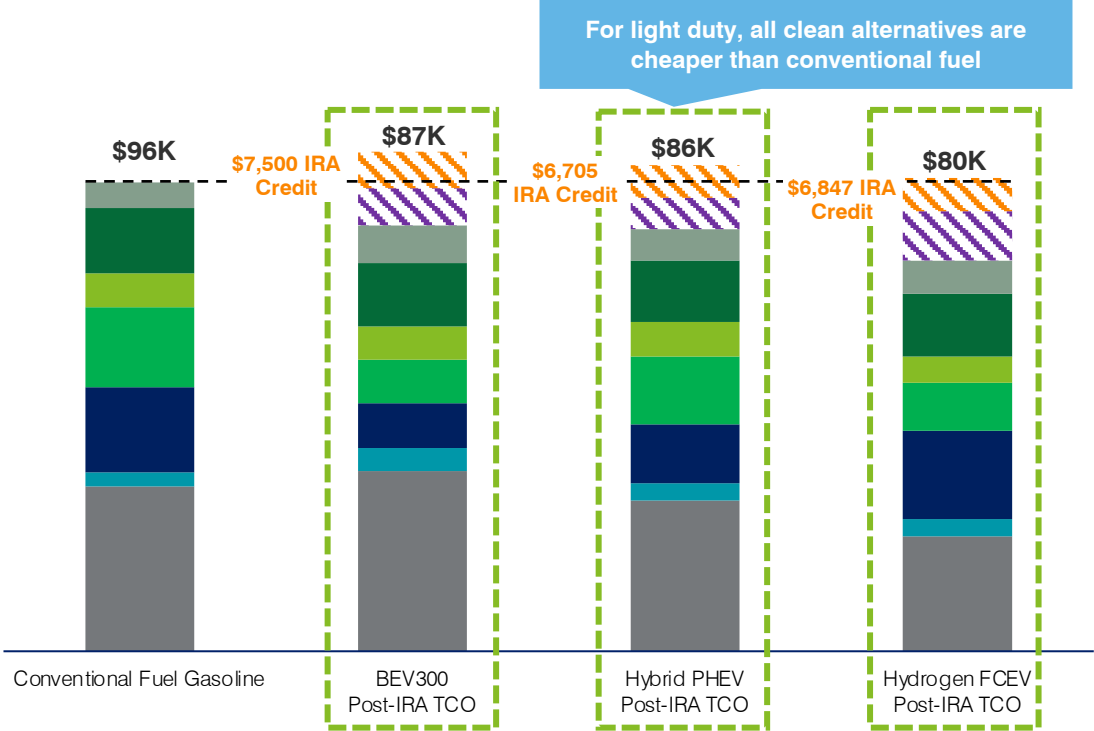
- Covers three types of fuel: 1) electricity, 2) fuel where at least 85% of volume consists of ethanol or natural gas, CNG, LNG, LPG, or hydrogen, and 3) Diesel/biodiesel/kerosene mixtures where at least 20% of volume consists of biodiesel
- 30% credit for meeting prevailing wage and apprenticeship requirements, 6% otherwise
- Likely most economically viable for on-site charging of large EV fleets or installing on-the-go charging infrastructure
- Includes bidirectional charging which improves the business case for fleet conversion with Vehicle-to-Grid (V2G) in which vehicles sell electricity back to the grid

Notes: Unless otherwise specified, all references to "Section" in this presentation are to the Internal Revenue Code of 1986, as amended (IRC).
Sources: Deloitte Analysis, [P.L. 117-119](#), [WH IRA Guidebook](#), IRC.

The Business Case (Light Duty):

With incentives, all light duty clean vehicle types are now projected to be cheaper than conventional fuel gasoline over 15 years of ownership

Light Duty: Estimated 15-year Total Cost of Ownership (TCO) for Light Duty Vehicles in the US (Medium SUV) in \$, beginning in 2025



LEGEND

- Estimated IRA Credit Value
- Estimated State Incentive Value
- Estimated Taxes & Fees
- Estimated Lifetime Insurance Costs
- Estimated Lifetime Repair Costs
- Estimated Maintenance Costs
- Estimated Lifetime Fuel Costs
- Estimated Financing Costs
- Estimated Upfront Vehicle Cost

Total cost of ownership (TCO) parity with conventional fuel gasoline vehicles over a 15-year period

Sources: Deloitte Analysis, Argonne National Lab, ICCT, BNEF 1, BNEF 2, DOE State Incentives Database, IRC.

