WORLD RESOURCES INSTITUTE

ELECTRIC SCHOOL BUS (ESB) UTILITY WORKING GROUP

UWG MEETING | MAY 26 2022

MEETING GOALS

- Launch a collaborative working group aimed at influencing, supporting and driving the equitable transition to ESBs
- Learn about various ESB-related activities, issues and ideas particularly as they pertain to electric utility interactions, requirements and programs.
- Collectively identify key ESB topics to explore in subsequent meetings and the related resources and support required

WE KINDLY ASK…

- Please rename your ZOOM title with your name and organization
- Please mute yourself during presentations and when not talking
- Please put your questions in the chat box
- Please participate in the surveys to help inform the topics and provide feedback on the value of the materials being presented
- Please be respectful of the meeting participants and the space allowed for input
- The meeting will be recorded and made available to all participants

AGENDA

1:00 – 1:05	**Welcome (Goals, Requests and Agenda)**
1:05 – 1:10	**Initiative Recap and Team**
1:10 –1:25	**Important News and Updates**
1:25 – 2:05	**Topic 1 – ESB Business Models (Presentation, Questions, Survey)**
2:05 – 2:45	**Topic 2 – Power Planner, Advice for School District and Electric Utility Engagement (Presentation, Questions, Survey)**
2:45 – 2:55	**Future Topic Survey**
2:55 – 3:00	**Wrap-Up**

WHY ELECTRIFY THE U.S. SCHOOL BUS FLEET?

Electrification can accelerate decarbonization while bringing direct, tangible benefits to every community

- **Improved health** and cognitive outcomes for children
- **Cleaner air**, especially in high-pollution corridors and communities of color
- **Reduced operating expenses** for school districts
- **New jobs** in green manufacturing
- A **tipping point** for MHD + electrification
- Enhanced **resiliency** and **renewables integration** with V2G

OUR VISION INVOLVES MULTIPLE STAKEHOLDERS

Goal: **An Equitable Transition to Electric School Buses**

School Districts

Pillar 1

Manufacturers

Pillar 2

Utilities

Pillar 3

Federal & State Policymakers

Pillar 4

Local Communities

Pillar 5

Foundation: **Equity, Communications, Engagement**

Utilities

Pillar 3

UTILITY ENGAGEMENT AND FINANCING SOLUTIONS TEAM

Sue Gander
Director, Electric School Bus Initiative

Lori Bird
Director, US Energy Program

Gregg Kresge
Senior Manager, Utility Engagement & Transportation Electrification

Michelle Levinson
Manager, eMobility Financial Solutions

Haley Minter
Grants & Finance Specialist

Alyssa Curran
Research & Administrative Assistant

Caitlin Macomber
Research Analyst, Environmental Justice & Equity

Hamilton Steimer
Research Analyst

EQUITY UPDATE

- The Equity Framework guides overall project decision-making to ensure justice and fairness are driving project outcomes
- Team capacity-building activities provide tools to deliver on the framework
- Our partnership guide fosters and cultivates inclusive stakeholder relationships
- Equity Points of Contact work with each Pillar to achieve equity goals and craft strategies

- Continued learning and implementation from initial Equity Focus Group
- Equity Collaboration with Smart Electric Power Alliance (SEPA) and key utilities on proactive fleet electrification in disadvantaged and underserved communities
- Exploring community-owned solar models & application to ESBs; meetings with local organizations that have created best practice examples
- Upcoming resiliency/disaster response V2X whitepaper
- Upcoming business model comparison & trade offs

IMPORTANT NEWS – EPA CLEAN SCHOOL BUS PROGRAM

[Clean School Bus Program Funding | US EPA]

- $5 billion over 5 years ($2.5 for ESBs, $2.5 for clean fuels but can also include ESBs)
- Released May 20, 2022 and open for applications until August 19, 2022
- Before anything else, apply System for Award Management number to receive funding at SAM.gov SAM.gov | Home
- All public-school districts in the U.S. are eligible to apply for funding through the Clean School Bus Program! That includes school districts in all 50 states, Washington, D.C., Puerto Rico, Guam, American Samoa, the Northern Mariana Islands and the U.S. Virgin Islands. Public charter schools with an NCES District ID are eligible as well.

