



Heavy-Duty Electric Vehicle Technology and Funding Showcase



California Infrastructure and
Economic Development Bank





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First Priority Global

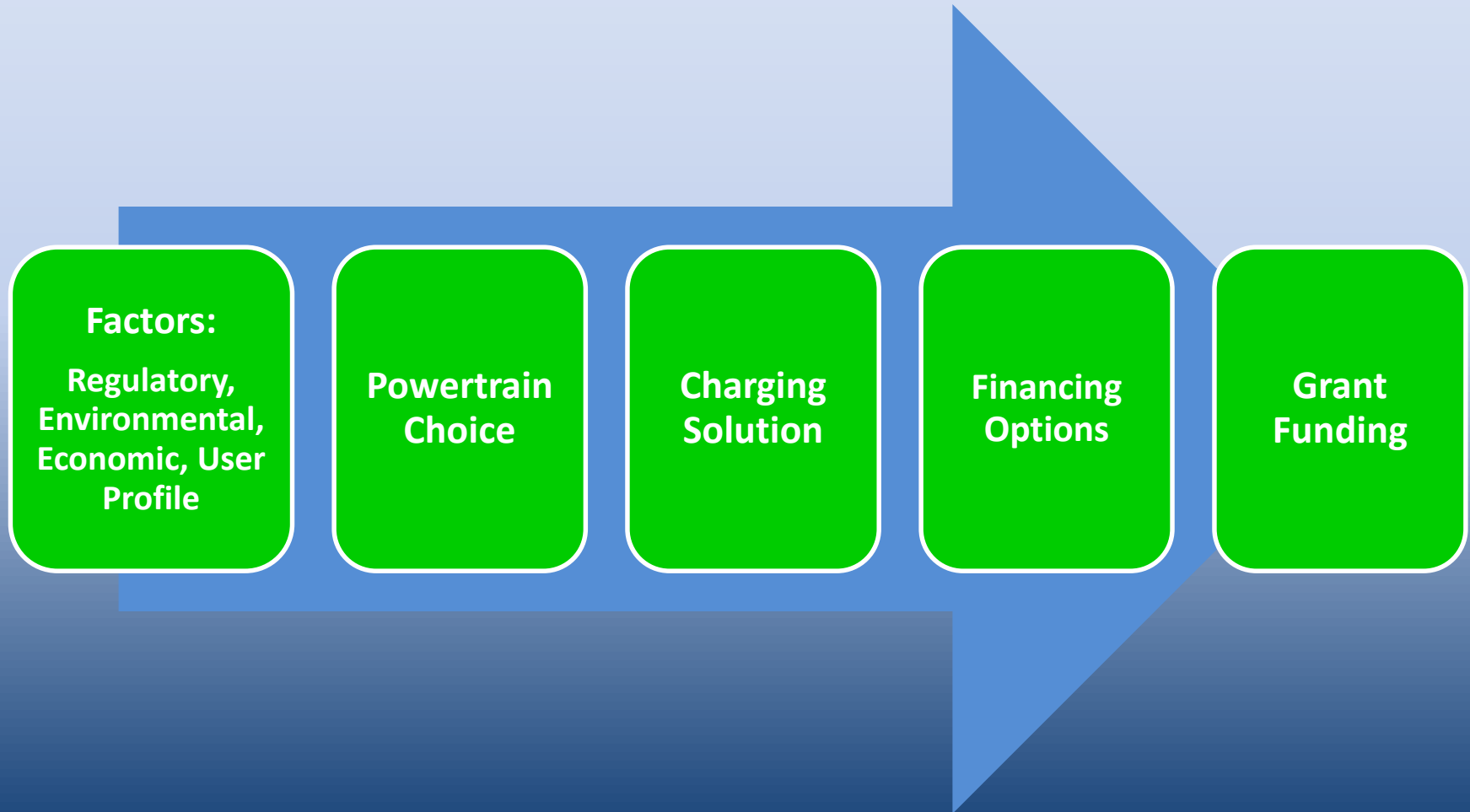
First Priority Emergency Vehicles



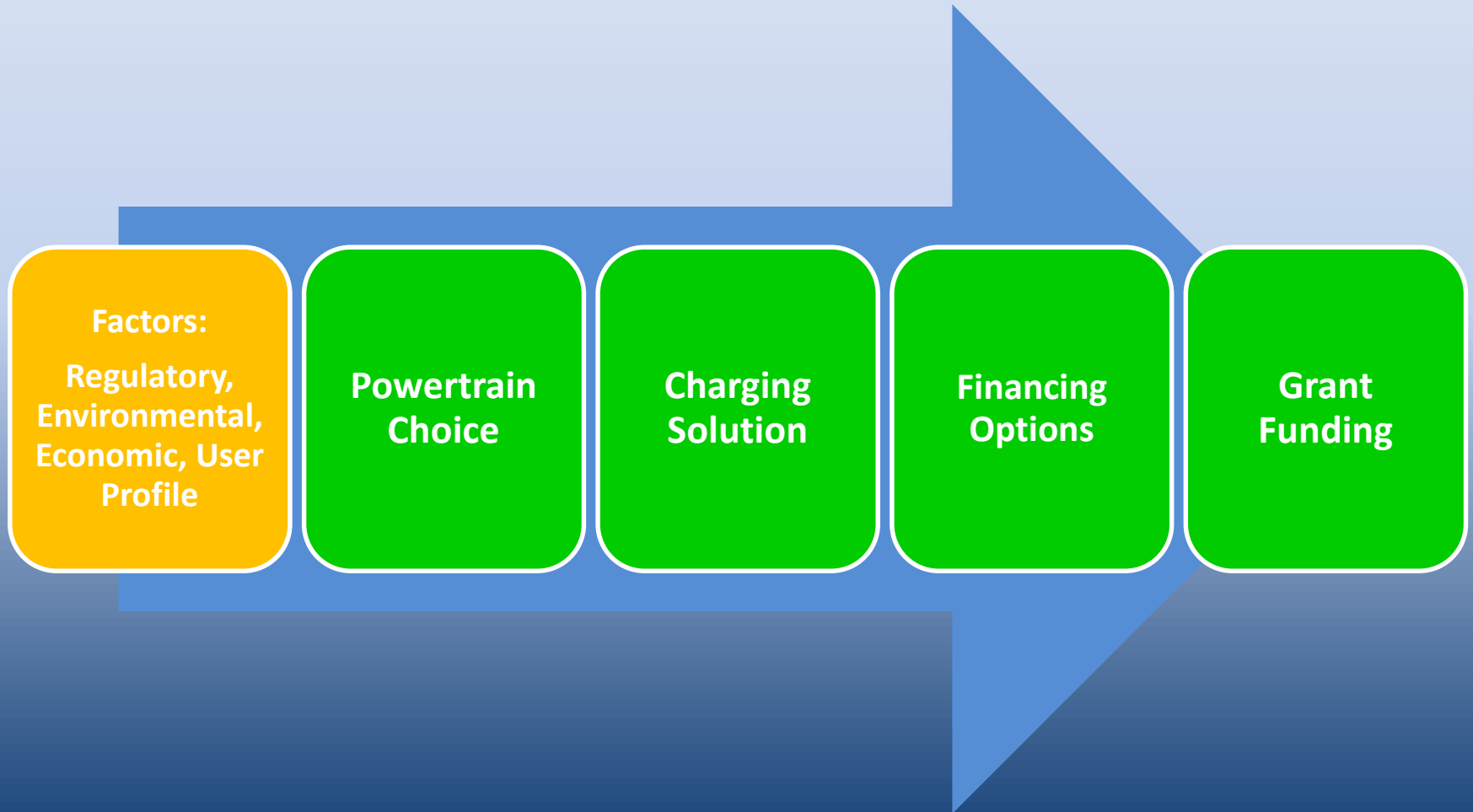
First Priority GreenFleet

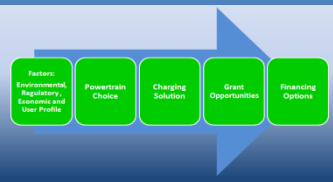


Pathway to Green: Considerations



Pathway to Green: Considerations





Factors: Regulatory



California Environmental Protection Agency

AIR RESOURCES BOARD

Engine Model Year Schedule for Lighter Trucks

Engine Year	2010 Replacement Date
1995 and older	January 1, 2015
1996	January 1, 2016
1997	January 1, 2017
1998	January 1, 2018
1999	January 1, 2019
2003 and older	January 1, 2020
2004-2006	January 1, 2021
2007-2009	January 1, 2023

What vehicles are affected by the Truck and Bus Regulation?

The regulation applies to all diesel fueled trucks and buses with a GVWR greater than 14,000 pounds that are privately or federally owned and for privately and publicly owned school buses

What are requirements for School Buses?

School buses with a GVWR more than 14,000 pounds were required to phase in PM filters from 2012 to 2014. School bus fleets need to demonstrate that 100% of buses had PM filters by 2014. If a school bus engine cannot be equipped with a PM filter it will need to be replaced by January 1, 2018.