Sample Business Case

$$\begin{aligned}
 &\text{Vehicle TCO Differential} \times \text{Vehicle Fleet Size} = \text{Total Cost Savings} \\
 &TCO_{ICE} - TCO_{Clean} \times \# \text{ Vehicles} = \$ \text{ Savings} \\
 &(\$96K - \$80K) \times 100 = \mathbf{\$1,600,000}
 \end{aligned}$$

Additional cost and revenue drivers to consider include vehicle depreciation, vehicle lifespan, vehicle resale value, charging infrastructure, actual state and local incentives based on geography, and cost of capital. See [IEA TCO](#) tool for calculation support.

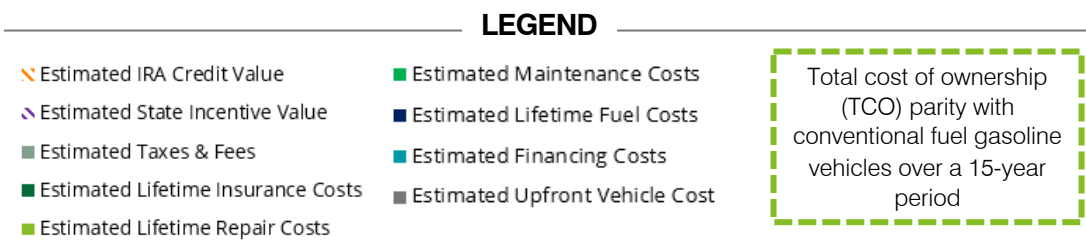
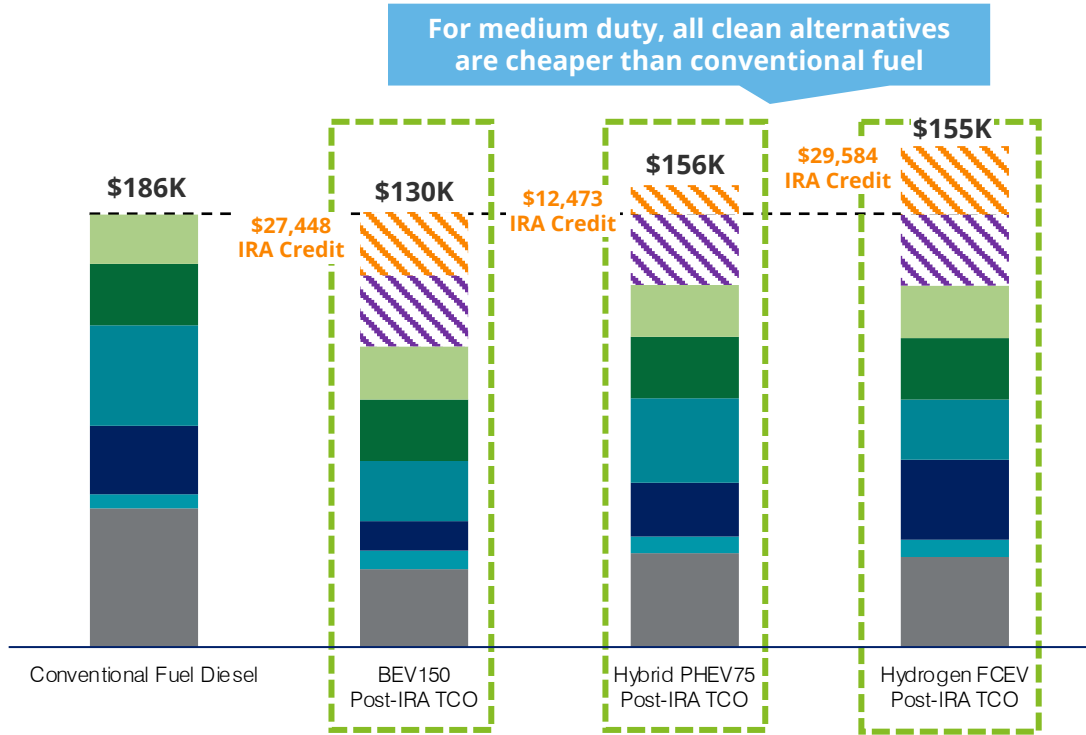
A company with 100 light duty vehicles could save an estimated \$1,600,000 over 15 years by converting from conventional fuel gasoline vehicles to clean vehicle alternatives based on total cost of ownership differences.

