

# WELCOME!

10:00 - 10:05 AM	Welcoming Remarks
10:05 - 10:15 AM	Office of Energy Efficiency and Renewable Energy Leadership Vision
10:15 - 10:30 AM	Priorities for the Sustainable Transportation Sector
10:30 - 10:45 AM	Vehicle Technologies Office Priorities: Goals, Key Targets, Notable R&D Outcomes
10:45 AM – 11:30 AM	Panel: Workforce and Energy and Environmental Justice for a More Inclusive Sustainable Transportation Industry  Moderator: <i>Michael Berube, EERE</i>
11:30 - 11:40 AM	Department of Energy Leadership Vision
11:40 AM – 12:25 PM	Panel: Sustainable Transportation through Federal Collaboration  Moderator: <i>Don Hillebrand, Argonne National Laboratory</i>
12:25 – 12:40 PM	Vehicle Technologies Office Awards

Download the **Cvent Events** app from the App store or Google Play and search for “**2022 Vehicle Technologies Office Annual Merit Review**” in the app.



**Wi-Fi information:**  
Connect to **Hilton Meeting**,  
Launch a web browser,  
When prompted, enter  
**VTAMR22** in the Event Wi-Fi  
section of the page.

# [VIDEO FROM EE-2 – 10 minutes]

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**Kelly Speakes-Backman**  
Principal Deputy Assistant Secretary  
Office of Energy Efficiency and Renewable Energy

# [DAS-T – 15 minutes]

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**Michael Berube**

Deputy Assistant Secretary for Sustainable Transportation  
Office of Energy Efficiency and Renewable Energy

# OVERVIEW | VEHICLE TECHNOLOGIES OFFICE

DAVID HOWELL

Director, Vehicle Technologies Office

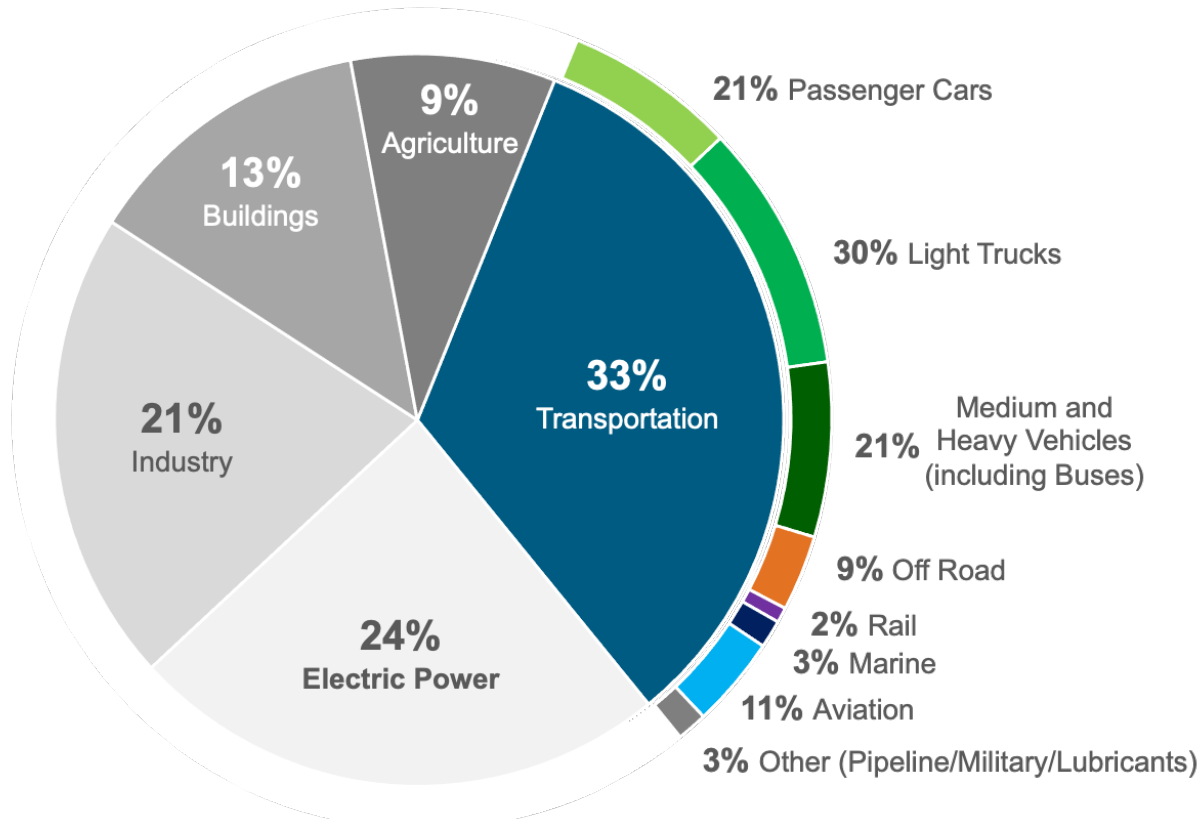
Acting Director and Principal Deputy Director, Office of Manufacturing and Energy Supply Chains