Factors: Environmental



Aging school buses have the dubious distinction of emitting as much pollution per mile as a semi-truck. They routinely expose children and communities to soot and smog-forming pollution and add to the global burden of greenhouse gas emissions.

- Child's exposure is 4 x greater than riding in a car
- Asthma
- Lung Disease
- Heart Disease
- 46 times greater risk to develop a related cancer



On any given day, the cumulative exhaust inhaled by the 40 or so children on a self-polluting bus is comparable to, or in many cases larger than, the cumulative amount of exhaust inhaled by all the other people in the South Coast Air Basin, which covers the urban portions of Los Angeles, Orange, Riverside, and San Bernardino counties. (Marshall, Behrentz)



Factors: Economic

elion Type C - 75 mile	Diesel	Electric
MSRP (including 8% tax)	\$139,100	\$347,750
HVIP incentive		-\$130,000
Customer cost (initial capital investment)	\$139,100	\$217,750
"Additional investment" for electric bus		\$78,650
Operating expenses per year		
Maintenance cost per year*	\$9,075	\$1,770
Diesel fuel**	\$5,930	
Battery power (kWh)***		<u>\$2,714</u>
Yearly cost of ownership	\$15,005	\$4,484
Savings over diesel		\$10,521
Payback period (in years) for "additional investment"		7.48
Savings over life of bus (after payback period)		\$89,686
Less cost of battery (at 8 years)†		-\$45,600
Total savings over life of electric bus		\$44,086

Factors: **User Profile**

Factors:
Environmental,
Regulatory,
Economic and
User Profile

Powertrain
Choice

Charging
Solution

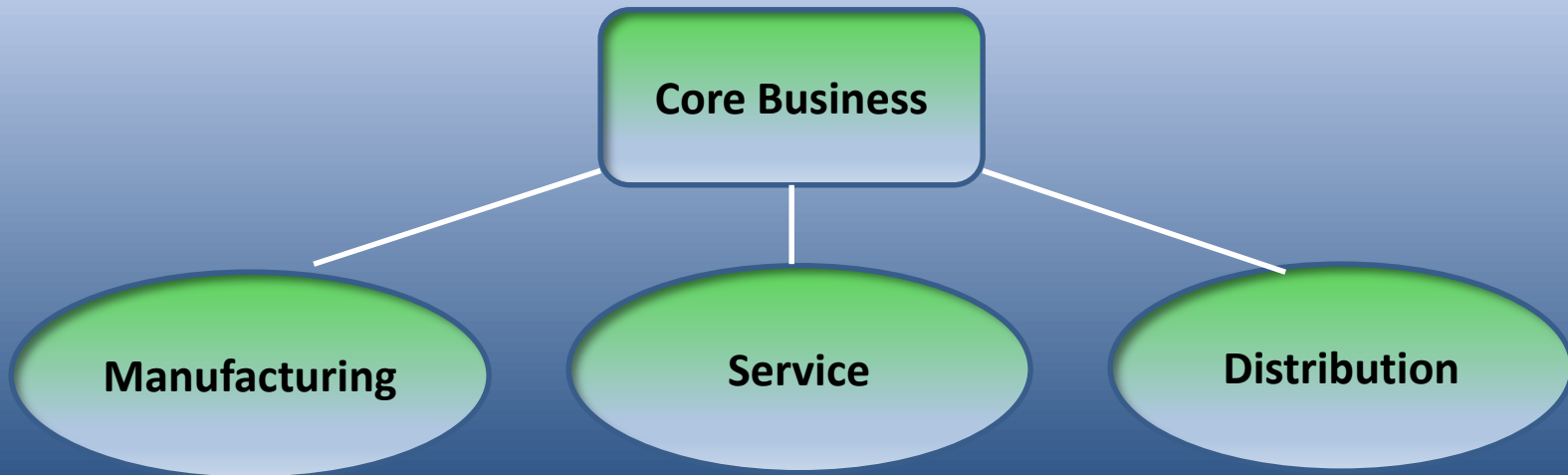
Grant
Opportunities

Financing
Options

- What is my overall range requirement?
- What type of terrain is on the route?
- Is the route fixed or variable?
- Is there a lot of stop/start cycles? (Urban)
- Is there a large proportion of sustained high speed on the route? (Highway)
- Is there a mix of high speed and stop start on the route? (Rural)
- What are the traffic patterns like on the route?
- Is the vehicle used only during certain times of the day or continuously?
- Does the vehicle follow a set route and have specific places along the route where the vehicle will stop for a time greater than 10 minutes?
- Does the vehicle begin the route full of cargo and come back empty or does it go out loaded and return loaded?

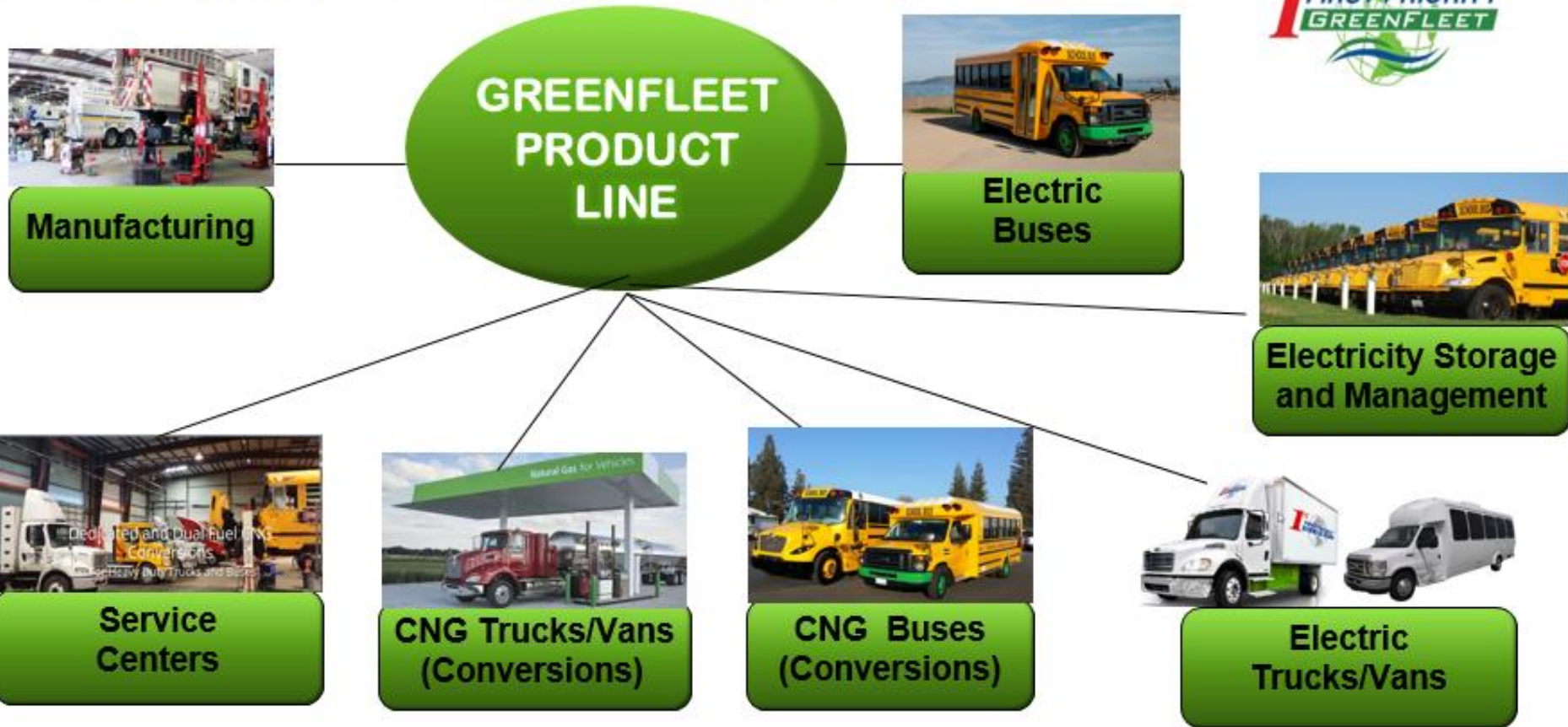
First Priority *GreenFleet*

First Priority GreenFleet, a member company of First Priority Global, brings to market end-to-end solutions for fleets across a full product matrix ranging from Battery Electric trucks and buses to alternative fuel vehicles including CNG, Propane and Clean Diesel. All designed to offer highly reliable performance, significantly reduce total cost of ownership, lower fuel expenses and diminish our client's environmental footprint.