ASSUMPTIONS

- All TCO data is from 2021 Argonne National Lab Study with two exceptions:
 - 1) Downward adjustment to battery cost estimates for BEV300 and PHEV based on projected impacts of IRA (\$82.5/kWh)
 - 2) Added estimated IRA tax credit value
- 15-year ownership assumes an estimated 201,400 miles in Argonne study
- Assumes PHEV Battery Capacity is >7 kWh
- Impact of IRA credit on vehicle depreciation value is not included in analysis, IRA and state credit values are not tax-impacted
- MSRPs based on 2025 model year prices
- IRA credit is absorbed by purchaser entirely
- Other changes to battery pack manufacturing costs (e.g., through IRA labor requirements) were not considered
- Finance costs likely to be lower than estimated due to IRA tax credit
- Excludes IRA effect on fuel and charging prices
- Total cost savings in sample business case is based on lowest cost clean vehicle option (FCEV)
- Estimated state incentive values are blended national averages by powertrain type (BEV/PHEV/FCEV) of (\$7,578/\$6,311/\$10,114)

The Business Case (Medium Duty): With incentives, all medium duty clean vehicles are now projected to be cheaper than conventional fuel diesel over 15 years of ownership

Medium Duty: Estimated 15-year Total Cost of Ownership (TCO) in the US (Pickup/Delivery) in \$, beginning in 2025



Sources: Deloitte Analysis, [Argonne National Lab](#), [ICCT](#), [BNEF 1](#), [BNEF 2](#), [DOE State Incentives Database](#), IRC.

Sample Business Case

Vehicle TCO Differential	x	Vehicle Fleet Size	=	Total Cost Savings
$TCO_{ICE} - TCO_{Clean}$		# Vehicles		\$ Savings
(\$186K - \$130K)		100		\$5,600,000

Additional cost and revenue drivers to consider include vehicle depreciation, vehicle lifespan, vehicle resale value, charging infrastructure, actual state and local incentives based on geography, and cost of capital. See [IEA TCO](#) tool for calculation support.

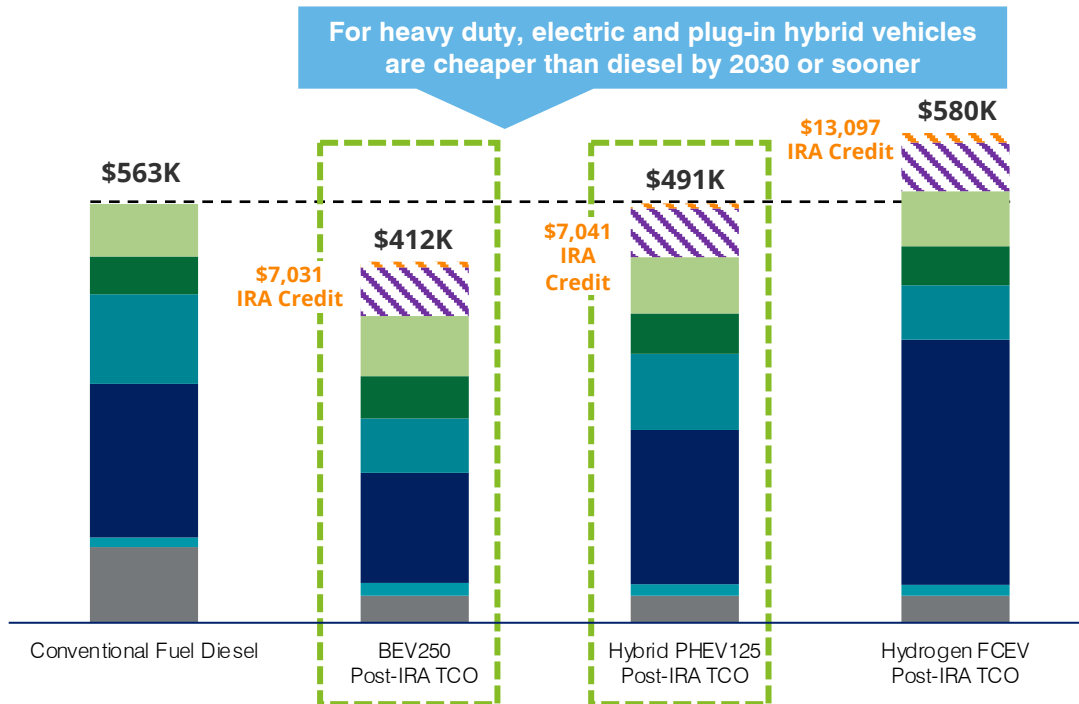
A company with 100 medium duty vehicles could save an estimated \$5,600,000 over 15 years by converting from conventional fuel vehicles to clean vehicle alternatives based on total cost of ownership differences.

