Telematics:
Insights to actions

Panel for Data for Sustainability & Success
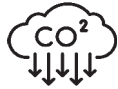
Steve Hemenway, Integrated Partnerships, Verizon Connect

August 2023

6 ways telematics supports sustainability

Make an impact

Use fuel efficiently

Plan ahead

Coach Drivers

Maintain equipment & vehicles

Go completely paperless

The right data for the right actions

By automating data gathering, a
fleet manager can get to key
issues fast and prepare reports
for the whole fleet operation.

Actionable data benefits...

- **Monitor** speeding, idling, harsh braking and other driver behaviors
- **Track** essential business details
- **Analyze** operation to improve routes, labor costs, asset utilization, and downtime
- Accurately **plan** for capacity and reduce overtime
- **Review** progress toward achieving and maintaining KPIs, budgets or goals
- Near real-time planning and analysis to measure actual **performance against plan**

Variety of data categories available

Driver

Vehicles

Groups

Assets

Geofences

Video

Logs

Assignments

Alerts

Users

Work Orders

Safety

Electric Vehicles

Fuel

Diagnostics

Data 'on the move'

Fleet data surfaces in multiple forms including pre-built, BYO, or partner solutions
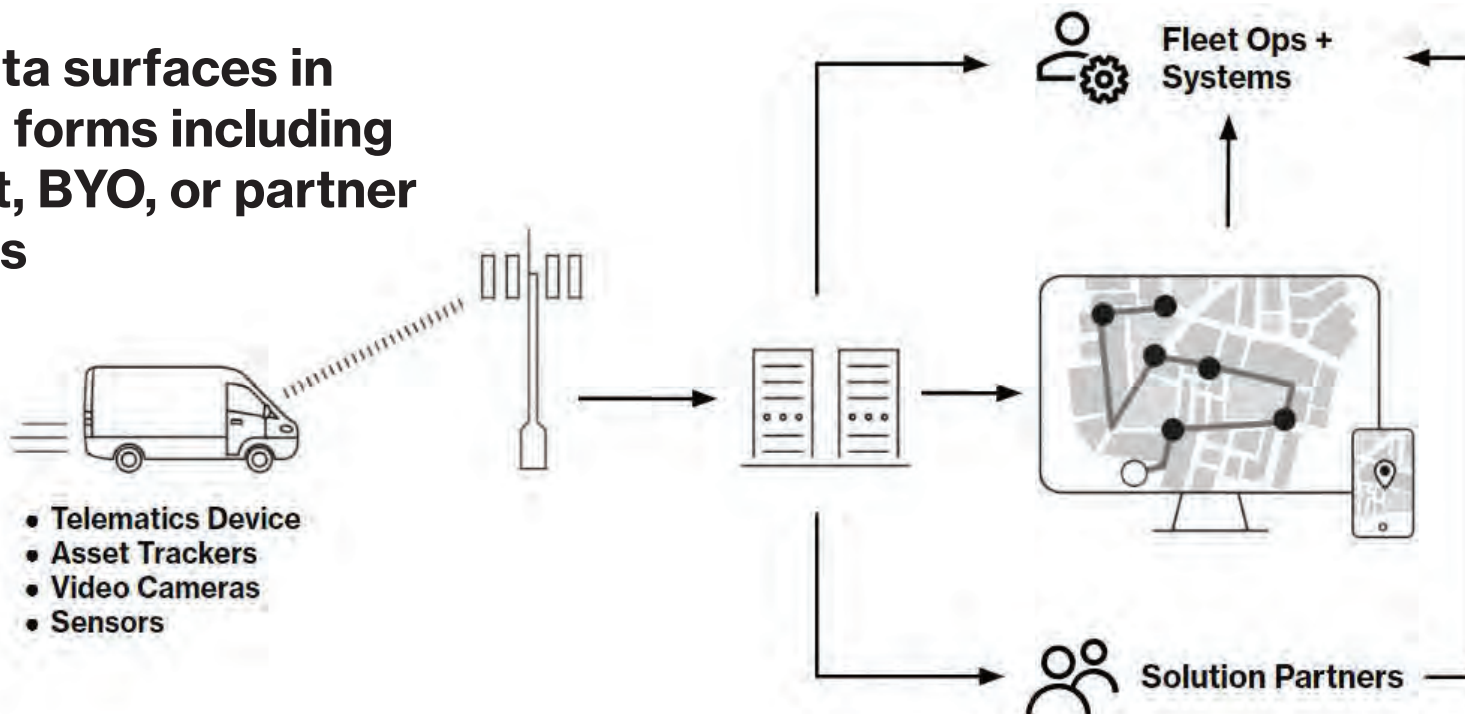
- Telematics Device
- Asset Trackers
- Video Cameras
- Sensors

Fleet Ops + Systems

Solution Partners

Pre-built reports, alerts & dashboards

Productivity	Sustainability	Costs	Safety	Compliance
Daily **Cost analysis** **Sensor activity** **Geofence** **Work orders** **Travel stops** **Time spent** **User activity**	**Emissions** **EV Suitability** **Carbon Footprint**	**Maintenance** **Labor** **Fuel Costs** **Idling**	**Video** **Harsh Driving** **Exception** **Speeding** **Driving Style**	**Driver log** **Inspections** **Hours of Service**

Data available in configurable reports, graphs, maps, and dashboards

Pre-built data views to inform plans

EV Suitability Tool

Replace **41% of your fleet** with **Electric Vehicles (EVs)**

See which of your vehicles are suitable for replacement with EVs. The information here is updated daily and is based on your fleet's activity over the last eight weeks.

Learn about EV suitability calculations

For accurate calculations, ensure you have selected the fuel type for each of your existing EVs as 'Battery Electric Vehicle' on the Vehicle information tab.

Your fleet's EV suitability

Vehicles suitable for replacement with EVs: 41%

- 238 EV Suitable
- 20 Existing EVs
- 328 Other

Estimated savings and reductions (per annum)

Total fuel cost savings	Fuel savings	CO2 savings
$459,344	174,926 gal	949 metric tons

Most suitable vehicles

Top Recommendation | Recommendation #2 | Recommendation #3

TX_043 — EV suitability: Excellent, Vehicle Size: Medium-duty

Daily distance (average): 60 mi
Daily distance (maximum): 92 mi
Efficiency (average): 16 mpg

Estimated EV range: 144 mi
Estimated efficiency: 2 mi/kWh

Total fuel cost savings: $5,460 per annum
CO2 savings: 12 metric tons

Daily distance (maximum) | Estimated EV range (144 mi)

Your 238 most suitable vehicles for replacement with EVs   EXPORT CSV

VEHICLE NAME	PRIMARY GROUP	DAILY DISTANCE (MAXIMUM)	DAILY IDLING TIME (AVERAGE)	CO2 SAVINGS	FUEL SAVINGS	COST SAVINGS	EV SUITABILITY	VEHICLE SIZE	ESTIMATED EV RANGE	ESTIMATED EFFICIENCY
TX_043	GROUP	92 mi	7h 4m	12 metric tons	1904 gal	$5,460	Excellent			
FL_552	GROUP	84 mi	8h 40m	3 metric tons	1466 gal	$4,235				
GRO_764	GROUP	225 mi	8h 7m	6 metric tons						

EV Summary

Carbon Footprint Report

Fuel Purchase Report

Fuel Efficiency Report

Lost Fuel Report

Idling Report

Driving Style

Developer Portal

Allows customers & solution partners to access fleet data for development of ...

