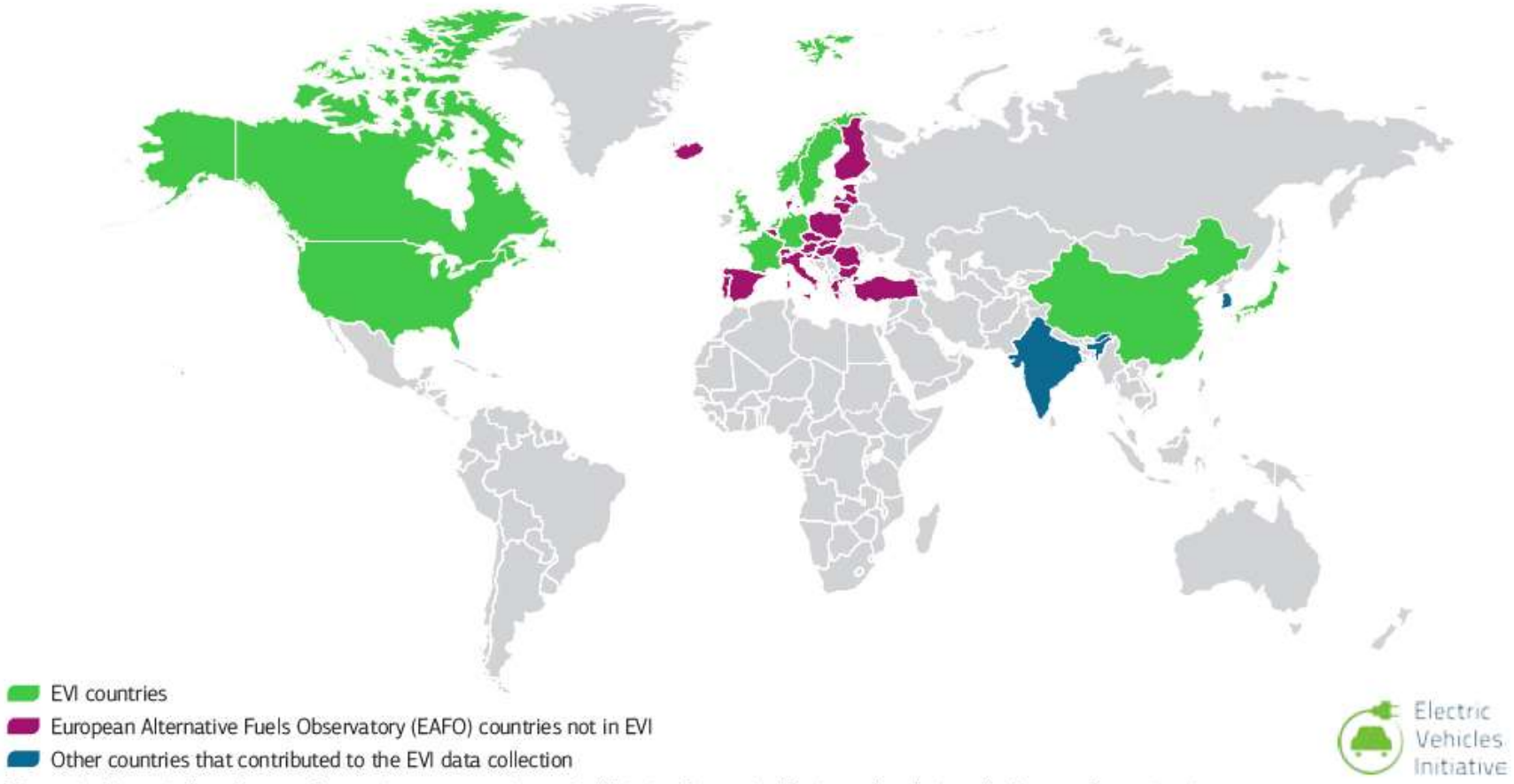
Innovative Utility Financing for Clean Transit: Exploring Opportunities for Cities

100% EV transit bus in Louisville, KY

Clean Energy WORKS

Holmes Hummel, PhD, Principal
Clean Energy Works
www.cleanenergyworks.org

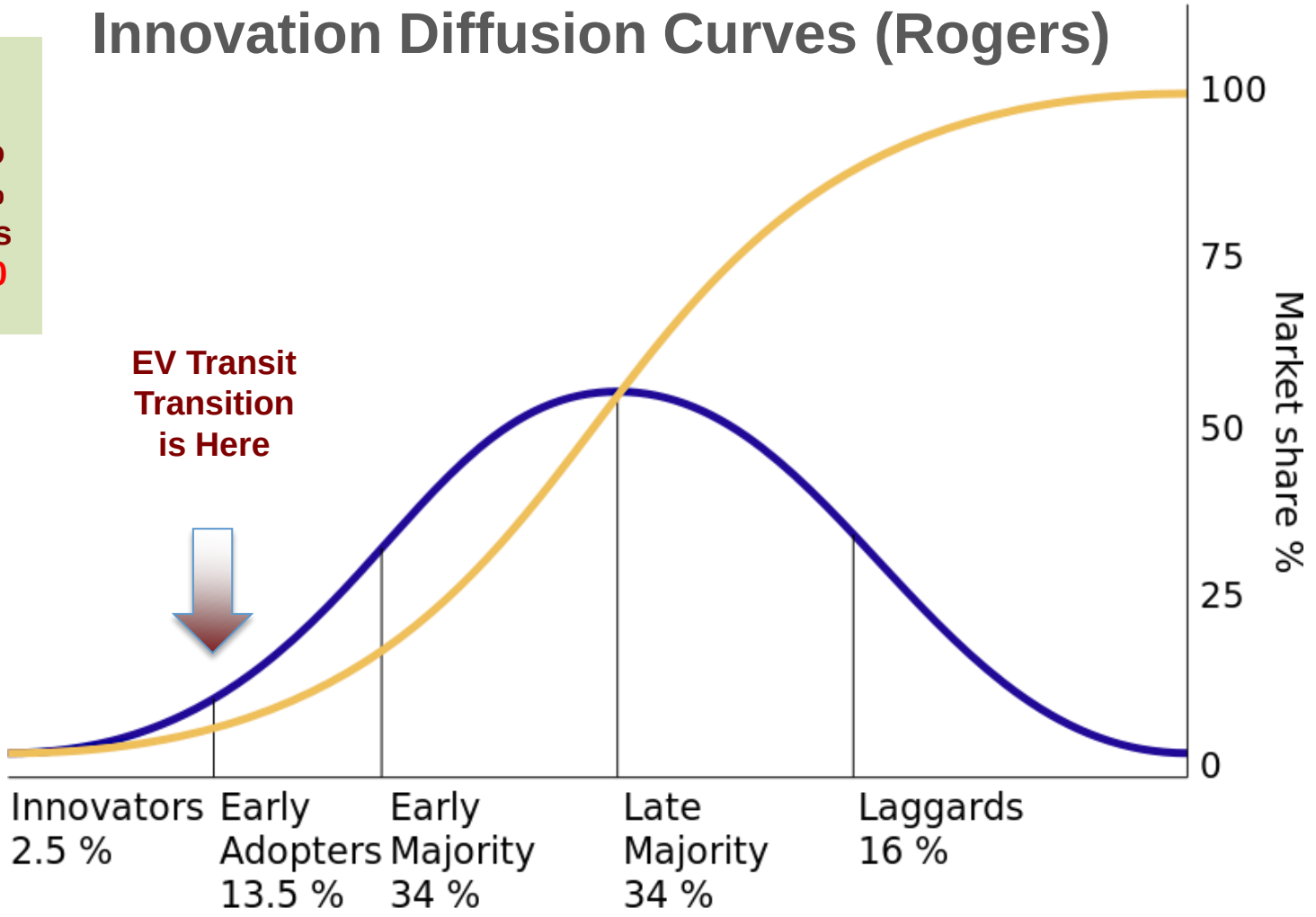
Seeking replicable, scalable solutions for financing



Speed, Scale, and Avoiding Stranded Assets

McKinsey:

Paris scenario requires 100% zero-emissions transit by 2030

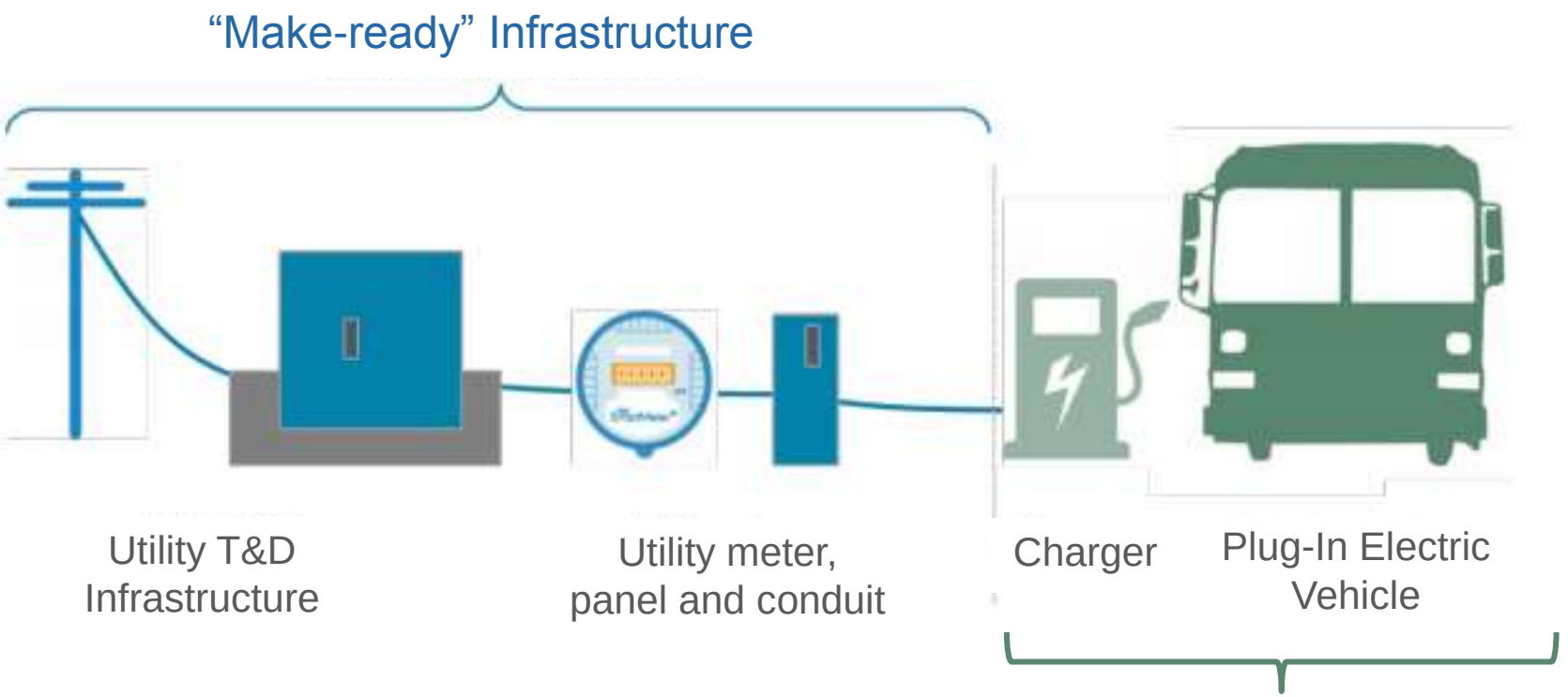


Sources: IEA, Global EV Outlook, 2017; BNEF, Electric Buses in Cities, 2018; McKinsey, Focused Acceleration, 2018.

Utilities have aligned interests in electrification *and* unique financing options at scale

Source: NASA Lights at Night

Utilities can invest on the customer's side of the meter and recover their costs from that site.



Customers still face an upfront cost barriers on their side of the meter

PG&E awards contracts for 165MW energy storage projects in California

EBR Staff Writer

Published 05 December 2017

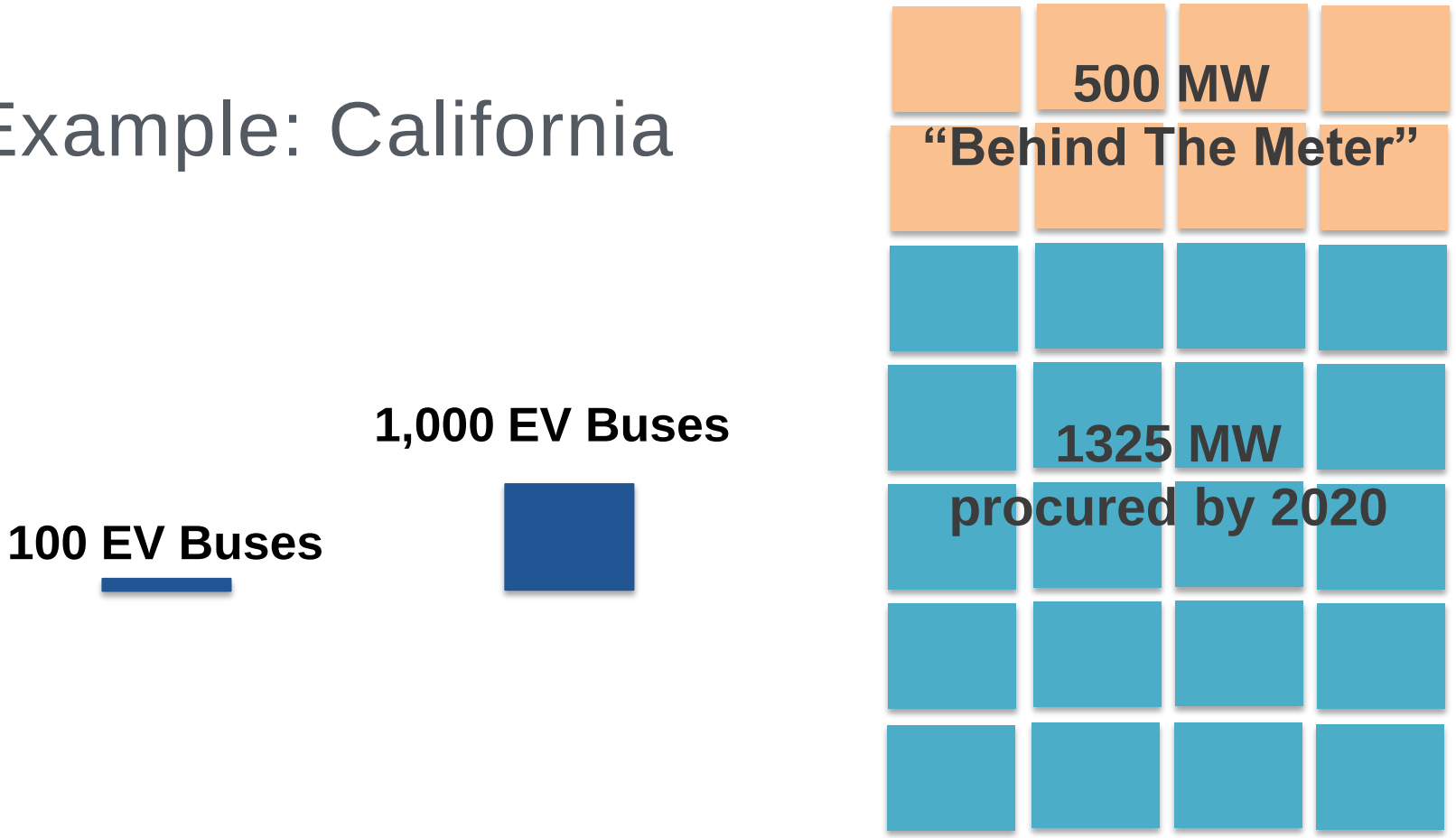
Pacific Gas and Electric Company (PG&E) has awarded contracts to six energy storage projects to be built in the US state of California with a combined capacity of 165MW.

All the six selected energy storage projects are lithium ion battery projects. The first of these projects is slated to be commissioned in November 2020.

Enel through its subsidiaries has bagged three projects with a combined capacity of 85MW/340MWh. These include the 50 MW/200MWh Kingston, 25MW/100MWh Cascade and 10MW/40 MWh Sierra projects.

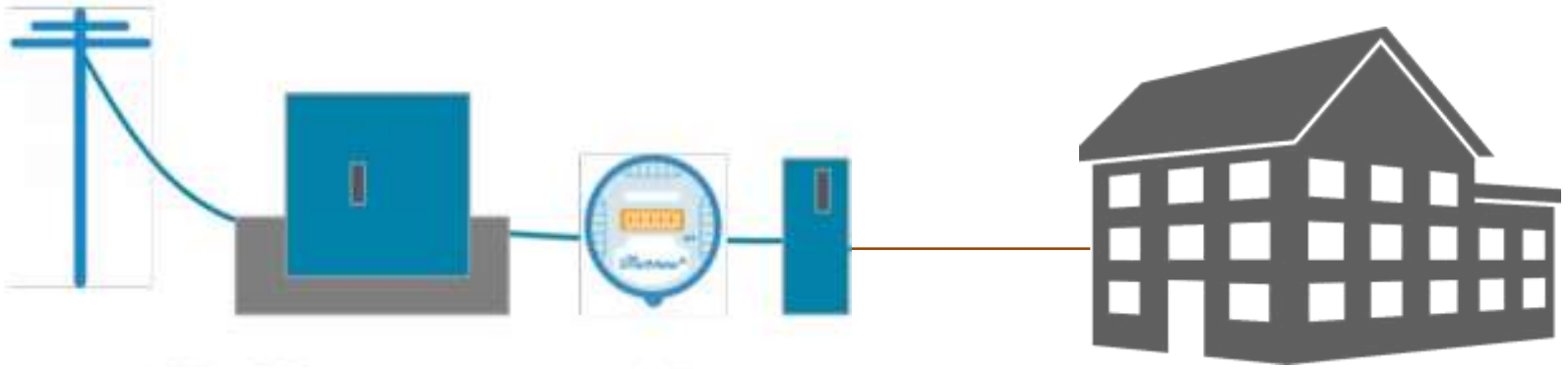
Some utilities are procuring batteries on a large scale to modernize their grid.

- Example: California



This figure is illustrative only. It bluntly presents all storage as batteries with a 4:1 energy-to-power ratio.

Utilities can invest on the customer's side of the meter and recover their costs from that site.



