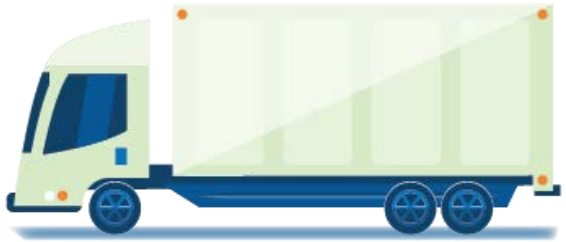
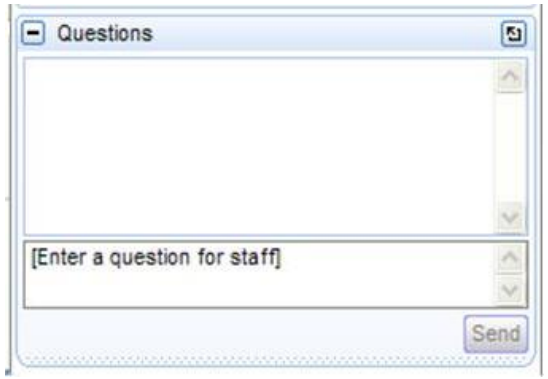
How Electric Trucks, Big Data, and Connectivity are Changing the Freight Industry



EPA SmartWay Freight Matters Webinar
April 26, 2018

Webinar Housekeeping

- Submit a question via the Questions box on your GoTo control panel.



- After the presentation, as time permits, our EPA presenter will answer questions submitted via the Questions box.

- Please complete the survey at the end of today's webinar. Your feedback is important to us!

Environmental Topics | Laws & Regulations | About EPA

SmartWay

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SmartWay

SmartWay Latest News

- January 2018 Affiliate Calendar
- View 2017 Excellence Awardees
- Truck fleets meet 10+ MPG in Run on Less.

Learn about SmartWay

- Overview of SmartWay
- Why Freight Matters
- How SmartWay Advances Sustainable Transportation Supply Chains
- Sustainability Accounting & Reporting
- SmartWay Program Successes
- Trends, Indicators & Partner Statistics

Participate in SmartWay

- How to Participate in SmartWay
- How the SmartWay Partnership Works
- Become a SmartWay:
  - Shipper
  - Logistics Company
  - Carrier
  - Affiliate

Upcoming Webinars & Events

- 1/17/2018 2017 SmartWay Awardees Best Practices Webinar
- 1/24/2018 A National Conversation with SmartWay Affiliates
- 1/31/2018 Introduction to the SmartWay 2018 Truck Tool

More SmartWay webinars & events

SmartWay

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- Use the SmartWay Brand
- Global Collaboration
- SmartWay Latest News
  - Newsroom
  - Webinars/Events

SmartWay Webinars & Events

EPA hosts events and webinars to help you learn how to get the most out of the SmartWay Program.

Webinars are free: Please register promptly because registration may be closed to new attendees after 12:00 noon on the day of the webinar.

Upcoming Webinars: To participate in an upcoming SmartWay webinar, you must pre-register. Registration links are provided below in webinar descriptions. After registering, you will receive a confirmation email containing information about joining the webinar.

Past Webinars: Selecting the "Past Webinar Resources" tab shows you previous training topics and may include additional resources such as slides, recordings, and transcripts.

Freight Matters! Webinar Series: Hear from leaders in the industry about freight-related trends and issues that matter to your business.

Upcoming Webinars/Events | Past Webinars/Events

Suggest a Webinar Topic: If you would like to see a webinar about a particular topic, email your idea (smartway_transport@epa.gov) with the subject line "SmartWay Webinar Suggestion."