First Priority *GreenFleet*

Service, Manufacturing, Distribution



Manufacturing

Electric Buses

Electricity Storage and Management

Service Centers

CNG Trucks/Vans (Conversions)

CNG Buses (Conversions)

Electric Trucks/Vans



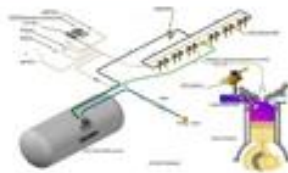
First Priority *GreenFleet*

THE *GREENFLEET* PRODUCT MIX



**Vehicle
Assembly**

Dual Fuel Propane-Diesel JTG-Dynamic



**Dual Fuel Propane
Extenders**



**Electric Bus
Distribution**



**Electric/PHEV
Trucks/Vans**



**Service and
Support**



**Infrastructure and
Electricity Storage/
Management**

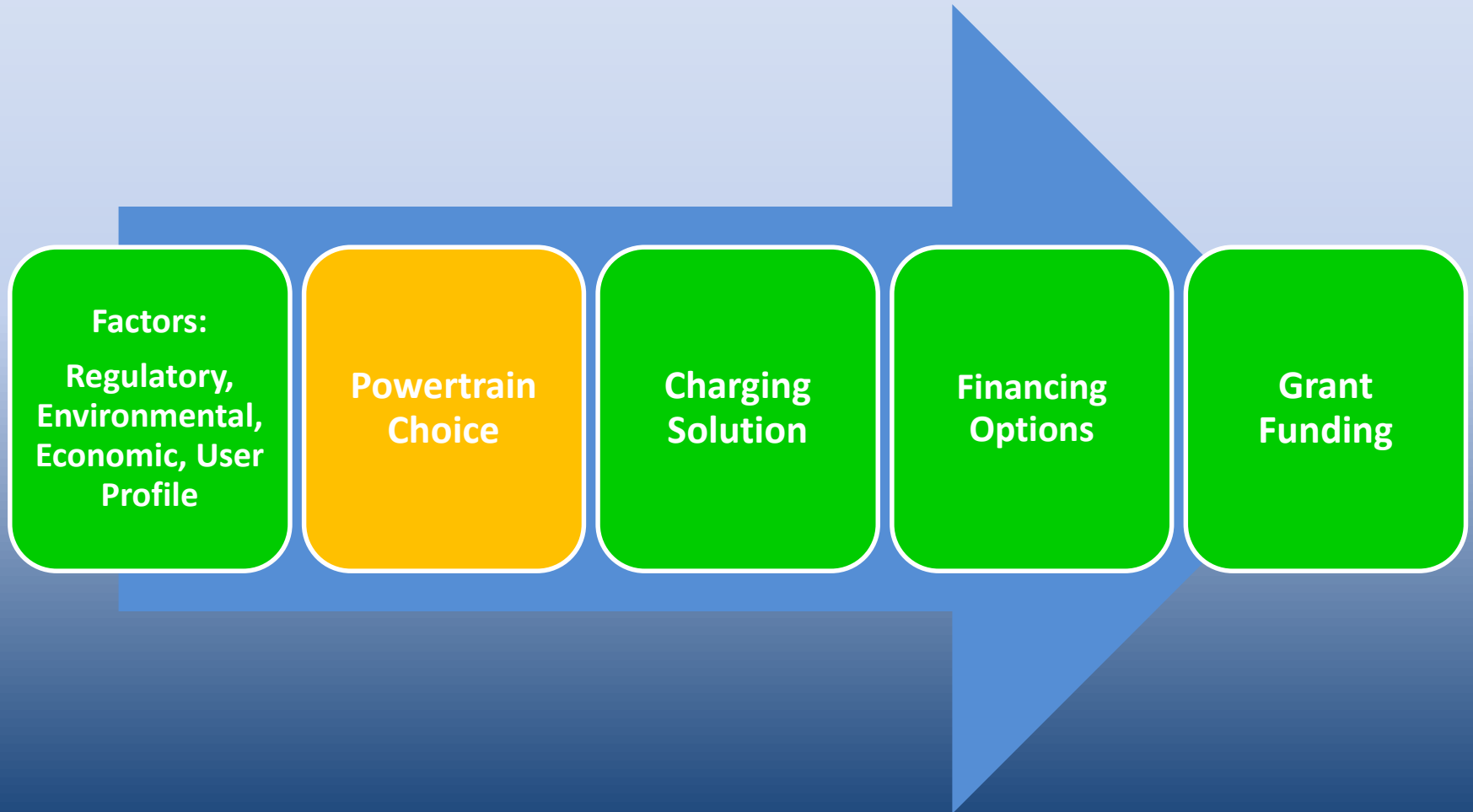


**CNG/Propane
Trucks/Vans
(Conversions)**



**CNG Truck/Buses
(Conversions)**

Pathway to Green: Considerations





Free trucks and buses from fossil fuel

Overview

Sacramento Clean Cities



6/7/2016

Proprietary and Confidential

June 2016



Electrify any Truck



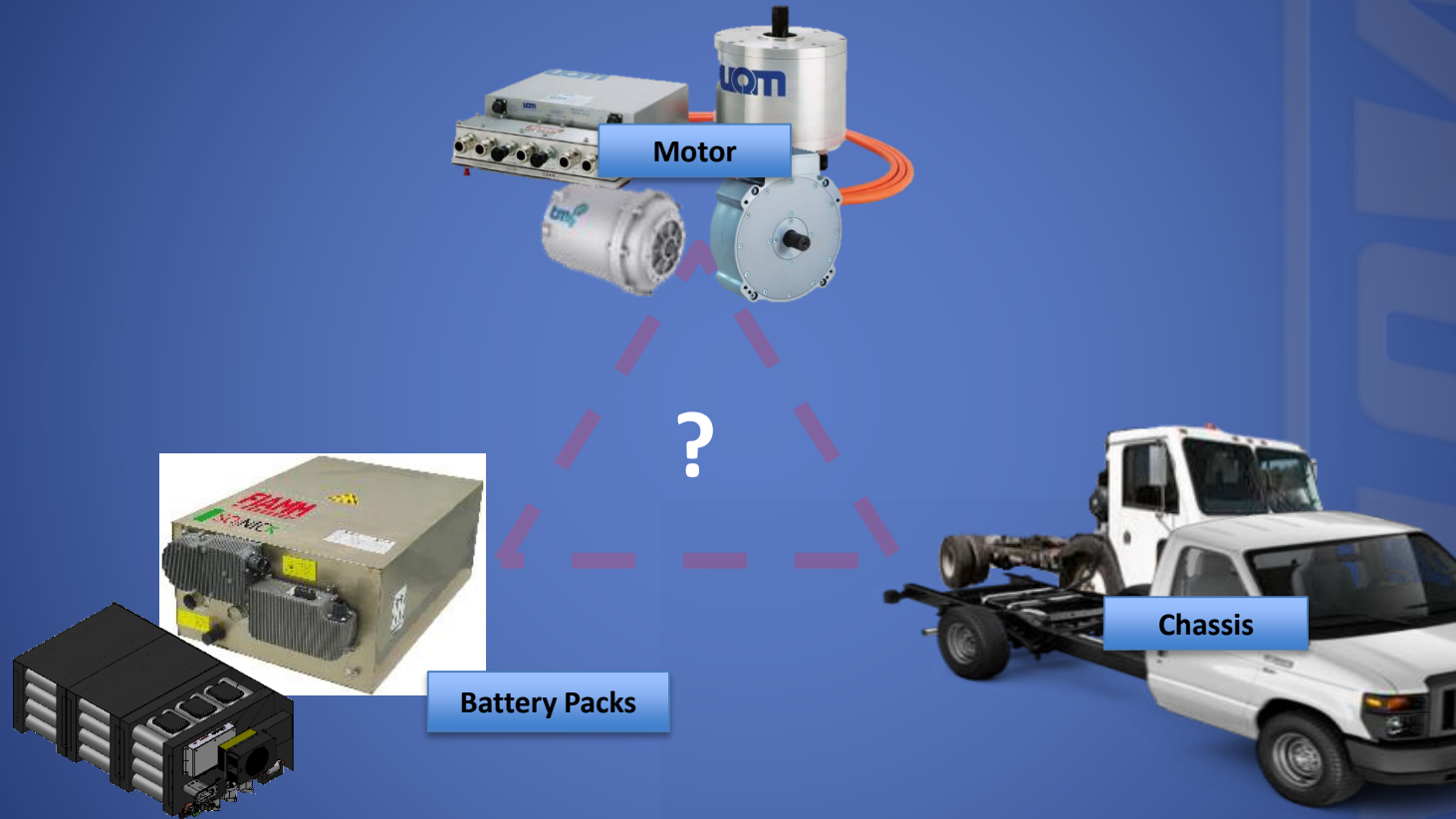
6 Motiv-Powered Electric Vehicles



Motiv's All-Electric Powertrain



The “Missing Piece” for Electric



Components are available, but they don't work together

The Solution:

Motiv's Patented All-Electric Powertrain



Build on standard diesel assembly lines



Motiv Value Chain

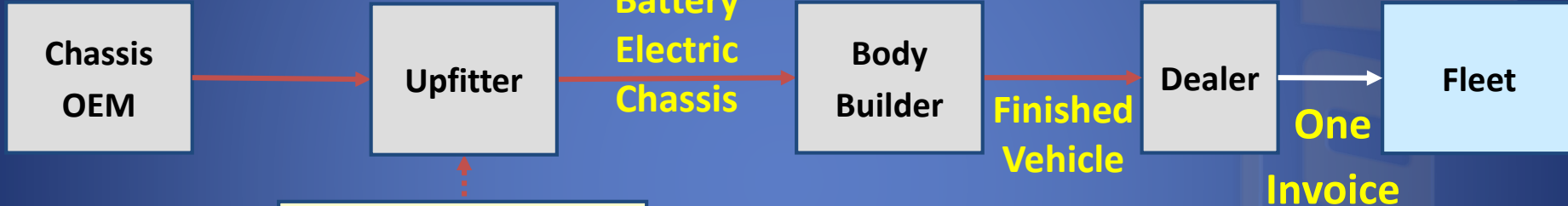


Glider

**Battery
Electric
Chassis**

**Finished
Vehicle**

**One
Invoice**



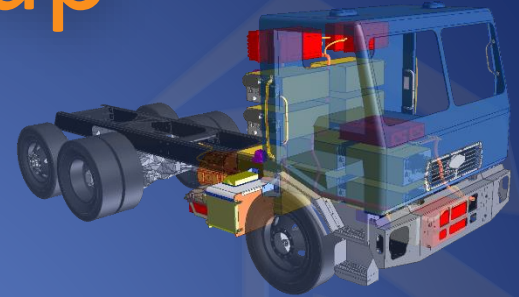
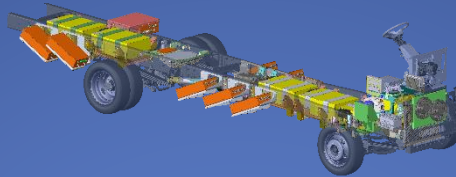
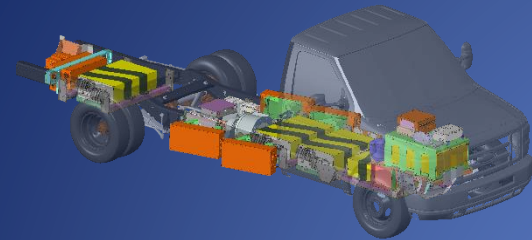
Motiv Electric
Powertrain



Same Build Process as
Natural Gas "kit"



Product Line-up



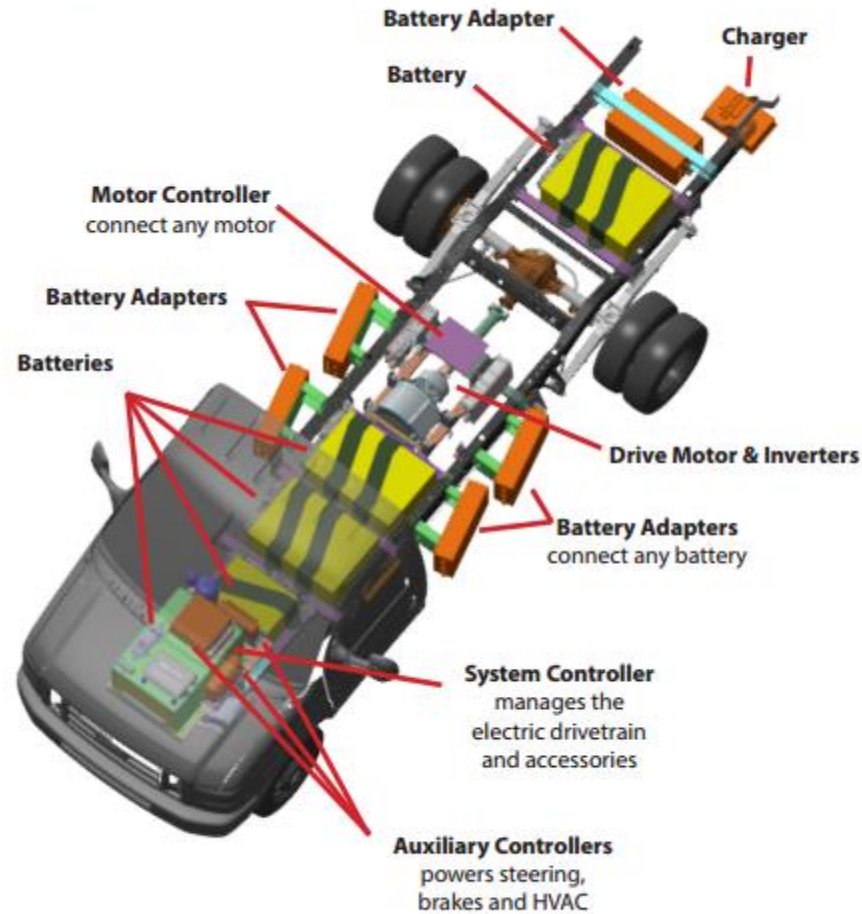
Ford E450	Ford F59	Class 8
Class 4 – 14,500 GVWR	Class 6 – 22,000 GVWR	Class 8 – 66,000 GVWR
68 – 100 miles range	58 – 85 miles range	50 – 80 miles range
8 hr charge time	8 hr charge time	8 hr charge time
School Bus (Trans Tech) Shuttle (Ameritrans) Parcel (Rockport) Flatbed (CTEC)	Parcel (Morgan Olson) Linen (Morgan Olson)	Refuse (Loadmaster) Drayage



Motiv's All-Electric Powertrain

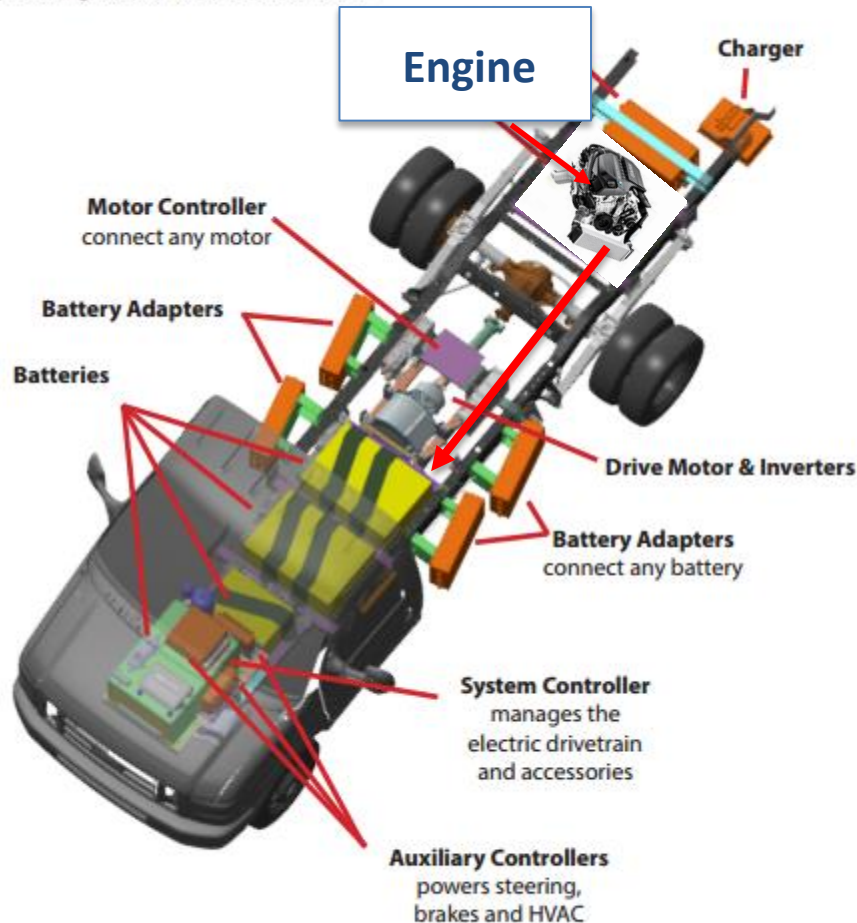
The Motiv All-Electric Powertrain:

Example configuration for Ford E450 Chassis



Different Powertrains

The Motiv All-Electric Powertrain:
Example configuration for Ford E450 Chassis



- **Electric**
- **Series hybrid** - basically an electric powertrain with a range extender (engine) which powers the battery, electric motor always drives the wheels, e.g. Chevy Volt, BMW i3
- **Parallel hybrid** – both engine & motor drive the wheels, e.g. Prius

Complexity

Comparison of Alt-Fuel Vehicles

Alt Fuel Vehicles	Electric	CNG	Diesel	Comment
Applications	Local delivery	medium distance	short /long distance	1/3rd of all trucks do local delivery
Route profile (local delivery)	>100 miles/day, starts & stops, park in depot at night	CNG - medium distance, LNG - long distance	Diesel particulate filters do not regenerate well	EVs most efficient for local routes
Pollution - well-to-wheels	1X	4.5X (6 - 11% lower than diesel)	5X	Numbers from Argonne National Labs, EV has zero tailpipe emissions
Operating Costs	1X	4X	5X	night time charging rates can be even lower
Maintenance Costs	1X	5X	3X	EVs have no oil/fluid changes, regen reduces brake wear
Purchase Costs	2X	1.2X	1X	EV costs will come down as battery costs decrease
Infrastructure Costs	Low charger <\$4K	Very High fueling station costs >\$1M	already in place	Motiv uses inexpensive 208V 3-phase charger



Trans Tech e-series School Bus

Kings Canyon Unified School District
Reedley, CA



6/7/2016

Proprietary and Confidential



Ameritrans ECO-CHARGE



Google /City of Mt View
Free Community Shuttles



e-Cargoport (Rockport)



Delivery Van

Electric Flatbed (CTEC)



City of Santa Ana
Parks & Recreation Dept Work Truck



Morgan Olson Electric WIV



AmeriPride Walk-in-Van
Vernon, CA



Cumberland/Motiv ERV



City of Chicago
E-Refuse Truck

Motiv Today

- Started in 2009, 45 employees
- HQ - Foster City, CA,
- Manufacturing - Hayward, CA
- 15 Motiv-powered vehicles with fleets
- >120,000 VMT total
- >50 vehicles by year end
- ~\$25M in grants, \$9M in private investment
- HVIP approved



Thank You!