- ASSUMPTIONS**
- All TCO data is from 2021 Argonne National Lab Study with two exceptions:
 - 1) Downward adjustment to battery cost estimates for BEV150 and PHEV based on projected impacts of IRA (\$82.5/kWh)
 - 2) Added estimated IRA tax credit value
 - 15-year ownership assumes an estimated 201,400 miles in Argonne study
 - Impact of IRA credit on vehicle depreciation value is not included in analysis, IRA and state credit values are not tax-impacted
 - Assumes PHEV Battery Capacity is > 15 kWh
 - MSRPs based on 2025 model year prices
 - IRA credit is absorbed by purchaser entirely
 - Other changes to battery pack manufacturing costs (e.g., through IRA labor requirements) were not considered
 - Finance costs likely to be lower than estimated due to IRA tax credit
 - Excludes IRA effect on fuel and charging prices
 - Total cost savings in sample business case is based on lowest cost clean vehicle option (BEV)
 - Estimated state incentive value of \$30,439 is a blended national average

The Business Case (Heavy Duty):

By 2030 or sooner, heavy duty electric and plug-in hybrid vehicles are projected to be cheaper than conventional fuel diesel over 15 years of ownership

Heavy Duty: Estimated 15-year Total Cost of Ownership in the US (Tractor - Day Cab) in \$, beginning in 2030



LEGEND

- Estimated IRA Credit Value
- Estimated State Incentive Value
- Estimated Taxes & Fees
- Estimated Lifetime Insurance Costs
- Estimated Lifetime Repair Costs
- Estimated Maintenance Costs
- Estimated Lifetime Fuel Costs
- Estimated Financing Costs
- Estimated Upfront Vehicle Cost

Total cost of ownership (TCO) parity with conventional fuel gasoline vehicles over a 15-year period

Sources: Deloitte Analysis, [Argonne National Lab](#), [ICCT](#), [BNEF 1](#), [BNEF 2](#), [DOE State Incentives Database](#), IRC.

Sample Business Case

$$\text{Vehicle TCO Differential} \times \text{Vehicle Fleet Size} = \text{Total Cost Savings}$$

$$\text{TCO}_{\text{ICE}} - \text{TCO}_{\text{Clean}} \times \# \text{ Vehicles} = \$ \text{ Savings}$$

$$(\$563\text{K} - \$412\text{K}) \times 100 = \mathbf{\$15,100,000}$$

Additional cost and revenue drivers to consider include vehicle depreciation, vehicle lifespan vehicle resale value, charging infrastructure, actual state and local incentives based on geography, and cost of capital. See [IEA TCO](#) tool for calculation support.

A company with 100 heavy duty vehicles could save an estimated \$15,100,000 million over 15 years by converting from conventional fuel vehicles to clean vehicle alternatives based on total cost of ownership differences.

