Public Body Procurement Workgroup

http://dgs.virginia.gov/dgs/directors-office/procurement-workgroup/

2022 PROPOSED WORK PLAN

Meeting #1 – July 14, 2022

1. Overview of Workgroup Authority and Duties
2. Introduction of Workgroup Members, Representatives, and Staff
3. Review of Proposed Work Plan

During the 2022 Regular Session, the General Assembly passed two bills that direct the Public Body Procurement Workgroup to conduct studies.

- SB 550 (Chapter 727 of the 2022 Acts of Assembly) was patroned by Senator Bell and requires certain payment clauses to be included in public and private contracts. The second enactment clause of the bill directs the Workgroup to review whether the issue of nonpayment between general contractors and subcontractors necessitates legislative corrective action and report its findings and any legislative recommendations to the General Assembly on or before December 1, 2022.
- SB 575 (Chapter 789 of the 2022 Acts of Assembly) was patroned by Senator Mason and requires all agencies of the Commonwealth to (i) utilize a total cost of ownership (TCO) calculator to assess and compare the total cost to purchase, own, lease, and operate light-duty internal combustion-engine vehicles (ICEVs) versus comparable electric vehicles (EVs) prior to purchasing or leasing any light-duty vehicles and (ii) purchase or lease an EV unless the calculator clearly indicates that purchasing or leasing an ICEV has a lower cost of ownership. The third enactment clause of the bill directs the Workgroup to evaluate the appropriateness of requiring all agencies of the Commonwealth to use the TCO calculator prior to purchasing or leasing any medium-duty or heavy-duty vehicles. The bill directs the Workgroup to consult with relevant stakeholders, including at least one medium-duty or heavy-duty vehicle technology provider with experience in real-world deployments, and consider (a) the current commercial market for medium-duty and heavy-duty electric vehicles; (b) the unique characteristics of medium-duty and heavy-duty vehicles, including charging infrastructure and operational duty cycles; (c) the potential volume of medium-duty and heavy-duty vehicles purchased by DGS and agencies of the Commonwealth; (d) the availability of public TCO calculators for medium-duty and heavy-duty vehicles and their suitability for use by DGS and agencies of the Commonwealth; and (e) any other information it determines relevant to its evaluation. The bill requires the Workgroup to report its findings and any recommendations to the Chairmen of the House Committee on General Laws and the Senate Committee on General Laws and Technology on or before December 1, 2022.

4. Presentation on SB 550
    - The Honorable John J. Bell, Senate of Virginia, Patron
5. Presentation on SB 575
    - Baxter Carter, Chief of Staff to The Honorable T. Montgomery "Monty" Mason, Senate of Virginia, Patron

Meeting #2 – July 28, 2022 (Tentative)

1. Receive Public Comment from Stakeholders on SB 550.
2. Receive Public Comment from Stakeholders on SB 575.

Meeting #3 – August 11, 2022 (Tentative)

1. Consideration of the presentations, testimony, and written comments and other information previously received by the Workgroup on SB 550.
2. Development of findings and recommendations on SB 550.
3. Consideration of the presentations, testimony, and written comments and other information previously received by the Workgroup on SB 575.
4. Development of findings and recommendations on SB 575.

Meeting #4 – August 30, 2022 (Tentative)

1. Finalize the Workgroup's findings and recommendations on SB 550. Staff provide overview of final report.
2. Finalize the Workgroup's findings and recommendations on SB 575. Staff provide overview of final report.

December 1, 2021

1. Report on the Workgroup's findings and recommendations on SB 550 due to the General Assembly.
2. Report on the Workgroup's findings and recommendations on SB 575 due to the Chairmen of the House Committee on General Laws and the Senate Committee on General Laws and Technology.

Memorandum

From: Alleyn Harned, Virginia Clean Cities at James Madison University

To: Joe Damico, DGS; and Beth Cooley DGS

Date: June 7, 2022

RE: S 575, Chapter 789: Cost of Ownership Calculators

This memo serves as an informational note for use if it is helpful in preparation of the DGS October 1, 2022 report regarding publicly available cost of ownership calculators to assess and compare the total cost to purchase, own, lease, and operate light duty internal combustion engine vehicles compared to other technologies like electric vehicles. Because these vehicles are required to be used by regulated fleets, numerous public sources are available including tested and frequently updated material from federal national laboratories.

We recommend using the Argonne National Laboratory's (ANL) Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) for the total cost of ownership calculations, specifically the Total Cost of Ownership Calculator. AFLEET is a national go-to tool and has been included in the Bipartisan Infrastructure Law to estimate the emissions of electric vehicle (EV) charging infrastructure projects.

Tool currently in use with fleets in VA:
AFLEET Tool (https://afleet.es.anl.gov/). Cost: Free. Updates: Frequent. Online and Excel versions.

ANL's AFLEET Tool will calculate and compare the environmental and economic costs and benefits of alternative fuel vehicles (AFVs) and internal combustion engine vehicles (ICEVs). Users can estimate petroleum use, greenhouse gas (GHG) emissions, air pollutant emissions, and total cost of ownership for light- and heavy-duty vehicles using detailed spreadsheet or online inputs. Based on the highlighted criteria in the legislation, the Total Cost of Ownership (TCO) Calculator would be a good fit for estimating costs of a vehicle and can be used to compare light-duty or heavy-duty ICEVs and EVs.

The TCO Calculator evaluates the net present value of operating and fixed costs over the years of planned ownership of a new vehicle, as well as lifetime petroleum use, GHGs, and air pollutant emissions. The TCO calculations includes the operating and fixed costs on an annual basis for every year of planned ownership of a new vehicle and infrastructure purchase. This calculator has more detailed cost calculations as compared to the Simple Payback Calculator, another calculator in AFLEET. The Simple Payback Calculator examines acquisition and annual operating costs to calculate a simple payback for purchasing either a new on-road or new offroad AFV as compared to its conventional counterpart, but the TCO Calculator provides additional cost graphs as compared to the Payback Calculator. In addition, the TCO Calculator includes the costs of financing a loan, depreciation, insurance, license, and registration, as well as the operating and acquisition costs. Using assumptions of inflation for various costs and a discount

rate, the tool calculates the net present value of a vehicle purchase. For more information, please see the User Guide for AFLEET Tool 2020 (https://greet.es.anl.gov/publication-afleet-tool-2020-user-guide). Information about the TCO Calculator begins on PDF page 32.

The tool allows input for annual miles, and calculates vehicles over time so addresses the age. Purchase and lease values can be entered into the tool and comparisons can be run quickly. Outputs include information on operation maintenance.

Other Calculators:
The Alternative Fuels Data Center (AFDC) Vehicle Cost Calculator (https://afdc.energy.gov/calc/) is also a great tool for calculating TCO.
This tool uses basic information about driving habits to calculate total cost of ownership and emissions for makes and models of most vehicles and can be used to compare up to 8 light-duty vehicles at a time, including ICEVs and EVs. The Vehicle Cost Calculator does not have the capability to calculate TCO for medium- or heavy-duty vehicles.

Fuel Economy Calculator from EPA/DOE:
Fueleconomy.gov's Fuel Savings Calculator
(https://www.fueleconomy.gov/feg/savemoney.jsp) primary function is estimating fuel costs, but purchase or lease costs can be manually inputted to compare costs between two vehicles. This calculator is also limited to light-duty vehicles only. This includes vehicle make model and year specifics for all ICE and EVs sold for consumers in the United States and is updated constantly with each model year.

For an overview of other tools and calculators, you may be interested in reviewing the AFDC and Related Technology Integration Tools brochure (https://afdc.energy.gov/files/u/publication/tools.pdf), which briefly describes the tools available from the AFDC and Fueleconomy.gov covering vehicles and emissions, fueling and stations, and informational resources.

Additional resources and "widgets" for websites (https://afdc.energy.gov/widgets/) are all available for use on the AFDC – the "widget" version provides the HTML code so other agencies and website managers can copy the tools directly to their website instead of needing to link to the AFDC website.

TCO calculations can adjust with access to state and federal incentive programs – we can maintain and support whatever information is necessary for DGS to convey information of incentives to interested fleets or we can work directly with those fleets if that is of interest.

Virginia Clean Cities is committed to assist here and will put extra hours of capacity and travel too assist into our existing federal funded Virginia green fleet work plans. We are state employees at James Madison University serving on several state and federal contracts to track and resolve solutions as needed by agencies. If DGS could use any assistance we are eager to support your work.

We have also connected with national laboratories – if there are tools that are not accessible from this memo or if there is additional functionality you would desire, we have a partnership with U.S. Department of Energy "Tiger Teams Technical Assistance" that can help further overcome obstacles to deploying alternative fuels and advanced vehicles and make informed choices to reduce fuel consumption.

Thank you.

2022 SESSION

SB 550 Contracts; payment clauses, right to payment of subcontractors.

Introduced by: **John J. Bell** | **all patrons** ... **notes** | **add to my profiles**

SUMMARY AS ENACTED WITH GOVERNOR'S RECOMMENDATION: (all summaries)

Contracts; payment clauses to be included in certain contracts; right to payment of subcontractors. Requires construction contracts awarded by state or local government agencies as well as certain private construction contracts in which there is at least one general contractor and one subcontractor to include a payment clause that obligates the contractors to be liable for the entire amount owed to any subcontractor with which it contracts. The bill provides that a contractor shall not be liable for amounts otherwise reducible due to the subcontractor's noncompliance with the terms of the contract; however, the contractor must notify the subcontractor in writing of the contractor's intent to withhold all or a part of the subcontractor's payment with the reason for such nonpayment. Payment by the party contracting with the contractor shall not be a condition precedent to payment to any lower-tier subcontractor. The bill also requires a payment clause to be included in any construction contract between an owner and a general contractor that requires (i) the owner to pay the general contractor within 60 days of receipt of an invoice following satisfactory completion of the contracted-for work, and (ii) a higher-tier contractor to pay a lower-tier subcontractor within the earlier of 60 days of satisfactory completion of the work for which the subcontractor has invoiced or seven days after receipt of amounts paid by the owner to the general contractor for work performed. Lastly, the bill provides that the Department of General Services shall convene the Public Body Procurement Workgroup to review whether the issue of nonpayment between general contractors and subcontractors necessitates legislative corrective action and report its findings and legislative recommendations to the General Assembly on or before December 1, 2022. The bill has a delayed effective date of January 1, 2023, and shall apply to construction contracts executed on or after January 1, 2023.