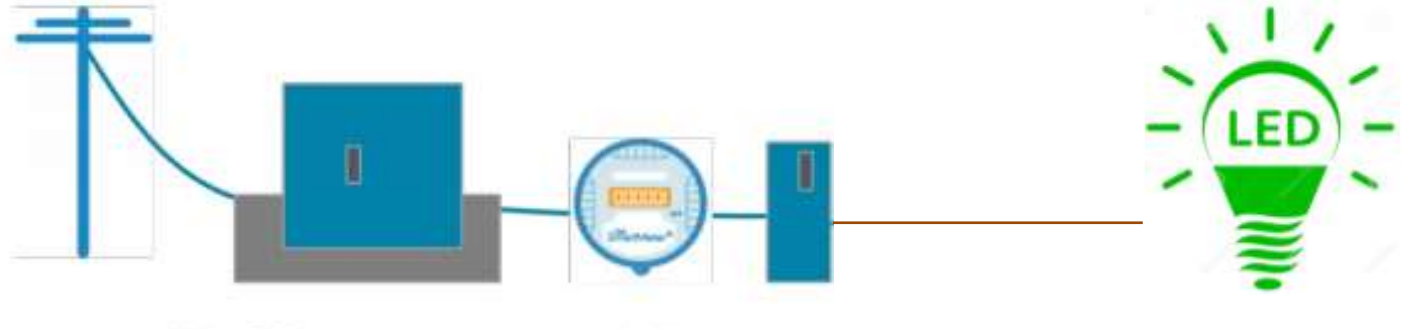
Utility T&D Infrastructure

Utility meter, panel and conduit

Building Energy Efficiency Upgrades

Upfront cost barriers challenge customers (esp. renters)

Utilities can invest on the customer's side of the meter and recover their costs from that site.



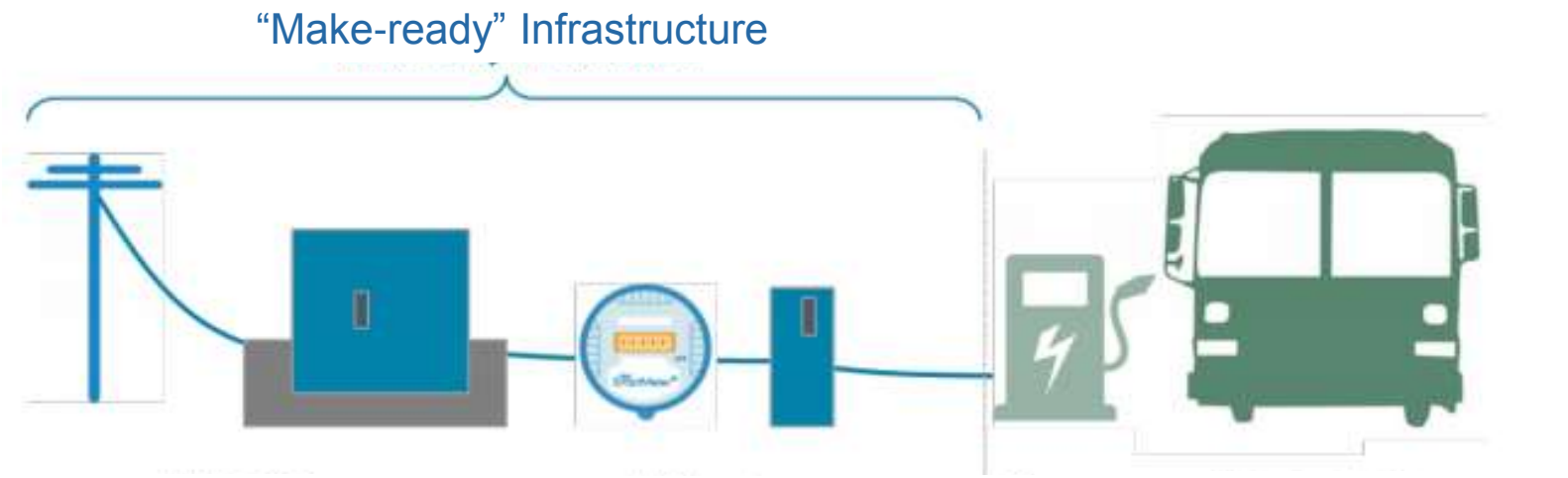
Utility T&D Infrastructure

Utility meter, panel and conduit

Energy Efficiency Upgrades For Lighting and More

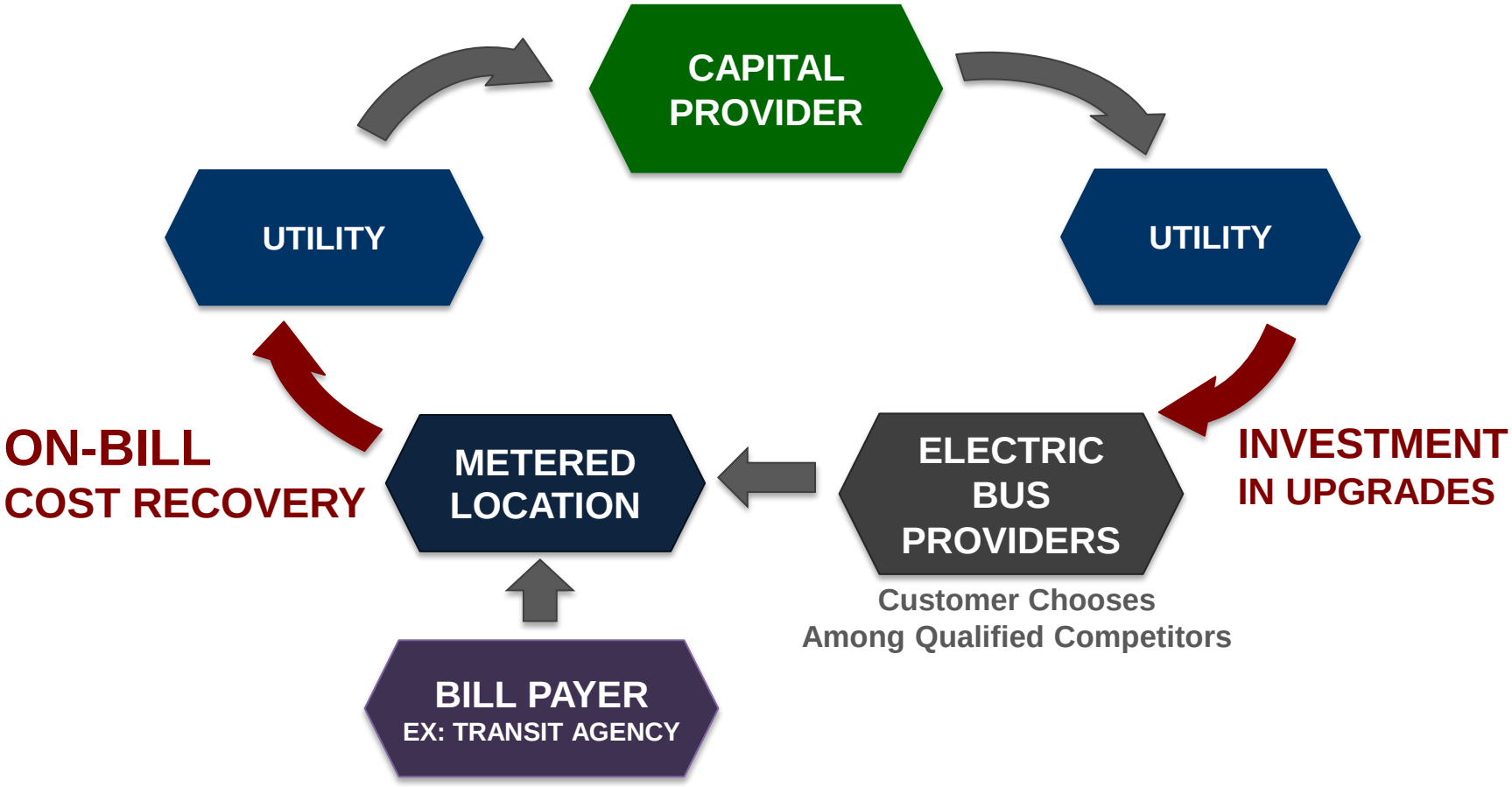
EESL in India has deployed more than $100 million for LED lights, achieving 80% cost reduction with bulk procurement

Utilities can invest on the customer's side of the meter and recover their costs from that site.

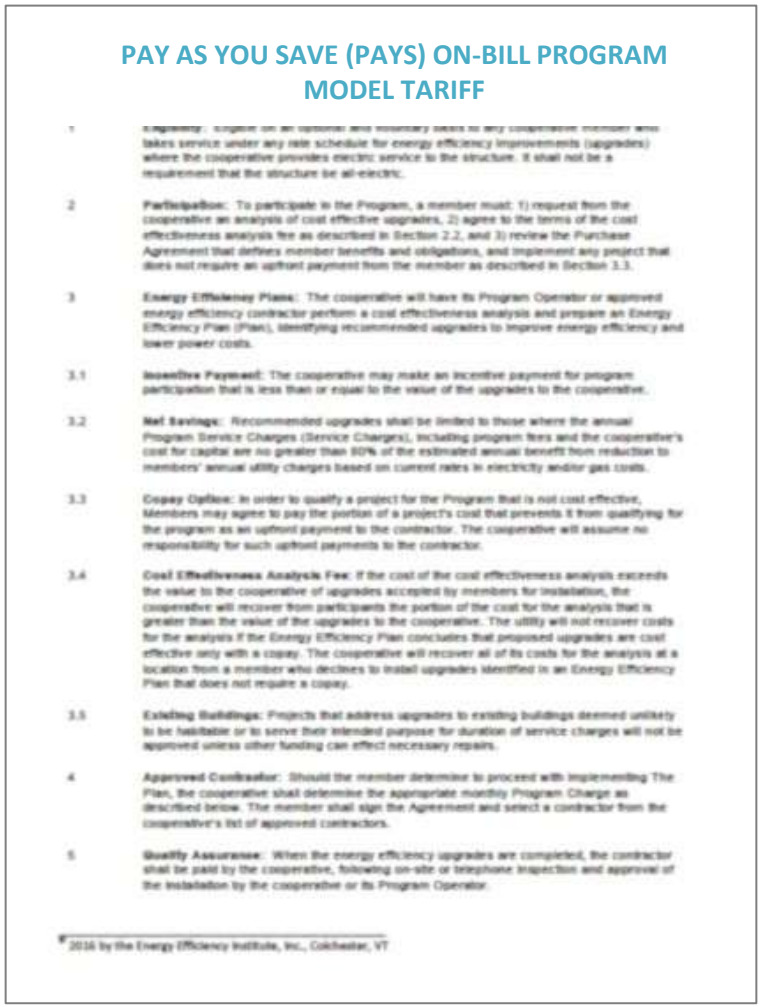


What if utilities could capitalize the cost of the on-board battery and on-site charging station – and recover those costs?