June 21, 2022



# Multiple, Targeted Solutions are Needed

## 2019 U.S. GHG Emissions



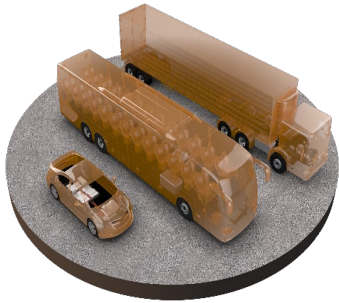
Aviation and marine include emissions from international aviation and maritime transport. Fractions may not add up to 100% due to rounding.

- Light Duty (cars/SUV/pickups) largest share (~52%), and can largely be electrified leveraging cheap and abundant clean electricity
- Strategy must also address **remaining 45+% of transportation including Rail** (projected to grow more rapidly)
  - Hydrogen and Biofuels will be critical to these other sectors
  - Electrification
  - Diversification of fuels improves resiliency
- Focus on solutions that can be **incrementally deployed**, delivering results by 2030
- Full **lifecycle emissions** must be addresses
- Effective **integration with the grid** and energy infrastructure

# Vehicle Technologies Office (VTO)

## ON-ROAD

Light-, Medium-, Heavy  
Duty Vehicles



Batteries &  
Electrification



Materials  
Technology



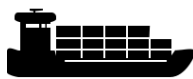
Mobility  
Systems



Demonstration and Deployment



Off-Road, Air, Marine, Rail



Electrification



Combustion and Net-Zero Carbon Fuels



Hydrogen/Fuel Cells

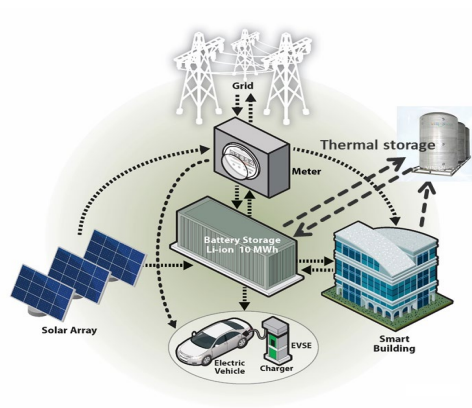
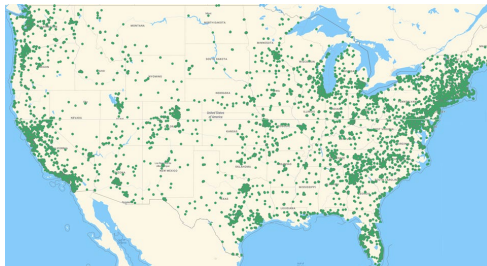
# Vehicle Technologies – FY 2023 Budget Request

Demonstrate and deploy technologies that enable transportation opportunities for all communities, with an emphasis on those that are currently underserved, and accelerate electric vehicle adoption at the community level.

- Advanced battery R&D for EVs.
- Rapid deployment of EVs and charging infrastructure.
- Reduce or eliminate GHG emissions in difficult to electrify sectors such as heavy freight, off-road, rail, marine, and aviation.

Subprogram (dollars in thousands)	FY 2022 Enacted	FY 2023 Request
Battery and Electrification Technologies	\$200,000	\$260,000
Decarbonization of Off-Road, Rail, Marine, Aviation Technologies (Advanced Engine and Fuel Technologies)	\$35,000	\$25,000
Materials Technology	\$45,000	\$50,000
Energy Efficient Mobility Systems	\$54,000	\$60,000
Technology Integration	\$80,000	\$199,731
Data, Modeling, and Analysis	\$6,000	\$8,000
<b>Total</b>	<b>\$420,000</b>	<b>\$602,731</b>

# Vehicle Technologies – FY 2023 Highlights and Major Changes



## Accelerate Nationwide Adoption and Deployment of EVs and Infrastructure (\$100M)

- Improve equitable access to the benefits of electrified transportation
- Work to increase charging infrastructure, PEV cost parity with conventional vehicles, education, and workforce training to facilitate widespread PEV adoption
- Support the Administration’s goal to deploy 500,000 PEV charging stations throughout the nation

## Clean Energy Mobility Solutions for Underserved Communities (\$40M)

Transition EV Community Partner activities to Community-Driven Clean Energy Transportation Projects that support local and regional partnerships, including Clean Cities, to ease barriers and promote the use of new transportation technologies and electric vehicle adoption, especially in underserved communities.