FULL TEXT

01/12/22 Senate: Prefiled and ordered printed; offered 01/12/22 22102233D pdf | impact statement

02/02/22 Senate: Committee substitute printed 22104655D-S1 pdf | impact statement

02/24/22 House: Committee substitute printed 22107080D-H1 pdf

03/03/22 House: Floor substitute printed 22107429D-H2 (Wiley) pdf | impact statement

03/10/22 Senate: Bill text as passed Senate and House (SB550ER) pdf | impact statement

04/11/22 Senate: Governor's substitute printed 22108193D-S2 pdf

04/27/22 Senate: Reenrolled bill text (SB550ER2) pdf

04/27/22 Governor: Acts of Assembly Chapter text (CHAP0727) pdf

AMENDMENTS

House committee, floor amendments and substitutes offered

Senate committee, floor amendments and substitutes offered

House committee amendments reported

House amendments not adopted

Governor's recommendation

HISTORY

01/12/22 Senate: Prefiled and ordered printed; offered 01/12/22 22102233D

01/12/22 Senate: Referred to Committee on General Laws and Technology

02/02/22 Senate: Reported from General Laws and Technology with substitute (10-Y 4-N 1-A)

02/02/22 Senate: Committee substitute printed 22104655D-S1

02/02/22 Senate: Rereferred to Finance and Appropriations

02/09/22 Senate: Reported from Finance and Appropriations (11-Y 4-N)

02/10/22 Senate: Constitutional reading dispensed (40-Y 0-N)

02/11/22 Senate: Read second time

02/11/22 Senate: Reading of substitute waived

02/11/22 Senate: Committee substitute agreed to 22104655D-S1

02/11/22 Senate: Engrossed by Senate - committee substitute SB550S1

02/14/22 Senate: Read third time and passed Senate (23-Y 17-N)

02/14/22 Senate: Reconsideration of passage agreed to by Senate (40-Y 0-N)

02/14/22 Senate: Passed Senate (25-Y 15-N)

02/21/22 House: Placed on Calendar

02/21/22 House: Read first time

02/21/22 House: Referred to Committee on General Laws

02/24/22 House: Reported from General Laws with substitute (17-Y 5-N)

02/24/22 House: Referred to Committee on Appropriations

02/24/22 House: Committee substitute printed 22107080D-H1

02/28/22 House: Reported from Appropriations with amendment(s) (22-Y 0-N)

03/01/22 House: Read second time

03/02/22 House: Passed by for the day

03/03/22 House: Floor substitute printed 22107429D-H2 (Wiley)

03/03/22 House: Read third time

03/03/22 House: Committee on General Laws substitute rejected 22107080D-H1

03/03/22 House: Appropriations committee amendments out of order due to rejection of General Laws

03/03/22 House: Substitute by Delegate Wiley agreed to 22107429D-H2

03/03/22 House: Engrossed by House - floor substitute SB550H2

03/03/22 House: Passed House with substitute (91-Y 9-N)

03/03/22 House: VOTE: Passage (91-Y 9-N)

03/07/22 Senate: House substitute agreed to by Senate (29-Y 10-N)

03/07/22 Senate: Title replaced 22107429D-H2

03/10/22 Senate: Enrolled

03/10/22 Senate: Bill text as passed Senate and House (SB550ER)

03/10/22 Senate: Signed by President

03/10/22 House: Signed by Speaker

03/22/22 Senate: Enrolled Bill Communicated to Governor on March 22, 2022

03/22/22 Governor: Governor's Action Deadline 11:59 p.m., April 11, 2022

04/11/22 Senate: Governor's recommendation received by Senate

04/11/22 Senate: Governor's substitute printed 22108193D-S2

04/27/22 Senate: Senate concurred in Governor's recommendation (40-Y 0-N)

04/27/22 House: House concurred in Governor's recommendation (95-Y 4-N)

04/27/22 House: VOTE: Adoption (95-Y 4-N)

04/27/22 Governor: Governor's recommendation adopted

04/27/22 Senate: Reenrolled

04/27/22 Senate: Reenrolled bill text (SB550ER2)

04/27/22 Senate: Signed by President as reenrolled

04/27/22 House: Signed by Speaker as reenrolled

04/27/22 House: Enacted, Chapter 727 (effective 1/1/23)

04/27/22 Governor: Acts of Assembly Chapter text (CHAP0727)

CHAPTER 727

An Act to amend and reenact §§ 2.2-4354 and 11-4.6 of the Code of Virginia, relating to contracts; payment clauses to be included; right to payment of subcontractors.

[S 550]

Approved April 27, 2022

Be it enacted by the General Assembly of Virginia:

1. That §§ 2.2-4354 and 11-4.6 of the Code of Virginia are amended and reenacted as follows:

§ 2.2-4354. Payment clauses to be included in contracts.

Any contract awarded by any state agency, or any contract awarded by any agency of local government in accordance with § 2.2-4352, shall include:

1. *A payment clause that obligates a contractor on a construction contract to be liable for the entire amount owed to any subcontractor with which it contracts. Such contractor shall not be liable for amounts otherwise reducible due to the subcontractor's noncompliance with the terms of the contract. However, in the event that the contractor withholds all or a part of the amount promised to the subcontractor under the contract, the contractor shall notify the subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment. Payment by the party contracting with the contractor shall not be a condition precedent to payment to any lower-tier subcontractor, regardless of that contractor receiving payment for amounts owed to that contractor. Any provision in a contract contrary to this section shall be unenforceable.*

2. A payment clause that obligates the contractor to take one of the two following actions within seven days after receipt of amounts paid to the contractor by the state agency or local government for work performed by the subcontractor under that contract:

a. Pay the subcontractor for the proportionate share of the total payment received from the agency attributable to the work performed by the subcontractor under that contract; or

b. Notify the agency and subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

~~2.~~ *3.* A payment clause that requires (i) individual contractors to provide their social security numbers and (ii) proprietorships, partnerships, and corporations to provide their federal employer identification numbers.

~~3.~~ *4.* An interest clause that obligates the contractor to pay interest to the subcontractor on all amounts owed by the contractor that remain unpaid after seven days following receipt by the contractor of payment from the state agency or agency of local government for work performed by the subcontractor under that contract, except for amounts withheld as allowed in subdivision ~~1~~ *2*.

~~4.~~ *5.* An interest rate clause stating, "Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent per month."

Any such contract awarded shall further require the contractor to include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

A contractor's obligation to pay an interest charge to a subcontractor pursuant to the payment clause in this section shall not be construed to be an obligation of the state agency or agency of local government. A contract modification shall not be made for the purpose of providing reimbursement for the interest charge. A cost reimbursement claim shall not include any amount for reimbursement for the interest charge.

§ 11-4.6. Liability of contractor for wages of subcontractor's employees.

A. As used in this section, unless the context requires a different meaning:

"Construction contract" means a contract between a general contractor and a subcontractor relating to the construction, alteration, repair, or maintenance of a building, structure, or appurtenance thereto, including moving, demolition, and excavation connected therewith, or any provision contained in any contract relating to the construction of projects other than buildings.

"General contractor" and "subcontractor" have the meanings ascribed thereto in § 43-1, except that those terms shall not include persons solely furnishing materials.

"Owner" means a person or entity, other than a public body as defined in § 2.2-4301, responsible for contracting with a general contractor for the procurement of a construction contract.

B. In any construction contract between an owner and a general contractor, the parties shall include a provision that requires the owner to pay such general contractor within 60 days of the receipt of an invoice following satisfactory completion of the portion of the work for which the general contractor has invoiced. An owner shall not be required to pay amounts invoiced that are subject to withholding pursuant to the contract for the general contractor's noncompliance with the terms of the contract.

However, in the event that an owner withholds all or a part of the amount invoiced by the general contractor under the terms of the contract, the owner shall notify the general contractor, in writing and with reasonable specificity, of his intention to withhold all or part of the general contractor's payment with the reason for nonpayment. Failure of an owner to make timely payment as provided in this subsection shall result in interest penalties consistent with § 2.2-4355. Nothing in this subsection shall be construed to apply to or prohibit the inclusion of any retainage provisions in a construction contract.

C. Any contract in which there is at least one general contractor and one subcontractor shall be deemed to include a provision under which any higher-tier contractor is liable to any lower-tier subcontractor with whom the higher-tier contractor contracts for satisfactory performance of the subcontractor's duties under the contract. Such contract shall require such higher-tier contractor to pay such lower-tier subcontractor within the earlier of (i) 60 days of the satisfactory completion of the portion of the work for which the subcontractor has invoiced or (ii) seven days after receipt of amounts paid by the owner to the general contractor or by the higher-tier contractor to the lower-tier contractor for work performed by a subcontractor pursuant to the terms of the contract. Such contractors shall not be liable for amounts otherwise reducible pursuant to a breach of contract by the subcontractor. However, in the event that a contractor withholds all or a part of the amount invoiced by any lower-tier subcontractor under the contract, the contractor shall notify the subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment, specifically identifying the contractual noncompliance, the dollar amount being withheld, and the lower-tier subcontractor responsible for the contractual noncompliance. Payment by the party contracting with the contractor shall not be a condition precedent to payment to any lower-tier subcontractor, regardless of that contractor receiving payment for amounts owed to that contractor, unless the party contracting with the contractor is insolvent or a debtor in bankruptcy as defined in § 50-73.79. Any provision in a contract contrary to this section shall be unenforceable. Failure of a contractor to make timely payment as provided in this subsection shall result in interest penalties consistent with § 2.2-4355. Nothing in this subsection shall be construed to apply to or prohibit the inclusion of any retainage provisions in a construction contract.

~~B.~~ *D.* Any construction contract entered into on or after July 1, 2020, shall be deemed to include a provision under which the general contractor and the subcontractor at any tier are jointly and severally liable to pay any subcontractor's employees at any tier the greater of (i) all wages due to a subcontractor's employees at such rate and upon such terms as shall be provided in the employment agreement between the subcontractor and its employees or (ii) the amount of wages that the subcontractor is required to pay to its employees under the provisions of applicable law, including the provisions of the Virginia Minimum Wage Act (§ 40.1-28.8 et seq.) and the federal Fair Labor Standards Act (29 U.S.C. § 201 et seq.).

~~C.~~ *E.* A general contractor shall be deemed to be the employer of a subcontractor's employees at any tier for purposes of § 40.1-29. If the wages due to the subcontractor's employees under the terms of the employment agreement between a subcontractor and its employees are not paid, the general contractor shall be subject to all penalties, criminal and civil, to which an employer that fails or refuses to pay wages is subject under § 40.1-29. Any liability of a general contractor pursuant to § 40.1-29 shall be joint and several with the subcontractor that failed or refused to pay the wages to its employees.

~~D.~~ *F.* Except as otherwise provided in a contract between the general contractor and the subcontractor, the subcontractor shall indemnify the general contractor for any wages, damages, interest, penalties, or attorney fees owed as a result of the subcontractor's failure to pay wages to the subcontractor's employees as provided in subsection ~~B~~ *D*, unless the subcontractor's failure to pay the wages was due to the general contractor's failure to pay moneys due to the subcontractor in accordance with the terms of their construction contract.

~~E.~~ *G.* The provisions of this section shall only apply if (i) it can be demonstrated that the general contractor knew or should have known that the subcontractor was not paying his employees all wages due, (ii) the construction contract is related to a project other than a single family residential project, and (iii) the value of the project, or an aggregate of projects under one construction contract, is greater than $500,000. As evidence a general contractor may offer a written certification, under oath, from the subcontractor in direct privity of contract with the general contractor stating that (a) the subcontractor and each of his sub-subcontractors has paid all employees all wages due for the period during which the wages are claimed for the work performed on the project and (b) to the subcontractor's knowledge all sub-subcontractors below the subcontractor, regardless of tier, have similarly paid their employees all such wages. Any person who falsely signs such certification shall be personally liable to the general contractor for fraud and any damages the general contractor may incur.