With PAYS, a utility can invest in EV batteries and charging stations – and recover its costs in a way that provides customers a path to ownership



Utility regulators approve a PAYS Tariff one time to establish the terms for investment and cost recovery.



PAY AS YOU SAVE (PAYS) ON-BILL PROGRAM MODEL TARIFF

1 **Eligibility**: Eligible on an optional and voluntary basis to any cooperative member who takes service under any rate schedule for energy efficiency improvements (upgrades) where the cooperative provides electric service to the structure. It shall not be a requirement that the structure be all-electric.

2 **Participation**: To participate in the Program, a member must: 1) request from the cooperative an analysis of cost effective upgrades, 2) agree to the terms of the cost effectiveness analysis fee as described in Section 2.2, and 3) review the Purchase Agreement that defines member benefits and obligations, and implement any project that does not require an upfront payment from the member as described in Section 3.3.

3 **Energy Efficiency Plans**: The cooperative will have its Program Operator or approved energy efficiency contractor perform a cost effectiveness analysis and prepare an Energy Efficiency Plan (Plan), identifying recommended upgrades to improve energy efficiency and lower power costs.

3.1 **Incentive Payment**: The cooperative may make an incentive payment for program participation that is less than or equal to the value of the upgrades to the cooperative.

3.2 **Net Savings**: Recommended upgrades shall be limited to those where the annual Program Service Charges (Service Charges), including program fees and the cooperative's cost for capital are no greater than 80% of the estimated annual benefit from reduction to members' annual utility charges based on current rates in electricity and/or gas costs.

3.3 **Copay Option**: In order to qualify a project for the Program that is not cost effective, Members may agree to pay the portion of a project's cost that prevents it from qualifying for the program as an upfront payment to the contractor. The cooperative will assume no responsibility for such upfront payments to the contractor.

3.4 **Cost Effectiveness Analysis Fee**: If the cost of the cost effectiveness analysis exceeds the value to the cooperative of upgrades accepted by members for installation, the cooperative will recover from participants the portion of the cost for the analysis that is greater than the value of the upgrades to the cooperative. The utility will not recover costs for the analysis if the Energy Efficiency Plan concludes that proposed upgrades are cost effective only with a copay. The cooperative will recover all of its costs for the analysis at a location from a member who declines to install upgrades identified in an Energy Efficiency Plan that does not require a copay.

3.5 **Existing Buildings**: Projects that address upgrades to existing buildings deemed unlikely to be habitable or to serve their intended purpose for duration of service charges will not be approved unless other funding can effect necessary repairs.

4 **Approved Contractor**: Should the member determine to proceed with implementing The Plan, the cooperative shall determine the appropriate monthly Program Charge as described below. The member shall sign the Agreement and select a contractor from the cooperative's list of approved contractors.

5 **Quality Assurance**: When the energy efficiency upgrades are completed, the contractor shall be paid by the cooperative, following on-site or telephone inspection and approval of the installation by the cooperative or its Program Operator.

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6 **Program Services Charge**: The cooperative will recover the costs for its investments including any fees as allowed in this tariff through monthly Service Charges assigned to the meter at the location where upgrades are installed and paid by members occupying that location until all cooperative costs have been recovered. Service Charges will also be set for a duration not to the exceed 80% of estimated life of the upgrades or the length of a full parts and labor warranty, whichever is less and in no case longer than twelve years. The Service Charges and duration of payments will be included in the Purchase Agreement.

6.1 **Cost Recovery**: No sooner than 45 days after approval by the cooperative or its Program Operator, the member shall be billed the monthly Program Charge as determined by the cooperative. The cooperative will bill and collect Service Charges until cost recovery is complete except in cases discussed in Section 7.

6.2 **Termination of Program Charge**: Once the cooperative's costs for Upgrades at a location have been recovered, the monthly Program Charge shall no longer be billed, except as described in Section 7.

6.3 **Extension of Program Charge**: As described in Section 6 or for any other reason, if the monthly Service Charge is reduced or suspended, once repairs have been successfully effected or service reconnected, the number of total monthly payments shall be extended until the Service Charges collected equal the cooperative's cost for installation as described in Section 5. The duration of Service Charges will also be extended if there are missed payments and the current occupant is still benefitting from the upgrades in order for the cooperative to recover its costs to install upgrades at a location.

6.4 **Tied to the Meter**: Until cost recovery for upgrades at a location is complete or the upgrades fail as described in Section 7, the terms of this tariff shall be binding on the metered structure and any future member who shall receive service at that location.

6.5 **Disconnection for Non-Payment**: Without regard to any other Commission or cooperative rules or policies, the Service Charges shall be considered as an essential part of the customer's bill for electric service, and the cooperative may disconnect the metered structure for non-payment of Service Charges under the same provisions as for any other electric service.

7 **Repairs**: Should, at any future time during the billing of Service Charges, the cooperative determine that the installed Upgrades are no longer functioning as intended and that the occupant, or building owner if different, did not damage or fail to maintain the upgrades in place, the cooperative shall reduce or suspend the Program Service Charges until such time as the cooperative and/or its contractor can repair the upgrade. If the upgrade cannot be repaired or replaced cost effectively, the cooperative will waive remaining charges.

If the cooperative determines the occupant, or building owner if different, did damage or fail to maintain the upgrades in place, it will seek to recover all costs associated with the installation, including any fees, incentives paid to lower project costs, and legal fees.

The Service Charges will continue until cost recovery is complete.

The model tariff here is based on a filing unanimously approved in Arkansas.

Transaction risk: The first is unique to PAYS, and all warrant attention

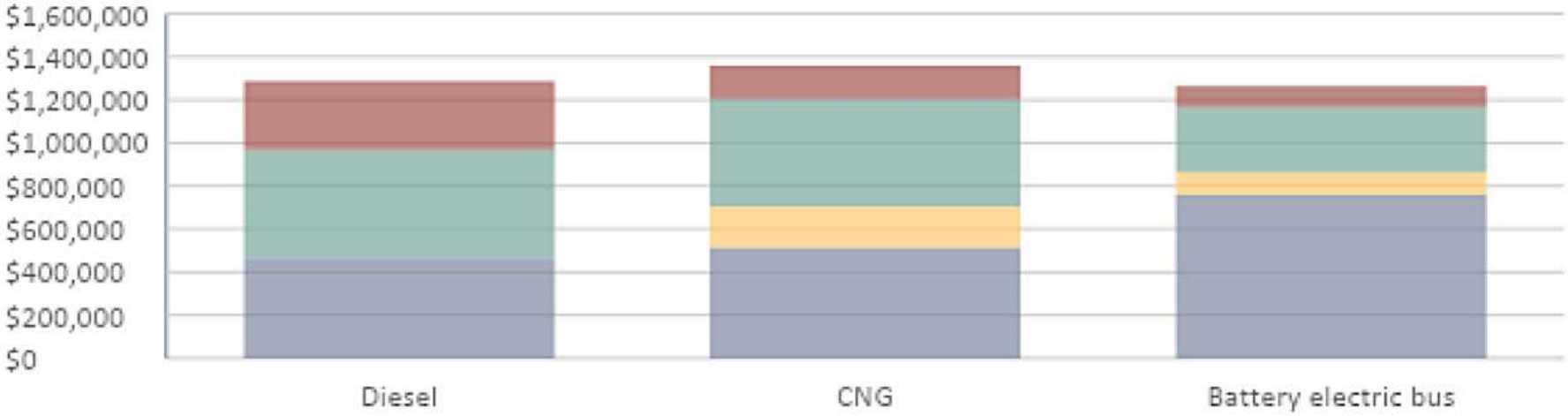
- **Utility insolvency**
  - If a utility struggles to capitalize *any* investment, even ones that *improve* its financial position, this may be an existential question for electrification as a transportation strategy in its service area.
- **Grid robustness**
  - If a utility cannot meet demand for additional supply, this infrastructure challenge pre-empts financing for the new loads.
- **Electricity prices**
  - The rate structure (e.g. demand charges and fixed charges) affects the choice of technology and operational regimes, which affects the value proposition.
- **Manufacturer warranty**
  - If the manufacturer is not willing or able to manage the technology risk of its product, other parties may refuse it as well, limiting the cost recovery period to the limits of technology risk assurance.
- **Uncertainty about maintenance savings**
  - Sensitivity analysis about these estimates is required due to lack of longevity of new models in the field.