More resources at WRI's website:
Apply for EPA Funds for Electric School Buses in Your District | World Resources Institute (wri.org)
Sign-up for EPA's weekly webinar where you can get answers to your questions.

PRESENTATION 1 – ESB OPPORTUNITIES FOR UTILITIES

About your presenter:

- Margarita Parra is the Transportation Program Director at Clean Energy Works and leads the portfolio in Latin America and in the United States. Margarita is an engineer with a master's in environmental engineering and a postgraduate diploma in sustainable development. She has worked with various non-profits for over two decades in policies and programs to reduce local air pollution and global carbon emissions from transport. Prior to joining Clean Energy Works, she managed the low carbon transport portfolio of the Hewlett Foundation's Global Climate Initiative. In 2020, Margarita was highlighted as one of 50 global changemakers in the Remarkable Women in Transport, a publication from the Transformative Urban Mobility Initiative (TUMI).

- Clean Energy Works is part of the Alliance for Electric School Buses, and since 2021, Clean Energy Works has been working with the WRI's Electric School Bus Initiative. Specifically, Margarita is supporting the research on new business models and the participation of utilities to leverage funding and scale up ESB deployment.

CLEAN ENERGY WORKS

Electric School Bus Opportunities for Utilities

Margarita Parra
Transportation Program Director

WRI – Utilities Working Group meeting - May 2022

Agenda

1. Introduction to Clean Energy Works

2. Electric School Buses
    a. New opportunity
    b. Costs for the transition
    c. Funding and Finance
    d. Business Models
    e. Inclusive Utilities Investments

3. Dialogue

CLEANENERGYWORKS

Clean Energy Works accelerates inclusive investments that open the clean energy economy to all.

Our Work

Outreach & Engagement

Policy & Regulatory Support

Research

Advising & Coaching

Our Transportation Partners

ALLIANCE FOR ELECTRIC SCHOOL BUSES

Electric School Bus INITIATIVE

ZEBRA
ZERO EMISSION BUS RAPID-DEPLOYMENT ACCELERATOR

P4G Partnering for Green Growth and the Global Goals 2030

icct THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

C40 CITIES

Funding Agency

Implementing Partners

Centro Mario Molina Investigación & desarrollo

WORLD RESOURCES INSTITUTE

GGGI

CLEAN ENERGY WORKS

Electric School Buses

The Opportunity: Big increase in investments

- 480,000 school buses nationwide
- Clean School Bus Program: $2.5b + investment by federal government to be leveraged
- Utilities have shown interest, multiple pilots and procurement
    - Both IOUs and RECs have engaged
    - $2.8b Investments available or pending for electric school buses and other fleets (Atlas Public Policy, March 2022)
- Potential Vehicle to Grid/Vehicle to Building Integration value streams
    - 60 GWh estimated as potential for storage capacity (U.S. PIRG report, April 2022)

Photo: Roanoke Energy Solutions Expo, Oct 2021

The DoE is supporting a collaboration to learn about the benefits of V2X

Rima Kasia Oueid · 1st
Commercialization Executive/Senior Energy Finance & Policy Advisor
3d · Edited ·