2. That the Department of General Services shall convene the Public Body Procurement Workgroup (the Workgroup) to review whether the issue of nonpayment between general contractors and subcontractors necessitates legislative corrective action. The Workgroup shall report its findings and any legislative recommendations to the General Assembly on or before December 1, 2022.

3. That the provisions of the first enactment of this act shall become effective on January 1, 2023,

and shall apply to construction contracts executed on or after January 1, 2023.

2022 SESSION

SB 575 DGS; state fleet managers to use total cost of ownership calculations, report.

Introduced by: **T. Montgomery "Monty" Mason** | **all patrons** ... **notes** | **add to my profiles**

SUMMARY AS ENACTED WITH GOVERNOR'S RECOMMENDATION: (all summaries)

Department of General Services; state fleet managers to use total cost of ownership calculations; report. Requires the Department of General Services, beginning October 1, 2022, to procure a total cost of ownership calculator prior to procuring any light-duty vehicles. Beginning January 1, 2023, the Department and all agencies of the Commonwealth shall utilize the calculator prior to purchasing or leasing light-duty vehicles and to purchase electric vehicles unless the calculator clearly indicates that purchasing or leasing an internal combustion-engine vehicle has a lower cost of ownership. The bill requires the Department to provide technical assistance to all public bodies in the use of such calculator. The bill requires the Department to report a summary of such procurements to the Governor and the General Assembly by January 1, 2026, and every three years thereafter. The bill exempts emergency vehicles and vehicles used by agencies of the Commonwealth for law-enforcement, incident response, or other emergency response activities from its provisions. The bill requires the Department of General Services Public Body Procurement Workgroup to (i) evaluate the appropriateness of requiring the Department to use a total cost of ownership calculator to, prior to purchasing or leasing any medium-duty or heavy-duty vehicle, assess and compare the total cost to purchase, own, lease, and operate such internal combustion-engine vehicles versus comparable electric vehicles and (ii) report its findings and recommendations to the Chairmen of the House Committee on General Laws and the Senate Committee on General Laws and Technology on or before December 1, 2022.

FULL TEXT

01/12/22 Senate: Prefiled and ordered printed; offered 01/12/22 22104176D pdf

01/26/22 Senate: Committee substitute printed 22104983D-S1 pdf | impact statement

03/01/22 House: Committee substitute printed 22106999D-H1 pdf | impact statement

03/10/22 Senate: Bill text as passed Senate and House (SB575ER) pdf | impact statement

04/27/22 Senate: Reenrolled bill text (SB575ER2) pdf

05/27/22 Governor: Acts of Assembly Chapter text (CHAP0789) pdf

AMENDMENTS

House subcommittee amendments and substitutes offered

House subcommittee amendments and substitutes adopted

House committee, floor amendments and substitutes offered

Senate committee, floor amendments and substitutes offered

Governor's recommendation

HISTORY

01/12/22 Senate: Prefiled and ordered printed; offered 01/12/22 22104176D

01/12/22 Senate: Referred to Committee on General Laws and Technology

01/26/22 Senate: Reported from General Laws and Technology with substitute (15-Y 0-N)

01/26/22 Senate: Committee substitute printed 22104983D-S1

01/28/22 Senate: Constitutional reading dispensed (39-Y 0-N)

01/31/22 Senate: Read second time

01/31/22 Senate: Reading of substitute waived

01/31/22 Senate: Committee substitute agreed to 22104983D-S1

01/31/22 Senate: Engrossed by Senate - committee substitute SB575S1

02/01/22 Senate: Read third time and passed Senate (39-Y 0-N)

02/01/22 Senate: Reconsideration of passage agreed to by Senate (40-Y 0-N)

02/01/22 Senate: Passed Senate (40-Y 0-N)

02/22/22 House: Placed on Calendar

02/22/22 House: Read first time

02/22/22 House: Referred to Committee on General Laws

02/23/22 House: Assigned GL sub: Subcommittee #1

02/24/22 House: Subcommittee recommends reporting with substitute (8-Y 0-N)

03/01/22 House: Reported from General Laws with substitute (22-Y 0-N)

03/01/22 House: Committee substitute printed 22106999D-H1

03/03/22 House: Read second time

03/04/22 House: Read third time

03/04/22 House: Committee substitute agreed to 22106999D-H1

03/04/22 House: Engrossed by House - committee substitute SB575H1

03/04/22 House: Passed House with substitute BLOCK VOTE (99-Y 0-N)

03/04/22 House: VOTE: Block Vote Passage (99-Y 0-N)

03/08/22 Senate: House substitute agreed to by Senate (39-Y 0-N)

03/08/22 Senate: Title replaced 22106999D-H1

03/10/22 Senate: Enrolled

03/10/22 Senate: Bill text as passed Senate and House (SB575ER)

03/10/22 Senate: Signed by President

03/10/22 House: Signed by Speaker

03/22/22 Senate: Enrolled Bill Communicated to Governor on March 22, 2022

03/22/22 Governor: Governor's Action Deadline 11:59 p.m., April 11, 2022

04/11/22 Senate: Governor's recommendation received by Senate

04/27/22 Senate: Senate rejected Governor's recommendation #1, #2, #3 (19-Y 21-N)

04/27/22 Senate: Senate concurred in Governor's recommendation #4 (40-Y 0-N)

04/27/22 House: House concurred in Governor's recommendation #4 (98-Y 2-N)

04/27/22 House: VOTE: Adoption (98-Y 2-N)

04/27/22 Governor: Governor's recommendation adopted in-part

04/27/22 Senate: Reenrolled

04/27/22 Senate: Reenrolled bill text (SB575ER2)

04/27/22 Senate: Signed by President as reenrolled

04/27/22 House: Signed by Speaker as reenrolled

04/27/22 Senate: Communicated to Governor on April 27, 2022

04/27/22 Governor: Governor's Action Deadline 11:59 p.m., May 27, 2022

05/27/22 Governor: Approved by Governor-Chapter 789 (effective 7/1/22)

05/27/22 Governor: Acts of Assembly Chapter text (CHAP0789)

CHAPTER 789

An Act to amend the Code of Virginia by adding a section numbered 2.2-1176.2, relating to Department of General Services; fleet managers to use total cost of ownership calculations; report.

[S 575]

Approved May 27, 2022

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding a section numbered 2.2-1176.2 as follows:

§ 2.2-1176.2. Declaration of policy supporting cost-effective vehicle purchase and lease; total cost of ownership calculator; report.

A. It is the policy of the Commonwealth to encourage and promote the use of cost-effective vehicles by considering the total cost of ownership by agencies of the Commonwealth.

B. By October 1, 2022, the Department shall identify a publicly available total cost of ownership calculator that will be used to assess and compare the total cost to purchase, own, lease, and operate light-duty internal combustion-engine vehicles (ICEVs) versus comparable electric vehicles (EVs). Beginning on January 1, 2023, the Department and all agencies of the Commonwealth shall utilize the calculator prior to purchasing or leasing any light-duty vehicles and shall purchase or lease an EV unless the calculator clearly indicates that purchasing or leasing an ICEV has a lower cost of ownership.

1. The calculator shall, at a minimum, account for the vehicle's make, model, and age; the average miles traveled per year for similarly used vehicles; the expected life expectancy of the vehicle and average annual depreciation; the upfront and annual costs of purchasing such vehicle and all other costs of vehicle ownership or lease; and all costs the agency must incur to add chargers or other fueling facilities to support such vehicles. The calculator shall be updated at least annually to account for updates in information, including information on the latest light-duty vehicle models available.

2. The Department shall make the calculator available to all state and local public bodies and transit agencies. The Department shall also provide technical assistance to such public bodies utilizing the calculator upon request.

For purposes of this subsection, "light-duty vehicle" means a motor vehicle with a gross vehicle weight of 14,000 pounds or less.

C. Beginning January 1, 2026, and every three years thereafter, the Department shall submit to the Governor and the General Assembly a report summarizing the Department's vehicle procurements and the vehicle procurements of other agencies of the Commonwealth. The report shall, at a minimum, include a compilation of types of vehicles by size, fuel sources, and the total estimated cost savings and avoided emissions attributable to purchasing or leasing of EVs instead of ICEVs.

D. Emergency vehicles, as defined in § 46.2-920, and any vehicles used by an agency of the Commonwealth in law-enforcement, incident response, or other emergency response activities shall be exempt from the requirements of this section. The Department may authorize other exemptions from the requirements of this section upon finding that an EV is not a practicable alternative to an ICEV for a particular use, or for some other compelling reason.

E. The Department shall develop guidance documents regarding the procedure for requesting exemptions from the requirements of this section and the criteria for evaluating such exemption requests. Before adopting or revising such guidance documents, the Department shall publish the document on its website and provide a 30-day period for public review and comment.

F. The Department may issue any directives or guidance documents or promulgate any regulations as may be necessary to implement the requirements of this section.

2. That the initial report required pursuant to subsection C of § 2.2-1176.2 of the Code of Virginia, as created by this act, shall be due January 1, 2026.

3. That the Department of General Services (the Department) Public Body Procurement Workgroup (the Workgroup) shall evaluate the appropriateness of requiring the Department and all agencies of the Commonwealth to use a total cost of ownership (TCO) calculator to, prior to purchasing or leasing any medium-duty or heavy-duty vehicle, assess and compare the total cost to purchase, own, lease, and operate medium-duty or heavy-duty internal combustion-engine vehicles versus comparable electric vehicles. In conducting its evaluation, the Workgroup shall consult with relevant stakeholders, including at least one medium-duty or heavy-duty vehicle technology provider with experience in real-world deployments, to consider (i) the current commercial market for medium-duty and heavy-duty electric vehicles; (ii) the unique characteristics of medium-duty and heavy-duty vehicles, including charging infrastructure and operational duty cycles; (iii) the potential volume of medium-duty and heavy-duty vehicles purchased by the Department and

agencies of the Commonwealth; (iv) the availability of public TCO calculators for medium-duty and heavy-duty vehicles and their suitability for use by the Department and agencies of the Commonwealth; and (v) any other information it determines relevant to its evaluation.

The Department shall report the Workgroup's findings and any recommendations to the Chairmen of the House Committee on General Laws and the Senate Committee on General Laws and Technology on or before December 1, 2022.

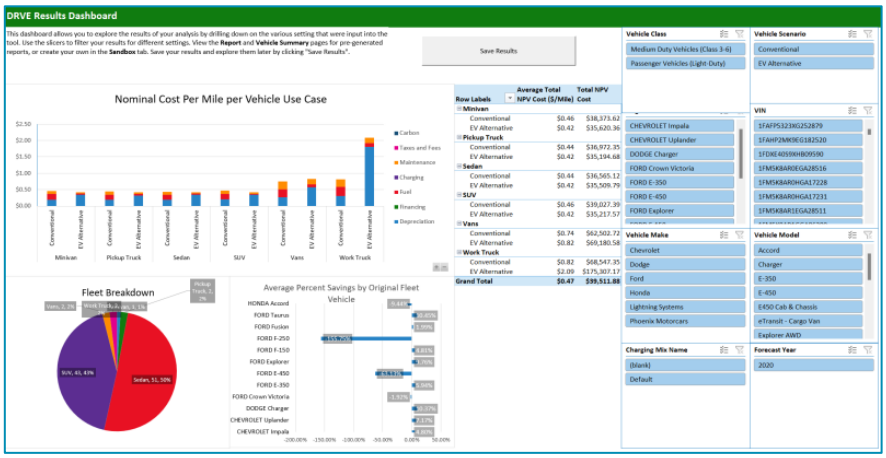
For purposes of this enactment, "medium-duty and heavy-duty vehicle" means a motor vehicle with a gross weight greater than 14,000 pounds.