Conditions suitable for PAYS

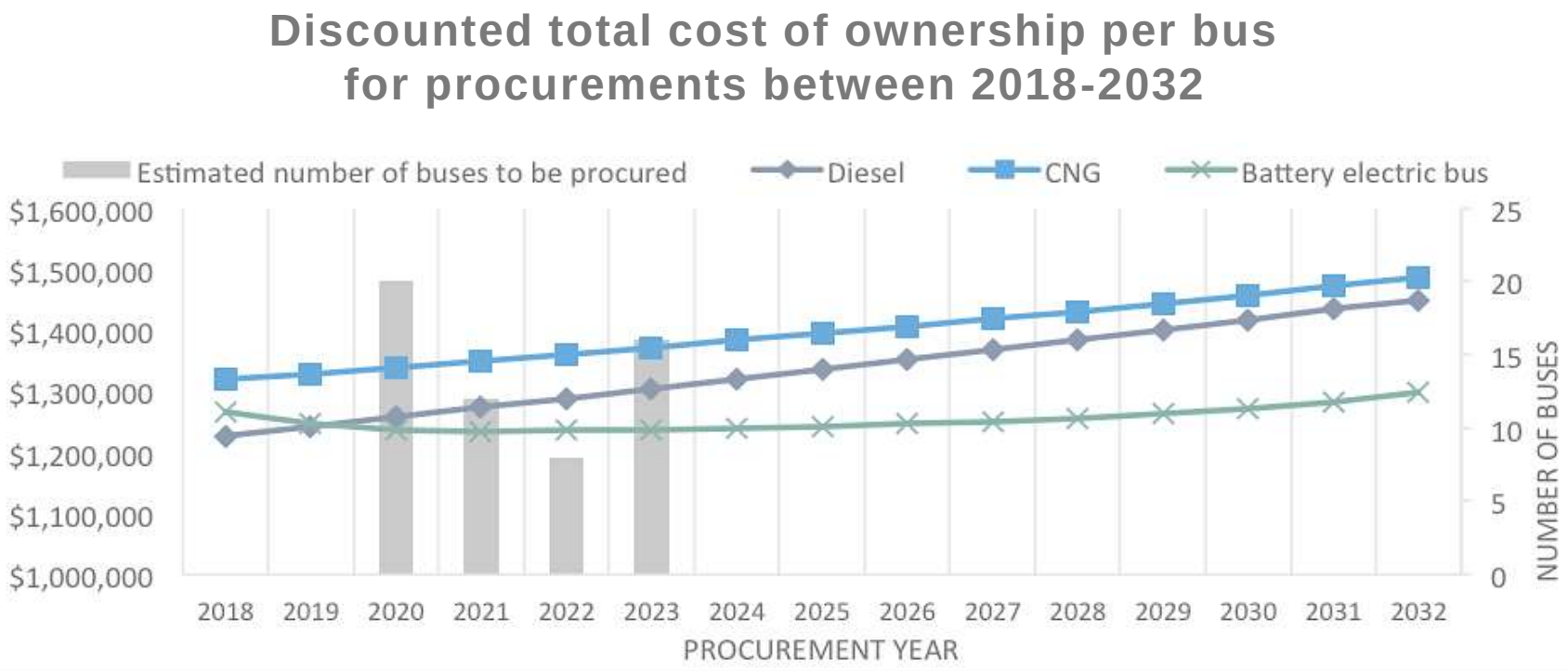
- **Utility is able to meet its capital obligations and can secure low cost capital,** and its leaders have a vision that includes electrification of the transportation sector as a strategy for strengthening its balance sheet.
  - Any utility type can work (e.g., investor owned, municipal, etc.)
  - Regulator must be willing to approve a PAYS tariff (one precedent)
- **Grid can meet demand for electricity from transit,** and utility is interested in resilience benefits with added flexibility.
- **Electricity prices are relatively low and stable**, and transit agency prefers depot overnight charging or managed off-peak charging.
- **Transit procurement requires warranties for new technology,** even if battery and charging station have a warranty period different than the bus.

Example: Lake City Transit
Total Cost of Ownership

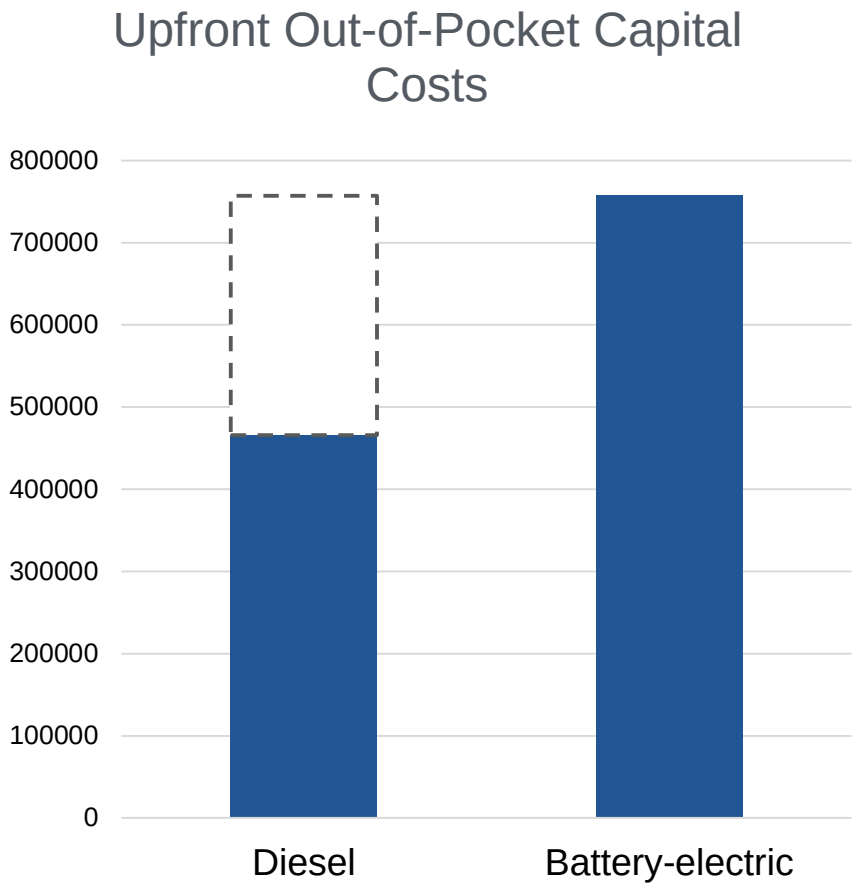
Total cost of ownership by cost category and bus fuel type in 2019 (NPV)

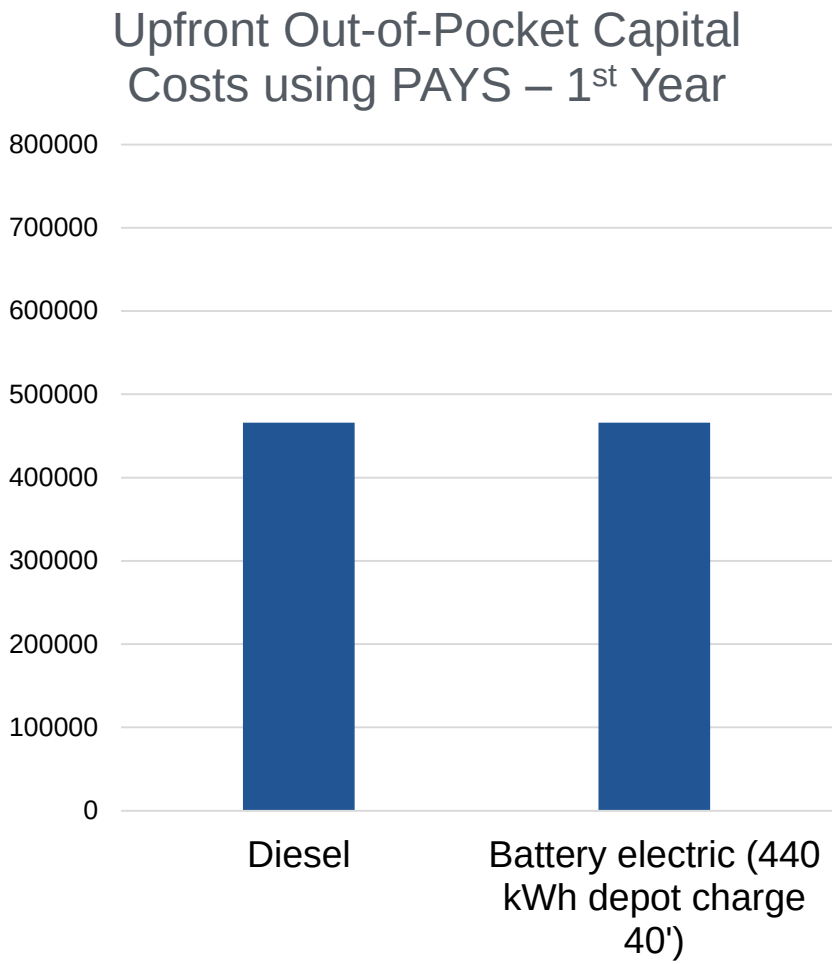


Financial analysis informed a fleet transformation decision: Battery electric bus would be best.