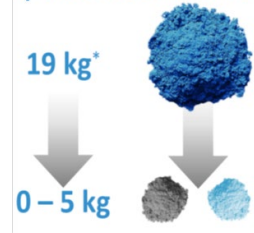
# Vehicle Technologies – FY 2023 Highlights and Major Changes

## Expanded Advanced Battery R&D (\$75M)



### *Solid State Batteries*

Low/No Cobalt Cathode



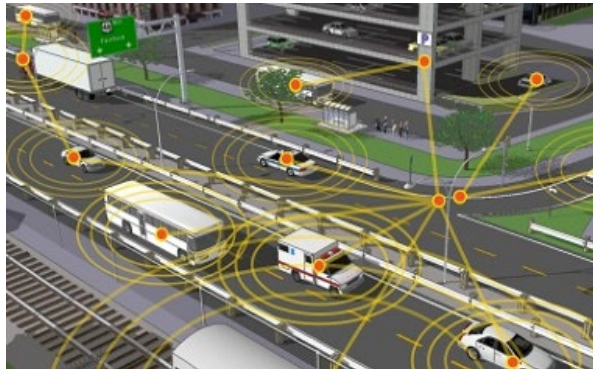
- Transition solid state research to scale up and manufacturing process development
- Advance processing technology for no/low cobalt cathode chemistries
- Expand battery recycling through processing development and transitioning technologies to industry

# Vehicle Technologies – FY 2023 Highlights and Major Changes



## Expand SuperTruck 3 (\$40M)

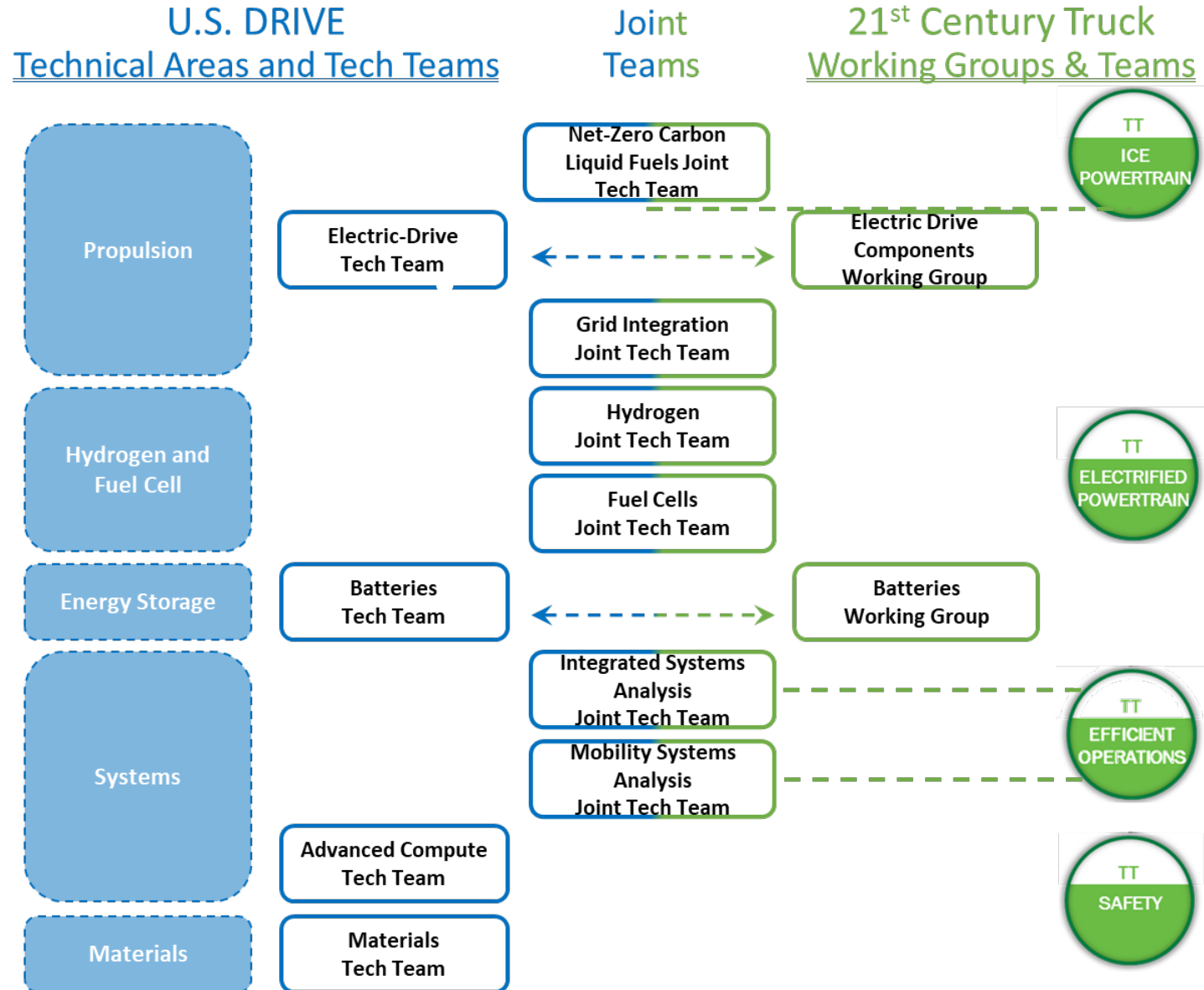
Fund projects to electrify medium- and heavy-duty freight trucks. Additional investment will boost vehicle efficiency and expand EV infrastructure. Work will advance the Administration's goal of achieving carbon pollution-free transport and to deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050.