Electrification Coalition

The Dashboard for Rapid Vehicle Electrification (**DRVE**) Tool

About the DRVE Tool

The DRVE Tool brings powerful, turnkey fleet analytics to organizations and fleets in need of quickly assessing where electrification is best matched in their light-, medium-, and heavy-duty fleet operation. By design, the tool is built to work with a wide variety of fleet data, allowing users to run the analysis tool locally on their computer, producing a detailed report and recommendations, often under an hour.



Screenshot of the DRVE Tool Website

The tool is built to also offer a variety of customization, allowing users to develop various financing, charging, and usage scenarios to identify various options. In this way, the DRVE Tool can reduce the time and resources often required for conducting fleet assessment, providing powerful analytics to all users, with analysis resources across all light-, medium-, and heavy-duty vehicle options.

Photo via City of Des Moines, IA

Download the Tool for Free

For further information or help using the DRVE tool for electrifying your fleet, tool download, user guide, and sample data please visit: www.electrificationcoalition.org/press-release-drve/

Using the DRVE Tool at a Glance

1. **Import Fleet Data:** Select the file containing your data by pressing the “Open File” button. Then, select the sheet where your inventory data resides and select the following: VIN, Annual VMT, and Vehicle Service Life. Please ensure field names appear in the first row of your worksheet.
2. **Map Vehicles:** This tool maps your fleet vehicles to open-sourced, federal database of vehicles. If a match is not found, a default vehicle will be used based on vehicle class. You also have the ability to provide a custom mapping for each vehicle by selecting a different vehicle or adjusting the vehicle settings. This mapping can be used in later analysis as well.
3. **Set Options:** You can change or add different settings to your fleet analysis. These include ‘Analysis Settings’, ‘Market Conditions’, ‘Charging Strategy’, and ‘Procurement Strategy’.
4. **Run Analysis:** This may take several minutes.
5. **View Results:** Once you finish running the analysis, you can view and download the results into a customized print-ready report.

About the Electrification Coalition

The Electrification Coalition is a nonpartisan, not-for-profit group of business leaders committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale in order to combat the economic, public health, and national security dangers caused by America’s dependence on oil. For more information, visit www.electrificationcoalition.org.

2022 Special Session I

Budget Bill - HB30 (Chapter 2)

Department of General Services

Item 85	First Year - FY2023	Second Year - FY2024
Administrative and Support Services (79900)	**$6,124,171**	**$6,148,833**
General Management and Direction (79901)	$3,690,527	$3,690,527
Information Technology Services (79902)	$2,433,644	$2,458,306
Fund Sources:		
General	$6,000,865	$6,000,865
Enterprise	$123,306	$147,968

Authority: Title 2.2, Chapter 11 and Chapter 24, Article 1, Code of Virginia.

A.1. The Department shall lead, provide administrative support to, and convene an annual public body procurement workgroup to review and study proposed changes to the Code of Virginia in areas of non-technology goods and services, technology goods and services, construction, transportation, and professional services procurements. The workgroup shall consist of the Director of the Department of Small Business and Supplier Diversity, Director of the Department of General Services, the Chief Information Officer of Virginia Information Technology Agency, Commissioner of the Virginia Department of Transportation, Director of the Department of Planning and Budget, the President of the Virginia Association of State Colleges and University Purchasing Professionals (VASCUPP), the President of the Virginia Association of Governmental Purchasing or their designees; a representative from the Office of the Attorney General Government Operations and Transactions Division, a staff member of the Virginia House Appropriations Committee, Senate Finance and Appropriations Committee, and Division of Legislative Services.

2. The workgroup is charged with hearing legislation referred by letter from the Chairs of the House Rules, General Laws, and Appropriations Committees, and Chairs of the Senate Rules, General Laws and Technology, and Finance and Appropriations Committees. The workgroup will hear from stakeholders identified by the patron of the referred legislation and other interested individuals to discuss the legislation's impacts to: 1) small businesses to include women and minorities; 2) the Commonwealth's budget; and 3) the Commonwealth's procurement processes. Such meetings will be open to the public. In addition, the Chairs of the House Rules and House Appropriations Committees and Chairs of Senate Rules and Senate Finance and Appropriations Committees may request the workgroup review procurement related proposals in advance of upcoming legislative sessions to better understand potential impacts prior to the start of the annual General Assembly Session.

B. The Department of General Services, in collaboration with the Virginia Information Technologies Agency, shall inventory state agency call center contractual staffing solutions currently in place, and make recommendations on the benefit of developing a statewide standing call center staffing augmentation contract. The agencies shall report findings and recommendations to the Chairs of the House Appropriations and Senate Finance and Appropriations Committees by December 31, 2022.

Statement to the Public Body Procurement Workgroup
SB 550 – Payment to Subcontractors
July 13, 2023

There is an inherent problem in construction because subcontractors are forced to finance construction projects for about fifty percent of each project. This association has developed a paper, which is available upon request, that shows many subcontractors must expend $247,000 on a $500,000 job before receiving their first payment. How can a business afford to do this?

Some established Subcontractors have learned how to manage their cash flow so that they can front most of the construction costs on a commercial project. This financial structure, however, is deadly for new, minority, women and other disadvantaged subcontractors who want to compete in the marketplace.

The financing problem is systemic, a problem with the entire system; from the funding source, to the owner, to the GC, to the Subcontractor. Unless the Commonwealth finds a solution to this problem, financing will continue to prevent the growth of small and disadvantaged construction subcontractors.

The most important solution this Work Group needs to consider involves the payment of change orders. Change orders are required or requested to complete the project to the owner's satisfaction. Once an owner directs a change order, the general contractor must proceed with that work while the pricing for the extra work is reviewed and accepted by the owner. The change order approval process is commonly delayed for months and may even be used as a negotiating tool at the project close-out. Therefore, the subcontractor, the entity performing the change order, goes deeper into negative cash flow on the project.

No additional work can be directed to be performed ***until*** the necessary additional funds are in the project budget ***and*** the change order has been approved and ready to be funded once the additional work has been completed, (NOT at the end of the project to be used as leverage to offset back-charges, etc.). Until this happens the Subcontractors will continue to finance the additional work performed.

A third issue to address is the elimination of retainage as we now know it. As noted above, subcontractors are already financing 50% of the project. On top of that burden their payment requests are reduced by 5% retainage on public work and 10% on private work until final acceptance.

We ask the workgroup to consider ways to address the funding process, change orders and retainage so that all subcontractors in the Commonwealth can survive and thrive in a healthy construction environment.

Who is ACE – the Alliance for Construction Excellence?

- National Electrical Contractors Association (NECA) – Annandale Virginia
- Mechanical Contractors Association of Metropolitan Washington (MCA)
- Atlantic Coast Chapter – National Electrical Contractors Association (NECA)
- American Subcontractors Association of Metro Washington (ASA)
- Mechanical Contractors Association, Inc. (MCA)
- Iron Workers Employers Association of VA, MD, and D.C. (IWEA)
- Mid-Atlantic Chapter - Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

Please visit our Website http://allianceforconstructionexcellence.com/

For More Information Contact:

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571/237-7101 or ike@asamw.org

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JT Thomas, National Electrical Contractors Association and ACE Chairman

(703) 658-4383 or JT@wdcneca.org

MAY 2020

AMPLY

FLEET CHARGING SIMPLIFIED

Unlocking the Cost-Saving Potential of Electric Fuel

An AMPLY Power White Paper

Executive Summary

Cities, municipalities, and private companies around the United States are transitioning fleets with internal combustion engines (ICE) to fleets powered by electric batteries, leveraging new technologies and business models to operate cleaner fleets at lower operating costs.

This AMPLY white paper simplifies complex electricity rate structures given fleet vehicle requirements by comparing the cost to "fuel" different vehicle fleets in the Top 25 U.S. Metropolitan areas.

This updated report, authored by AMPLY Power, attempts to distill and simplify the interaction of complex electricity rate structures with fleet vehicle requirement by providing a comparative assessment of how electricity rate structures in the Top 25 U.S.Metropolitan areas impact the cost to "fuel" different vehicle fleets.

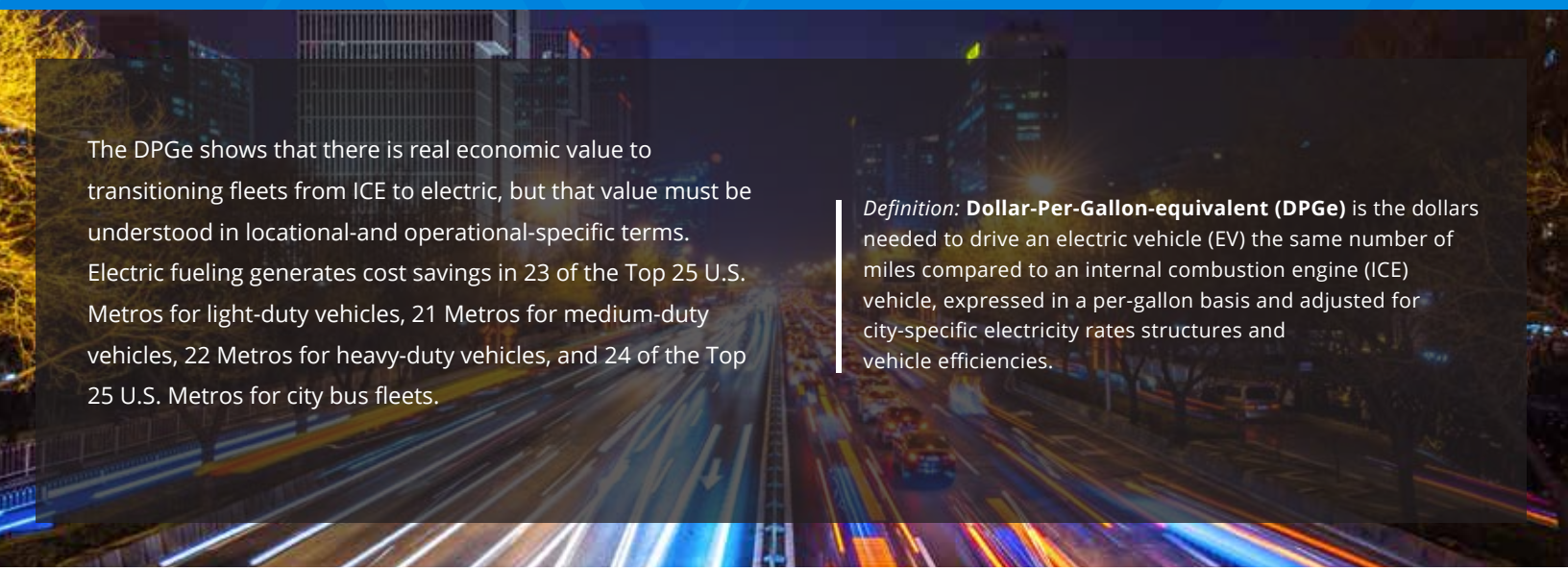
In over 84% of the Top 25 Metropolitan areas based on population in the United States, it is cheaper to re-fuel electric trucks, buses, and passenger vehicles with electricity than fossil fuels.