Event Type Legend

Type	Date	Event Name
Education Webinar	November 30, 2016	Unlocking SmartWay Data for Shippers: Optimize Supply Chain Decision Making and Enhance CSR Reporting
Education Webinar	December 7, 2016	2016 SmartWay Awardee Best Practices Webinar Exit

Global Freight Projected to Double by 2050

Freight Fastest Growing Source of Transport Emissions

Transformational change is possible

Presenters

Scott Perry

Suddath Global Logistics

Tim Proctor

Cummins

Larry Smith

Mitsubishi Fuso

Scott Perry

As president of Suddath Global Logistics, Scott leads new and emerging businesses, and guides multiple lines of business, each responsible for thousands of ground, air and ocean shipments, carrying millions of products on any given day. Scott is committed to assembling a skilled workforce capable problem solving, coordinating and managing complex supply chain operations worldwide.

Scott has more than 25 years' experience in overseeing third-party logistics services and managing complex global and domestic supply chains. He is experienced with next-generation technology, product management, and strategy and integration of new technology into existing systems.

He served as chief operating officer at Nikola Motor Company, a technology company specializing in hydrogen fuel cell commercial vehicle manufacturing. Prior to that, he was chief technology and procurement officer for Ryder System, Inc.'s Fleet Management Solutions division, where he worked for more than 26 years in various operational and functional leadership roles in logistics and transportation. While there, Scott oversaw Ryder's internal supply chain and the negotiation of primary supplier agreements around the world.

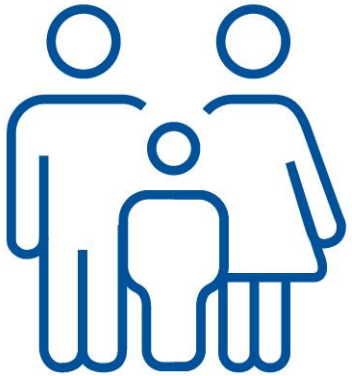
The Suddath Companies

Scott Perry - Global Logistics

How Electric Trucks, Big Data, and Connectivity are Changing the Freight Industry

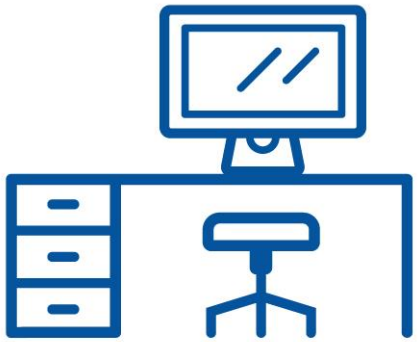
Suddath

We Move People, Businesses and Products



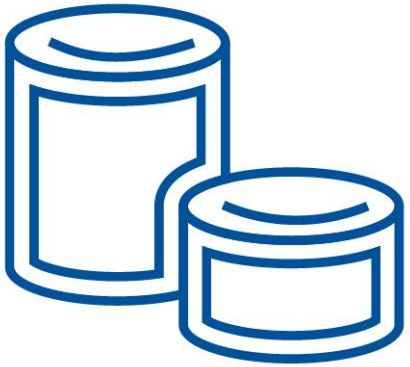
People

Corporate Moving & Relocation Management	Residential Moving	Government Services
• Real Estate • Destination Service Provider	• Local • Interstate • International	• Military • Government Employees