ASSUMPTIONS

- All TCO data is from 2021 Argonne National Lab Study with two exceptions:
 - 1) Downward adjustment to battery cost estimates for BEV300 and PHEV based on projected impacts of IRA (\$82.5/kWh)
 - 2) Added estimated IRA tax credit value
- 15-year ownership assumes an estimated 201,400 miles in Argonne study
- Impact of IRA credit on vehicle depreciation value is not included in analysis, IRA and state credit values are not tax-impacted
- Assumes PHEV Battery Capacity is > 15 kWh
- MSRPs based on 2030 model year prices
- IRA credit is absorbed by purchaser entirely
- Other changes to battery pack manufacturing costs (e.g., through IRA labor requirements) were not considered
- Finance costs likely to be lower than estimated due to IRA tax credit
- Excludes IRA effect on fuel and charging prices
- Total cost savings in sample business case is based on lowest cost clean vehicle option (BEV)
- Estimated state incentive value of \$65,305 is a blended national average

Additional factors and markets trends will likely improve the business case for clean commercial vehicles

Growth of domestic battery, semiconductor, and manufacturing industries

- IRA incentives for **battery manufacturing** within the US is accelerating the rise of the “Battery Belt,” which will likely help manage EV supply chain costs and risks
- The CHIPS and Science Act provides approximately \$280 billion in new funding for domestic research and manufacturing of **semiconductors**, another key input into EVs, which will likely help ease supply chain bottlenecks

Declining costs of clean electricity and resulting decreases in EV fueling costs

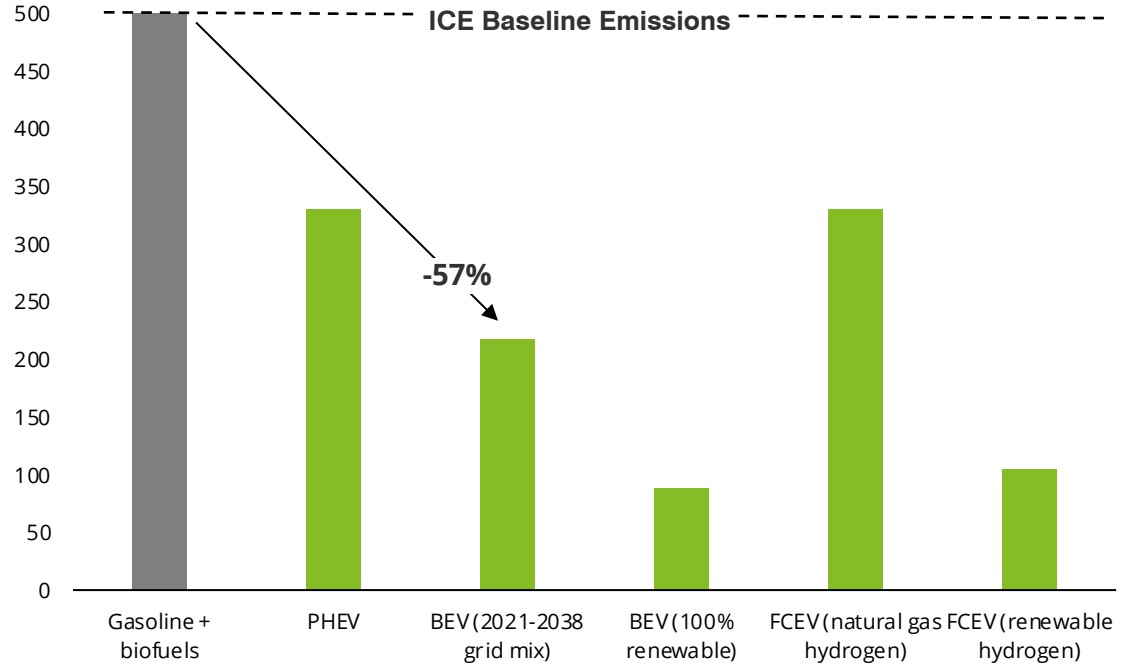
- The IRA is estimated to nearly triple federal tax **incentives for green energy** over the next ten years
- Boosts in renewable energy supply are projected to result in the lowest levelized cost of clean electricity in the world, which will likely **reduce fueling/charging costs for EV owners**
- Both public and private investments are significantly expanding the network of **affordable and accessible EV charging stations** (including bi-directional vehicle charging capabilities)

Additional federal, state, and local EV incentives within and beyond the IRA

- The IRA offers additional funding for clean vehicles beyond Sec. 45W and 30C, such as **Clean Ports** funding and **Clean Heavy-Duty Vehicle Program**
- The **Infrastructure Investment and Jobs Act** (IIJA) provides approximately \$18.6 billion in funding for EV infrastructure and charging programs
- Many **state and local governments** provide clean vehicle **grants** in addition to incentives, and some offer significantly higher incentives than the average values reflected in the TCO analysis