We introduced the Dollar-per Gallon-equivalent (DPGe)—a comparison of mile-for-mile gasoline/diesel fueling costs versus mile-for-mile electric fueling costs across each metropolitan area—in our 2019 White paper, and are excited to apply this metric to more vehicles to demonstrate the potential of AMPLY's optimal management strategy.

We have added delivery vans (medium-duty) and Class 8 Trucks (heavy-duty) fleets to our analysis in addition to updating the DPGe for light-duty and city bus fleets.

In this white paper, we outline the methodology and logic for calculating the DPGe, present the results and insights gleaned from DPGe for the Top 25 U.S. Metros, and issue a nationwide call-to-arms to industry, regulators, fleet operators, and energy providers to work together to unleash the profound financial and societal benefits that fleet electrification can bring to the United States.

AMPLY Power has developed the **Dollar per Gallon-equivalent (DPGe) metric.** The Dollar per Gallon-equivalent is a direct, apples-to-apples comparison that allows us to assess the electric dollar per gallon-equivalent of gasoline (or diesel) for specific cities, incorporating regional-specific electricity rate structures, fleet-specific charging strategies, and vehicle class efficiencies into a single, comprehensible metric that can be used to assess, plan, and budget for a fleet transition.



The DPGe shows that there is real economic value to transitioning fleets from ICE to electric, but that value must be understood in locational-and operational-specific terms. Electric fueling generates cost savings in 23 of the Top 25 U.S. Metros for light-duty vehicles, 21 Metros for medium-duty vehicles, 22 Metros for heavy-duty vehicles, and 24 of the Top 25 U.S. Metros for city bus fleets.

Definition: **Dollar-Per-Gallon-equivalent (DPGe)** is the dollars needed to drive an electric vehicle (EV) the same number of miles compared to an internal combustion engine (ICE) vehicle, expressed in a per-gallon basis and adjusted for city-specific electricity rates structures and vehicle efficiencies.

A Targeted or Managed Charging Strategy is Cost-Critical in Most Metros

Take, for example, New York. In New York, it would be illogical and quite costly to transition a medium-duty fleet to electric vehicles without a targeted management strategy—with the DPGe (and annual fuel cost) almost three times as expensive as gasoline if unmanaged. However, with a targeted management strategy, the decision is almost a no-brainer the other way: **A fleet transition would yield almost over 30% savings on fuel.**

Where a city's DPGe is not meaningfully lower than that city's equivalent gasoline or diesel price, transitions may be stalled, or absent altogether. Careful rate design, incentives, or other mechanisms must be utilized to encourage this paradigm shift to electric fleets. Well-designed state and local policies, incentives, and rate structures can ensure predictable electric fuel prices that are lower than fossil fuel, will encourage targeted clean economic development, and can be used as a tool by grid operators to optimize and manage their networks.

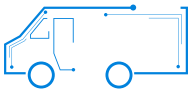
The environmental benefits of these efforts can parallel or exceed the economic benefits, where each fleet transition will substantially reduce carbon emissions into the atmosphere. For each 15-vehicle fleet that transitions to electrification, hundreds of thousands of kilograms CO_2 -equivalent is saved. But realizing these economic and environmental benefits requires the cooperation of fleet operators, industry, utilities, and regulators alike.

2020 Spotlight: Medium-Duty and Heavy-Duty Fleets

In addition to updating the light-duty and city bus fleet comparisons, AMPLY extended the analysis to include medium-duty and heavy-duty fleets. These larger vehicles, encompassing delivery vans and Class 8 trucks, highlights the potential AMPLY's optimal management strategy and electrification have to unlock all parts of the vehicular market.

We applied the same model as from our first Whitepaper with added new assumptions associated with medium-duty and heavy-duty fleets. Using the FHA's metric for annual miles-traveled per vehicle type[1] and then applying an electric vehicle "efficiency factor", we are able to find the kWh consumed per vehicle type on a daily basis. Then to calculate charging cost, we compare "unmanaged charging" from solely on-peak periods to "managed charging" from solely off-peak periods. To better understand demand charges, we assume that medium-duty fleet vehicles incur a 19 kW demand and that heavy-duty fleet vehicles incur a 120 kW demand spike.[2] AMPLY's project experience suggests that a targeted strategy can reduce that demand by about 67% for medium-duty and heavy-duty fleets.[3]

CONSUMPTION PROFILE ASSUMPTIONS



MEDIUM-DUTY

50.3 / **1.00** = **50.3**

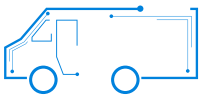
MILES TRAVELED/DAY (a) | MILES TRAVELED/kWh (b) | kWh/CONSUMED/DAY (c = a/b)

HEAVY-DUTY

125 / **0.31** = **409**

MILES TRAVELED/DAY (a) | MILES TRAVELED/kWh (b) | kWh/CONSUMED/DAY (c = a/b)

DEMAND PROFILE ASSUMPTIONS



MEDIUM-DUTY

19 kW UNMANAGED

6.27 kW MANAGED

HEAVY-DUTY

120 kW UNMANAGED

40.9 kW MANAGED

The results for medium-duty and heavy-duty fleets demonstrate the profound power of electrification and optimal management strategies. AMPLY found in 21 of the Top 25 U.S. Metros for medium-duty and in 22 of the Top 25 U.S. Metros for heavy-duty that fueling these fleets with electricity generates significant costs savings. [3] Removing these cities that did not experience savings, electric fuel is on average 41% cheaper than gasoline for medium-duty vehicles and 47% cheaper than diesel for heavy-duty vehicles.

[1] *U.S. DOT, Federal Highway Administration, Table VM-1.*

[2] *AMPLY recognizes that this figure lacks a publicly-referenceable citation, in large part because EV fleets—and optimizing them—are nascent. However, based on the AMPLY team's experience working with its partners to optimize their fleets, AMPLY uses the 67% metric here as a conservative approximation for demand reduction capabilities with optimization.*

[3] *The exact amount for each fleet will inherently depend on the size, operating requirements, vehicles, and driving profile of those fleets.*

A Primer on Electricity Rate Structures in the U.S.

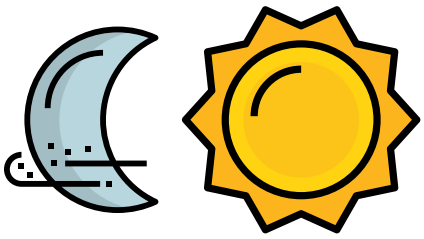
The complexity of electricity rate structures coupled with confusing or conflicting metrics is a fundamental impediment to a global transition to electric vehicle (EV) fleets. Unlike gasoline or diesel fuel prices (all-too-well-understood in the U.S. as a fixed number of dollars per volumetric gallon), electricity prices can vary significantly on a volumetric (measured in kWh) basis.

The 3 Basic Components of an Electricity Bill

- **Energy Charges:** In $/kWh, these are simply how many electrons you consume. Much like gasoline, this charge is purely volumetric (e.g., to fill a 100 kWh battery you would need 100 kWh); however, as compared to gasoline, the volumetric price per kWh in most cities will vary depending on the time of day or day of week that you charge the battery ("time of use" energy pricing). In some cities, "on peak" energy charges (e.g., charging in the middle of the afternoon) can be nearly six times as costly as "off peak" energy charges (e.g., charging at 2AM). Imagine paying $3.00/gallon of gasoline in the evening but $12/gallon in the daytime, and in most U.S. Metros, this is only part of the equation!

- **Demand Charges:** Demand charges (in $/kW) refer to the instantaneous rate at which you charge the vehicle, and for the majority of the Top 25 Metros, are typically calculated using the single highest 15- or 30-minute "spike" registered in a month. The demand charge is much more a derivative of the charging infrastructure than it is the vehicle: DC Fast Charging infrastructure can charge vehicles at rates above 50 kW whereas Level 2 Chargers typically max out around 10 kW—or, in other words, a DC Fast Charger can get a lot more energy into your vehicle in a much quicker timeframe. A 15-minute charge with a 50 kW DC Fast Charger on a $30/kW demand charge tariff would cost $1,500; but, it's critical to understand that this once-per month cost can (and should) be amortized over the course of all other charges in that month. Much like energy charges, demand charges in the Top 25 Metros typically also have on and off-peak rates, thus, designing a fueling strategy to limit demand both overall and during on-peak periods is critical.

- **Fixed Charges:** Fixed charges (in $/month) simply refer to the regulator-approved fixed components of any electricity bill. For the most part, these charges are not impacted by charging strategies and should be amortized across all consumption over the course of the month.



> Imagine paying **$3.00/gallon** for gasoline at night but **$12/gallon** in the late afternoon, but only during weekdays. In most U.S. metros, this is only part of the challenge!

EV Specific Rates: In California and Colorado, some utilities have proposed specific rates to encourage fleet transitions to electric vehicles. These rates contain little to no demand charges but relatively higher energy charges. In general, these will be in place for five years before returning to more conventional rate structures with a reintroduction of demand charges. An optimal fuel management strategy is vital for navigating these changing rate structures and to take advantage of these opportunities.

Understanding DPGe from Atlanta to San Francisco

Rates structures in the Top 25 Metros are best understood by comparing two cities with drastically different rate design—Atlanta and San Francisco:

ATLANTA, GA

For the most part, Atlanta's pricing structure minimally provides an optimization incentive. At about $0.06/kWh for energy year-round, and with non-TOU demand charges, vehicle charging is more or less agnostic to exactly when or the rate at which it charges. We found Atlanta's DPGe for city bus fleet vehicles to be $1.54.

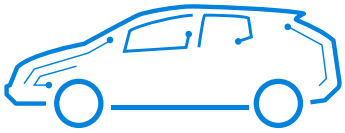
SAN FRANCISCO, CA

San Francisco, conversely, has extreme time-variable rates. Under San Francisco's new proposed commercial EV tariff, charging during peak times costs over $0.30/kWh for energy whereas charging during off-peak times costs under $0.09/kWh, plus monthly subscription charges. Given the complex structure and multiple optimization avenues to save on energy and demand, San Francisco's DPGe ranges between $0.72 and $2.47, or in other words, a range that can be two-thirds more expensive or twice as cost-effective as Atlanta depending on how charging the fleet is managed!

**Californian IOU utilities are proposing or implementing 5-year demand charge holidays that will reduce DPGe costs and incentivize short-term electric fleet adoption.*

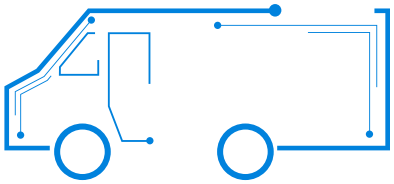
Insights

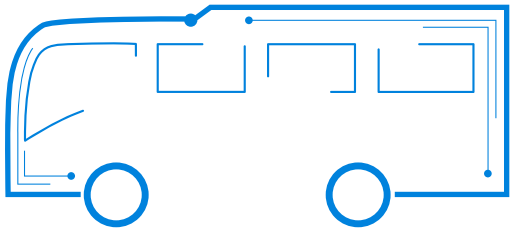
The results of the DPGe calculation across the Top 25 U.S. Metros yield significant findings:



Light-duty fleets: With our updated assessment, we found that well-managed light-duty EV fleets can see a lower fuel cost than their ICE fleet counterparts in **23 of the Top 25 U.S. Metros.** In those 23 Metros, it is **47% cheaper than gasoline** to fuel light-duty vehicles with electricity.