Businesses

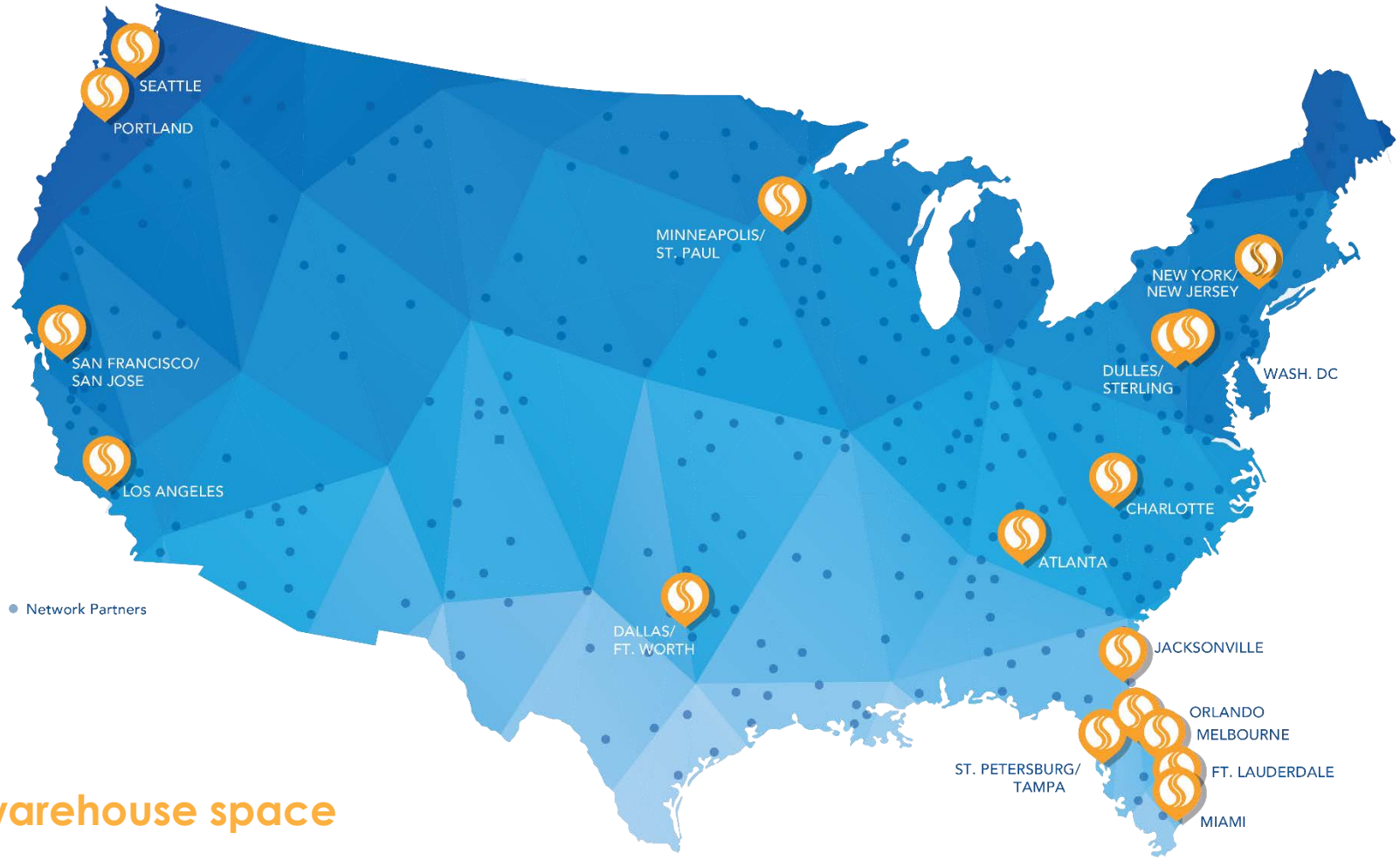
Commercial Moving & Workplace Solutions
• Office Moving/Storage • Hospitality • Furniture



Products

Global Logistics
• Contract • FF&E • International Forwarding

Nationwide Locations



1600 employees

2.7MM square feet of domestic warehouse space

16 domestic markets

Operation centers in London and Shanghai

There have never been so many options for Logistics providers to consider!

- Advanced Technologies – electric, fuel cell, advanced diesel
- Connectivity – Telematics, RFID, Beacons
- Insights – Big Data, Virtual Reality, Augmented Reality
- Productivity & Safety- Autonomy, Platooning, ADAS, RPA

There are new brands entering the EV development race every day

Connectivity Abounds

- **The Electronic Logging Device mandate transforms fleet connectivity.**
  - Real-time data collection
  - Asset sharing between companies

Suddath

Considerations for any Fleet

- **Know your duty cycle**
  - Electronic Vehicles (EV's) are purpose built
  - Consider range, weight, charging networks
- **Physical charging infrastructure is key**
  - The larger the vehicle deployment, the more critical this becomes
- **Change Management**
  - Drivers and operations personnel should be part of the plan