- Fleet applications
- Data commingling
- Analytics
- Process automation
- Reports and alerts
- GIS
- Consulting services

Simplified data sharing to increase speed to decision-making

BYO - Integrate data into your business ops

There are many use cases where fleets ingest data into business systems for specific purposes.
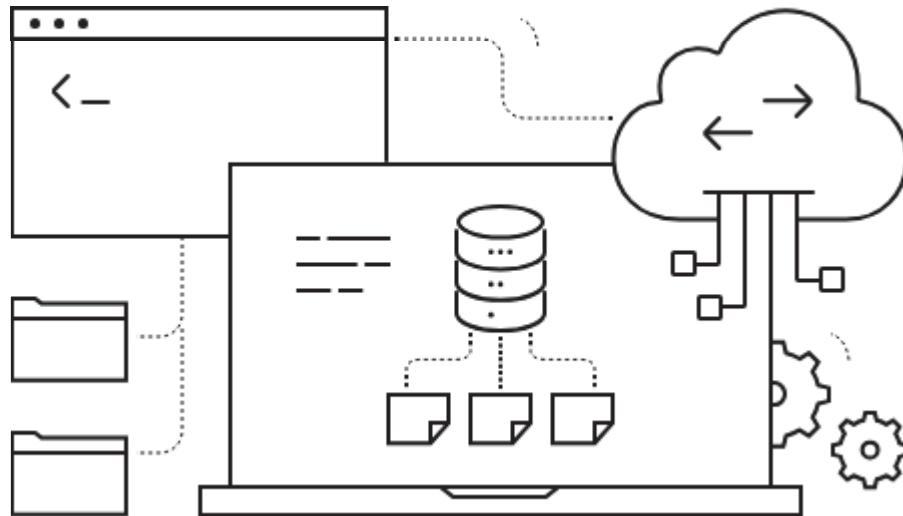
- **Planning**
- **Preparedness**
- **Procurement**
- **Performance**
- **People**
- **Paperless**

Your company → Open API platform

- Video
- BI and data analytics
- Field service management
- Critical systems
- Fuel tax reporting
- Fleet management
- Routing
- CRM/ERP
- Transportation
- Partners
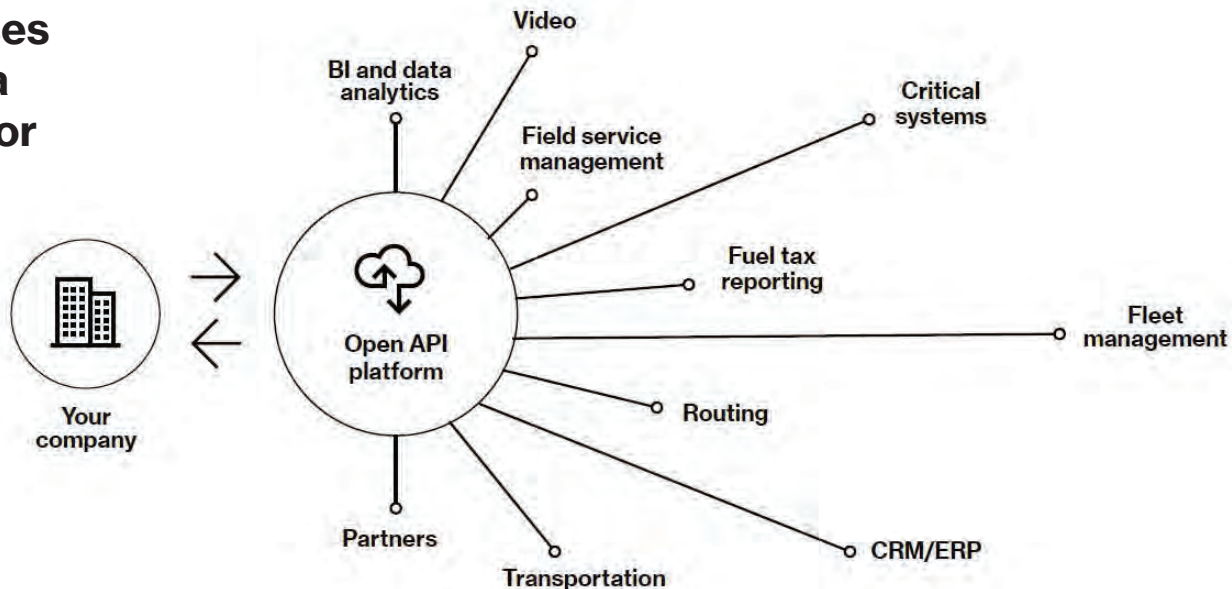
Solution partners with more tools and insights

- **Growing industry of thousands of integrated solution providers with highly specialized capabilities for electrification, GIS, M&R, ESG, and consulting services**
- **Many pre-integrated with telematics for easy fleet data access.**
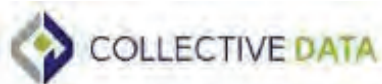
We're in this together

New fleet challenges pose new questions

- **Community has wealth of experience and fleet leaders to share insights and mentor talent**
- **Large ecosystem of technology partners and solutions**

Resources

2023 Fleet Technology Trends Report

22 Reports for Fleets

Data Privacy for Fleet Managers

Developer Portal

Electric Vehicle Fleet Solutions

Short Term Needs
A
Strategic Outlook

SMART AUTOMATION & COSTS RECOVERY

Strategic Outlook

Consider
Scenarios
Forethought

Discuss
Forethought
Business Knowledge
Business Intelligence

Plan
Future Risk Mitigation
Risk Encouragement

Business Intelligence (BI) Maturity Levels

Management Restructuring

Level A
Unorganized

Level B
Operational Reports

Level C
Management Dashboards

Level D
Service Analysis

Level E
Data Driven Solutions

- *As needed data reports*
- *Heavy spreadsheet usage*
- *Staff Experience Single point of failure*

- *Uses data from Transactional Systems*
- *Manual Data Reporting*
- *True Reporting on "What's Happening"*

- *Executive Level Report Needs*
- *Agency Driven Dashboard*
- *Better Insights/Trends*

- *Business User Driven Analysis*
- *Data Exploration across the Enterprise*
- *In-depth Automation*

- *Advanced Predictive Analysis*
- *Big Data Core Capabilities*
- *Critical Points*