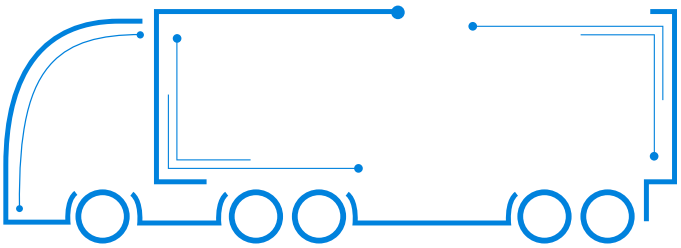
Medium-duty fleets: The DPGe study indicates that with a fueling management strategy, fueling light-duty vehicles with electricity is cheaper than fueling using gasoline in **21 of the Top 25 U.S. Metros.** Removing the four cities that did not experience cost-savings, electric fuel is, on average across these cities, **41% cheaper than gasoline** for medium-duty vehicles.





City bus fleets: In **24 of the Top 25 U.S. Metros** we found that switching from diesel to electricity generates cost savings. We see on average larger savings than last year with electric fueling being **64% cheaper than diesel** in those 24 Metros.

Heavy-duty fleets: Fueling heavy-duty vehicle fleets with electricity in **22 of the Top 25 U.S. Metros** provides significant costs savings with a managed charging strategy. On average, it is **47% cheaper than diesel** to fuel heavy-duty fleets in these 22 Metros.



The AMPLY DPGe Navigator (http://www.amplypower.com/comparison-map/)

The DPGe continues to demonstrate that there is real value to transitioning fleets to electric, but that value must be understood in locational-and operational-specific terms. In some metros, such as New York, it would be illogical and quite costly to transition a light-duty fleet to electric without a targeted management strategy. A targeted management strategy, is almost a no-brainer. Other metros with lower electricity rates, such as Seattle, face a simpler quandary: whether or not the fleet is managed or otherwise, there is real value to be had in fleet electrification. In every metro, a fleet management strategy can generate even greater savings and yield increased value to organizations that decide to transition.

Where in the highest-variable Metros **a managed charging strategy can reduce fuel costs by as much as 85%**, fleet operators must truly understand the dynamics of both their city's electricity structure and their fleet requirements. Detailed studies, analyses, route planning, and assessments must be completed to realize these savings—but this hard work and thorough diligence will generate very meaningful value to stakeholders, and will flip the discussion of a fleet transition from **"a costly sustainability action"** to **"a must-have cost reduction measure."**

City-Specific Rates. These statistics are astounding; they highlight both the incredible efficiencies of an electric vehicle versus its ICE counterpart, and the hypercritical value of fleet management and optimization. The DPGe for each of the Top 25 U.S. Metros are listed below in Table 1, Table 2, Table 3, Table 4.

DPGe versus DPG for the Top 25 U.S. Metros - Medium-Duty Fleets

TABLE 1. MEDIUM-DUTY FLEETS

METROS		$/GASOLINE			DIFFERENCE		PERCENTAGES	
	TOP 25 METROS IN ORDER OF GREATEST DPGE GAINS	UNMANAGED ELECTRIC	MANAGED ELECTRIC	ICE GASOLINE	COMPARED TO UNMANAGED	COMPARED TO MANAGED	CHANGE UNMANAGED	CHANGE MANAGED
1	*Los Angeles-Long Beach-Anaheim	$3.08	$1.22	$3.57	$0.49	$2.35	14%	66%
2	*Riverside-San Bernardino-Ontario	$3.08	$1.22	$3.50	$0.42	$2.28	12%	65%
3	*Denver-Aurora-Lakewood	$2.68	$0.86	$2.34	-$0.35	$1.47	-15%	63%
4	Seattle-Tacoma-Bellevue	$1.92	$1.32	$3.21	$1.29	$1.89	40%	59%
5	Portland-Vancouver-Hillsboro	$2.72	$1.30	$3.08	-$0.36	$1.78	12%	58%
6	Tampa-St. Petersburg-Clearwater	$3.06	$1.07	$2.38	-$0.68	$1.31	-28%	55%
7	San Diego-Carlsbad	$5.32	$1.82	$3.55	-$1.77	$1.73	-50%	49%
8	*San Francisco-Oakland-Hayward	$5.97	$2.04	$3.56	-$2.41	$1.52	-68%	43%
9	Baltimore-Columbia-Towson	$2.67	$1.44	$2.42	-$0.25	$0.98	-11%	41%
10	Philadelphia-Camden-Wilmington	$2.92	$1.55	$2.51	-$0.41	$0.96	-16%	38%
11	Chicago-Naperville-Elgin	$2.90	$1.74	$2.68	-$0.22	$0.94	-8%	35%
12	Houston-The Woodlands-Sugar Land	$3.06	$1.50	$2.15	-$0.91	$0.65	-42%	30%
13	Orlando-Kissimmee-Sanford	$3.28	$1.66	$2.37	-$0.92	$0.71	-39%	30%
14	Miami-Fort Lauderdale-West Palm Beach	$4.11	$1.88	$2.48	-$1.64	$0.60	-66%	24%
15	New York-Newark-Jersey City	$8.01	$2.11	$2.61	-$5.39	$0.51	-207%	19%
16	Phoenix-Mesa-Scottsdale	$5.59	$2.43	$2.98	-$2.61	$0.55	-87%	19%
17	Charlotte-Concord-Gastonia	$2.56	$1.94	$2.29	-$0.27	$0.35	-12%	15%
18	Washington-Arlington-Alexandria	$3.51	$2.22	$2.42	-$1.09	$0.21	-45%	9%
19	St. Louis	$2.65	$2.14	$2.27	-$0.38	$0.13	-17%	6%
20	Minneapolis-St. Paul-Bloomington	$4.27	$2.23	$2.32	-$1.95	$0.09	-84%	4%
21	Dallas-Fort Worth-Arlington	$5.19	$2.13	$2.16	-$3.03	$0.03	-140%	1%
22	San Antonio-New Braunfels	$4.71	$2.18	$2.06	-$2.65	-$0.12	-128%	-6%
23	Atlanta-Sandy Springs-Roswell	$2.66	$2.66	$2.31	-$0.35	-$0.35	-15%	-15%
24	Boston-Cambridge-Newton	$7.34	$3.95	$2.52	-$4.82	-$1.43	-191%	-57%
25	Detroit-Warren-Dearborn	$9.07	$4.70	$2.61	-$6.46	-$2.09	-247%	-80%

Utilities with proposed special EV charging rates

City-Specific Rates. These statistics are astounding; they highlight both the incredible efficiencies of an electric vehicle versus its ICE counterpart, and the hypercritical value of fleet management and optimization. The DPGe for each of the Top 25 U.S. Metros are listed in Table 1, Table 2, Table 3, Table 4.

NOTE: Gasoline (light- and medium-duty) and diesel (heavy-duty and city buses) prices effective as of 02/23/2020. Source: AAA (https://gas prices.aaa.com)

NOTE: For all the Metros, managed charging unlocks larger savings. AMPLY handles all aspects of charging operations on behalf of fleet owners, and AMPLY's managed charging systems are optimized for the lowest electricity costs through navigating demand charges and different tariff rates.

DPGe versus DPG for the Top 25 U.S. Metros - Heavy-Duty Fleets

TABLE 2. HEAVY-DUTY FLEETS

METROS		$/DIESEL			DIFFERENCE		PERCENTAGES	
	TOP 25 METROS IN ORDER OF GREATEST DPGE GAINS	UNMANAGED ELECTRIC	MANAGED ELECTRIC	ICE DIESEL	COMPARED TO UNMANAGED	COMPARED TO MANAGED	CHANGE UNMANAGED	CHANGE MANAGED
1	*Denver-Aurora-Lakewood	$2.39	$0.74	$2.64	$0.25	$1.90	9%	72%
2	*Portland-Vancouver-Hillsboro	$1.99	$0.95	$3.23	$1.24	$2.27	38%	70%
3	*Los Angeles-Long Beach-Anaheim	$3.38	$1.21	$3.90	$0.52	$2.69	13%	69%
4	*Riverside-San Bernardino-Ontario	$3.38	$1.21	$3.83	$0.45	$2.62	12%	68%
5	Tampa-St. Petersburg-Clearwater	$2.48	$1.02	$2.73	$0.25	$1.71	9%	63%
6	Seattle-Tacoma-Bellevue	$1.77	$1.38	$3.40	$1.62	$2.01	48%	59%
7	Baltimore-Columbia-Towson	$2.24	$1.33	$2.76	$0.52	$1.43	19%	52%
8	Philadelphia-Camden-Wilmington	$2.33	$1.45	$2.96	$0.63	$1.52	21%	51%
9	*San Francisco-Oakland-Hayward	$6.32	$2.05	$3.92	-$2.40	$1.87	-61%	48%
10	Miami-Fort Lauderdale-W Palm Beach	$3.05	$1.56	$2.88	-$0.17	$1.31	-6%	46%
11	Orlando-Kissimmee-Sanford	$2.53	$1.48	$2.70	$0.17	$1.23	6%	45%
12	San Diego-Carlsbad	$6.22	$2.13	$3.84	-$2.38	$1.71	-62%	45%
13	Chicago-Naperville-Elgin	$2.37	$1.61	$2.88	$0.52	$1.27	18%	44%
14	Houston-The Woodlands-Sugar Land	$2.51	$1.49	$2.58	$0.07	$1.09	3%	42%
15	New York-Newark-Jersey City	$5.71	$1.88	$3.17	-$2.45	$1.29	-80%	41%
16	Phoenix-Mesa-Scottsdale	$3.96	$1.91	$3.02	-$0.94	$1.11	-31%	37%
17	Minneapolis-St. Paul-Bloomington	$3.38	$2.05	$2.87	-$0.51	$0.81	-18%	28%
18	Dallas-Fort Worth-Arlington	$3.93	$1.95	$2.55	-$1.38	$0.60	-54%	24%
19	Charlotte-Concord-Gastonia	$2.48	$2.08	$2.71	$0.23	$0.63	8%	23%
20	San Antonio-New Braunfels	$3.67	$1.94	$2.52	-$1.15	$0.58	-46%	23%
21	Washington-Arlington-Alexandria	$3.06	$2.22	$2.87	-$0.19	$0.65	-7%	23%
22	St. Louis	$2.61	$2.28	$2.60	-$0.01	$0.32	-1%	12%
23	Atlanta-Sandy Springs-Roswell	$3.08	$3.08	$2.88	-$0.20	-$0.20	-7%	-7%
24	Boston-Cambridge-Newton	$5.70	$3.50	$3.01	-$2.69	-$0.49	-89%	-16%
25	Detroit-Warren-Dearborn	$7.18	$4.35	$2.97	-$4.21	-$1.37	-141%	-46%

*Utilities with proposed special EV charging rates

City-Specific Rates. These statistics are astounding; they highlight both the incredible efficiencies of an electric vehicle versus its ICE counterpart, and the hypercritical value of fleet management and optimization. The DPGe for each of the Top 25 U.S. Metros are listed in Table 1, Table 2, Table 3, Table 4.