Utilities can capitalize the incremental upfront cost for battery electric buses using PAYS





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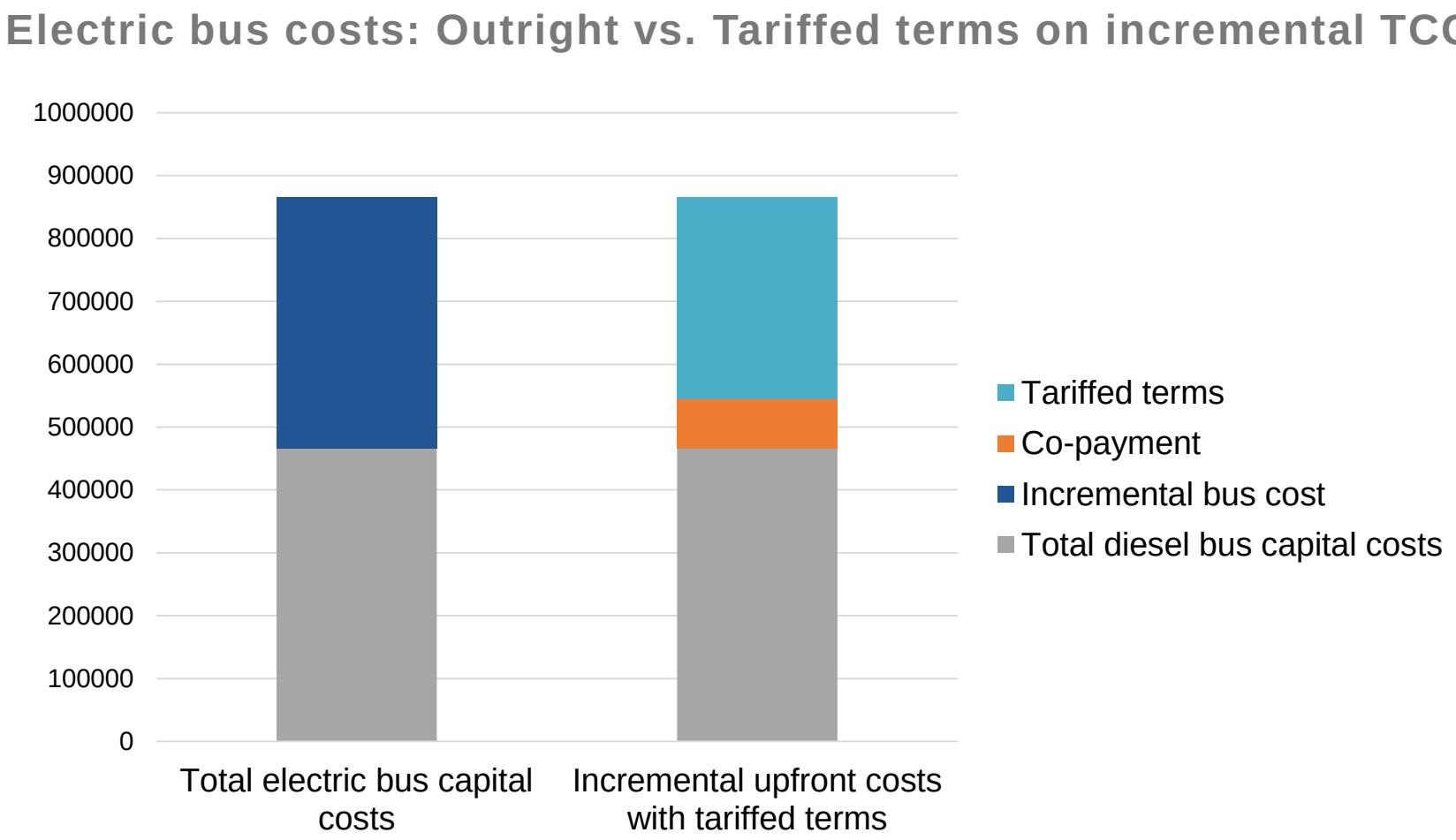
Utilities can capitalize the incremental upfront cost for battery electric buses using PAYS



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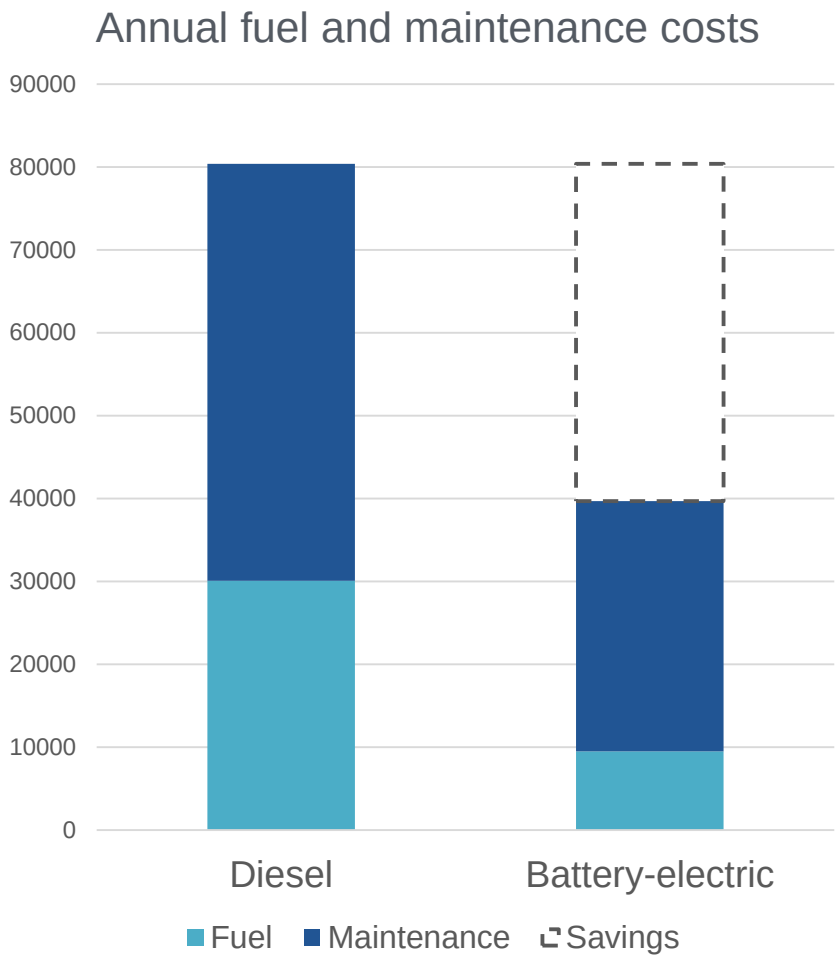
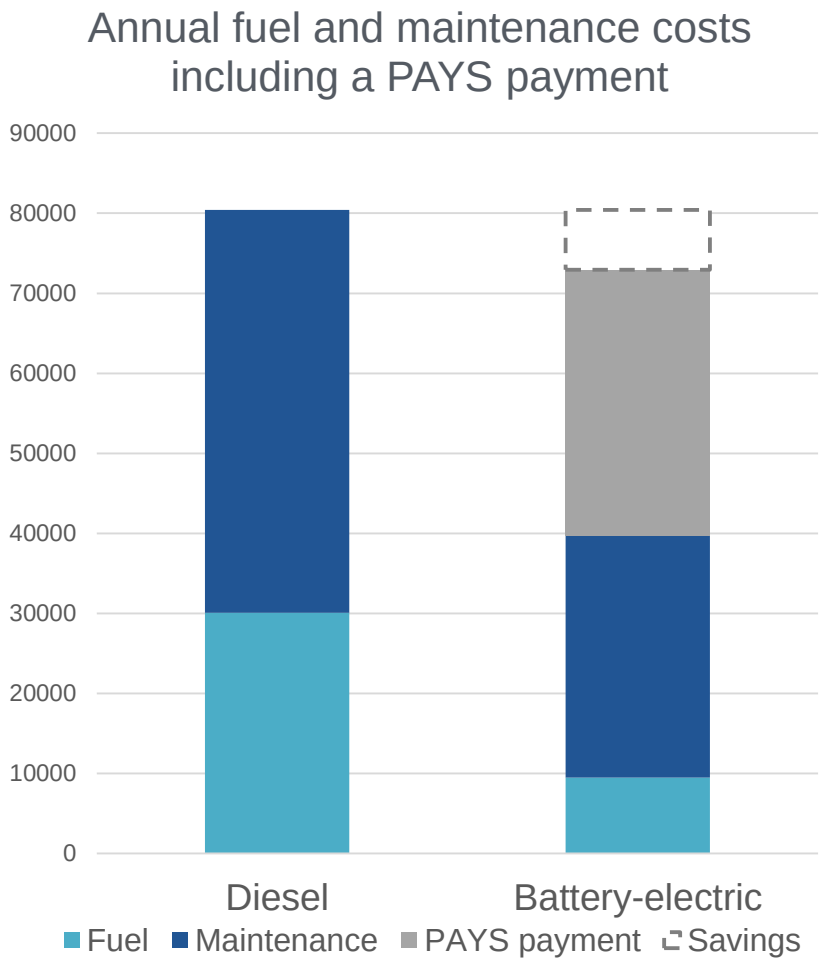
The utility's cost recovery is less than the estimated savings for switching to electricity





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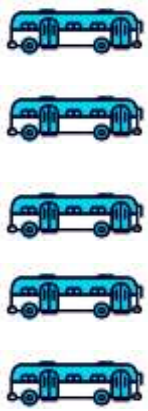
With a utility offering PAYS terms, Lake City Transit can leverage 5x more capital with grant funds in 2019

For a $400,000 US grant in **2019**, Lake City Transit could buy **1 battery-electric bus**, or…

Lake City Transit could **cover the copayments for 5 electric buses** with PAYS.