07.19.2022

Automation Strategy

Test Scenario

2023 Month 01	2023 Month 03	2023 Month 04	2023 Month 06	2023 Month 08
Test Case Execution	Environmental Support	Attribute and Test Development	Automation Feasibility Analysis	Test Strategy
Step 1	Step 2	Step 3	Step 4	Step 5

11.09.2023

Key Fleet Management Activities
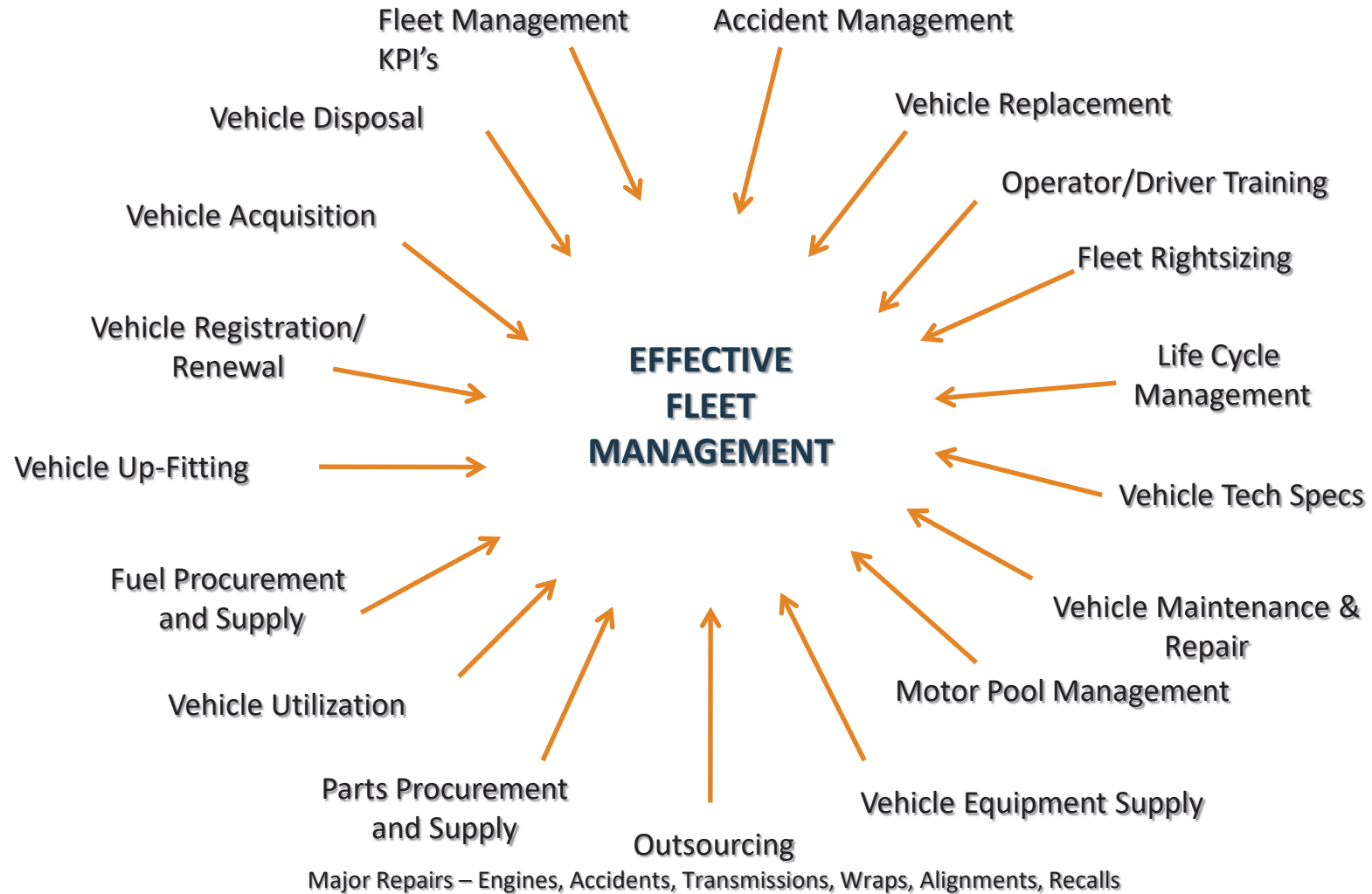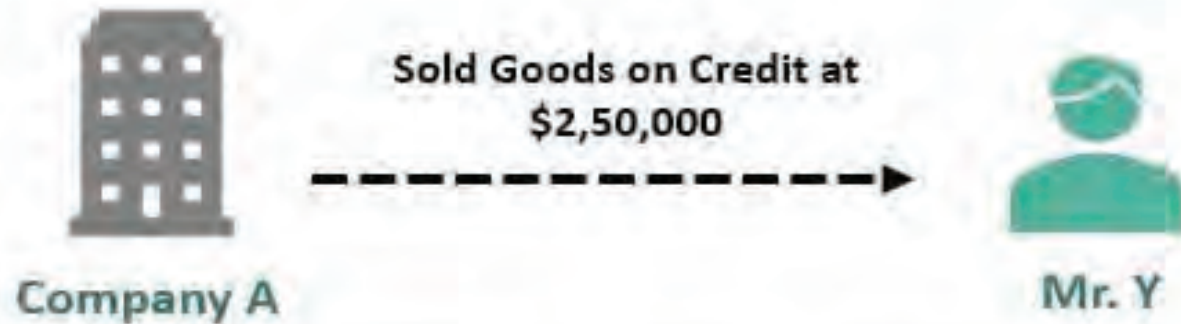
Fleet Management KPI's

Accident Management

Vehicle Replacement

Vehicle Disposal

Operator/Driver Training

Vehicle Acquisition

Fleet Rightsizing

EFFECTIVE FLEET MANAGEMENT

Life Cycle Management

Vehicle Registration/ Renewal

Vehicle Tech Specs

Vehicle Up-Fitting

Fuel Procurement and Supply

Vehicle Maintenance & Repair

Vehicle Utilization

Motor Pool Management

Parts Procurement and Supply

Vehicle Equipment Supply

Outsourcing

Major Repairs – Engines, Accidents, Transmissions, Wraps, Alignments, Recalls

Cost Recovery Method

Smart City Concept Connectivity

Intelligent Infrastructure

BIG DATA **BUSINESS MODEL** MATURITY INDEX

Measures degree to which organizations have integrated data and analytics into their business models