NOTE: Gasoline (medium-duty vehicles) and diesel (heavy-duty) prices effective as of 02/23/2020. Source: AAA https://gas prices.aaa.com

DPGe versus DPG for the Top 25 U.S. Metros - Light-Duty Fleets

TABLE 3. LIGHT-DUTY FLEETS

METROS		$/GASOLINE			DIFFERENCE		PERCENTAGES	
	TOP 25 METROS IN ORDER OF GREATEST DPGE GAINS	UNMANAGED ELECTRIC	MANAGED ELECTRIC	ICE GASOLINE	COMPARED TO UNMANAGED	COMPARED TO MANAGED	CHANGE UNMANAGED	CHANGE MANAGED
1	*Los Angeles-Long Beach-Anaheim	$1.55	$0.70	$3.57	$2.02	**$2.87**	**57%**	**80%**
2	*Riverside-San Bernardino-Ontario	$1.55	$0.70	$3.50	$1.95	**$2.80**	**56%**	**80%**
3	San Diego-Carlsbad	$2.42	$0.83	$3.55	$1.13	**$2.73**	**32%**	**77%**
4	Seattle-Tacoma-Bellevue	$1.01	$0.85	$3.21	$2.20	**$2.36**	**68%**	**74%**
5	*Denver-Aurora-Lakewood	$1.45	$0.79	$2.34	$0.88	**$1.54**	**38%**	**66%**
6	Portland-Vancouver-Hillsboro	$1.75	$1.05	$3.08	$1.32	**$2.02**	**43%**	**66%**
7	Tampa-St. Petersburg-Clearwater	$1.73	$0.83	$2.38	$0.66	**$1.55**	**28%**	**65%**
8	*San Francisco-Oakland-Hayward	$2.97	$1.30	$3.56	$0.59	**$2.27**	**17%**	**64%**
9	Houston-The Woodlands-Sugar Land	$1.75	$0.98	$2.15	$0.40	**$1.17**	**19%**	**55%**
10	Baltimore-Columbia-Towson	$1.50	$1.13	$2.42	$0.91	**$1.29**	**38%**	**53%**
11	Chicago-Naperville-Elgin	$1.66	$1.35	$2.68	$1.02	**$1.34**	**38%**	**50%**
12	Charlotte-Concord-Gastonia	$1.32	$1.15	$2.29	$0.97	**$1.14**	**42%**	**50%**
13	Philadelphia-Camden-Wilmington	$1.65	$1.28	$2.51	$0.86	**$1.23**	**34%**	**49%**
14	Atlanta-Sandy Springs-Roswell	$1.22	$1.22	$2.31	$1.08	**$1.08**	**47%**	**47%**
15	St. Louis	$1.38	$1.24	$2.27	$0.89	**$1.03**	**39%**	**45%**
16	Orlando-Kissimmee-Sanford	$1.89	$1.45	$2.37	$0.47	**$0.92**	**20%**	**39%**
17	Washington-Arlington-Alexandria	$1.91	$1.56	$2.42	$0.51	**$0.86**	**21%**	**36%**
18	New York-Newark-Jersey City	$4.77	$1.76	$2.61	-$2.15	**$0.85**	**-83%**	**33%**
19	Miami-Fort Lauderdale-West Palm Beach	$2.42	$1.79	$2.48	$0.06	**$0.68**	**2%**	**28%**
20	Minneapolis-St. Paul-Bloomington	$2.43	$1.87	$2.32	-$0.11	**$0.45**	**-5%**	**19%**
21	Phoenix-Mesa-Scottsdale	$3.34	$2.48	$2.98	-$0.36	**$0.51**	**-12%**	**17%**
22	Dallas-Fort Worth-Arlington	$3.00	$1.80	$2.16	-$0.84	**$0.36**	**-39%**	**17%**
23	San Antonio-New Braunfels	$2.69	$1.96	$2.06	-$0.62	**$0.10**	**-30%**	**5%**
24	Boston-Cambridge-Newton	$4.27	$3.34	$2.52	-$1.75	**-$0.82**	**-70%**	**-33%**
25	Detroit-Warren-Dearborn	$5.14	$3.94	$2.46	-$2.68	**-$1.48**	**-109%**	**-60%**

**Utilities with proposed special EV charging rates*

NOTE: Gasoline (light- and medium-duty) and diesel (heavy-duty and city buses) prices effective as of 02/23/2020. Source: AAA (https://gas prices.aaa.com)

NOTE: For all the Metros, managed charging unlocks larger savings. AMPLY handles all aspects of charging operations on behalf of fleet owners, and AMPLY's managed charging systems are optimized for the lowest electricity costs through navigating demand charges and different tariff rates.

DPGe versus DPG for the Top 25 U.S. Metros - City Bus Fleets

TABLE 4. CITY BUS FLEETS

METROS		$/DIESEL			DIFFERENCE		PERCENTAGES	
	TOP 25 METROS IN ORDER OF GREATEST DPGE GAINS	UNMANAGED ELECTRIC	MANAGED ELECTRIC	ICE DIESEL	COMPARED TO UNMANAGED	COMPARED TO MANAGED	CHANGE UNMANAGED	CHANGE MANAGED
1	*Los Angeles-Long Beach-Anaheim	$1.69	$0.61	$3.90	$2.21	**$3.29**	**57%**	**84%**
2	*Riverside-San Bernardino-Ontario	$1.69	$0.61	$3.83	$2.14	**$3.22**	**56%**	**84%**
3	Portland-Vancouver-Hillsboro	$1.02	$0.57	$3.23	$2.21	**$2.66**	**69%**	**82%**
4	*Denver-Aurora-Lakewood	$1.20	$0.54	$2.64	$1.44	**$2.10**	**54%**	**80%**
5	Seattle-Tacoma-Bellevue	$0.89	$0.80	$3.40	$2.51	**$2.60**	**74%**	**76%**
6	Tampa-St. Petersburg-Clearwater	$1.25	$0.65	$2.73	$1.48	**$2.08**	**54%**	**76%**
7	San Diego-Carlsbad	$3.10	$1.06	$3.84	$0.74	**$2.78**	**19%**	**72%**
8	*San Francisco-Oakland-Hayward	$3.16	$1.14	$3.92	$0.76	**$1.90**	**19%**	**71%**
9	Baltimore-Columbia-Towson	$1.13	$0.86	$2.76	$1.63	**$1.73**	**59%**	**69%**
10	Houston-The Woodlands-Sugar Land	$1.27	$0.85	$2.58	$1.31	**$1.99**	**51%**	**67%**
11	Philadelphia-Camden-Wilmington	$1.18	$0.97	$2.96	$1.79	**$1.86**	**60%**	**67%**
12	Chicago-Naperville-Elgin	$1.20	$1.02	$2.88	$1.69	**$1.66**	**59%**	**65%**
13	Orlando-Kissimmee-Sanford	$1.28	$1.04	$2.70	$1.42	**$1.66**	**53%**	**62%**
14	New York-Newark-Jersey City	$2.90	$1.26	$3.17	$0.27	**$1.90**	**9%**	**60%**
15	Miami-Fort Lauderdale-W. Palm Beach	$1.54	$1.18	$2.88	$1.33	**$1.69**	**46%**	**59%**
16	Charlotte-Concord-Gastonia	$1.24	$1.15	$2.71	$1.46	**$1.56**	**54%**	**57%**
17	Washington-Arlington-Alexandria	$1.54	$1.35	$2.87	$1.33	**$1.52**	**46%**	**53%**
18	St. Louis	$1.31	$1.23	$2.60	$1.29	**$1.36**	**50%**	**52%**
19	Minneapolis-St. Paul-Bloomington	$1.71	$1.40	$2.87	$1.16	**$1.46**	**40%**	**51%**
20	Phoenix-Mesa-Scottsdale	$2.01	$1.54	$3.02	$1.01	**$1.48**	**33%**	**49%**
21	Dallas-Fort Worth-Arlington	$1.99	$1.33	$2.55	$0.56	**$1.21**	**22%**	**48%**
22	Atlanta-Sandy Springs-Roswell	$1.54	$1.54	$2.88	$1.34	**$1.34**	**47%**	**47%**
23	San Antonio-New Braunfels	$1.85	$1.40	$2.52	$0.66	**$1.12**	**26%**	**44%**
24	Boston-Cambridge-Newton	$2.89	$2.38	$3.01	$0.13	**$0.63**	**4%**	**21%**
25	Detroit-Warren-Dearborn	$3.63	$2.98	$2.97	-$0.65	**-$0.00**	**-22%**	**-0%**

**Utilities with proposed special EV charging rates*

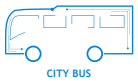
NOTE: Gasoline (light- and medium-duty) and diesel (heavy-duty and city buses) prices effective as of 02/23/2020. Source: AAA (https://gas prices.aaa.com)

NOTE: For all the Metros, managed charging unlocks larger savings. AMPLY handles all aspects of charging operations on behalf of fleet owners, and AMPLY's managed charging systems are optimized for the lowest electricity costs through navigating demand charges and different tariff rates.

Detailed Methodology

AMPLY's analysis seeks to simplify complex energy rate structures and electric vehicle efficiency metrics into a single, comprehensible figure that consumers understand and use daily—the price per gallon of gasoline. To that end, we have developed the city-specific Dollar per Gallon-equivalent (DPGe) and calculated the DPGe for the Top 25 U.S. Metro Areas. DPGe is the dollars needed to drive an electric vehicle the same number of miles compared an ICE vehicle, expressed in a per-gallon basis. Because cities' electricity rate structures can be complex, and vehicle fleet requirements can vary far and wide, we have provided a range for this figure between an unmanaged charging scenario (without having, or with a suboptimal, charging strategy) and an automated or other well-managed charging scenario (using an optimized charging strategy). Fleet operators should view these figures as a range of potential costs; depending on the fleet's operating demands, these costs are likely to vary between the high and low case. The DPGe calculation methodology is described below.

TABLE 5. kWh CONSUMED/DAY CALCULATION

 LIGHT-DUTY	43.5	/ 2.2	= 19.8	
	MILES TRAVELED/DAY (a)	MILES TRAVELED/kWh (b)	kWh/CONSUMED/DAY (c = a/b)	
 MEDIUM-DUTY	50.3	/ 1.00	= 50.3	
	MILES TRAVELED/DAY (a)	MILES TRAVELED/kWh (b)	kWh/CONSUMED/DAY (c = a/b)	
 HEAVY-DUTY	125	/ 0.31	= 409	
	MILES TRAVELED/DAY (a)	MILES TRAVELED/kWh (b)	kWh/CONSUMED/DAY (c = a/b)	
 CITY BUS	93.3	/ 0.4	= 233.2	
	MILES TRAVELED/DAY (a)	MILES TRAVELED/kWh (b)	kWh/CONSUMED/DAY (c = a/b)	

Calculating the Annual Cost of Electricity

Rate & Rate Structure. For each city, we used the standard utility electric rate based on a 500 kW commercial load profile—typically the "general commercial" rate structure, or where specific EV rates are available, the EV rate applicable to a 500 kW commercial load. We applied EV rates in the Los Angeles, San Francisco, Riverside, San Diego, and Denver metro assessments as utilities there have proposed five-year commercial EV rates to encourage EV adoption. In regulated or quasi-regulated markets, we assume that the energy is bought through the local utility at the applicable rate—we do not assume any reduction in energy cost vis-à-vis third-party or community choice aggregators (CCAs, as in California). For fully deregulated markets, we assume a standard non time-of-use energy rate at publicly-available rates at the time of this writing.