## Innovative Medium-Duty and Heavy-Duty EV Charging Infrastructure (\$45M)

Demonstrate medium-duty and heavy-duty electric commercial vehicle charging infrastructure for essential freight corridors, ports, and large freight depot locations.

# Public-Private Partnerships: Re-visioned U.S. DRIVE-21CTP Crosswalk



# Clean Cities Coalition Network

More than 75 Clean Cities coalitions with thousands of stakeholders, representing ~80% of U.S. population

Coalition projects have helped to put nearly **1 million alternative fuel vehicles** on the road.



## Clean Cities Coalitions



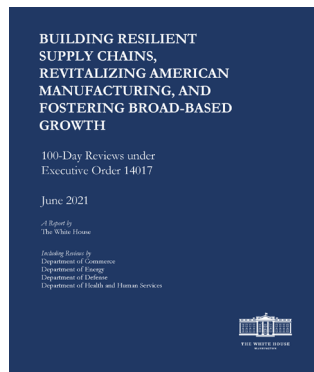
**96 million gasoline gallon equivalents** of energy were saved through fuel economy improvement projects like telematics, driver training, and outfitting fleets with idle reduction equipment.








Map Date: 2/3/22

# Federal Consortium for Advanced Batteries (FCAB)

- Establishes the framework for collaboration on lithium battery interests across the Federal Government
- FCAB includes 17 Federal Agencies led by DOE (EERE Chair), Department of Commerce, Department of Defense, and Department of State



## GOALS TO ACHIEVE OUR VISION

-  **1** Secure access to raw and refined materials and discover alternates for critical materials for commercial and defense applications
-  **2** Support the growth of a U.S. materials-processing base able to meet domestic battery manufacturing demand
-  **3** Stimulate the U.S. electrode, cell, and pack manufacturing sectors
-  **4** Enable U.S. end-of-life reuse and critical-materials recycling at scale and a full competitive value chain in the U.S.
-  **5** Maintain and advance U.S. battery technology leadership by strongly supporting scientific R&D, STEM education, and workforce development