The Climate Case: Converting to clean vehicles can help US companies reduce their fleet emissions by approximately 60%, and approximately 83% on a fully renewable grid

Comparison of Lifecycle GHG emissions of SUVs in the US for ICEVs, PHEVs, BEVs, and FCEVs (in g CO₂e/mile)



ASSUMPTIONS

- Fuel and electricity consumption values are based on the EPA data
- Average vehicle lifetime of 18 years and 209,402 miles
- Excludes effect of IRA on renewable energy deployment in the grid, which is likely to improve the climate case
- Excludes IRA effect on fuel and charging prices
- Nitrous Oxide (N₂O) emissions are assumed to be 3.2 mg/mile for gasoline and 24.1 mg/mile for diesel based on ICCT data
- Uses light duty vehicle data as a conservative estimate because emissions reduction potential increases as vehicle size / fuel consumption increases

Sources: Deloitte Analysis, [EPA](#), [ICCT](#)

Sample Climate Case

Lifecycle Emissions Differential	x	Vehicle Fleet Size	=	Total Emissions Reduction
$GHG_{ICE} - GHG_{Clean}$	x	# Vehicles	=	MT CO ₂ e Reduction
(105 - 45.5) MT CO ₂ e	x	100	=	5,950 MT CO₂e

Exact emissions reduction potential will depend on grid decarbonization, charging infrastructure optimization, and vehicle size. Absolute emissions reduction potential increases as vehicle size increases due to the greater fuel consumption of larger vehicles.

A company with 100 light duty vehicles could save an estimated 5,950 MTCO₂e over the lifetime of its vehicles by converting from conventional fuel vehicles to clean alternatives.

This estimate includes approximately 67.4 kg of avoided N₂O pollution, which would drive significant improvements in air quality and public health outcomes, particularly in disadvantaged communities. Compared to a diesel vehicle baseline, avoided N₂O emissions increase to 505.5 kg.

\$45W: Businesses that purchase qualified commercial clean vehicles or mobile machinery may be eligible for the clean vehicle tax credit of up to \$40,000 per vehicle

CREDIT OVERVIEW

Provision Description: Provides a tax credit for purchasers of qualified commercial clean vehicles

Period of Availability: Vehicles acquired and placed in service between 1/1/23 and before 12/31/32

Incentive Type: Tax credit for commercial use including lease to third parties and direct pay for tax-exempt organizations

New or Modified Provision: New



Nonrefundable and Nontransferable



Direct Pay for Tax-exempt Organizations



No Limit to # of Credits



General Business Credit Terms Apply

Credit Amount:

Vehicle Weight	Hybrid	No ICE (BEV/Fuel Cell)
<14,000 lbs (Light Duty)	Whichever is less: <ul style="list-style-type: none"> 15% of vehicle cost, up to \$7,500 Incremental cost of hybrid over ICE 	Whichever is less: <ul style="list-style-type: none"> 30% of vehicle cost, up to \$7,500 Incremental cost of BEV/Fuel Cell over ICE
= >14,000 lbs (Medium & Heavy Duty)	Whichever is less: <ul style="list-style-type: none"> 15% of vehicle cost, up to \$40,000 Incremental cost of hybrid over ICE 	Whichever is less: <ul style="list-style-type: none"> 30% of vehicle cost, up to \$40,000 Incremental cost of BEV/Fuel Cell over ICE

ELIGIBILITY REQUIREMENTS



Available January 1, 2023, through December 31, 2032

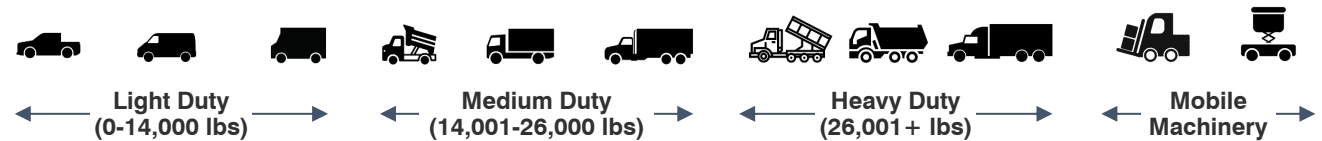
Organization Types and Usage:

- Businesses that acquire motor vehicles or mobile machinery for use or lease in the US
- Tax-exempt entities that acquire motor vehicles or mobile machinery for use in the US
- Must be for use in business, not for resale (includes leasing to others, e.g., car rental business)

Vehicle Types:

- Not subject to North American manufacturing and assembly requirements included in 30D
- Excludes trains
- Minimum of 7 and 15 kWh battery capacity for hybrids and BEVs under and over 14,000 lbs, respectively

Example eligible vehicles types (non-exhaustive):



HOW TO CLAIM THE CREDIT

- Monitor IRS website for release of relevant tax form (still finalizing form for businesses to file alongside federal tax return to claim credit and will post here when complete ([IRS Forms](#)))
- Review the [IRS Guidance on assessing incremental cost](#) and [DOE study](#) to compute the anticipated credit amount
- Collect and record vehicles' VIN along with the amount of the credit to prepare for tax forms

§30C: Businesses that construct alternative fuel refueling infrastructure may be eligible for the clean fueling tax credit of up to \$100,000 per installation

CREDIT OVERVIEW

Provision Description: Provides a tax credit for the installation of alternative fuel vehicle refueling and charging property by businesses, tax-exempt entities, and individual taxpayers in the US

Period of Availability: Infrastructure placed in service between 1/1/23 and 12/31/32

Incentive Type: Tax credit for personal and commercial installation

New or Modified Provision: Modified and timeframe extended



Transferable



Direct Pay for Tax-exempt Organizations



No Limit to # of Credits



General Business Credit Terms Apply

Credit Amount for Individuals: 30% of costs, capped at \$1,000 (excluding permitting and inspection)

Credit Amount for Businesses:

Prevailing Wage and Apprenticeship Requirements	Credit Amount (capped at \$100K)
Meets requirements	30% of costs, excluding permitting and inspection
Does not meet requirements	6% of costs, excluding permitting and inspection

ELIGIBILITY REQUIREMENTS



Available January 1, 2023, through December 31, 2032

Organization Types and Usage:

- Businesses and tax-exempt entities that install a qualified refueling property placed in service in the eligibility timeframe. Fueling station owners who install qualified equipment at multiple sites are allowed to use the credit towards each single item in each location
- Individuals who install a qualified refueling property at their principal residence

Geographic Location:

Property must be placed in an eligible census tract as defined in under Sec. 45D(e), being either:

- Low-Income Community with certain poverty rate and median income requirements; or
- Non-urban area as defined by the Census Bureau



Source: [CDFI Fund Mapping Tool](#)

HOW TO CLAIM THE CREDIT

- File IRS form 8911 alongside their federal tax return to claim the credit ([IRS Forms](#))
- Explore combining with State Grants for Highway Corridor Charging, State Rebates/Vouchers for Charging Purchases and Utility Make Ready (installation costs), and/or Rebate Programs to further lower upfront costs as well as grants that cover operations and maintenance
- Evaluate stacking 30C with 48/48E for on-site electricity generation and storage

Companies are already taking advantage of the IRA to support their transition to clean vehicles

FLEET ELECTRIFICATION & CHARGING INFRASTRUCTURE EXAMPLES

Delivery Fleet Electrification

In December 2022, DHL announced the rollout of 45 (with 130 forthcoming) new last mile delivery vans in Palo Alto, California as part of the company's **commitment to operate 60% of its U.S. vehicles electrically** and **reduce all logistics emissions to net zero by 2050.**



EV Charging Market Entry

In January 2023, Mercedes-Benz announced plans to launch a global high-power EV charging network across North America, Europe, China, and other key markets. **It will begin to be built in 2023 in the US and Canada**, followed by other regions around the globe.



Mercedes-Benz

Heavy Duty Fleet Electrification

In December 2022, PepsiCo announced the **rollout of 100 heavy-duty Tesla Semitrucks in 2023** for deliveries to customers like Walmart and Kroger. Alongside the vehicle purchase, PepsiCo is installing four 750 kW charging stations in California. **The IRA commercial vehicle credit and state grants supported the purchase.**



SAMPLE CLEAN VEHICLE VENDORS

Class 3&4

Several electric cargo van companies currently operate in the North American market.