Accordingly, the DPGe presented for each city should be contextualized, and in some cases, may substantially understate the value to be had by transitioning a fleet. If a fleet's load is able to be served by a different rate class or by third-party energy providers (via a CCA, energy retailer, or renewable power purchase agreement (PPA)), the actual DPGe seen by that fleet may be significantly lower.

Calculating Vehicle Consumption Profile. To calculate each vehicle's consumption profile, we leverage the FHA's metric for annual miles-traveled by vehicle type[1], with which we are able to calculate daily miles traveled. By applying an electric vehicle "efficiency factor," or kWh consumed per each mile driven, we are able to calculate the kWh consumed per vehicle type per day. The assumptions and calculations are **(shown above in Table 5).**

Calculating Vehicle Charging Cost. The core to AMPLY's analysis is in calculating the low-to-high range of annual electric utility costs to charge each vehicle given a vehicle's consumption profile **(shown above in Table 5).** In other words, we need to understand and plan for "how" and "when" each vehicle will charge. To calculate energy costs, we calculate the two extreme cases for the year: (1) "unmanaged charging" assumes all vehicles charge in the on-peak period only and (2) "managed charging" assumes all vehicles charge in the off-peak period only, where the "on-" and "off-peak" periods in this analysis use the period with the lowest and highest price of energy for each electric utility, respectively (though typically daytime versus evening).

Detailed Methodology-continued

Getting from Annual Cost of Electricity to Dollars per Gallon-equivalent (DPGe)

For calculating the demand cost, AMPLY leverages its experience with fleet optimization to make assumptions on demand profiles

TABLE 6. DEMAND PROFILE ASSUMPTIONS

	LIGHT-DUTY	MEDIUM-DUTY	HEAVY-DUTY	CITY BUS
UNMANAGED DEMAND	10 kW	19 kW	120 kW	70 kW
MANAGED DEMAND	7 kW	6.27 kW	40.9 kW	49 kW

For "sub-optimal" charging, we assume that light duty fleet vehicles incur a 10 kW demand spike vis-à-vis a one-to-one ratio to a L2 charger and that City Buses incur a 70 kW demand spike vis-à-vis minimal charging overlap using high-powered DC-Fast chargers. Under the same framework, we assume that medium-duty fleet vehicles incur a 19 kW demand and that heavy-duty fleet vehicles incur a 120 kW demand spike. AMPLY's project experience suggests that a targeted strategy can reduce that demand by about 30% for light-duty and city bus fleets, and by about 67% for medium- and heavy-duty fleets. These assumptions are provided above in **Table 6**.[2] As with energy, we further calculate the extreme cases as (1) charging all vehicles in the on-peak period only and (2) charging all vehicles in the off-peak period only.

And finally, for the sake of completeness, we sum all electricity bill charges—energy, demand, and fixed— attributed to that vehicle over the course of the year.

To calculate the Dollars per Gallon-equivalent (DPGe), we first calculate the average cost per kWh of energy—which is simply the Annual Cost of Electricity divided by the total kWh consumed per vehicle in that year. Next, for each vehicle class, we calculate the cost of an "electric gallon" of fuel, or in other words, the cost of filling an "electric tank" to the same energy content as one gallon of gasoline or diesel. We do this by multiplying the cost per kWh times the energy content (in kWh) in a gallon of gasoline – the EPA states that each gallon of gasoline has the equivalent energy content as 33.7 kWh and each gallon of diesel has the equivalent energy content as 37.95 kWh.[3] It is worth noting at this point a stark comparison: in each of the Top 25 U.S. Metros, the cost of 33.7 kWh (or 37.95 kWh) was exceptionally higher than that same energy equivalent (one gallon) in gasoline or diesel.

**The calculation does not include the cost of vehicle acquisition.*

To reach our final calculation for DPGe, we multiply the cost of an electric gallon times a "vehicle efficiency factor"—or the MPG of an ICE vehicle divided by the MPGe of an electric vehicle. For ICE vehicle classes, we use the U.S. Department of Energy (DOE)'s MPG figure[4]. For MPGe, instead of relying on manufacturer-provided MPGe estimates based on ideal driving conditions, we use more conservative figures actually seen in the field by AMPLY partners and clients, which take into account less-than-ideal driving (e.g., a bus starts and stops every few blocks on a route). Our MPGe figure is calculated as the kWh energy content of a gallon of gasoline (or diesel) times the miles traveled per kWh, with the latter coming from clients and partners[5].

Though well-intentioned and appropriately recognizing the significant difference in the efficiency of an electric vehicle over an ICE vehicle, we believe the auto manufacturer-provided MPGe figure paints only a partial and misleading picture. MPGe provides no insights whatsoever into the regional-specific cost side of the equation, and is therefore of minimal (if any) value to a fleet operator assessing whether he or she should transition a fleet to electric vehicles, which cities they should pursue fleet transitions, and how to budget for that transition.

Detailed Methodology-continued

Getting from Annual Cost of Electricity to Dollars per Gallon-equivalent (DPGe)

[1] U.S. DOT, Federal Highway Administration. Table VM-1

[2] AMPLY recognizes that this figure lacks a publicly-referenceable citation, in large part because EV fleets—and optimizing them—are nascent. However, based on the AMPLY team's experience working with its partners to optimize their fleets, AMPLY uses the 30% and 67% metric here as a conservative approximation for demand reduction capabilities with optimization. The exact amount for each fleet will inherently depend on the size, operating requirements, vehicles, and driving profile of those fleets. See the table on page 9.

[3] Alternative Fuels Data Center – Fuel Properties Comparison. https://afdc.energy.gov/fuels/fuel_comparison_chart.pdf.

[4] Alternative Fuels Data Center, Average Fuel Economy of Major Vehicle Categories. https://afdc.energy.gov/data/10310.

[5] AMPLY uses 2.2 miles traveled per kWh for light-duty Fleet Vehicles and 0.4 miles traveled per kWh for City Bus fleets. This translates to an MPGe of 74.14 MPGe for light-duty Fleet Vehicles and 15.18 MPGe for City Bus fleets.

COVID-19 Developments

We would be remiss not to address the ongoing COVID-19 pandemic and its impact on fuel costs. In these strange times, we commend the fleet operators moving essential workers and supplying essential goods around the country.

Through various processes, the U.S. has sought to decrease reliance on foreign fuel resources. This current fall in price demonstrates how domestic gasoline and diesel prices are still dependent on international exporters. The fall in price may also push out domestic producers who cannot operate at such low margins which in the long run could increase gasoline and diesel costs.

While electricity costs are also volatile, AMPLY navigates this uncertainty with a wealth of experience and expertise on behalf of the fleet customer. Using gasoline and diesel prices from March 23rd, 2020, AMPLY models that its optimal charging management strategy savings generates cost-savings for light-duty fleets in 22 out of 25, for medium-duty fleets in 18 out of 25, for heavy-duty fleets in 22 out of 25, and for city bus fleets in 24 out of the 25 Top U.S. Metros. COVID-19 is also demonstrating the possible environmental and social results of a zero-carbon-emission future. As more metros encourage EV adoption, communities could enjoy cleaner air on a more consistent basis.

Conclusion

The Future of Electric Fleets

The future of electric vehicle fleets is bright: with new EV models seemingly being announced by the month, battery costs decreasing, and cities and utilities investing in and incenting EV fleets, there are very real reasons for operators to consider and invest in fleet electrification. Managing an EV fleet is complex, as shown by the exceptional variation in the DPGe across cities; but with complexity, comes value.

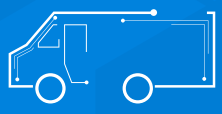
Optimal management strategies liberate fleet operators from the unpredictability of fuel prices and fuel-related operating cost spikes driven by global developments. With EV fleets under a sophisticated management strategy, there are tangible ways to take control and drive down your operating costs, increase revenues, and push your organization into the next era of clean transportation.

The societal and economic impacts of our collective efforts can be astonishing - for each 15-vehicle fleet that we transition, we eliminate a substantial amount of carbon dioxcide from the atmosphere:

PRIVATE PASSENGER FLEET

65,000

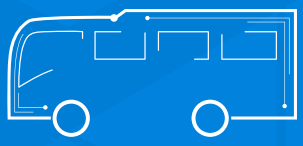
$kgCO_2e$ SAVED/yr



PRIVATE DELIVERY FLEET

255,000

$kgCO_2e$ SAVED/yr



PUBLIC BUS FLEET

1,785,000

$kgCO_2e$ SAVED/yr

PRIVATE TRUCK FLEET

1,580,000

$kgCO_2e$ SAVED/yr

We cannot reach this era without the dedication, foresight, and cooperation of fleet operators, the industry, utilities, and regulators alike. Accordingly, AMPLY Power expands our global call-to-arms from light-duty and city bus fleets to medium-duty and heavy-duty fleets

To fleet operators: we challenge you to embrace this complexity, to commit to an EV fleet transition plan, and to push your peers to find the real economic value in EV fleets that can and should be realized by their organizations.

To utilities and regulators: we challenge you to embrace the incredible financial, economic, and environmental opportunity for fleet electrification, and to carefully craft your policies and rates in a way that can be used as a tool to bring down costs and induce even greater social and environmental benefits to society. We invite you to look to utilities in California such as PG&E, SCE, and SDGE, and to Colorado with Xcel Energy, and observe their implementation of EV-specific rates.

To the industry—AMPLY's peers: we challenge you not only to sell hardware to support your bottom line, but rather to design your businesses to generate real, intentional, and sustainable value to your clients, to our energy system, and to society. Working with other stakeholders, we as an industry are the critical link that can unlock a profoundly cost-effective and global transition toward zero emission transportation.

Unlocking the Cost-Saving Potential of Electric Fuel

MAY 2020

An **AMPLY Power White Paper**

AMPLY

FLEET CHARGING SIMPLIFIED

About AMPLY Power

FLEET CHARGING, SIMPLIFIED. AMPLY Power provides **Charging-as-a-Service** to de-risk and accelerate the adoption of electric buses, trucks, and passenger vehicles by public and private fleets through its simple price-per-mile-driven model. AMPLY provides a fully managed charging solution that enables municipal and commercial fleets to deploy electric vehicles confidently and without hassles. AMPLY handles all aspects of charging operations on behalf of fleet owners, and AMPLY's charging systems are optimized for the lowest electricity costs.

For more please visit **www.amplypower.com** and follow **@AMPLYPower** on Twitter and LinkedIn.