Shyam Nagrani

VP Marketing

shyam@motivps.com



Motiv Power Systems

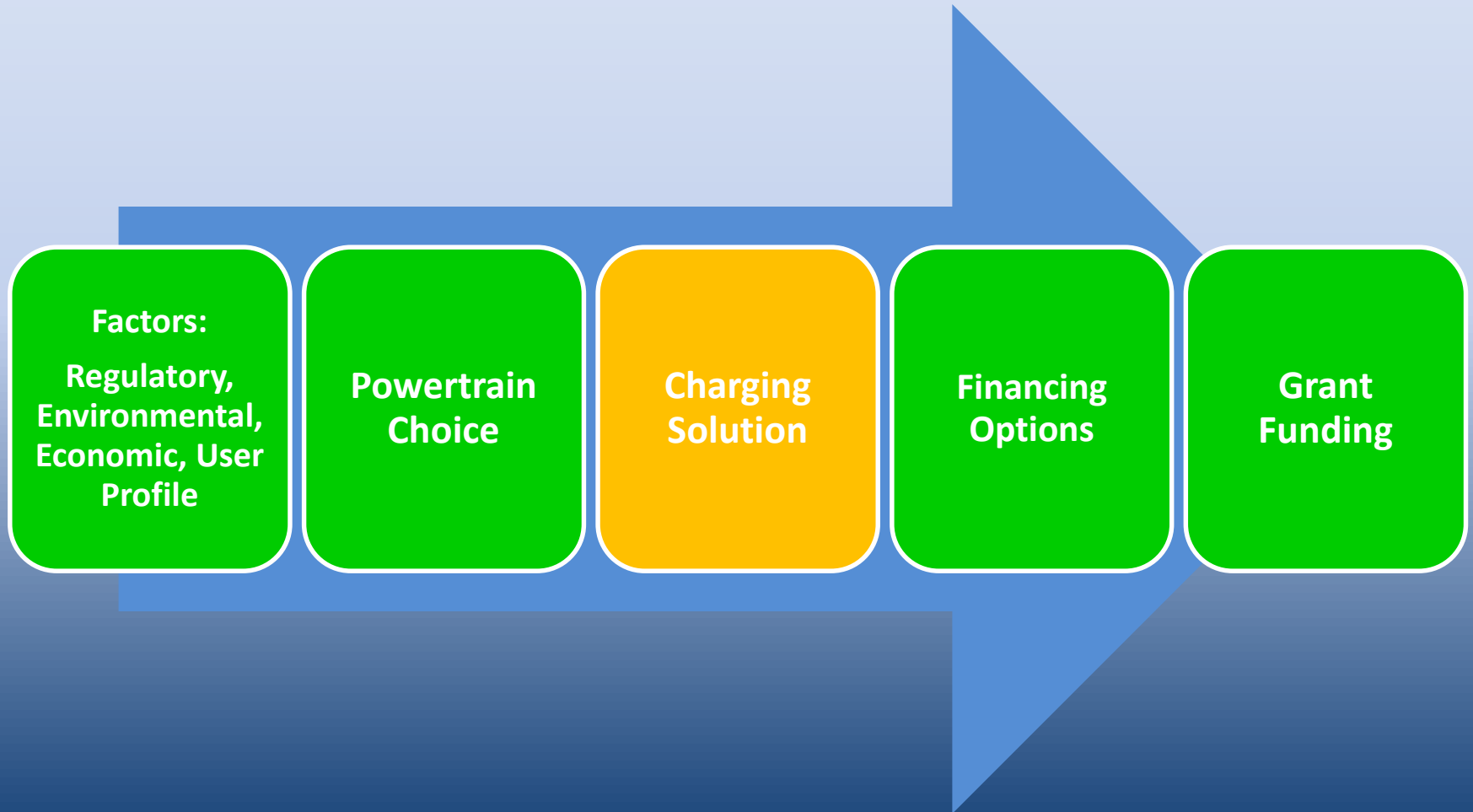
Foster City, CA



www.motivps.com

Proprietary and Confidential

Pathway to Green: Considerations



EV Connect

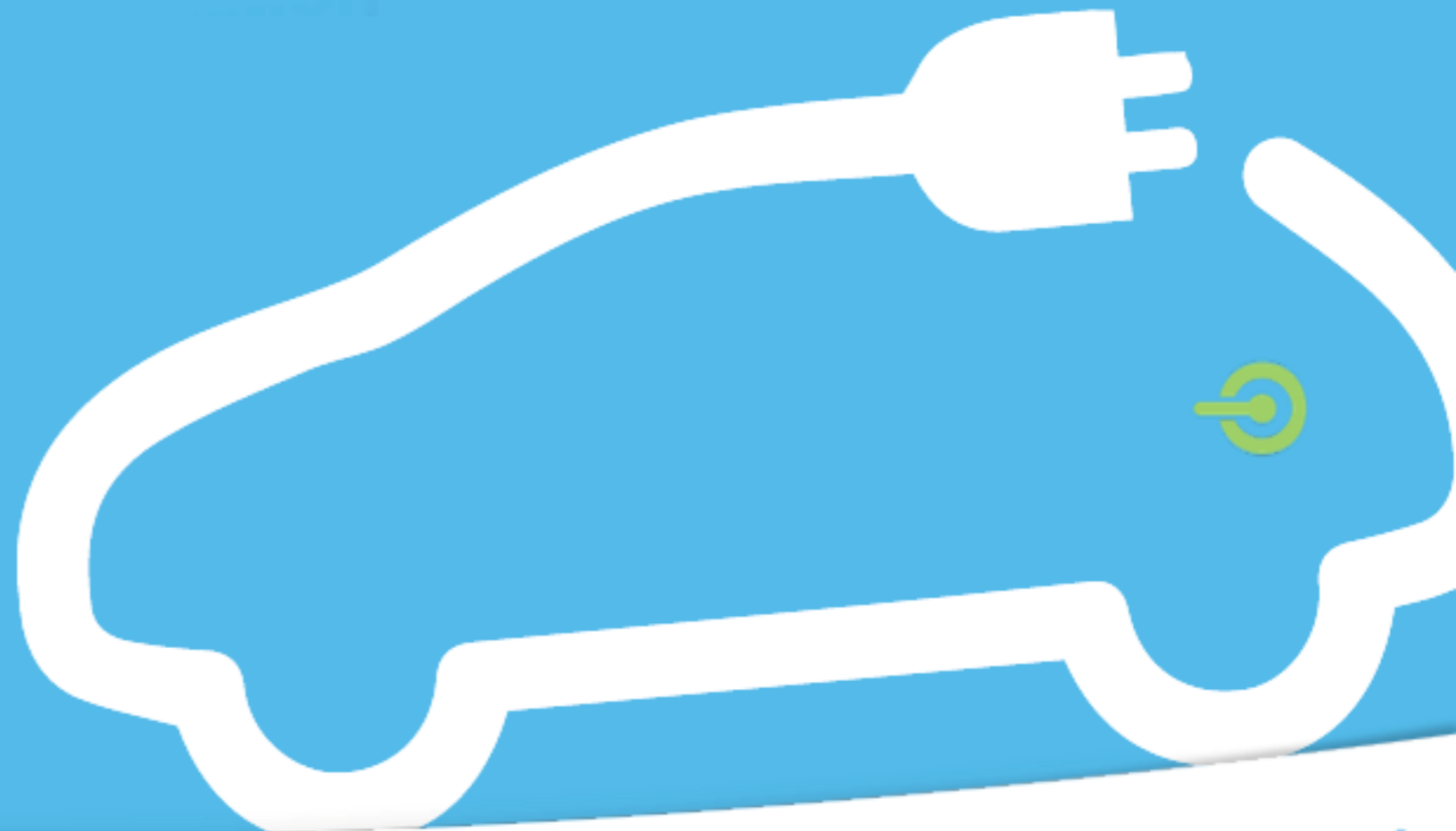
Managing the Electric Vehicle Ecosystem

June 9, 2016

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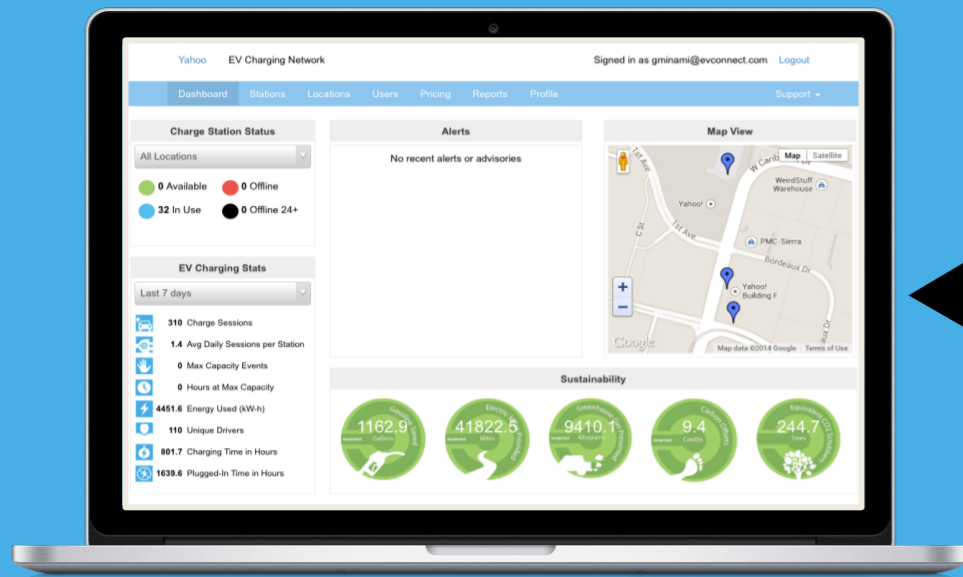


Charging Station Selection Criteria

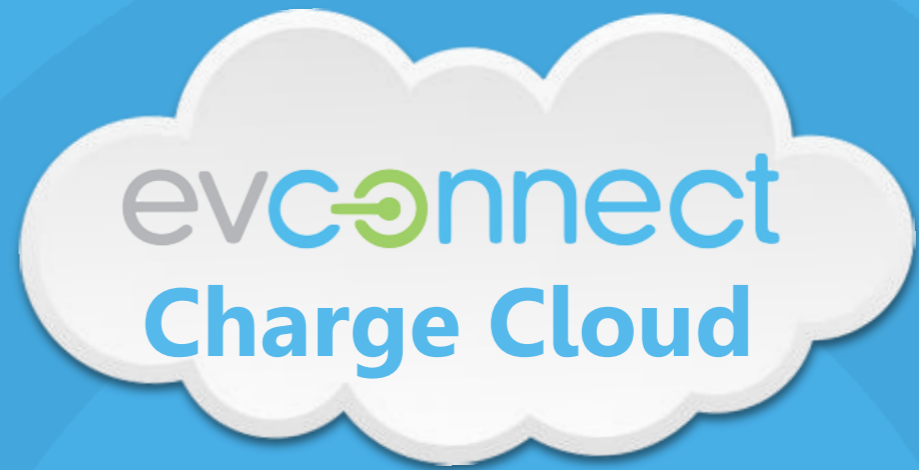
- Number of stations/ports to install
- Networked versus non-networked
- Level 1 versus level 2
- Wall-mount versus pedestal
- Where to install the stations
- Own versus lease
 - CAPEX versus OPEX
 - EV Charging as a Service (starting at \$99/month/port)



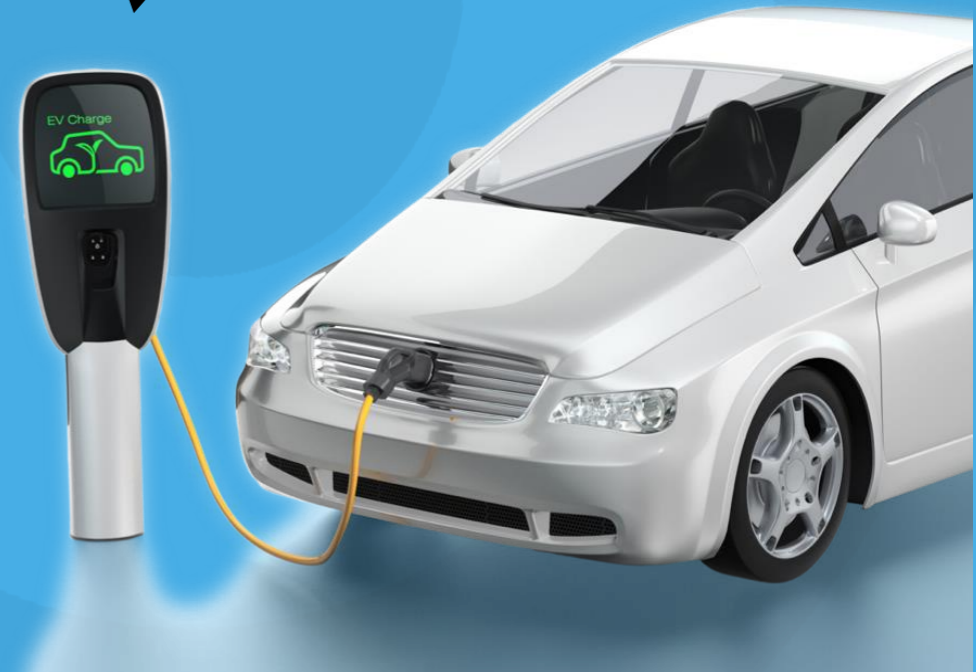
First, Largest, and Most Trusted OCPP Management Platform



Customer Portal



Driver App



Charging Station

Smart Charging for Your Fleets?

- Secure area?
- Non-fleet driver usage? Pay to use?
- Electricity rate savings
 - Lower electricity prices at night
 - Lower demand charges at night
 - Lower demand charges through peak load reduction
- Carbon credits (California and Oregon)

Smart Charging Worth the Extra Cost?

Benefits	5 year ROI
Driver billings for non-fleet employees at \$1/hour	\$5,200
1 cent drop in electricity charges at night	\$350
\$5/kW drop in electricity demand charges at night	\$2,160
Program scheduling of charging to reduce peak load	> \$2,160
Carbon credits in California and Oregon	\$2,000
Control station access, station availability, LEED points, reporting, charge station health, etc.	\$X