Domestic, Global, and Defense Markets

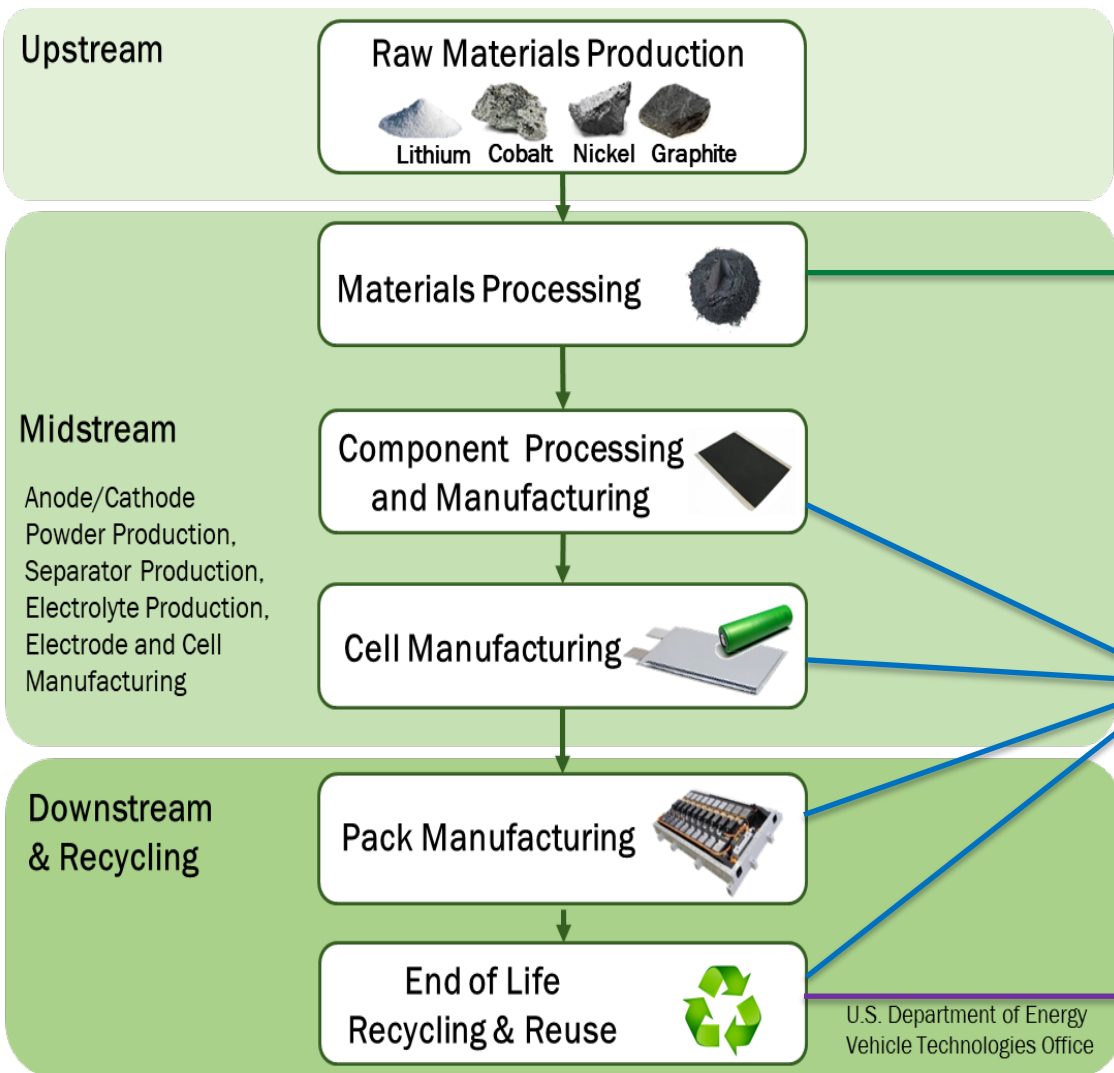
Technology Advancement

Technology Transition across End-Use Applications

Intellectual Property and Knowledge Protection

Federal Policies and Authorities

# Bipartisan Infrastructure Law: Boost Domestic Battery Manufacturing and Supply Chain



**Sec. 40207(b) Battery Material Processing Grants** (\$3 billion total over 5 years)

*Note: Includes separation of materials from extracted feedstocks and materials processing or refining*

**Sec. 40207(c) Battery Manufacturing and Recycling Grants** (\$3 billion total over 5 years)

**Research, Development, and Demonstration**

**Sec. 40208 Electric Drive Vehicle Battery Recycling and Second-Life Applications Program** (\$200 Million Total over 5 years)

FOAs released 5/2/2022

**BIL Battery Materials Processing and Battery Manufacturing FOA** - \$3.1 billion - support the creation of new, retrofitted, and expanded commercial facilities as well as manufacturing demonstrations and battery recycling.

**BIL Electric Drive Vehicle Battery Recycling and Second Life Applications FOA** - \$60 million - support research, develop, and demonstrate, electric drive vehicle battery recycling and second use applications.

Visit <https://eere-exchange.energy.gov/>

# Public-Private Partnerships

## Li-Bridge Alliance

Facilitating Industry-Government interaction to support a resilient high-capacity battery supply chain for the U.S.



PRIVATE SECTOR WILL BE ENGAGED THROUGH US-BASED TRADE ASSOCIATIONS



> 600 Industrial partners

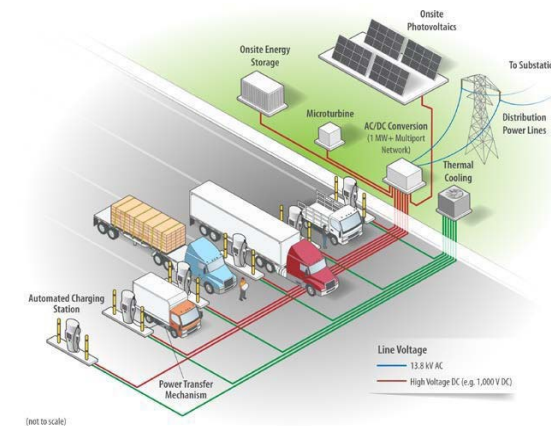
FEDERAL SECTOR WILL BE ENGAGED THROUGH THE FEDERAL CONSORTIUM FOR ADVANCED BATTERIES