Key Business Processes

Economic Drivers

BUSINESS MONITORING

BUSINESS INSIGHTS

Prescriptive Recommendations

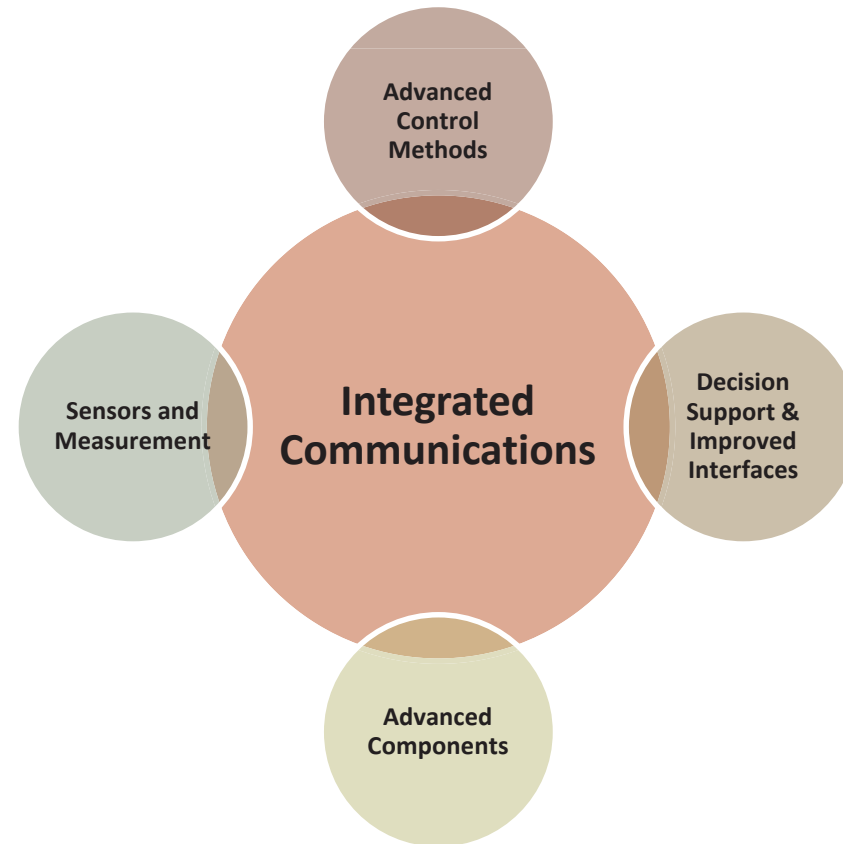BUSINESS OPTIMIZATION

INSIGHTS MONETIZATION

BUSINESS METAMORPHOSIS

The Technology Affect

V2V/V2C/V2I

- Vehicle to Vehicle
- Vehicle to Command
- Vehicle to Infrastructure

At DPW-FMA
We must answer the demand for service
Thru Connectivity and Smart
Innovation

Where are we going

Pilot Program

Timeline
- Start to finish
- Move-in vs. move-up

Effective Efficiency
- Tracking standards
- Industry measurements

Contractual Needs
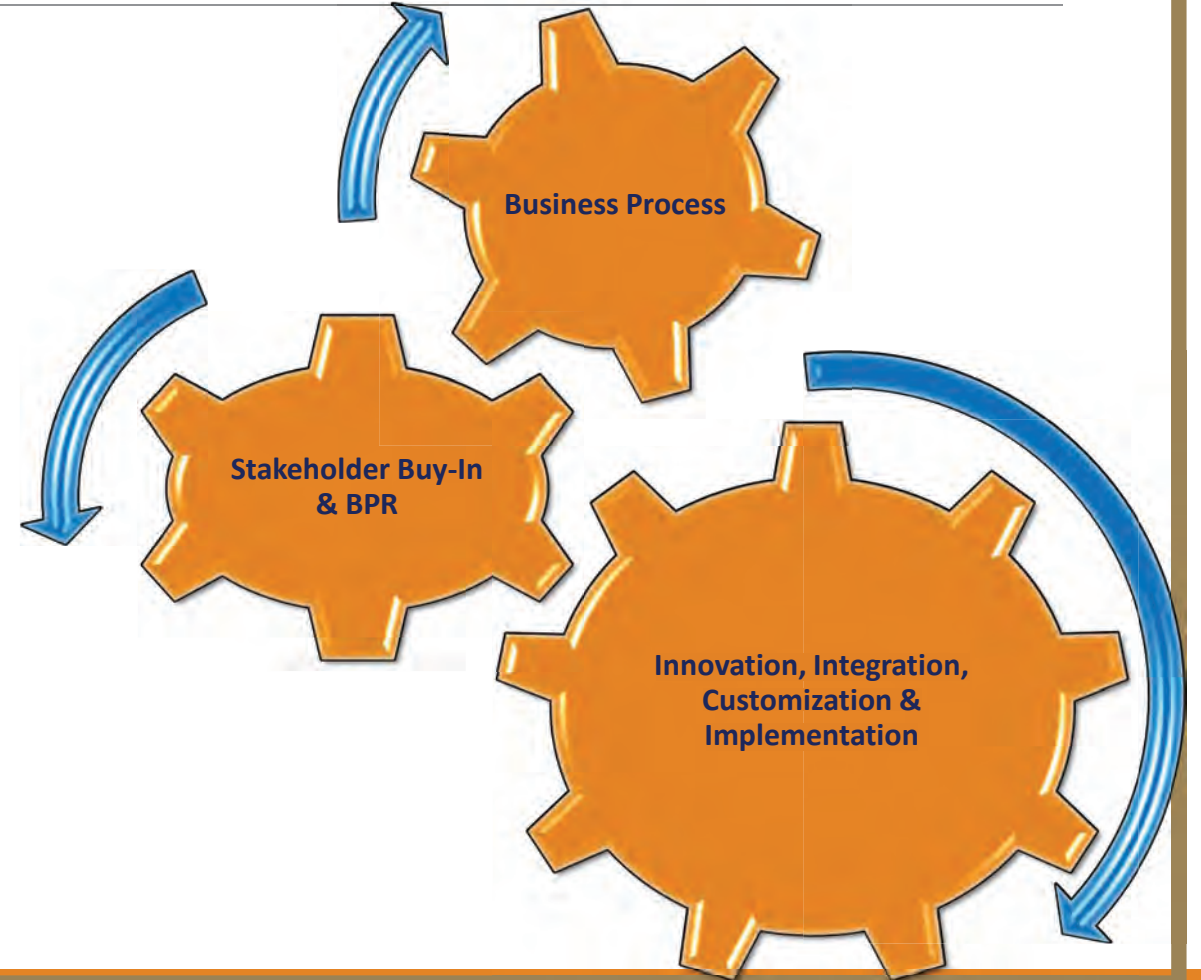- Transition Needs
- Service offerings

Benchmarking (setting the pace)
- Smart Business
- Customization

Quality   Speed   Efficiency   Cost

What is your Business Data Management Process?