* Stations used 20 hours/week

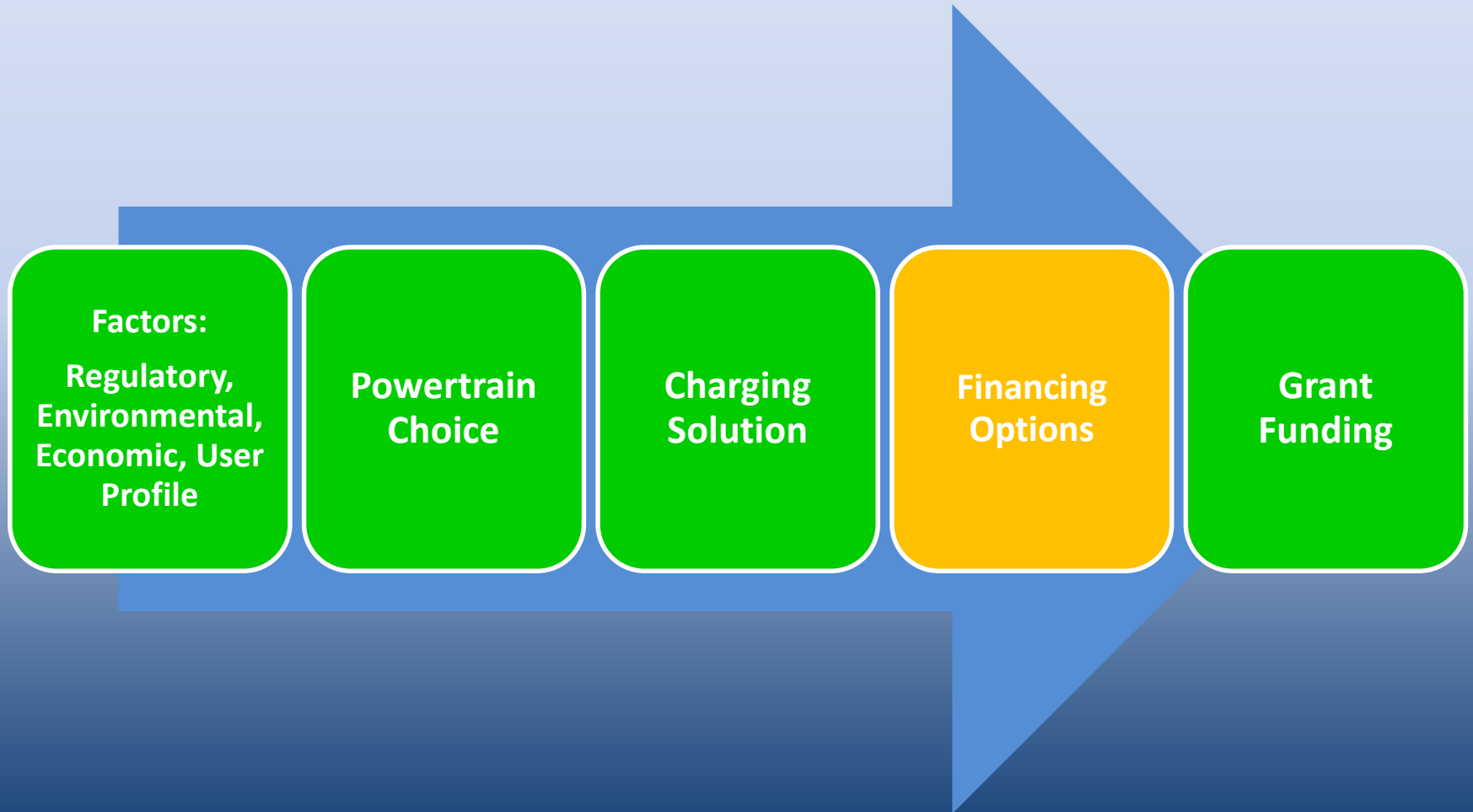
Thank You

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Pathway to Green: Considerations





California Infrastructure and
Economic Development Bank



CALIFORNIA INFRASTRUCTURE AND ECONOMIC DEVELOPMENT BANK (IBANK)

- The legislature created IBank in **1994** to finance public **infrastructure** and private **development** that creates **jobs** and a strong **economy** to improve the **quality of life** for the people of California.
- IBank has **broad authority** to issue tax-exempt and taxable revenue bonds, provide financing to **public agencies**, leverage State and Federal funds and more.

OUR FINANCING PROGRAMS



**California Lending for
Energy and Environmental
Needs Center**



**Infrastructure State
Revolving Fund
Program**



**Bond Financing
Program**



**Small Business
Finance Center**



California Lending for
Energy and Environmental
Needs Center

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

CLEAN CENTER

Aims to aid in achieving

California's **Greenhouse Gas**

Reduction Goals;

Drive down the cost of

clean **energy**, water **conservation** and

environmental projects; and enhance market

confidence in green investing.

PRIMARY FOCUS: PUBLIC BORROWERS IN THE MUSH MARKET



M

Municipalities



U

Universities



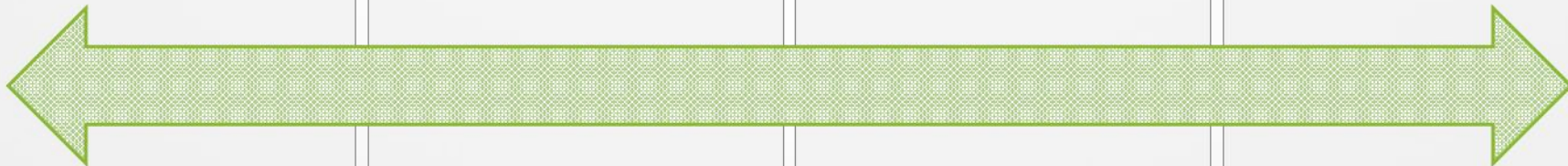
S

Schools



H

Hospitals





California Lending for Energy and Environmental Needs Center

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

DIRECT FINANCING

Funding available in amounts
ranging from
\$500 thousand to \$30 million

Terms for the useful-life of the
project

Up to 100% eligible project
costs financed





INTEREST RATE METHODOLOGY

Benchmarked to Thompson
Reuters Municipal Data (MMD)
Index

Subsidized based upon:

- Air Quality Index

Lower transaction costs

Better than a public offering

TYPES OF CLEAN ENERGY PROJECTS



Alternative Technologies

- Electric Vehicle (EV) charging stations, energy storage, transmission, distribution, alternative technologies, alternative fuels



Conservation

- Energy efficiency retrofits, Light Emitting Diode (LED) lights, Building automation and controls

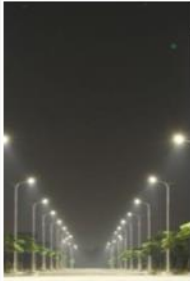


Generation

- Renewable energy, solar, wind, biomass, hydroelectric

STATEWIDE ENERGY EFFICIENCY PROGRAM (SWEEP)

COMPREHENSIVE ENERGY EFFICIENCY IMPROVEMENTS TO NEW AND EXISTING FACILITIES, SUCH AS:



Light Emitting Diode (LED) Street Lighting



Advance metering systems



Data Center, information technology, communications



Energy management and/or control systems



Heating, ventilation and air conditioning system



Thermal and electric energy storage



CITY OF HUNTINGTON BEACH

STREET LIGHT ACQUISITION AND LED RETROFIT PROJECT



As IBank's first CLEEN project,

the loan assisted in the acquisition and retrofit of more than **11,000 streetlights**

with new Light Emitting Diode (LED) technology

with an expected **3.5 million kilowatt-hours** of annual energy savings in the first year.

Loan Amount:

- \$3,000,000

Interest Rate:

- 2.32%

Loan Term:

- 10 years



Infrastructure State
Revolving Fund
Program

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

ISRF DIRECT LOAN PROGRAM

Direct **financing** to public borrowers and non-profit organizations sponsored by public entities for a wide variety of **infrastructure** and **economic development** projects.



**Infrastructure State
Revolving Fund
Program**

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

ISRF offers funding available from
\$50 thousand to \$25 million;
terms for the useful-life of
the project **up to 30-years;**
and up to **100%** of eligible project cost
financed.

EXAMPLES OF ELIGIBLE PROJECTS



Water, Sewage, Flood Control
and Waste



Streets, Highways, Public Transit and
Public Safety Facilities



Educational, Cultural, Social, Parks
and Recreational Facilities



Power and Communications



Ports and Goods Movement Related
Infrastructure

CITY OF SAN GABRIEL

FUNDS HELPED “ACCELERATED GREAT STREETS
PROGRAM PROJECT”

“The bottom line is this financing
is **needed** to complete a
project of this size.”

-Mayor, Jason Pu

Loan Amount:

▪ \$3.8 million

Interest Rate:

▪ 3.5%

Loan Term:

▪ 15 years





Bond Financing Program

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

BOND FINANCING PROGRAM

Provides tax-exempt and taxable conduit revenue bond financing for:

Qualified **nonprofit** public benefit corporations

Eligible **manufacturing** and processing companies

Government agencies

Privately owned facilities that provide services to the general
public



**Small Business
Finance Center**

CALIFORNIA INFRASTRUCTURE AND
ECONOMIC DEVELOPMENT BANK

SMALL BUSINESS FINANCE CENTER (SBFC)

Provides **loan guarantees**

for small businesses that experience

barriers to capital,

aiding in the **creation and retention of jobs**

and encouraging investment in low- to moderate-
income communities.



SMALL BUSINESS LOAN GUARANTEE PROGRAM (SBLGP)

Since **1968**,
the SBLGP has guaranteed
over **30,000** loans to lending
institutions that are
committed to helping
small businesses

grow and prosper in
California and their
communities.

modern-twist^o

designing a **plastic-free** planet



Emeryville-based Modern-twist has pioneered the use of pure, food-grade, hand-silk screened silicone products. Owner, Kat Nouri believes what we eat on should be as pure as what we eat.

“ IBank’s loan guarantee is a **game changer** for me. I can actually grow my business and go into mass distribution with my products now. Other **traditional loans didn’t work for my business** and this one really makes a difference. ”

-Kat Nouri, owner

Total Loan Amount:

■ \$450,000

Interest Rate:

■ 5.25% (term loan)

Guarantee Term:

■ 7 years (term loan)

APPLICATIONS CONTINUOUSLY ACCEPTED

Call us and discuss your projects.

IBank representatives provide technical assistance and work with you throughout the process.

No matching funds requirement - may serve as matching funds for other financings.

No federal overlays.