> 14 Federal Agencies

## EVs@Scale Lab Consortium Subtopics

1. Vehicle Grid Integration (VGI)/ Smart Charge Management
2. High Power Chargers and Charging Facilities
3. Integrating Dynamic Wireless Power Transfer Systems in Roadways
4. Cybersecurity Countermeasures for EV Charging Ecosystem
5. Codes and Standards for EVs@Scale
6. EVs@Scale Consortium Management and Stakeholder Engagement



# SuperTruck

## SuperTruck II

Objective: Demonstrate 55% engine brake thermal efficiency (BTE), and greater than 100% improvement in freight efficiency (ton-mpg)

- Cummins-Peterbilt and Navistar teams have demonstrated 55% engine BTE
- All ST2 Teams are on course to demonstrate vehicle freight efficiency targets at the end of this year or beginning of next year



## SuperTruck III

Objective: Demonstrate 75% reduction in greenhouse gas and air pollution emissions as well as reducing the total cost of ownership when compared to a 2020/2021 model year truck

- Paccar and Volvo will develop Class 8 battery-electric tractor trucks
- Paccar will demonstrate a megawatt charging station
- GM will develop Class 4-6 BEV and fuel cell trucks
- Ford will develop Class 6 fuel cell trucks
- Daimler will develop Class 8 fuel cell tractor trucks



# Keep in Touch!



Send questions to: [vto@ee.doe.gov](mailto:vto@ee.doe.gov)

For more information: [www.vehicles.energy.gov](http://www.vehicles.energy.gov)



Subscribe to our newsletters at:  
<https://www.energy.gov/eere/vehicles/vehicle-technologies-office-newsletters>

## Vehicle Technologies Office Newsletter

Submit your email address to receive the latest news on funding opportunities, success stories and reports on vehicle technologies research.

## Transportation Fact of the Week Newsletter

Each week, the Vehicle Technologies Office's website posts a Fact of the Week. Enter your email to receive an email every Monday with the weekly Fact.

**Notice of Intent to Issue a FY22 VTO Program Wide FOA – released 5/12/2022**

Visit <https://eere-exchange.energy.gov/>

# Workforce and Energy and Environmental Justice for a More Inclusive Sustainable Transportation Industry



**Moderator:**  
*Michael Berube,*  
Deputy Assistant  
Secretary for  
Sustainable  
Transportation,  
EERE



**Speaker:**  
*Shalanda Baker,*  
Director of the Office of  
Economic Impact and  
Diversity, and Deputy  
Director for Energy  
Justice,  
DOE



**Speaker:**  
*Betony Jones,*  
Senior Advisor for  
Workforce,  
EERE



**Speaker:**  
*Greg Dierkers,*  
Project Officer,  
State Energy Program,  
DOE

# Department of Energy Leadership Vision

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**David Turk**  
Deputy Secretary  
U.S. Department of Energy

# Sustainable Transportation through Federal Collaboration



**Moderator:**  
*Don Hillebrand,*  
Deputy Associate  
Director,  
Argonne National  
Laboratory



**Speaker:**  
*Kelly Cummins,*  
Acting Director and  
Principal Deputy  
Director,  
Office Of Clean  
Energy  
Demonstrations,  
DOE



**Speaker:**  
*Puesh Kumar,*  
Director,  
Office of  
Cybersecurity,  
Energy Security,  
and Emergency  
Response,  
DOE