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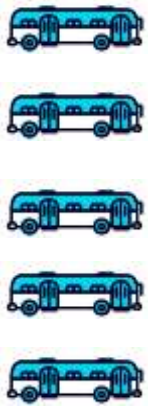
With a utility offering PAYS terms, Lake City Transit can leverage 5x more capital with grant funds in 2019

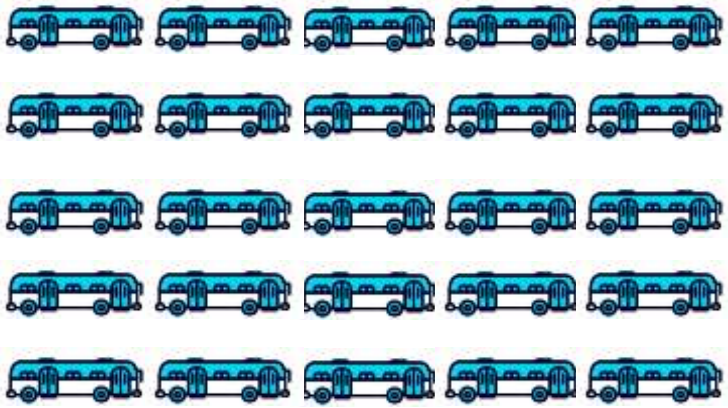
For a $400,000 US grant in **2019**, Lake City Transit could buy **1 battery-electric bus**, or…

For a $1 million US grant in **2020**, Lake city Transit could buy **3 battery-electric buses**, or…

Lake City Transit could **cover the copayments for 5 electric buses** with PAYS.



Lake City Transit could **cover the copayments for 20 electric buses** with PAYS.



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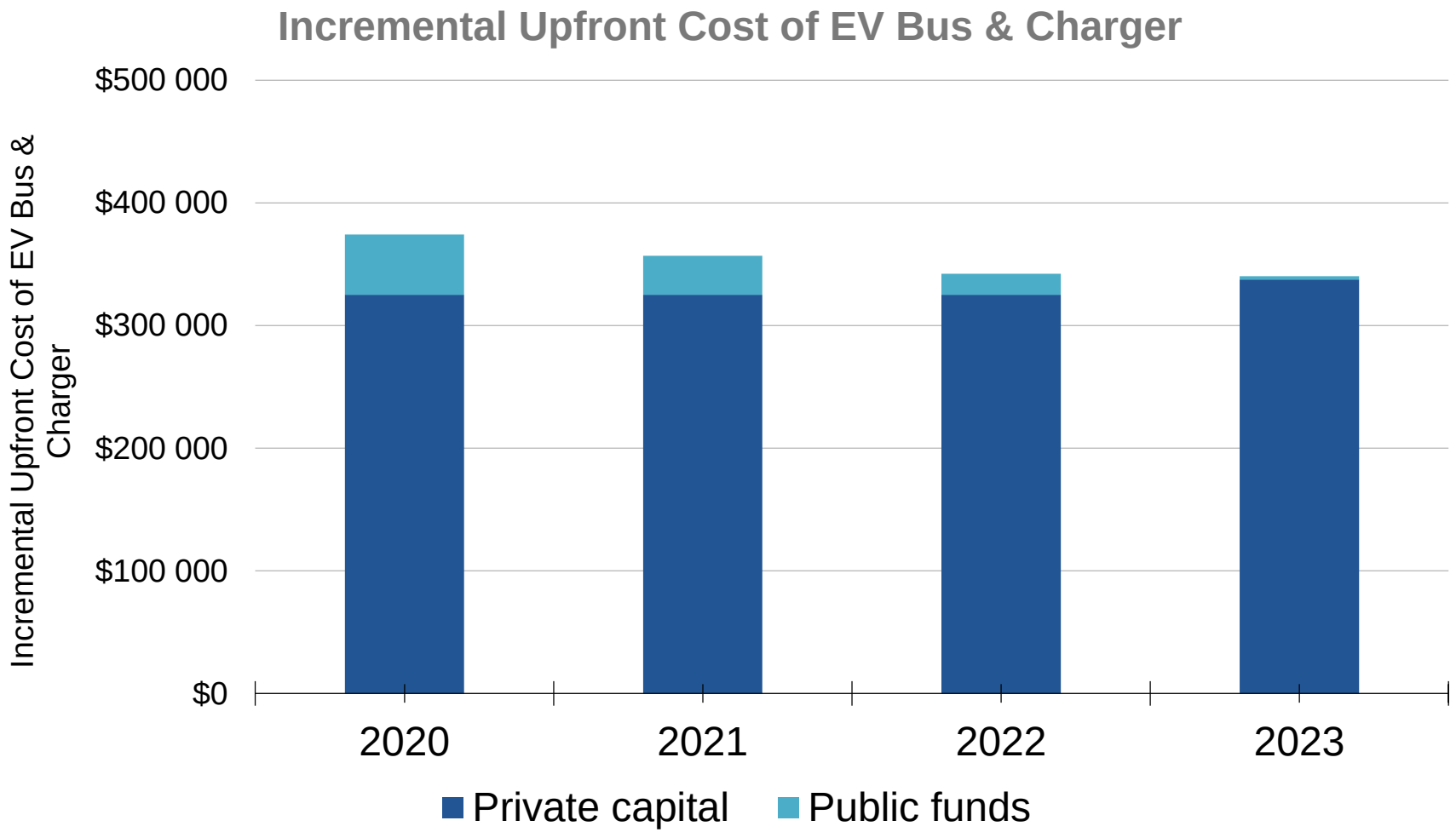
With a utility offering PAYS, Lake City Transit can leverage 100x more capital with grant funds in 2023

The need for copayment from concessionary or grant funding reduces significantly, speeding procurements and reducing emissions, pollution, and stranded assets.

Use of grant funds for full incremental upfront cost of a single bus & charger compared to copayments in a tariffed on-bill program

	Procurement years				
	2019	2020	2021	2022	2023
Full incremental upfront cost	$399,000	$375,000	$361,000	$350,000	$339,000
Incremental upfront cost that meets PAYS threshold for cost effectiveness	$321,000	$325,700	$329,100	$332,800	$336,400
Copayment needed	$78,000	$49,300	$31,900	$17,200	$2,600
Ratio of Copayment to full incremental upfront cost	5:1	8:1	11:1	20:1	132:1

Increase in cost effectiveness reduces need for public funds over time – *fast*



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Building on field experience with buildings and appliances, we can expand to clean transport, starting with clean transit

- PAYS aligns with interests to mobilize more capital:
  - **Utility:** More sales, stronger balance sheet
  - **Capital providers:** Sound transaction, deploying capital at scale
  - **Transit:** More clean buses without weighing balance sheet
  - **Manufacturers:** More sales, sooner
  - **Health officials:** Opening gateway to additional vehicle types
  - **City leaders:** meeting policy goals faster with less public spending
  - **Public interest groups:** Better service, better health, lower cost

Winner of 3 international competitions seeking breakthrough climate action innovations