Business Goals
- Performance-Goals
- Acquisition/Disposal

Operations Goals
- WBS
- CBS

Benefit Analysis
- TCO
- ROI

Business Process

Stakeholder Buy-In & BPR

Innovation, Integration, Customization & Implementation

Criticality of Operations

Do I have the Right People in Place

Product

Process

People

Am I delivering the Best Product

Do I know my Process
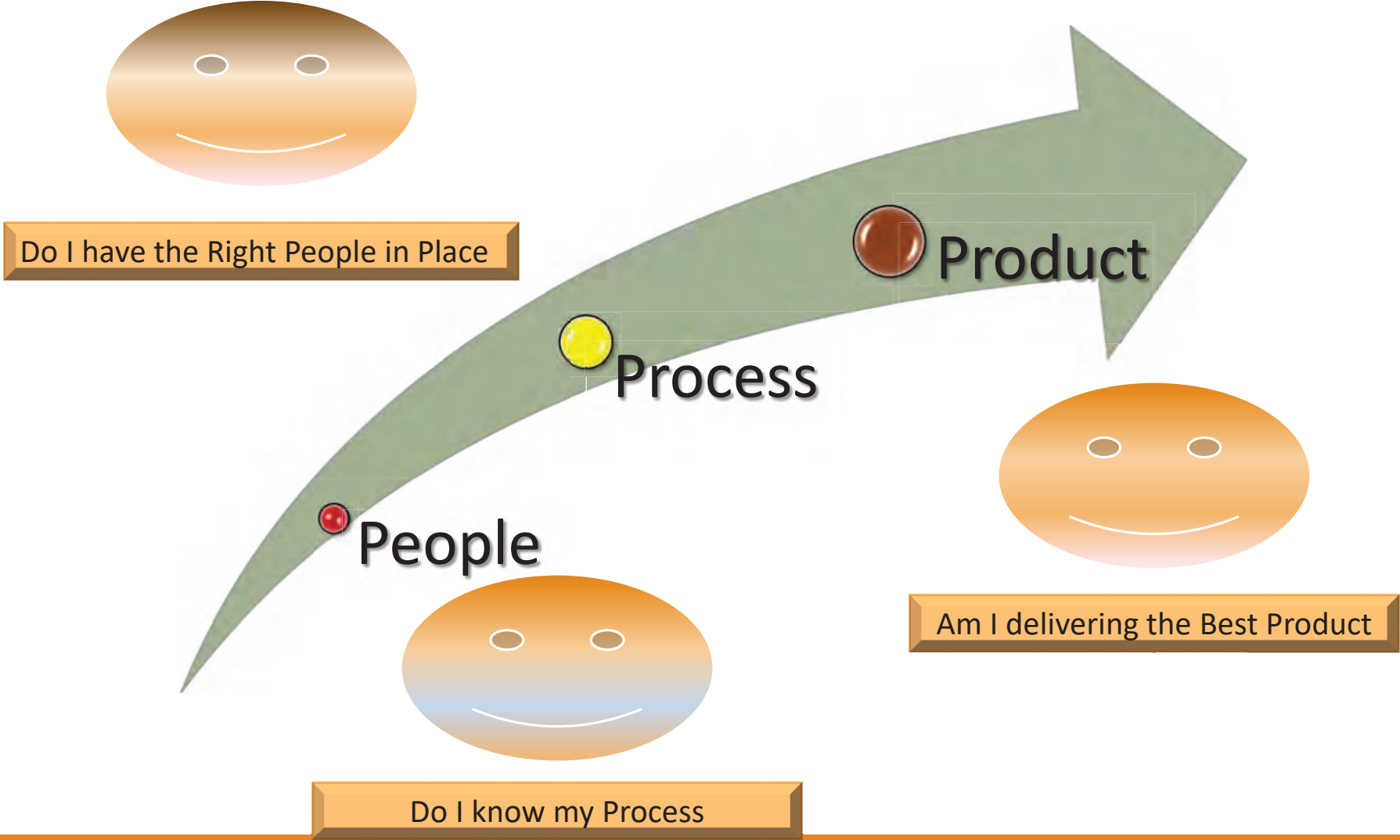
USING TELEMATICS TO IMPROVE OPERATIONS & PRODUCTIVITY

GPS-KPI'S DRIVES PERFORMANCE

- Regardless of the metric being measured; we must first accumulate the data

- The number of KPIs possibilities are endless

- We must first decide what data you're looking to identify

- Why are we measuring each of the metrics and how do we calculate the impact of results improvement?

- Once the metric is determined we simply pull together the variables, calculate the KPI result and know exactly where you are

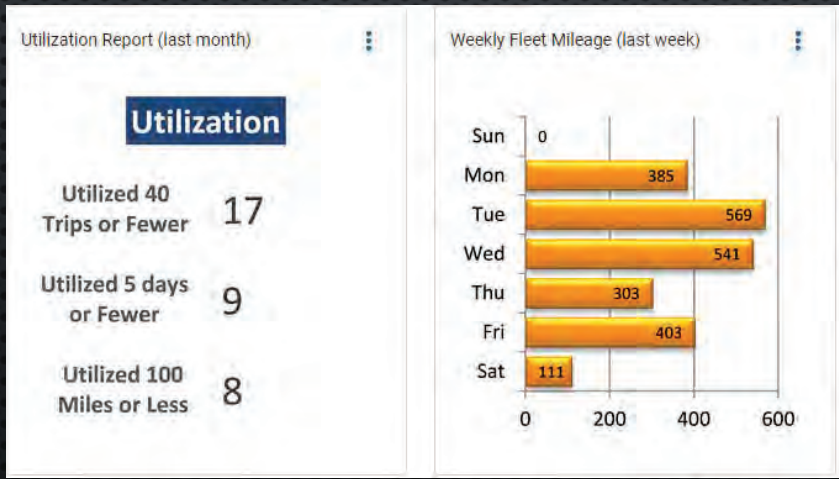# USING TELEMATICS AND MAKING DATA DRIVEN DECISIONS

Maximize Uptime

Minimize Waste

Create Buy-in

CASE STUDY ON THE DEPLOYMENT OF TELEMATICS

- **Challenge**
  To deploy a telematics solutions that would minimize risk, cost effective, plug and play technology, expandable open API, customizable, that improves productive, and lower our carbon footprint, while lowering fuel and operational costs.

- **Solution**
  238 Geotab units were installed in electric, hybrids, and gas cars & trucks.
  Units deployed in following Departments: Juvenile Court, Tax Assessors Office, Water Department, DOT, and Senior Services.

- **Results**
  Implementing the Driver Safety scorecard improved our average fleet safety by 25%. This reduced accidents, lowered the number of high-risk drivers by 87% and improved overall driver safety.

  During the implementation stage we had over 20 incidents where a vehicle was in motion without a seatbelt fastened. After just 4 weeks of coaching in action, 100% of all employees were using them seatbelts.

  Cost savings was another benefit of Geotab telematics deployment. Maintenance/repair cost were cut approximately 15%. With a Fleet that travels over 5 million miles a year we had to address excessive idling. Geotab has allowed us to reduce over 1 1/2-hour idle time per vehicle. Equates to over 20,000 gallons of fuel saves and $50,000 in cost savings. The reduction in fuel usage has directly impacted our overall operational cost and has reduced over 342,000 lbs. of CO_2 emissions.