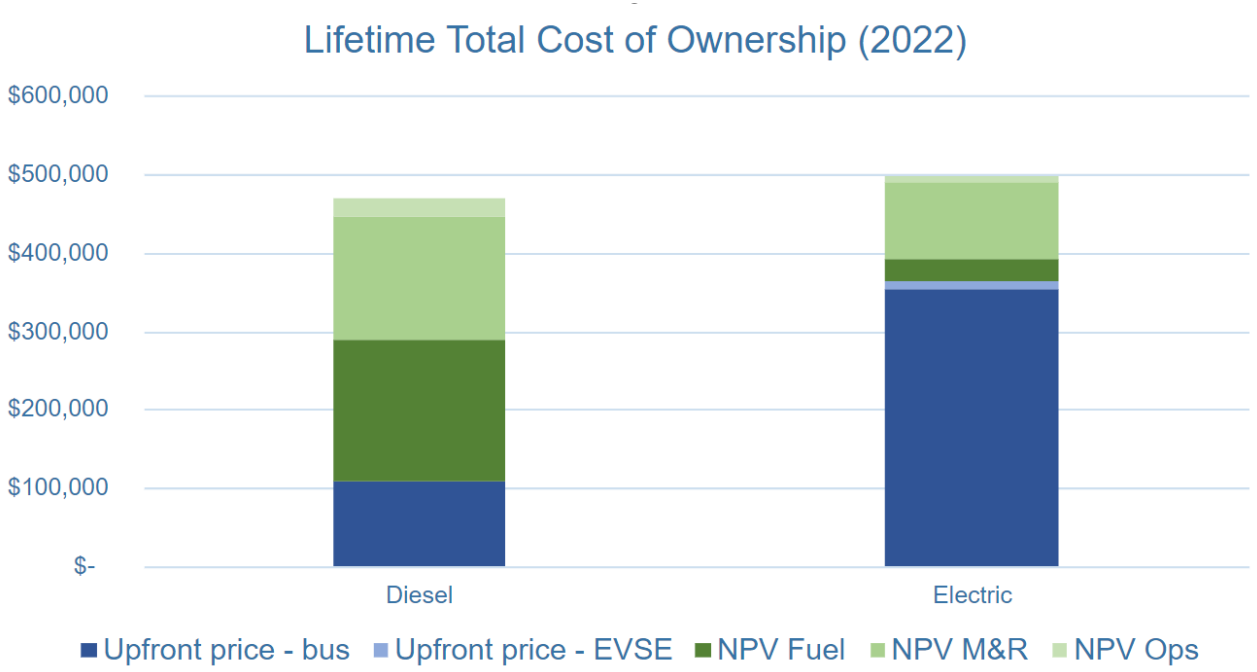
The bidirectional electric vehicle revolution has officially begun!

It was an honor to lead the development of U.S. Department of Energy (DOE) Vehicle-to-Everything MOU which builds partnerships and brings together cutting-edge resources from DOE, national labs, state and local governments, OEMs, EVSEs, and utilities to accelerate and integrate bidirectional charging into energy infrastructure. Thank you to all the signatories and our partners for the courage to accelerate adoption of EVs in a thoughtful way!

This is truly a coalition of the willing and we look forward to creating more partnerships!