Final approval by IBank Board of Directors





California Infrastructure and
Economic Development Bank

CONTACT US



CLEEN Center

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ISRF Loan Program

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Bond Financing Program

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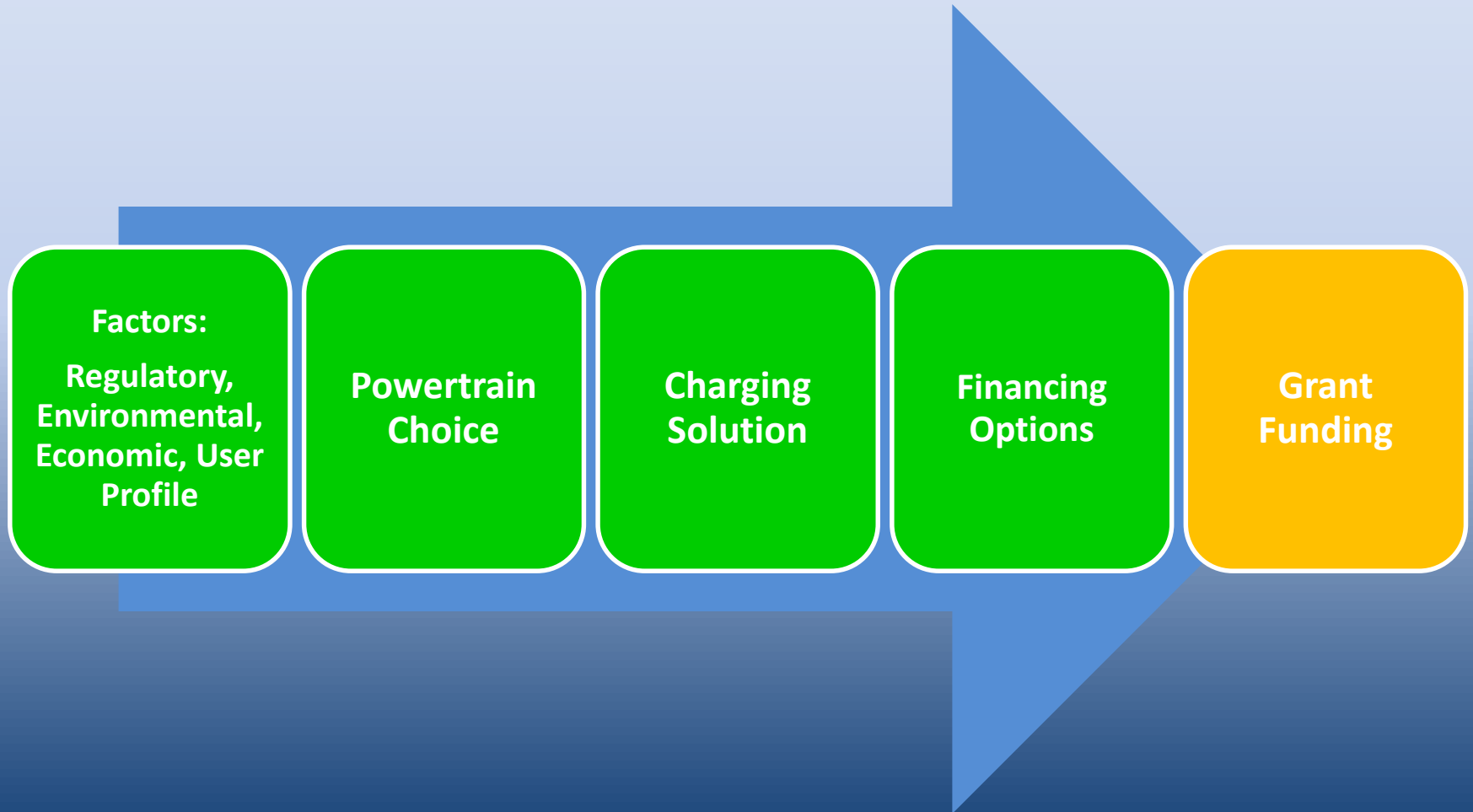
Small Business Finance Center

Nancee Trombley
SBFC@ibank.ca.gov

Telephone: (916) 341-6600

Website: www.ibank.ca.gov

Pathway to Green: Considerations



Heavy Duty Diesel Truck Funding in Sacramento

Kristian Damkier

Sacramento Metropolitan AQMD

June 9, 2016

Overview

- * District Overview
- * Sacramento Federal Nonattainment Area
- * Sacramento Emergency Clean Air Transportation (SECAT) Program
- * Proposition 1B Funding Development
- * Other Incentive Options

Sacramento Metropolitan AQMD

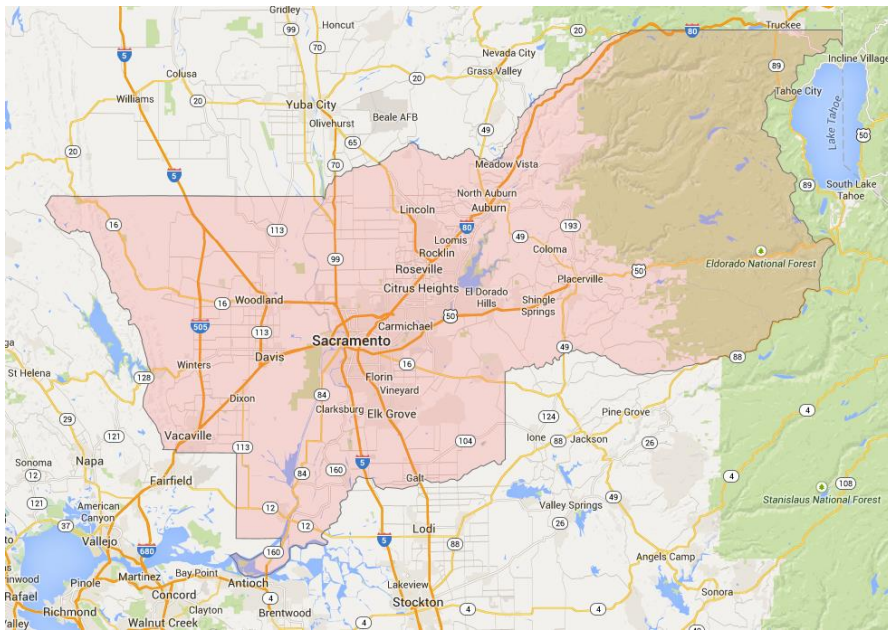
- * Local government agency in Sacramento County
- * Regulate sources of air pollution to protect human health
- * Coordinate with state and federal agencies to clean up mobile sources

SACRAMENTO METROPOLITAN



AIR QUALITY
MANAGEMENT DISTRICT

Sacramento Federal Ozone Nonattainment Area



- * Sacramento, Placer, El Dorado, Yolo, Solano, and Sutter Counties
- * Does not meet federal health standards for air pollution
- * Most pollution comes from cars, trucks, trains, and other mobile sources

Incentive Funding

- * Applicants must be compliant with all ARB rules and regulations and local air district rules (if applicable)
- * Funding cannot be used to help immediate compliance issues – only help fleets prepare for future targets
- * Replacement trucks must use DEF (2010-compliant) or alternative fuels and operate mainly in California
- * Staff can review and approve applications quickly

SECAT Program

- * Created in 2000 to reduce pollution from trucks
- * Funding replacement of older trucks with new clean vehicle projects
- * Up to \$60,000 per vehicle
- * Funding based on engine model year and historic operation in the SFNA



Who is Eligible for SECAT?

- * Heavier heavy-duty diesel vehicles with a 2009 & older engine (GVWR over 26,000 lbs.) equipped with a diesel particulate filter
- * All lighter heavy-duty diesel vehicles (GVWR between 14,001-26,000 lbs.) with a 1999-2006 model year engine
- * Registered Work Trucks (Currently WT – Previously Construction CT) with 2005 & 2006 model year engines driving less than 20,000 miles per year
- * Limited Mileage Agricultural Trucks (AG) with any 2006 & older engine driving less than 15,000 miles per year
- * Trucks compliant with other ARB regulations (e.g. Public Fleets, Solid Waste Collection Vehicles, Transit Fleet Rules)

Proposition 1B Funding



- * Accepting applications through April 15, 2016
- * Not required by regulation
- * All fleets eligible for alternative fuel replacement
- * Small Fleets may be eligible for diesel replacement
- * Up to \$200,000 per truck for zero emission vehicles

Alternative Fuel Vehicle Funding Table

Truck Class	Old Engine MY	Technology	Max Funding
Class 7 & 8	2009 or older	Zero Emission	\$200,000
		Hybrid / ZEV	\$150,000
		Ultra Low NOx	\$100,000
		Standard Hybrid	\$80,000
		Natural Gas	\$65,000
Class 6	1998 – 2009	Zero Emission	\$100,000
		Hybrid / ZEV	\$65,000
		Ultra Low NOx	\$50,000
		Standard Hybrid	\$45,000
		Natural Gas	\$40,000

Other Incentive Options

- * SMAQMD Carl Moyer Program
 - * Funding for off-road diesel equipment replacement
 - * Diesel ag pump electrification
 - * Other source categories
- * Clean Vehicle Rebate Project
 - * Up to \$5,000 for personal electric or fuel cell cars
- * Hybrid Voucher Incentive Project
 - * Up to \$120,000 for hybrid & electric heavy-duty trucks

Contact Information

- * SECAT – www.4secat.com
- * Carl Moyer Funding – www.airquality.org
- * CVRP – www.energycenter.org/clean-vehicle-rebate-project
- * HVIP – www.californiahvip.org/default.aspx
- * Kristian Damkier
 - * kdamkier@airquality.org
 - * (916) 874-4892