Class 5&6

Step van options are improving in terms of availability and performance. Newer market entrants are willing to accommodate custom vehicle specifications.



Class 7&8

Several class 8 models are expected to enter the North American market with the earliest one being the Volvo VNR by 2023.



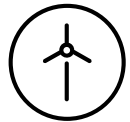
Notes: All information on this slide has been obtained from publicly available sources (e.g., press releases) and shall not be construed to reflect companies' tax attributes or actual usage of tax credits.
Sources: Deloitte Analysis, [DHL](#), [Mercedes-Benz](#), [PepsiCo](#)

Every function has a role to play to take advantage of the IRA to support the transition to clean vehicles



Strategy

- Assess fleet decarbonization against corporate strategy
- Analyze competitive landscape to estimate competitors' movement on clean vehicles post-IRA and protect first-mover advantage



Sustainability

- Calculate projected abatement potential from fleet decarbonization and compare against goals and strategy
- Assess against alternative abatement projects to calculate opportunity cost of investment



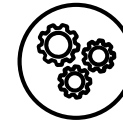
Finance

- Refresh business case with IRA incentives
- Calculate optimal vehicle type and per-vehicle savings
- Present and receive sign-off on business case from CFO
- Consider effect of depreciation on finances (depreciable basis of the vehicle is reduced by the amount of the commercial clean vehicle credit the company receives)



Tax

- Assess eligibility for §45W and §30C based on census tract definitions of low-income and rural communities and calculate projected value
- Prepare to file for relevant credits and incentives (e.g., §45W: track VIN, purchase price, and manufacturer; §30C: [IRS Form 8911](#))



Operations & Procurement

- Work with Finance to identify vehicle and charging needs to inform cost estimates
- Identify specific vehicle and charging manufacturers to purchase from (e.g., [Qualified Manufacturers](#) for §45W)

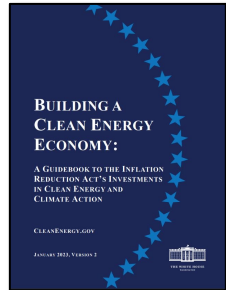


Government Affairs

- Identify additional federal, state and local incentive structures
- Engage with the IRS to provide input on credit allocation mechanisms (while the [comment period](#) for both credits closed Dec. 3, 2022, the IRS will consider input provided after that date at www.regulations.gov (type IRS-2022-56))

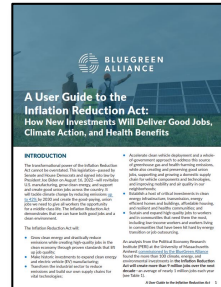
Several resources exist to help companies navigate the details of the IRA and develop the strategy

General IRA Resources



[WH IRA Guidebook](#)

Includes overview, description, and funding details for each IRA funded incentive



[BGA IRA User Guide](#)

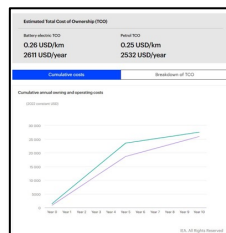
Provides overview of IRA incentives by sector and explains funding mechanisms



[IRS Credits and Deductions under the IRA](#)

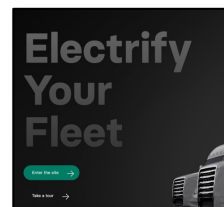
Compiles resources, forms and descriptions of IRA tax credits and deductions

EDF & Partner Fleet Electrification Resources



[IEA Electric Vehicles: TCO Tool](#)

Interactive calculator where users can compare costs of owning and operating ICE vs. electrified vehicles



[EDF Fleet Electrification Solutions Center](#)

Interactive tool with step-by-step guide on fleet electrification



[NACFE - North American Council for Freight Efficiency](#)

Organization that publishes analysis, workshops and data for heavy duty fleet conversion



Victoria Mills
Managing Director
vmills@edf.org

Other useful resources:

- [EDF Study on Post-IRA Medium and Heavy-Duty Vehicle Sales](#)
- [IRS Notice 2023-9 - Guidance on Sec. 45W Incremental Cost](#)
- [DOE Database of Federal and State Clean Vehicle Incentives](#)
- [Electrification Coalition EV Funding Finder](#)

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