Source: Department of Energy

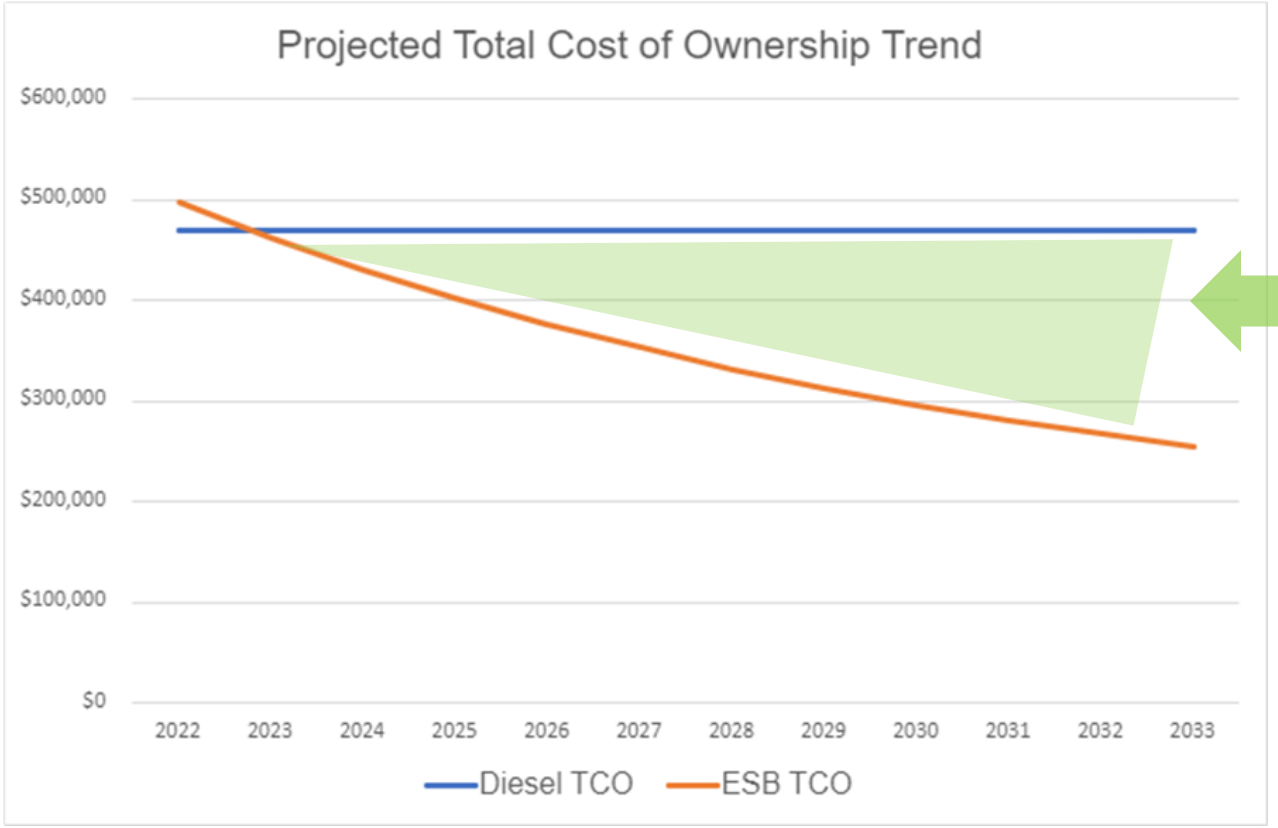
Costs for Electric School Buses



- Total cost of ownership (TCO) is almost the same with current values (diesel cost of today)
- Upfront cost differential between electric and diesel can be 3.5 X
- Technology costs will continue to decrease
- And, operational, maintenance and fuel savings for electric are significant!

Source: WRI internal analysis

Projected costs: Parity is closer than we think



Overall Savings

Source: WRI internal analysis

How do schools cover the costs: Funding and Finance

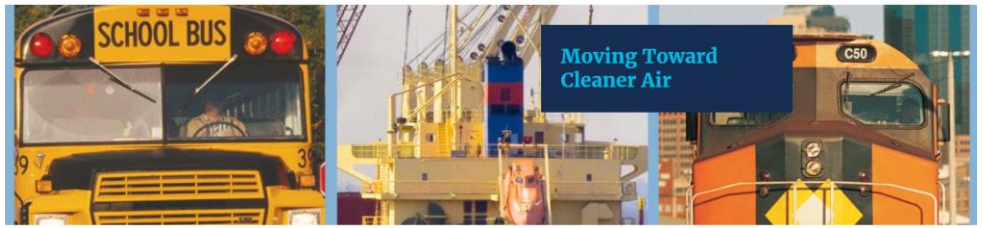
Public Funding

- Fleets transitioning today utilize public funding to improve purchase economics of ESBs
- Public funding in form of rebates and grants
- Funding can phase out as prices in the market decline

Financing

- It is used to complement public funds
- Financing can be expected to endure at least until purchase price parity
- Fleets beginning their electrification journeys now can benefit from capturing future savings in today's plans

Diesel Emissions Reduction Act (DERA) Funding



Trends in Business Models

- School buses business models have been static
  - ⅓ contract
  - ⅔ district ownership (including leasing)
- Slow trend towards business models with new private actors

Electrification opens New Business Models

New Business Models for Electric School Buses

	Actors for different business models		Actors for electrification			
Roles / Business Models	Bus owner & maintenance	Bus operation	Charger owner (& Maintenance)	Energy manager (software)	Electricity provider	Example
Traditional	SD	SD	SD	SD	Customer: SD	Old model
Fleet/energy manager	SD	SD	SD	**3rd party**	Customer: SD	elQ Mobility, Olivine, ESCos
Lease	**3rd party**	SD	SD	**3rd party**	Customer: SD	OEM lessor/dealer + partner
Charging-as-a-Service	SD	SD	**3rd party**	**3rd party**	Customer: SD	Mobility House, Amply, Electric Utilities, ESCos
Turnkey asset management	**3rd party**	SD	**3rd party**	**3rd party**	Customer: 3rd party	Highland, Levo, Dominion Energy
Transportation-as-a-Service	**3rd party**	**3rd party**	**3rd party**	**3rd party**	Customer: 3rd party	Zum, NYCSBUS, First Student