Suddath

Potential Immediate Benefits

- **Early adopters become industry leaders**
- **Growing final-mile market**
- **Understand Operating Cost/Benefits:**
  - Fuel/energy, maintenance, productivity, residual values
  - Carbon footprint of EV affected markets
  - Stay ahead of future emissions regulations

Suddath

Thank You

We exist to reimagine the way the world moves

Worldwide Headquarters

The Suddath Companies
815 South Main Street
Jacksonville, FL 32207
800.395.7100
suddath.com

Suddath

Tim Proctor

As Executive Director of Product Management & Market Innovation for Cummins Engine Business, Tim leads the segment's efforts to see the future first and ensure that Cummins has its products positioned to win in the market in the short and long term.

Prior to assuming this role, Tim demonstrated his passion for innovation, leading the technical team that developed the 2017 X 15 engine for the North America on-highway market. This program delivered market leading fuel economy through base engine hardware changes and advanced controls solutions that extended Cummins' impact beyond the flywheel and into the powertrain. It was also the first program to integrate deeply with connectivity and provide over the-air calibration update capability.

Since joining Cummins in 2005, Tim has played an instrumental role in the adoption of many of the systems engineering tools used widely throughout Cummins today. Previous to his work Cummins, Tim spent most of his career in the Motorsport industry, working at Cosworth Racing and Toyota Racing Development, where he drove the design and development of IndyCar engines and World Rally Car Engines.

How Electric Trucks, Big Data & Connectivity are Changing the Freight Industry

Tim Proctor

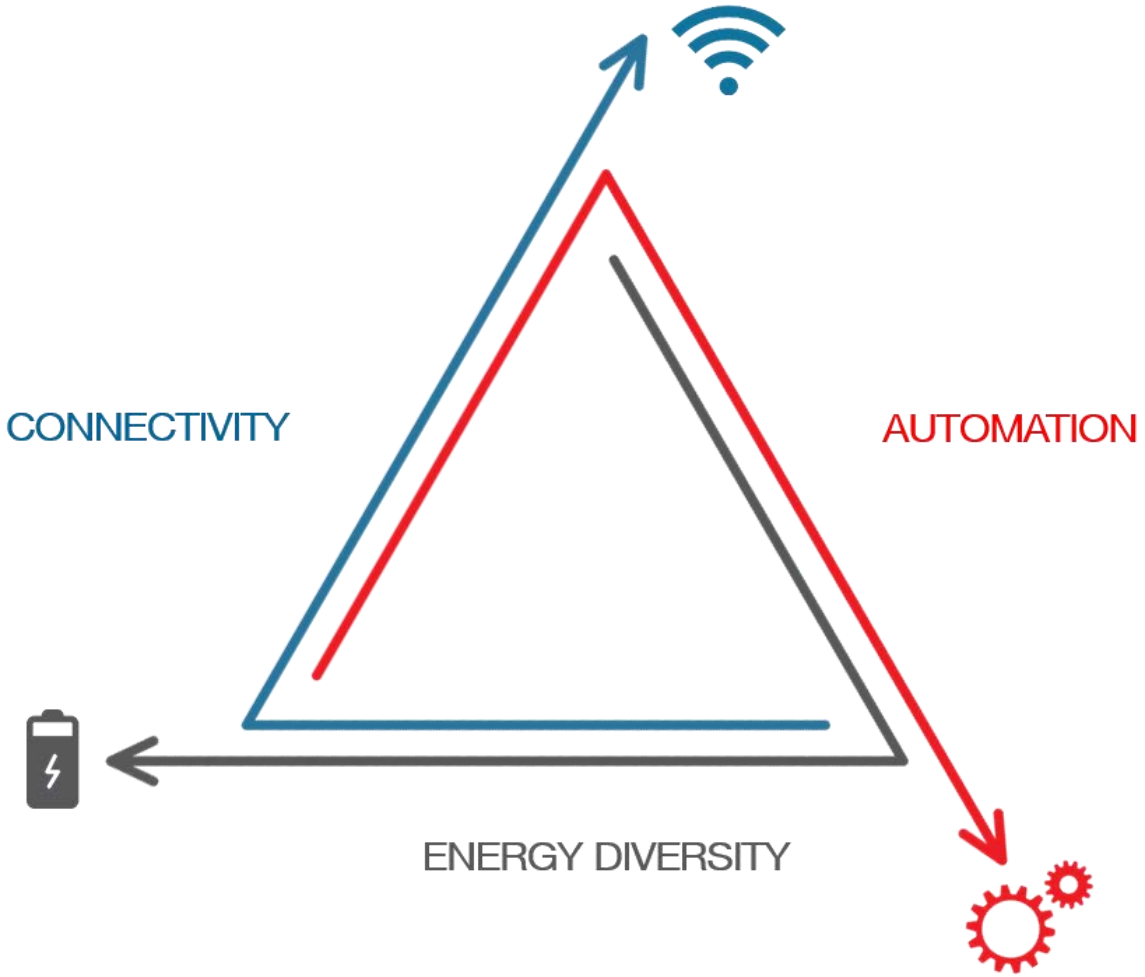
Executive Director of Product Management and Market Innovation