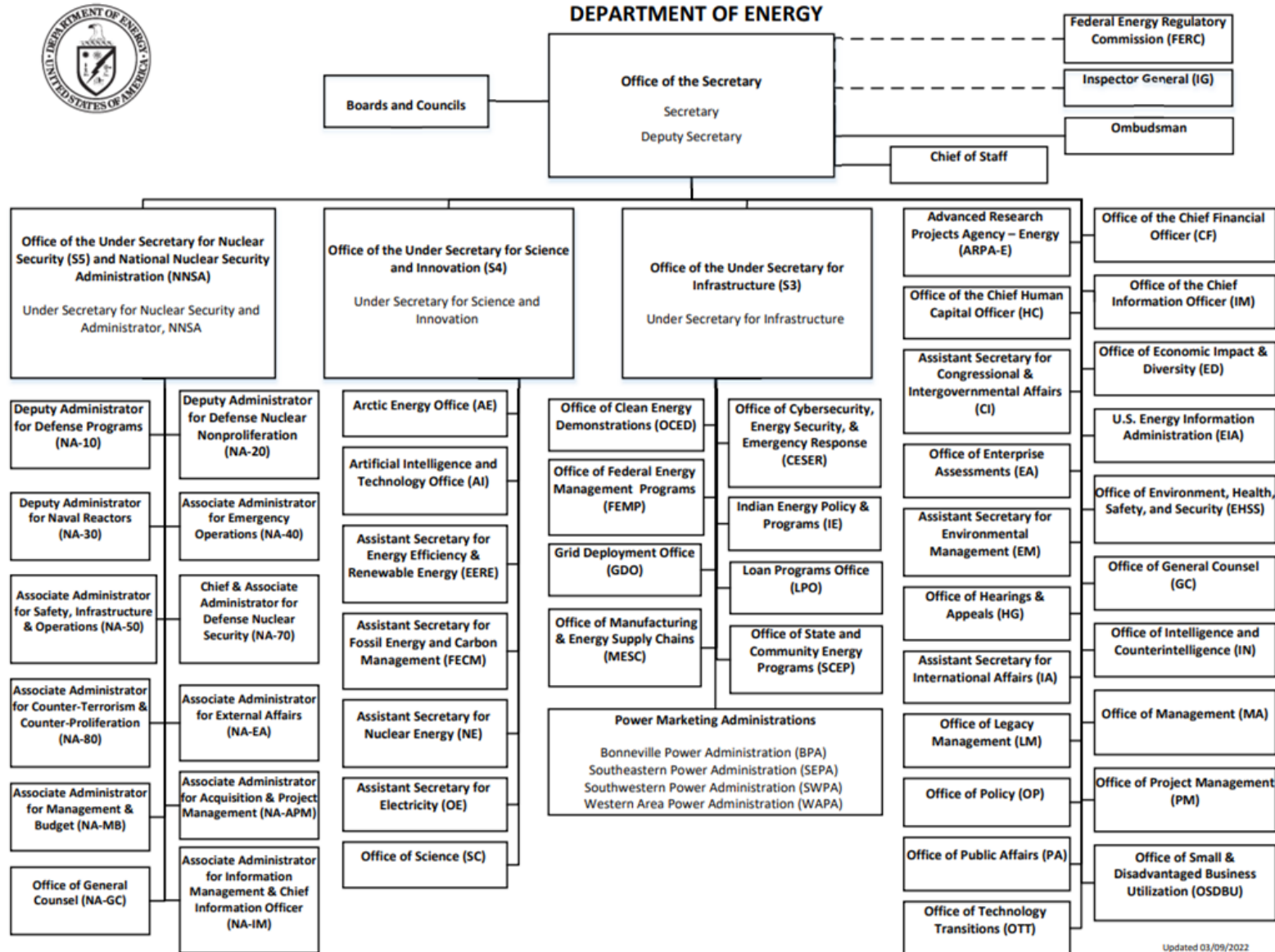


**Speaker:**  
*David Howell,*  
Acting Director and  
Principal Deputy  
Director,  
Office of  
Manufacturing and  
Energy Supply  
Chains,  
DOE



**Speaker:**  
*Alex Schroeder,*  
Interim Director,  
Joint Office of  
Energy and  
Transportation

# Department of Energy Organization Chart



Updated 03/09/2022

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# **2022 Vehicle Technologies Office Annual Merit Review Awards**

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# **Distinguished Achievement Awards**

# Distinguished Achievement Award

Jarod Kelly

**Argonne National Laboratory**



For leading a Cradle-to-Grave (“C2G”) analysis in support of the U.S. DRIVE partnership to evaluate GHG emissions of U.S. light vehicles

Amgad Elgowainy

**Argonne National Laboratory**



# Distinguished Achievement Award



**Jiguang (Jason) Zhang**  
**Pacific Northwest National**  
**Laboratory**

Appreciation and recognition of  
valuable contributions to the  
Vehicle Technologies Office's  
battery R&D activities

# Distinguished Achievement Award

Yan (Joann) Zhou

Argonne National Laboratory



In recognition of distinguished achievements supporting Electric Vehicle Charging Equity and the Justice40 Initiative at the U.S. Department of Energy

Jim Kuiper

Argonne National Laboratory



# Distinguished Achievement Award



**Matthew Kramer**  
**AMES Laboratory**

For years of outstanding skill and leadership in magnetic materials research, planning, and collaboration for electric drive technologies

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# **Team Awards**

# Team Award

## Cummins SuperTruck 2 Team Cummins, Inc.



In recognition of unique achievements in the field of heavy-duty engine efficiency that will contribute to more than doubling truck freight efficiency



# Team Award

## Navistar SuperTruck 2 Team Navistar, Inc.

In recognition of unique achievements in the field of heavy-duty engine efficiency that will contribute to more than doubling truck miles per gallon



# Team Award

Srikanth Pilla, Gang Li, Duane Detwiler, Ryan Hahnen, Shridhar Yarlagadda,  
Pal Swaminathan, Bruno Mariani

**Clemson University, Honda Development & Manufacturing of America, LLC,  
University of Delaware, Lanxess, and Proper Group International**