TELEMATICS IN ACTION WITH AI INTERGRATION

Cobb County...Expect the Best!

AL CURTIS
DIRECTOR,
COBB COUNTY
FLEET
MANAGEMENT
MARIETTA, GA

Integrating EV Data
From Chargers & Other Sources

AssetW⚙RKS

In 2022, OEM Order Books Opened for EVs Across All Duty-Cycles

Procurement is not the finish line

⚙ **Gasoline asset and fuel mgmt. requirements apply to EVs too**

⚙ **Key considerations:**

- Managing and tracking fuel costs
- Tracking vehicle lifecycle costs
- Billing back to internal departments
- Addressing both internal and external charging transactions

AssetWORKS

Fleet Charging Offerings
Vision and Direction

⚙ Multi-network, multi-solution environments

⚙ Deploying unique, tailored solutions for:

- Fleet
    - ⇢ Light-Duty
    - ⇢ Heavy-Duty
    - ⇢ Off-Road
- Public
- Workplace
- Advanced use-cases (V2X, DERS)

4
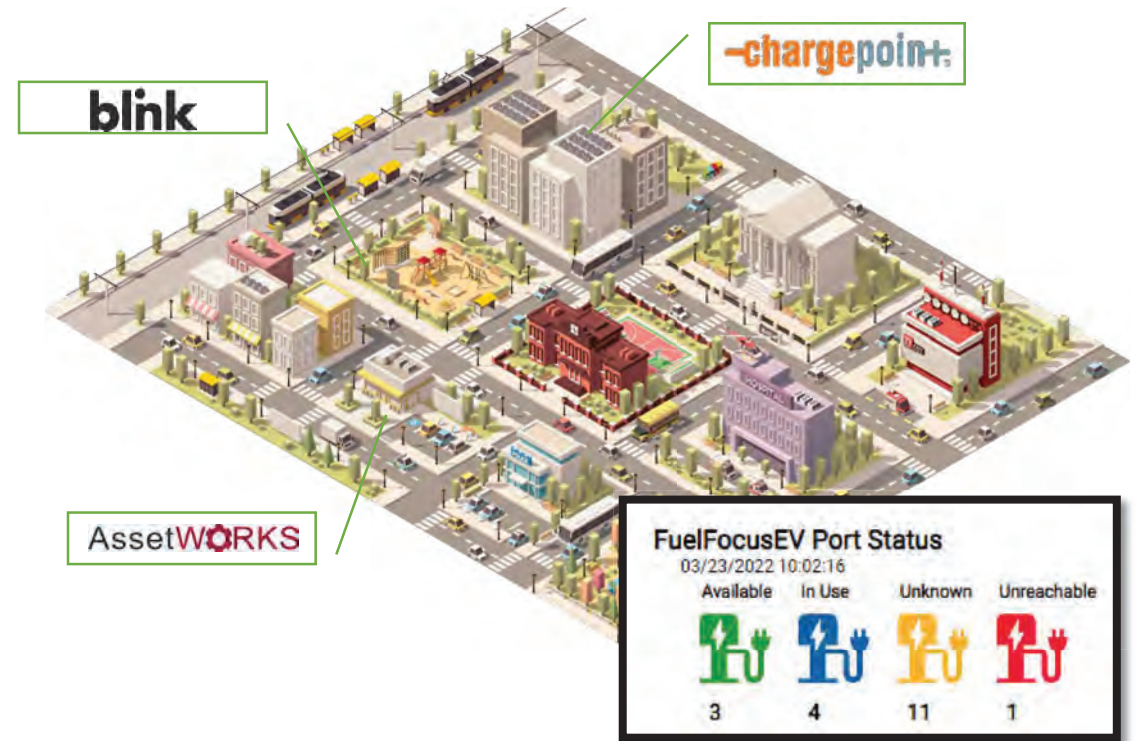
Electricity is a fuel unlike any other….

- **Different sources**
  - Grid
  - Distributed resources (e.g., solar)

- **Different rates**

- Each facility may have a different utility rate structure
  - Rates can change seasonally
  - Locations with dedicated meters may use special EV-only rates

- **Average cost per KWH will change based on:**
  - Time-of-use
  - Peak demand at each meter every month
  - Other factors

Integration Examples

Option A: AssetWorks CMS

FleetFocus™

AssetWORKS
Charge Management Software

Option B: Third-Party Partner Integration

FleetFocus™

chargepoint+   blink

Option C: ECU Pilot

FleetFocus™

FuelFocus™
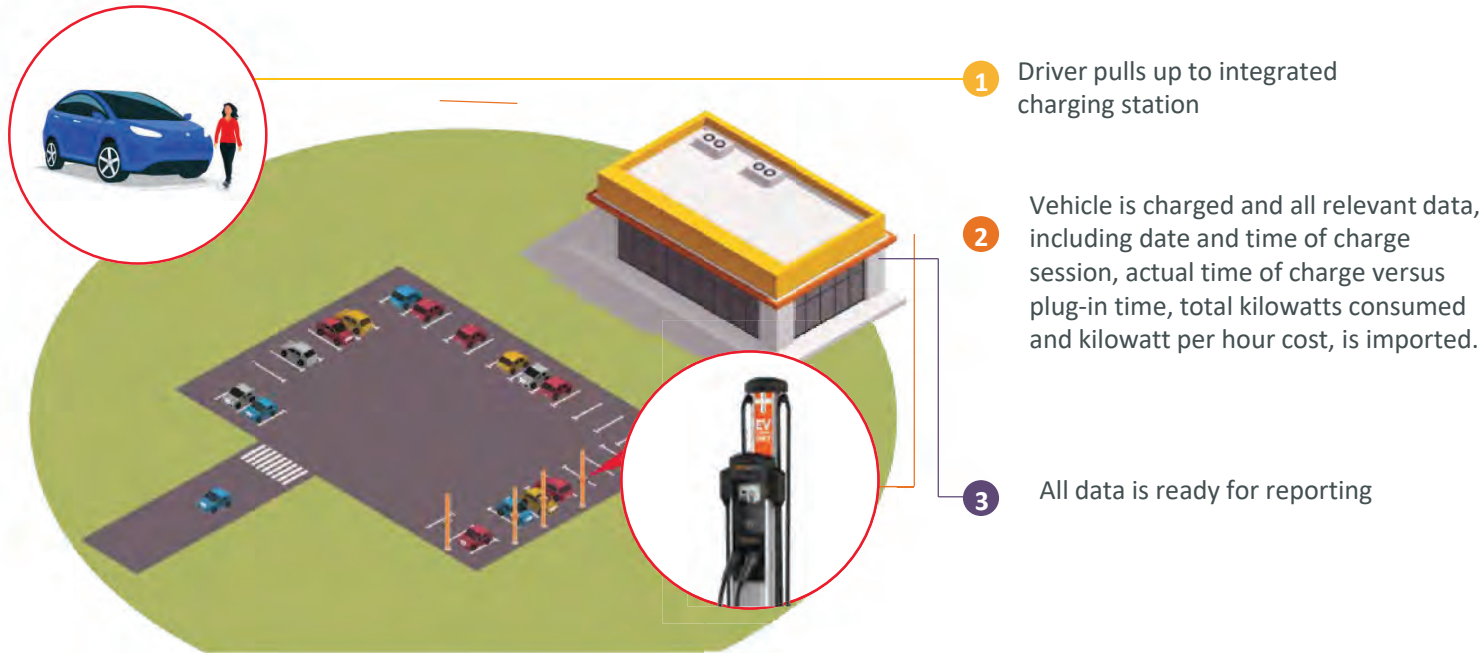*With Charging Support Enabled*

Other Commercial Fuel Upload Options

M5

⚙ *Interface Module:* Load fuel transactions from file. Requires standard Interface License.