April 26, 2018

Powering

a more prosperous world

The world is changing.



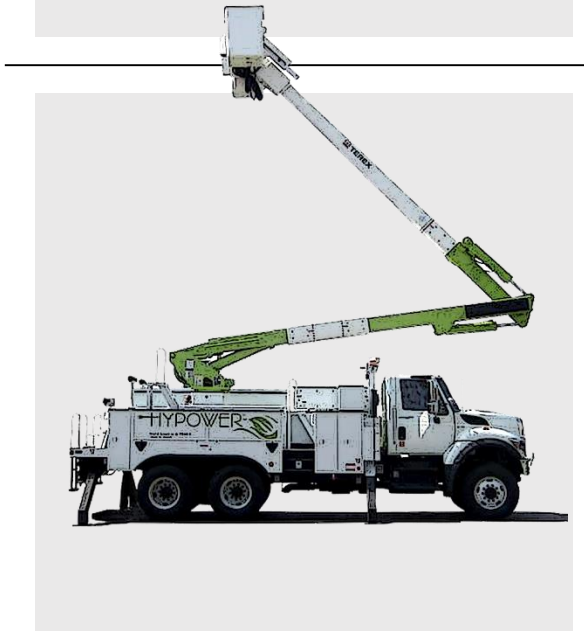
Line Haul On-Highway Market

DEFINING ATTRIBUTES OF LINE HAUL

- More than 300 miles a day
- More than 60,000 miles annually
- Average moving speed 50 to 60 mph
- 5 to 40 percent idle time
- 70 to 95 percent top gear time
- Uptime is critical

DIESEL

- Bio/ renewable fuels



Powertrain of now

DIESEL

HD Long Haul

Delivers coast to coast
500-600 miles/day
Empty interstates
Steady cruise speeds

Unreliable access
to natural gas

NATURAL GAS

HD Regional Haul

Dedicated route; 200-300 miles/day

Access to economically-priced
natural gas; Incentivized

Refuse Truck

Access to making the fuel cheap
Air quality issues in service area

HYBRID

Utility Truck

Makes repairs at regional/
local sites

During repair work,
vehicle-to-grid power
electronics provides power
through battery/ engine to
keep neighborhood in power

FULLY ELECTRIC

Urban Transit Bus

Densely populated area
Air/noise quality issues

Electricity readily available
in route & at depot

Lowers operation costs; Capital cost
borne by FTA grant process

Phases of Electrification

	PHASE 1	PHASE 2	PHASE 3
DRIVERS	• Sociability need • Capability to use current technology • Suitable drive cycle • Subsidies	• Improved technology • Wider local regulations • Some subsidies • Broader charging infrastructure	• Viable economics • Further technology breakthroughs
REGIONS	• High density urban cities (London) • Emissions containment areas (LA ports) • Industrial policy driven (China, etc.)	• High density urban cities (India, Eastern EU, etc.) • ULE Zones in US, Western EU	• Leapfrogging diesel emissions (Africa, South America) • Traditional commercial vehicles
EXAMPLES			
	Moving now: Some key sectors (e.g. transit bus) and niches of other sectors (e.g. drayage trucks)	*Predominantly urban use vehicles and equipment*	*Wider scale adoption*