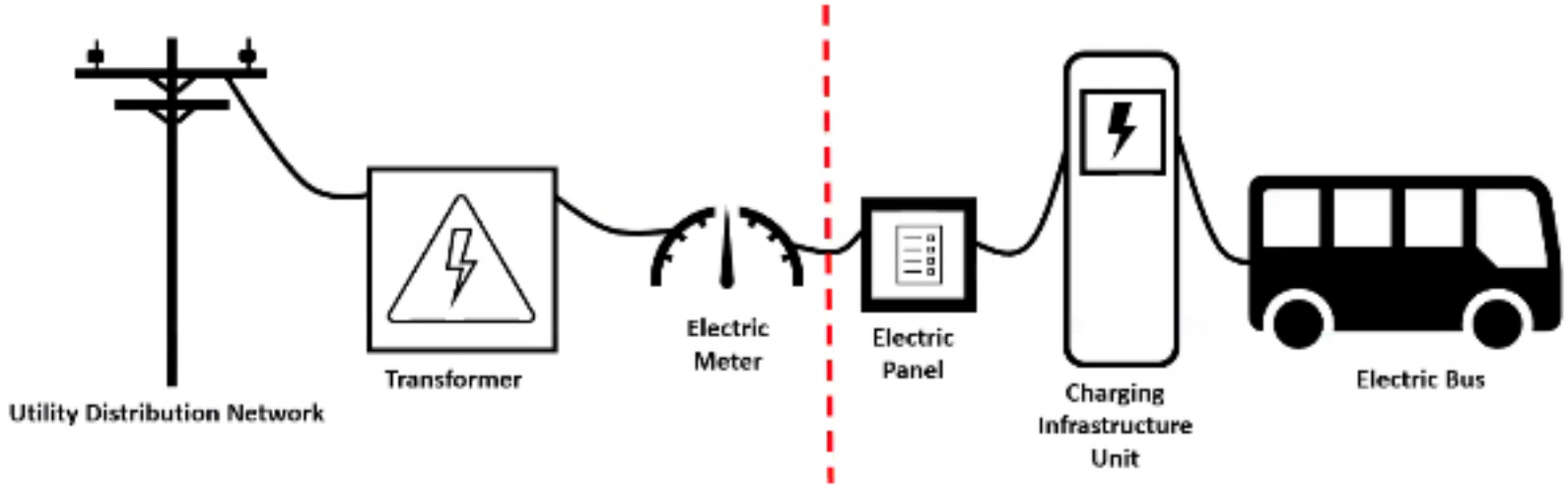
Factors Determining New Business Models

- Factors
  - Technological factors (batteries, infrastructure, maintenance)
  - Operational factors (workforce training, maintenance)
  - Financial factors (balance sheet, cost of capital)
  - Macro-economic factors (economic recessions, inflation)

- Who could be better at managing these factors?

- Who could best take advantage of the opportunity and provide the service needed?
  - New value streams from grid services
  - Grid optimization
  - High energy assurance at community emergency response centers