⚙ *API Module:* Commercial fuel can be imported via AssetProductIssue with license.

⚙ *Smart App Commercial Fuel Entry:* Operators use manual entry in the app which interfaces into FleetFocus with license.

FA

⚙ *Fuel Data Load:* Load transactions from file. No license required.

⚙ *API Module:* Commercial fuel can be imported via AssetProductIssue with license.

⚙ *Smart App Commercial Fuel Entry:* Operators use manual entry in the app which interfaces into FleetFocus (license required).

Asset**WORKS**

Charger Integration- The Driver Experience

1 Driver pulls up to integrated charging station

2 Vehicle is charged and all relevant data, including date and time of charge session, actual time of charge versus plug-in time, total kilowatts consumed and kilowatt per hour cost, is imported.

3 All data is ready for reporting

AssetWORKS

Cost and Usage Analysis- Segmentation

✓ **Internal Departments**

✓ **Asset Class or Individual Vehicles**

✓ **Location**

Addresses and Tracks Variability

- ⚙ Different Sources
  - Grid
  - Distributed Resources (PV, Co-gen)
- ⚙ Different Rates
  - Each facility may have a different utility rate structure
  - Rates can change seasonally
- ⚙ Average cost per KWH will change based on changes in usage due to
  - ⇢ Time-of-use
  - ⇢ Overall demand
  - ⇢ Other factors
- ⚙ Very possible to spend more electricity than gas/diesel

AssetW**O**RKS

See Impact of Management Decisions

Despite cost complexity, can manage many aspects to shape price

⚙ Can Control
- Time of charging
- Speed of charging (power)
- Utility rate type
- Electricity source
- Peak demand

⚙ Can't Control
- Number of shifts
- Duty-cycle requirements
- Utility rate design

AssetWORKS

Consider Different 'Types' of Electricity

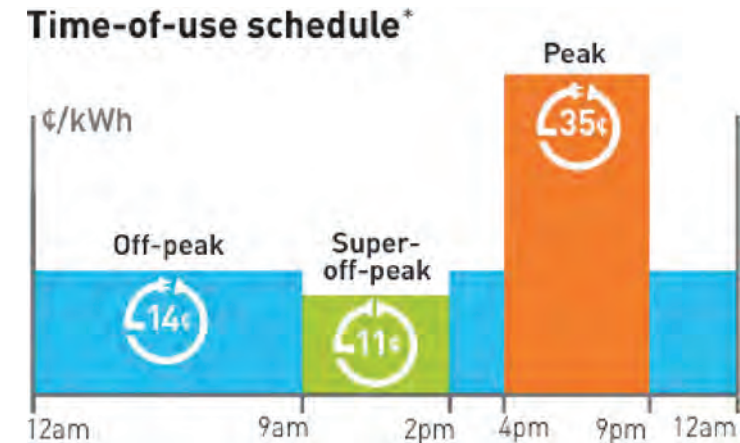*180KW off grid DC Fast Charger and genset supporting transit fleet ops*

Fuel Cost Variability

Charging costs are difficult to track without software and impossible to analyze/segment without integration. Key cost components are generally:

⚙ **Time-of-Use Rates**
- Vary by time and can increase the costs by 3x
- Encourages charge scheduling

⚙ **Peak Demand Charges**
- Tripped by peak electricity use in a 15- or 30-minute period.
- Can be majority of electricity cost
- Requires additional hardware to monitor
- Encourages load balancing

Time-of-use schedule*

¢/kWh

Off-peak 14¢ · Super-off-peak 11¢ · Peak 35¢

12am · 9am · 2pm · 4pm · 9pm · 12am

AssetWORKS

Light Duty Fuel Cost Example

- Ten F -150s (300mile range)
- Need to fill from 15% to 100% (153.6 KW)
- Takes 8 hours (80amps)
- Assume Demand Holiday Rate

Bad Time of Use Example

	One Truck Cost	Ten Truck Cost
Time of Use 4-9 PM ($0.35 per kwh)	$33.60	$336.00
Time of Use 9pm- 12am ($0.14 per kwh)	$8.06	$80.60
1 Night Total	$41.66	$416.60

Good Time of Use Example

	One Truck Cost	Ten Truck Cost
Time of Use 9pm- 5am ($0.14 per kwh)	$21.50	$215.00

Scheduled Charging Scenario with 50% Reduction in Costs

AssetWORKS

HD Fuel Cost Example

Example: Fifty Class 8 trucks at a LA area facility using no more than forty 150kw DCFC at a time					
Rate Type	Time of Use	Demand	Total Bill	Cost per kWh	Notes
Demand Holiday Year 1-5	$636,364	$0	$639,424	$0.15	Approx. 46% of energy costs from demand charges at full imposition in Year 11.
Demand Holiday Year 11	$525,505	$437,338	$965,904	$0.22	
TOU	$350,796	$883,764	$1,237,621	$0.28	Approx. 71% of energy costs from demand charges
Demand Subscription	$725,817	$70,964	$796,781	$0.18	

AssetWorks Insight- "Mileage May Vary: Time of use and demand rates are difficult to estimate. Actuals may vary significantly from forecast amounts. EV charging at scale is almost impossible to monitor and manage without charging software integrations.