Complicated answers to complicated problems

Objectives

- Achieve near-zero well-to-wheel emissions
- Increase safety for drivers & road users
- Drive productivity and profitability of the industry

Diversification of Energy

- Solar, hydrogen & bio fuels – best environmental results
- Carbon-based fuels – established infrastructures
- Low-carbon fuels/highly efficient, ultra-low emission powertrains offer significant short term improvements ahead of true zero carbon solutions

Electric powertrain

- Not just an electric-only truck
- Hybrid solutions provide real-world TCO compared to full electric vehicles

Smart & Connected Trucks

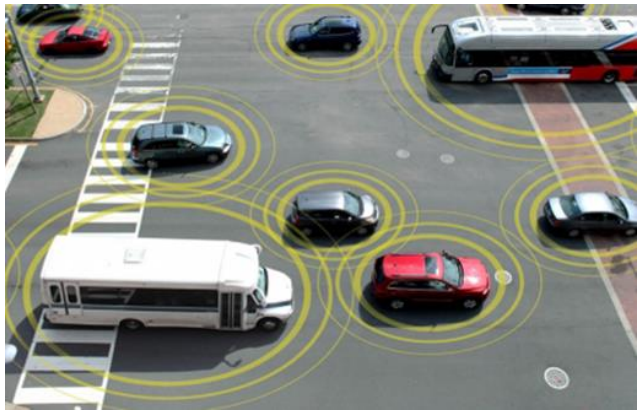
Offer improved:

- Downtime
- Powertrain efficiency
- Safety
- Network performance
- Product design

The future requires many solutions

This is a period of transformative change.

Energy diversity is critical for a carbon-constrained world.



Advancements in connectivity and automation will drive efficiencies further.

Larry Smith

Larry Smith is the Director of Fleet Operations for Mitsubishi Fuso Truck of America, a Daimler Brand Company. He has been with Mitsubishi Fuso Truck of America for the past 10 years, and most recently, over the past two years, has been the lead person for the company's market development and launch of the eCanter battery electric truck in the US. He has been associated with the Commercial Truck & Equipment Industry for over 25 years and has previous held executive positions with Truck dealerships & OEM Diesel Engine distributors.

FUSO Electric Truck Strategy

Presented by: Larry Smith

Director, Fleet Sales

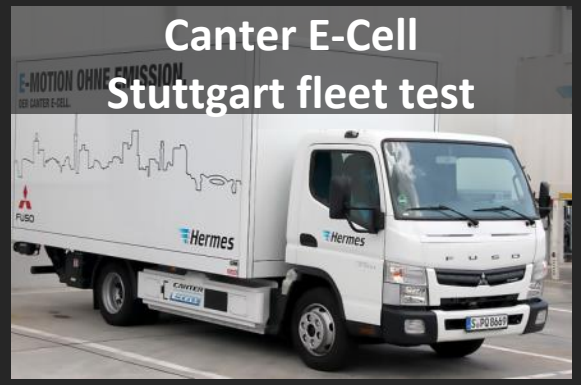
Three megatrends will define the future of electrification and commercial vehicles

Urbanization

Clean Energy

Technology Development

FUSO is a Pioneer in All-Eletric Trucks.