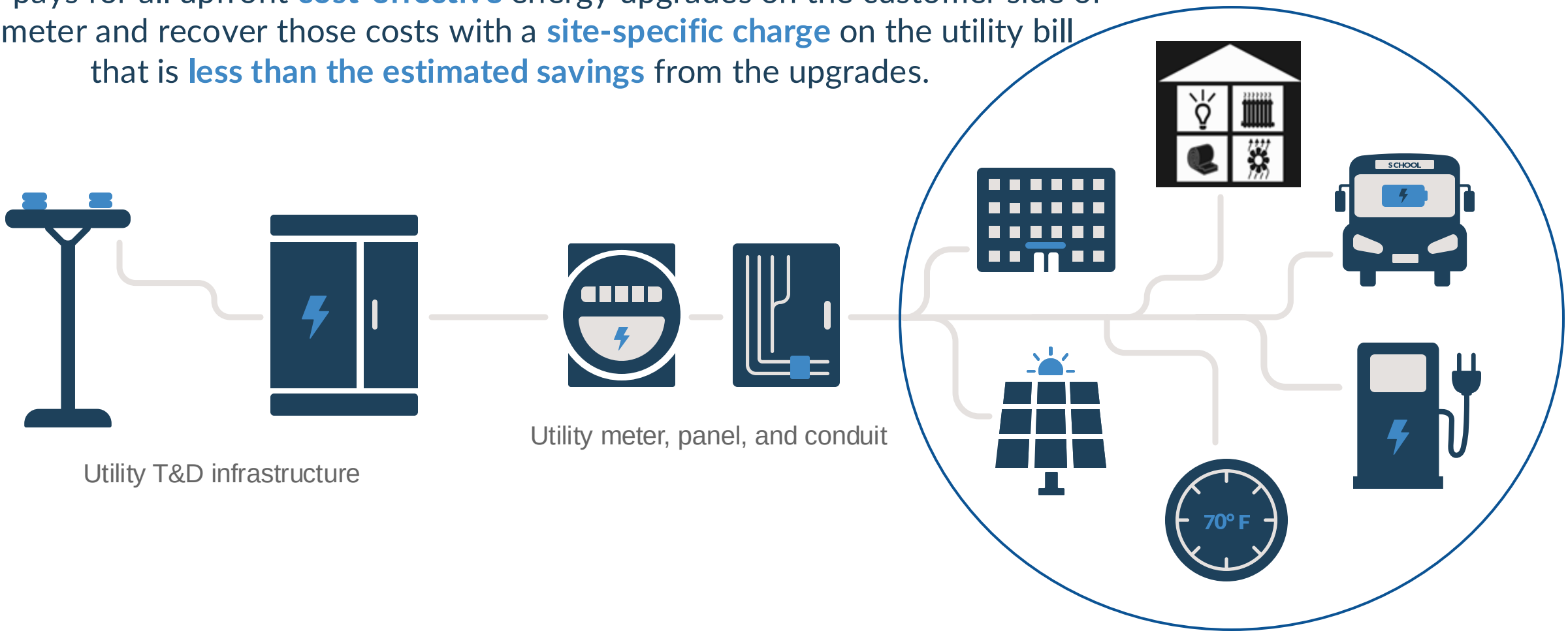
New Role for Utilities: Investments on the customer side of the meter!



Source: Diagram from the U.S. Environmental Protection Agency Clean School Bus Program

Inclusive Utility Investments

Utility pays for all upfront **cost-effective** energy upgrades on the customer side of the meter and recover those costs with a **site-specific charge** on the utility bill that is **less than the estimated savings** from the upgrades.