In recognition of Dr. Pilla's  
extraordinary expertise in leading  
carbon fiber thermoplastic  
composites door R&D to achieve  
weight savings, performance, and  
sustainability



# Team Award

**Brett Aristegui, Trev Hall, David Kirschner, Neil Kirschner,  
Dan Nardozi, Erin Russell-Story, Darren Stevenson  
National Energy Technology Laboratory**

In recognition of loyal dedication to the Vehicle Technologies Office and commitment to the national network of Clean Cities coalitions as the Clean Cities Regional Manager Team



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# **Lifetime Distinguished Achievement Awards**

# Lifetime Distinguished Achievement Award



**Dennis Dees**  
**Argonne National**  
**Laboratory**

For decades of world-class research in continuum modeling of high-energy, high power, and long-lasting batteries to support and shape the DOE advanced battery portfolio

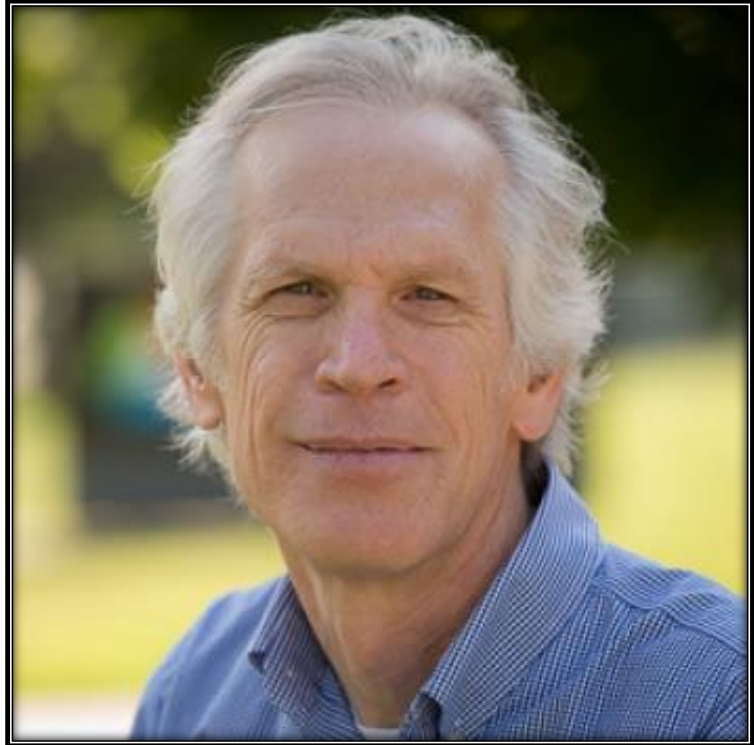
# Lifetime Distinguished Achievement Award



**David Anderson**  
**Department of Energy**

For valuable contributions to VTO by serving as EEMS' inaugural Program Manager and creating a meaningful and enduring program

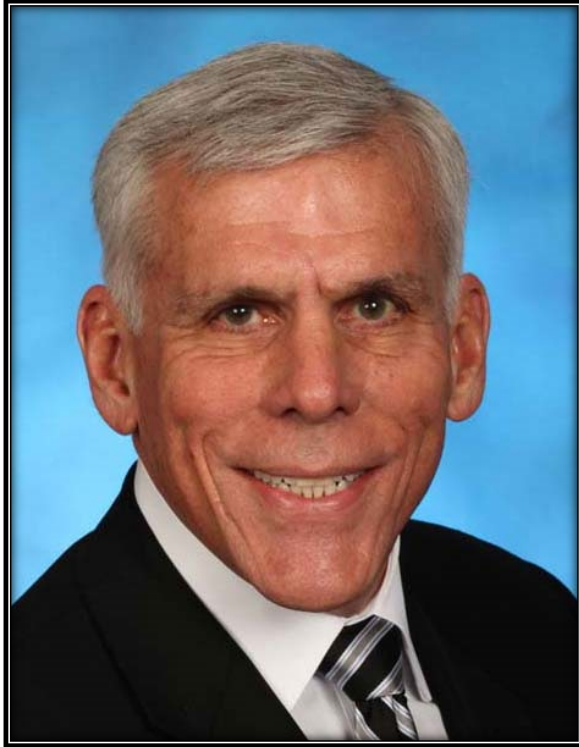
# Lifetime Distinguished Achievement Award



**Ira Bloom**  
**Argonne National  
Laboratory**

For two decades of tireless support of multiple DOE programs on advanced batteries in areas of accelerated testing, life estimation, and in elucidating the physical and chemical changes that limit battery life

# Lifetime Distinguished Achievement Award



For spirited leadership as executive director of USCAR and contributions to U.S. DRIVE and its predecessor partnerships

**Steve Zimmer**  
**United States Council for**  
**Automotive Research**