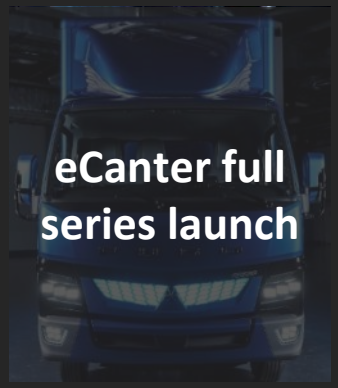
2014

2015

2016

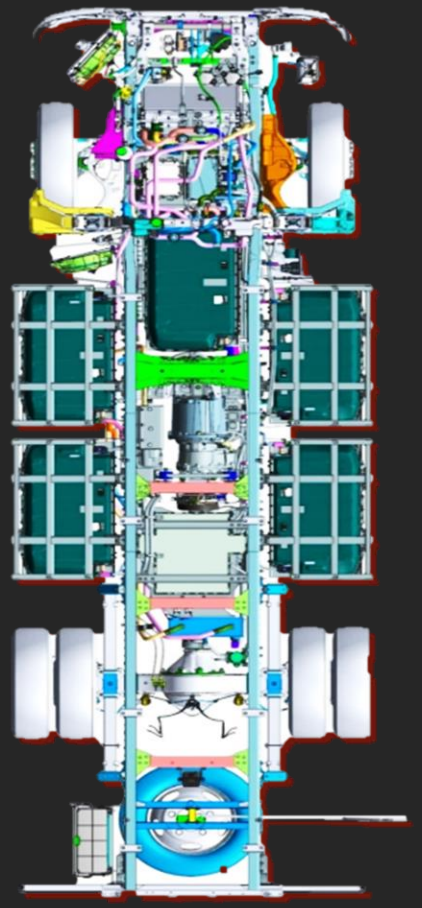
2017

2020



The FUSO eCanter is the Frontrunner in Electric Trucks

eCanter 1.0 (2017)



Drive Train Specification

Battery:

+ 6 parallel connect batteries
+ 1-2 hour DC quick charge or 8-hour AC charge

E motor

+ E motor connected to conventional propeller shaft

Product Highlights

+ **Class 4 truck**
+ **9,380 payload capacity (est.)**
+ **100% electric – zero tailpipe emissions**
+ **60 to 80 miles range**

eCanter: The Best-in-Class City Truck with in-house battery technology and a wide sales and established service network

Acceleration
Industry leading acceleration

Low Noise Level
No noisy internal combustion

City Entry
rfect character for inner-city

TCO Savings
Overall TCO savings vs Diesel

In-House Battery

- Deutsche Accumotive: Advanced battery expertise
- In-house battery: pushing further battery cost reductions

Synergy with MB EQ

- Electric parts have synergy with Mercedes-Benz EQ cars
- Daimler with eCars already in market

Wide service network

- With >10,000 sales and service points world wide, best in class service is assured

Infrastructure Support

- Wide knowledge of charging technology
- Support to install and extend charging grids (MB Energy)

Fuso is working to bring a connected charging ecosystem to our customers, leveraging MB tech & key partnerships

Charging Infrastructure

Fuso is also focused on hardware bringing:

- AC level 2 cables as standard
- DC charging stations as needed
- Standardized charging solutions

eCanter Mobile App

eCanter Mobile App is focused on ease of use and will let users:

- Find the closest charging stations
- See prices & make reservations
- Filter for truck friendly stations

Intelligent Charging

Fuso will use our TRUCKONNNECT platform to support customers with:

- Data collection & driving habits
- Prioritization of fleet charging
- Improved charging procedure

Energy Consultation

Fuso leverages its links to MB to offer customers advanced services in:

- Driving route optimization
- Minimizing electrical consumption
- Minimization of depot infrastructure

Three key take-aways

The electrification of trucks will be an important driver for cleaner cities

FUSO is the Frontrunner in electric trucks and launches the world's first all-electric truck in series production.

The electric ecosystem has to be created in partnership with customers, technology companies and municipalities


Thank You
Very Much
eCANTER
POWERED BY
POSITIVE
ENERGY
FUSO
LG
STARBUCKS
COFFEE
the voice
SEPT 25 MON & TUE
April 22-October 29
CITIZEN

THANK YOU!

QUESTION & ANSWER