Utility T&D infrastructure

Utility meter, panel, and conduit

This model has been tested in the building sector

$50M Invested
as of 2021

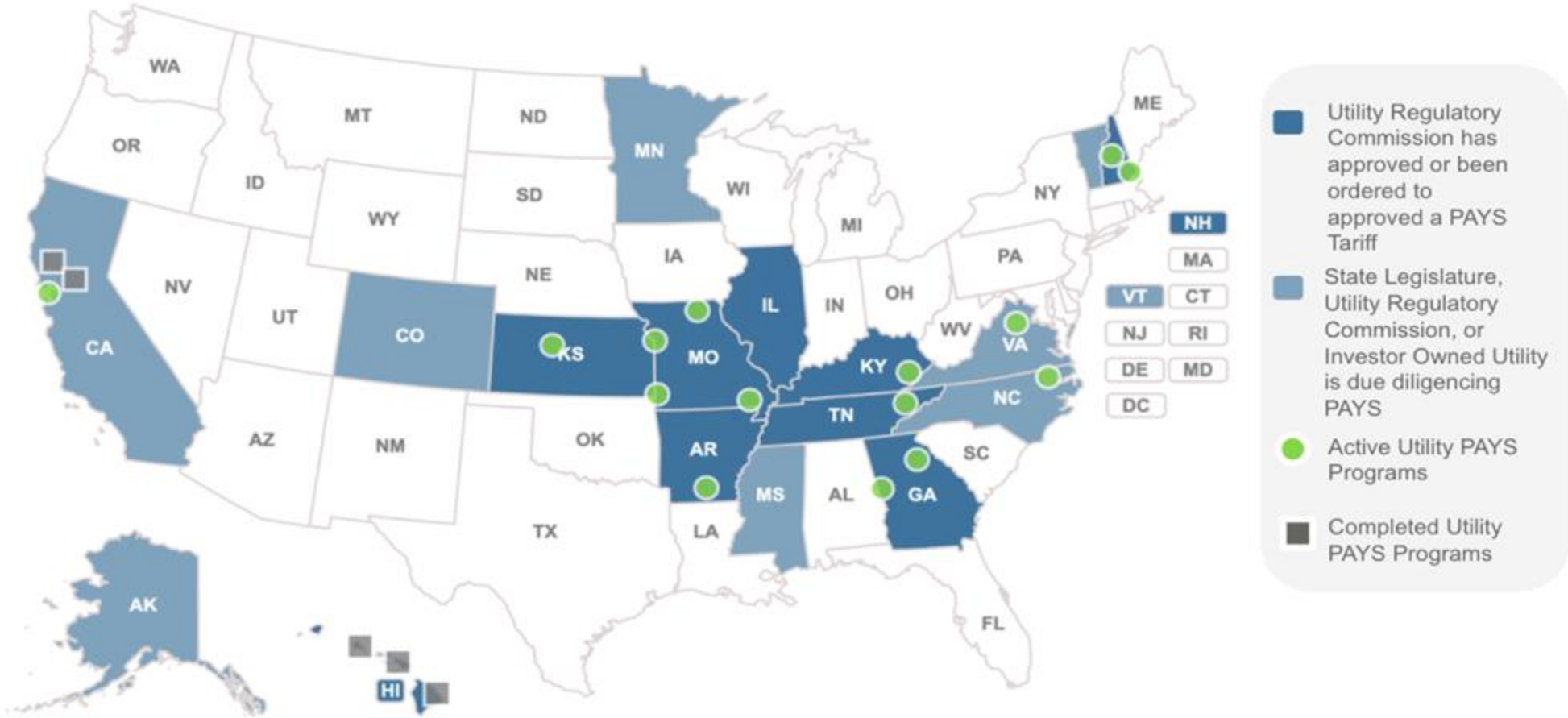
25 Utilities

11 States

4,500
Single family

590
Multi-family

$170M Committed
through 2023



Source: Energy Efficiency Institute and LibertyHomes

DTE: First proposed pilot of an inclusive investment for transit

- Charging Expansion proposal for $17M to reduce barriers for EV adoption, efficiently integrate EV load to the grid, allow equitable access to EVs, pilot new technologies, and support Michigan state policies.
- In proceeding with Michigan Public Service Commission – decision to be expected in November.
- Transit Batteries is a pilot that will allow for the utility to invest in the battery and charger of an electric transit bus to reducing the high upfront cost barrier for transit agencies.
- Transit agencies can use complementary public funding or incentives to cover the rest of the cost of the electric transit bus.
- The utility will recover its cost via a tariffed service charge that is less than the savings from switching to electric.

Key points to remember

- Electric school buses are a reality, get ready to contact schools in your service area!
- The EPA Clean School Bus Program funding will catalyze the market and raise the interest across the whole country (including the territories)
- Business models are evolving, and utilities have relevant opportunities in both sides of the meter
- Inclusive utility investments are an alternative payment mechanism that achieves higher scale with fiscal sustainability
- Contact us to explore how this model can benefit your utility!

Thank You

www.cleanenergyworks.org

Margarita.Parra@CleanEnergyWorks.org

QUESTIONS-TOPIC 1

- This is where we answer your questions
- Chat questions will be answered first
- An opportunity to raise your hand will be given after the chat questions are addressed
- All questions will be answered even if they cannot be addressed during the meeting

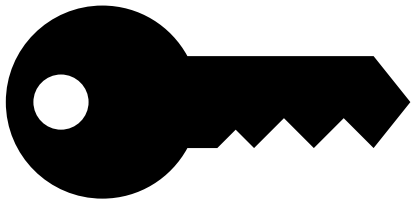
SURVEY-TOPIC 1

Go to **www.menti.com** and use the code **5912 9291**

PRESENTATION 2 – PROACTIVE UTILITY ENGAGEMENT FOR ELECTRIC SCHOOL BUS DEPLOYMENT

Power Planner for Electric School Bus Deployment

PRESENTATION 2 – PROACTIVE UTILITY ENGAGEMENT FOR ELECTRIC SCHOOL BUS DEPLOYMENT



Coordinated communication with schools and their electric utility is the KEY to success!