The Lab

Driving Sustainable Investment

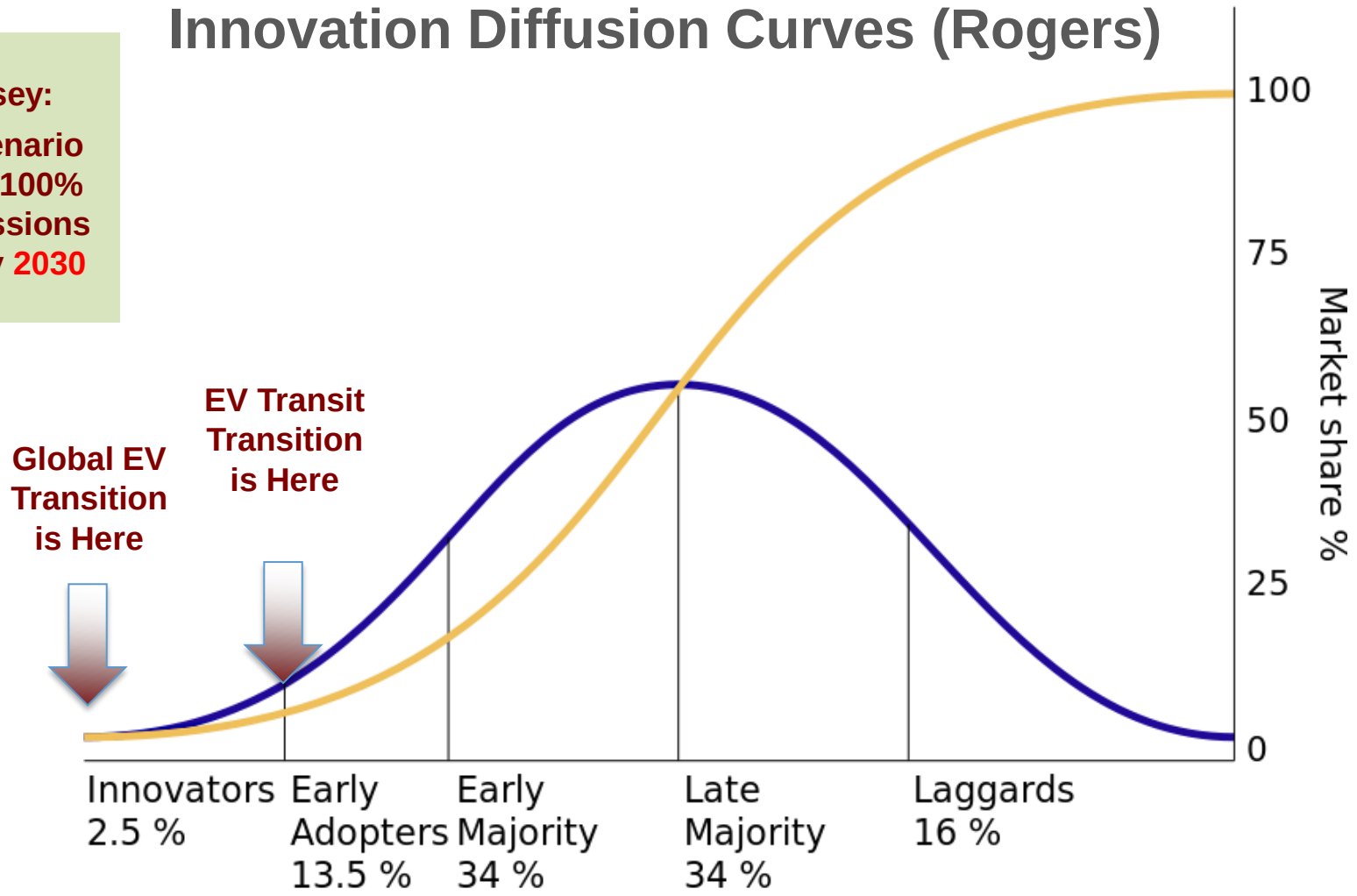
FIre AWARDS

Climate Strategies Accelerator

Speed, Scale, and Avoiding Stranded Assets

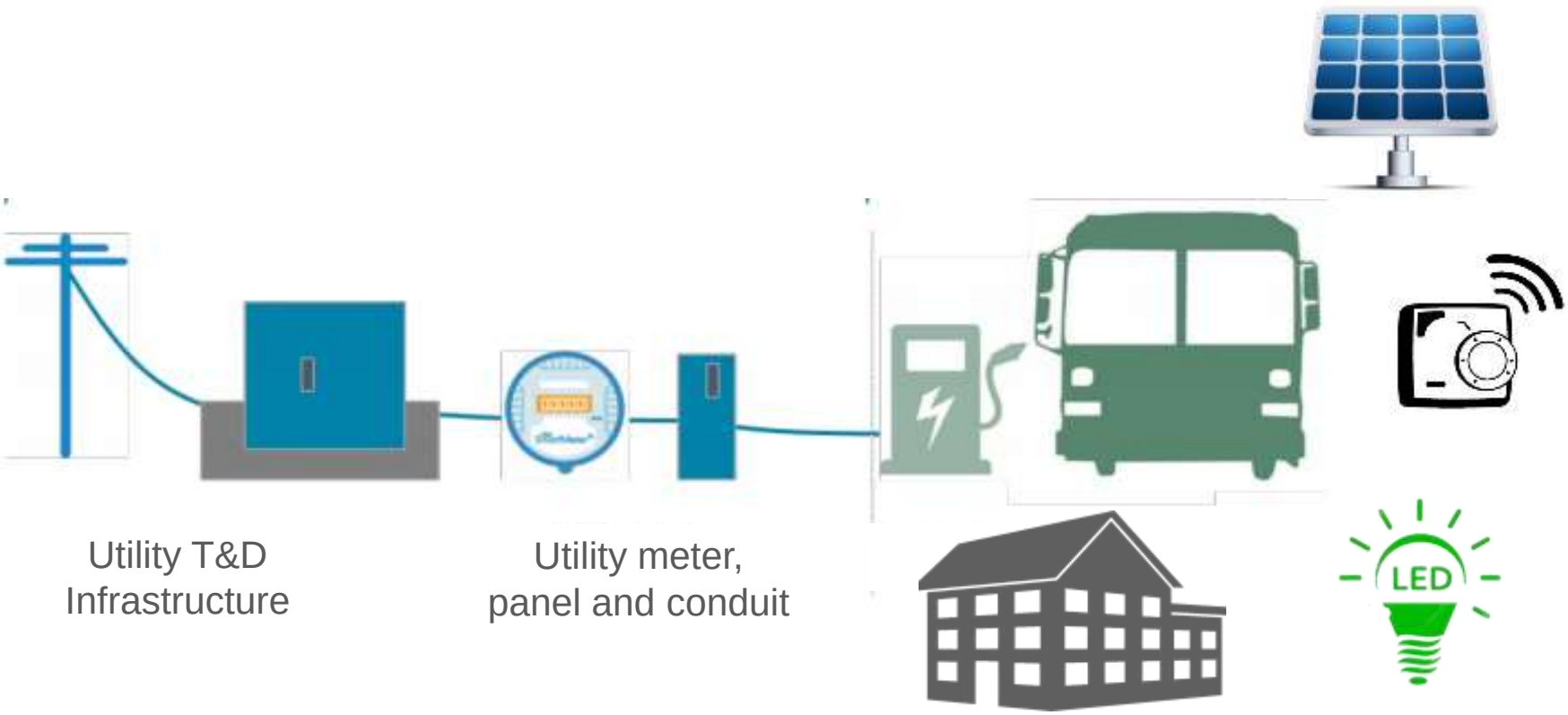
McKinsey:

Paris scenario requires 100% zero-emissions transit by 2030



Sources: IEA, Global EV Outlook, 2017; BNEF, Electric Buses in Cities, 2018; McKinsey, Focused Acceleration, 2018.

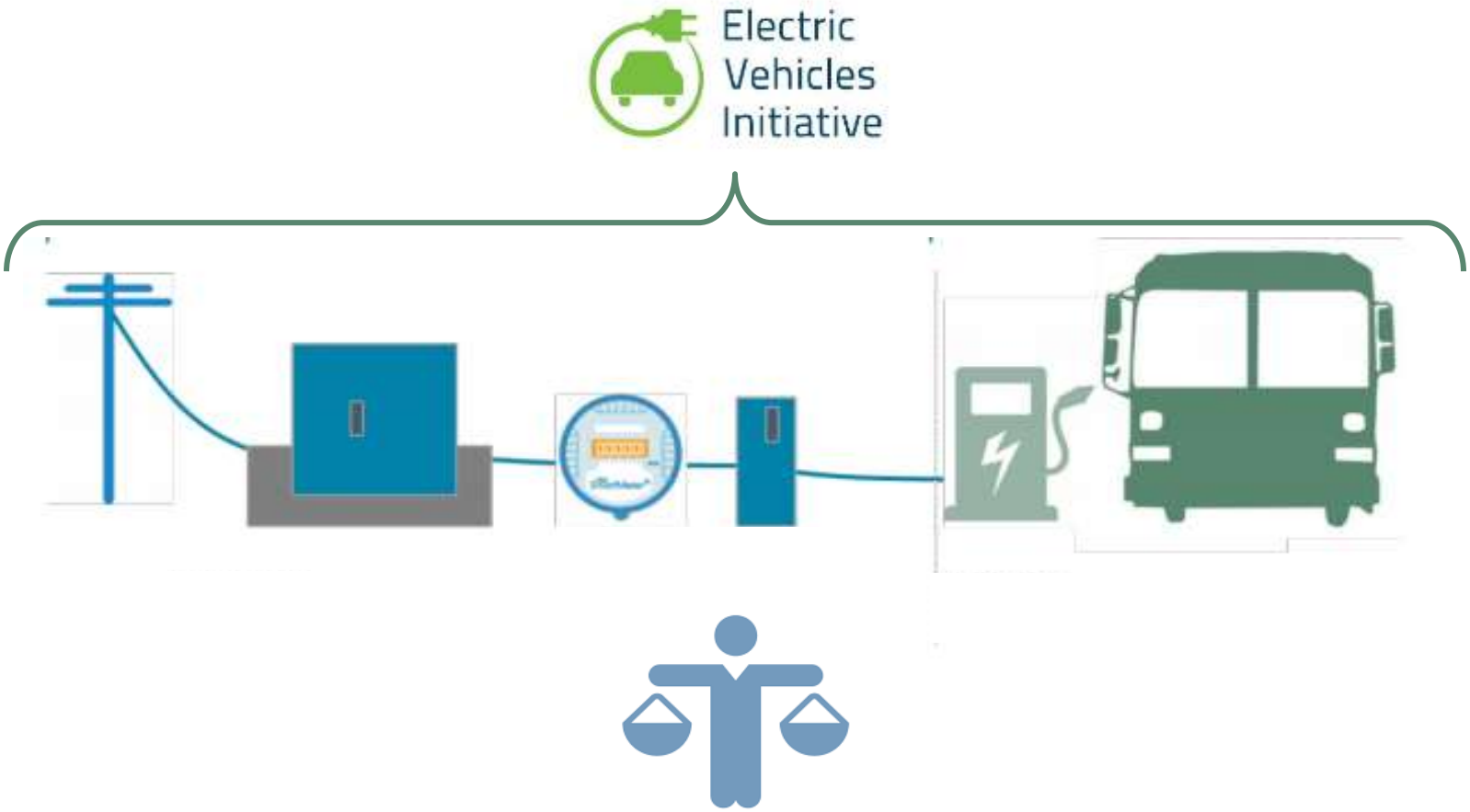
What if clean transit were a gateway for utilities to accelerate investment in additional distributed energy solutions?



Utility T&D Infrastructure

Utility meter, panel and conduit

What could happen if transit agencies convened with their future fuel providers – and their regulators?



Source: NASA Lights at Night

Clean Energy WORKS

Thank you

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