Source: https://cdn.gladstein.org/pdfs/whitepapers/california-fleet-electrification-case-study.pdf

AssetWORKS

Rate Choice

Example: Fifty Class 8 trucks at a LA area facility using no more than forty 150kw DCFC at a time					
Rate Type	Time of Use	Demand	Total Bill	Cost per kWh	Notes
Demand Holiday Year 1-5	$636,364	$0	$639,424	$0.15	Approx. 46% of energy costs from demand charges at full imposition in Year 11.
Demand Holiday Year 11	$525,505	$437,338	$965,904	$0.22	
TOU	$350,796	$883,764	$1,237,621	$0.28	Approx. 71% of energy costs from demand charges
Demand Subscription	$725,817	$70,964	$796,781	$0.18	

Different gas. and diesel blends = Different electricity types & rates

Source: https://cdn.gladstein.org/pdfs/whitepapers/california-fleet-electrification-case-study.pdf

AssetWORKS

High-Usage Vehicles Are Susceptible to Demand Charges

Table 34. Yard tractor electricity cost analysis results

Scenario	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR
Utility	SCE			LADWP			SCE		
Rate Schedule	TOU-EV-9	TOU-EV-9	TOU-EV-9	TOU A-3	TOU A-3	TOU A-3	TOU-8 Option E	TOU-8 Option E	TOU-8 Option E
Daily Energy (kWh)	287	341	N/A	287	341	N/A	287	341	N/A
Daily Operating Time (hours)	16	19	N/A	16	19	N/A	16	19	N/A
Charge Window	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A
Total Energy (kWh)	104,886	124,553	114,720	104,886	124,553	114,720	104,886	124,553	114,720
Peak Power (kW)	94	166		94	166		94	166	
Energy Charges	$15,103	$20,578	$17,841	$13,072	$15,697	$14,385	$12,743	$17,038	$14,890
Demand Charges	$5,370	$9,482	$9,482	$17,337	$18,487	$18,487	$11,869	$20,958	$20,958
Fixed Charges	$3,061	$3,061	$3,061	$900	$900	$900	$3,061	$3,061	$3,061
Total Cost ($/year)	$23,534	$33,121	$30,384	$31,309	$35,084	$33,771	$27,673	$41,057	$38,910
Average Cost ($/kWh)	$0.224	$0.266	$0.265	$0.299	$0.282	$0.294	$0.264	$0.330	$0.339

1 hour difference in charging schedule results in a $7,000 to $10,000 difference per truck in annual fuel costs.

Analyze with Existing Reports & Processes

Choose Your Method

Option A: AssetWorks CMS

Option B: Third-Party Partner Integration

Option C: ECU Pilot

Precision Detail with the right CMS

⚙ Configure pricing to match real-world

⚙ Set pricing based on:
- ✓ Seasonal utility rates
- ✓ Locations/Meters/Utility Service Areas
- ✓ Type of Charging (AC v DC)
- ✓ Specific chargers
- ✓ Driver behavior
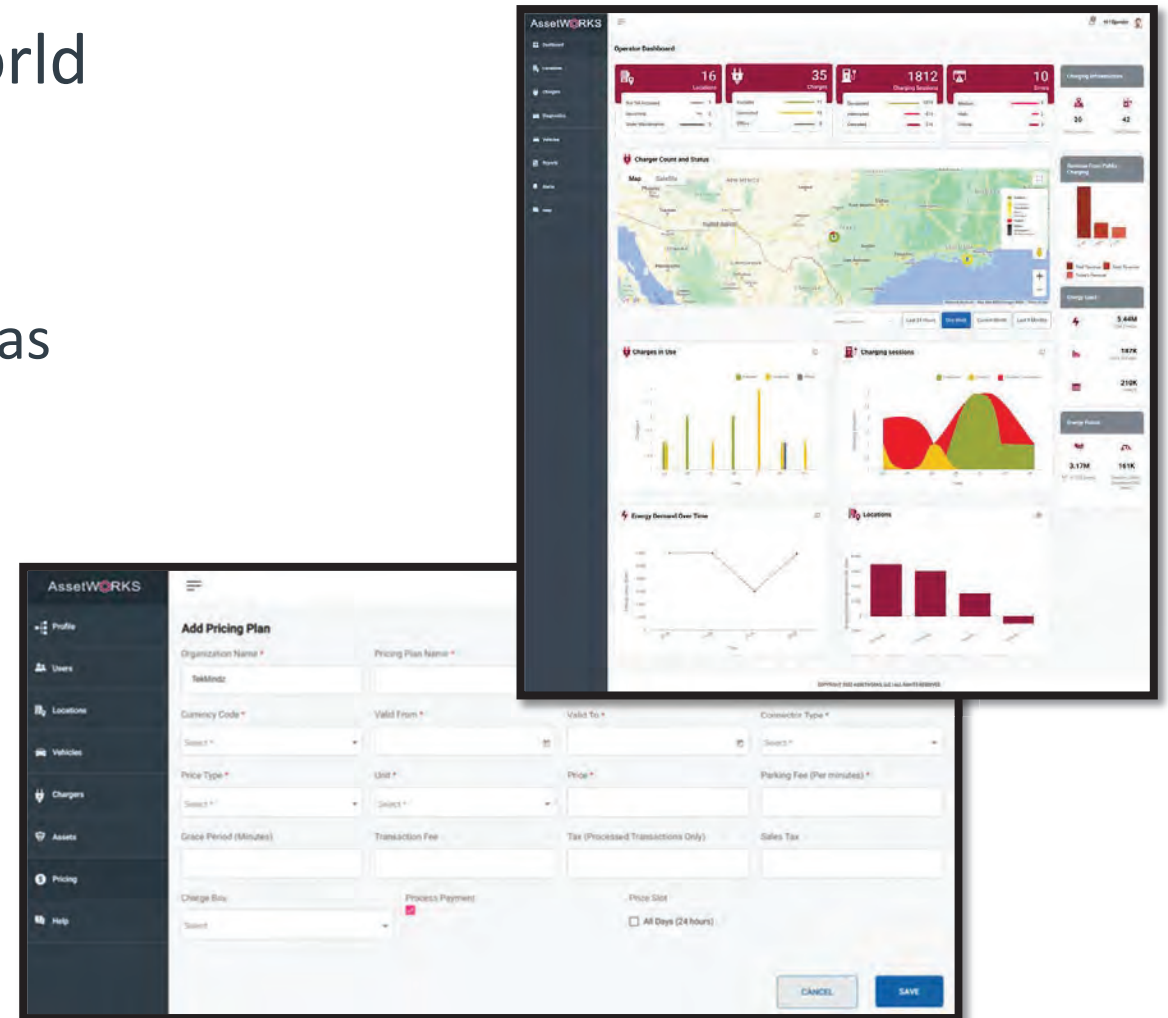
Third Party Charger Integration Process

UPDATE
FleetFocus/EAM (if needed)

SCHEDULE
the FuelFocusEV implementation with AssetWorks

GATHER
charger name and RFID card information.

KICK-OFF
with AssetWorks to enter interface inputs and update fuel settings.

MODIFY
Interface testing if needed due to past FA & M5 customization

CLOSE-OUT
after user testing is complete and the interface is moved from test to production

Complete setup can take weeks to a year if updates or customizations are needed.

Closing Thoughts on Integration

⚙ Electricity is complex and difficult to manage without software

⚙ Integrate "when small and early"

⚙ Understand what charging systems your FIMS provider supports and doesn't

Questions and Discussion...

Contact Info:

Mike Terreri

Michael.terreri@assetworks.com

Linkedin.com/in/terreri

AssetWORKS