NINE KEY STEPS FOR SCHOOL DISTRICTS

1. Assess your fleet
2. Determine your intended pace of bus electrification and charging locations
3. Identify your project priorities
4. Identify key contacts at your electric utility
5. Communicate with your electric utility early and often
6. Understand your electric utility rates
7. Understand the construction and installation requirements.
8. Determine charging and power requirements
9. Consider V2X and disaster response/ resiliency opportunities

WHY IT MATTERS...

1. Assess your fleet

   Assessing your existing fleet and the purpose of each vehicle helps you understand what is needed from your future electric school bus fleet.

2. Determine your intended pace of bus electrification and charging locations

   Construction, equipment and operation costs vary based on the number of buses you're converting to electric. Planning for the next five years will help you determine what's needed now and what you may consider down the road. While there are clear financial advantages to planning early for future expansion, these investment decisions must be made on a case-by-case basis.

3. Identify your project priorities

   You may be able to gain more support for ESB adoption and fleet conversion if you are able to align your goals with the priorities of your state, municipality or school district. It is also important to engage community members in your effort to help shape project priorities and to provide feedback and support throughout the deployment process.

WHY IT MATTERS...

4. Identify key contacts at your electric utility

   Your main point of contact will help you navigate the full process. While many electric utility employees may review or be involved in an aspect of your project, you will need a central contact to go to for information and project updates.

5. Communicate with your electric utility early and often

   Early communication saves time and money. Engaging with your electric utility early in the process and including a knowledgeable electrical technician or contractor helps you get answers to your questions and properly assess your site electrical requirements. And remember, you are not alone in this: WRI and others may be able to provide free technical assistance, tools and resources to help you navigate the electrical connection process.

6. Understand your electric utility rates

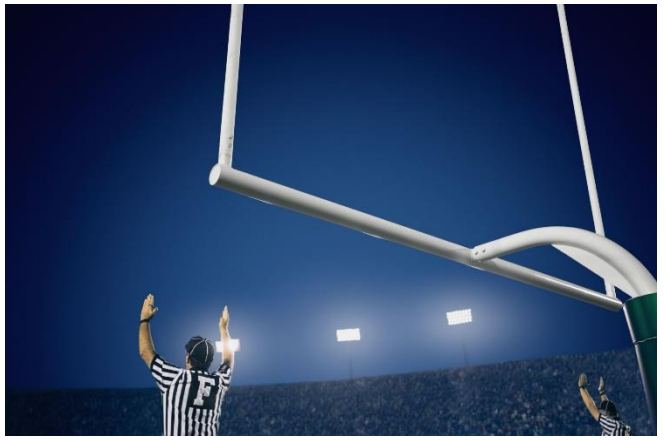
   It is important to know how electrifying your fleet is going to affect your electric bill. In addition, there may be rates that are more favorable to electric vehicles that can reduce your costs for electricity.

WHY IT MATTERS…

7. Understand the construction and installation requirements.
   Knowing your charging infrastructure construction and installation requirements up front will save you time and money. Often, these installations require permits and inspections before they can be approved for use.
8. Determine charging and power requirements
   Not all vehicles and chargers are built the same. It is critical to properly plan for the specifications of the vehicle and the charger to avoid installing the wrong equipment and being unable to charge your vehicles.
9. Consider V2X and disaster response/ resiliency opportunities
   By considering vehicle-to-everything (V2X) and grid resiliency/disaster response capabilities up front, you can set your fleet up to play an important role in a reliable and cleaner grid – while reducing your total cost of ownership (TCO).

GOAL

12 months



From the service request application to working charger use is less than 12 months. This aligns with procurement of the buses.

QUESTIONS-TOPIC 2

- This is where we answer your questions.
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SURVEY-TOPIC 2

Go to **www.menti.com** and use the code **5912 9291**

FINAL SURVEY

Go to **www.menti.com** and use the code **5912 9291**

THANK YOU

Please contact Gregg Kresge at
Gregg.Kresge @wri.org