



eNow™

POWERING POSSIBILITIES



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> COMPANY OVERVIEW



> eNOW: POWERING POSSIBILITIES



Who We Are

- eNow is an innovative, clean technology company that uses flexible solar technology to help the transportation industry realize substantial economic, environmental and regulatory benefits.

Our Vision

- Using proprietary technology, we have built a compelling renewable energy company that delivers cheaper, cleaner power generated on the roofs of the very trucks they help power.



> COMPANY HISTORY



- Founded: 2011
 - Goal: use advanced solar technology to create environmentally and financially sound applications in transportation industry
 - Today: solar-powered battery charging and power management solutions for multiple trucking industry applications
 - Team: executives, engineers, and scientists, averaging over 25 years of experience.
- Team members:
 - ✓ Developed NASA solar applications
 - ✓ Oversaw and pioneered advancements in solar panel manufacturing
 - ✓ Managed large solar installations
 - ✓ Served in operational, financial and sales roles at numerous successful companies.

> QUICK ROI FOR SOLAR-BASED AUXILIARY POWER SYSTEMS



No-Idle HVAC

- Eliminate fuel and noise from diesel powered APUs or engine alternator to charges batteries
- Reduce load on engine alternator
- Reduce fuel costs and engine maintenance costs



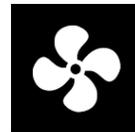
Safety Lighting

- Power light duty road construction/service vehicles
- Eliminate engine idling
- Reduce fuel consumption



Liftgate Systems

- Power Liftgate batteries reducing demand from engine alternator
- Reduces fuel consumption
- Extend battery life



Refrigeration

- Supply power to cold plate storage systems
- Power evaporator fans while in operation
- Extend daily range
- Reduce fuel consumption
- Lower system maintenance cost

WHY WE MATTER

> eNow solves 5 problems



Unstable
Fuel Prices



Rising Maintenance
Costs



Road Service
Costs



Battery
Replacement
Costs



Government
Regulations /
Environmental
Compliance

> THE eNOW CONNECTED TRUCK



> Vehicle to the Grid



> eNow Solar Battery Charging System



> eNow Cloud Interface



> Driver Interface



> Trailer Refrigeration



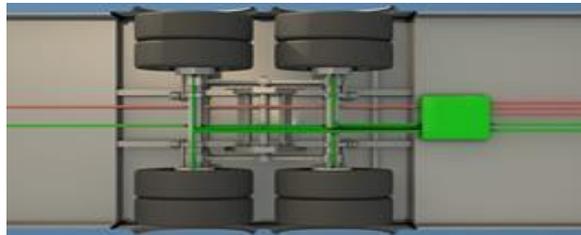
> Shorepower



> Liftgate



> eNow Battery Storage & Monitoring



> Hotel Loads



> PRODUCT OFFERINGS



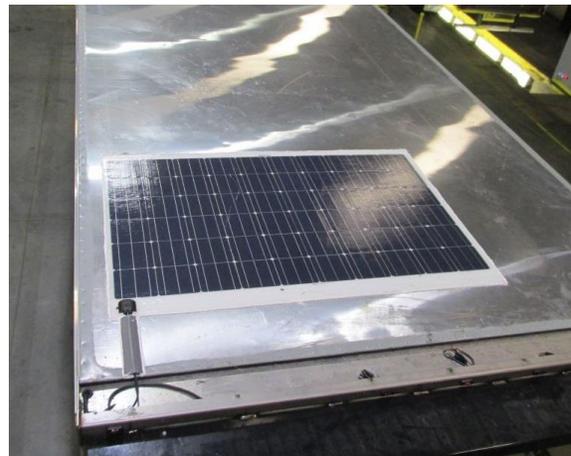
> No-Idle HVAC

- Typical long-haul trucks can use 2,400 gallons of fuel per year idling to run auxiliary equipment like cabin air conditioning, TV's, microwaves, and laptops
- Auxiliary batteries can run these "hotel" loads, but don't always get sufficient charge from alternator
- eNow Solar systems generate additional energy to charge the auxiliary batteries completely and extend the "run-time" of the systems



> Liftgate

- Liftgates located on trailers and box trucks are notorious for in-route failures due to battery problems
- Liftgate batteries have short lives often less than a year
- Operators will idle trucks at delivery stops to ensure liftgates won't die
- Batteries don't get charged properly due to voltage loss between alternator and auxiliary batteries
- Solar will charge batteries everyday even when trailers are not connected to tractors
- Solar charging treats the battery better than traditional methods of charging
- Battery life improves to 3 years or more; no idling at delivery stops



> Safety Lighting

- Police, Fire, DOT, and Ambulances often idle while emergency lights are running
- Causes engine wear, fuel usage, and greenhouse gas emissions
- Solar panel can keep lights running without idling
- Initial tests for a client with F350 went from 6.6 MPG to 9.8 MPG
- Systems available on MASS COMMBUYS: Statewide Contract VE1102 – Category 2



> Refrigeration

- Current refrigeration trailers and trucks use diesel engines or truck engine to power the compressors
- Diesel engines are costly to run and emit considerable pollution
- Market shift to hybrid diesel that runs off of shore power when at the dock
- eNow is supporting total zero emission all electric systems with solar on the top of the truck
- First zero emission solar truck running at Challenge Dairy in Fresno
 - Plugs into shore power at dock; runs on solar and battery during route
 - Exceeded all expectations on performance and pollution reduction
- Building a 53' refrigeration trailer that will run on shore power, batteries, and 6 kW of solar



> CUSTOMER SAVINGS



> TYPICAL PAYBACKS



	NO-IDLE HVAC	LIFT GATE BATTERIES	SAFETY LIGHTING	TELEMATICS	REFRIGERATION (STRAIGHT TRUCK)	REFRIGERATION (SEMI-TRUCK TRAILER)
Typical Solar Requirement	310 W	260 W	135 W	65 W	1500 W	5600 W
Suggested List Prices	\$2,798	\$2,559	\$1,630	\$549	\$13,500	\$26,000
Typical Annual Operating Cost Savings	\$3,015	\$3,000	\$2,000	\$900	\$6,750	\$13,000
System Benefits	<ul style="list-style-type: none"> Extend HVAC runtime Eliminate unnecessary idling Reduce fuel consumption 	<ul style="list-style-type: none"> Reduce low/dead battery conditions Reduce road service calls Extend battery life span 	<ul style="list-style-type: none"> Reduce idling Increase fuel efficiency through reduced fuel consumption 	<ul style="list-style-type: none"> Reduce low and dead battery conditions Offset parasitic electrical loads 	<ul style="list-style-type: none"> Reduce reefer diesel fuel consumption Eliminate TRU for medium duty trucks 	<ul style="list-style-type: none"> Reduce reefer diesel fuel consumption Eliminate TRU for medium duty trucks
Expected Life of Customer's Asset	3-5 years	6-7 years	3-5 years	3-5 years	10 years	10 years
Simple Payback (yrs.)	0.92	0.84	0.81	0.61	2	2
Payback w/30% Fed. Tax Credit	0.64	0.59	0.57	0.43	1.4	1.4

Calculations above are based on diesel fuel at \$2.50 per gallon

> CUSTOMER CASE STUDIES



> WHITE PAPERS & THIRD PARTY TESTING



CENTER FOR AUTOMOTIVE RESEARCH 



FUEL ECONOMY AND PERFORMANCE TESTING OF A CLASS 8 SLEEPER TRACTOR SIMULATING ENOW'S SOLAR CHARGING SYSTEM

SUMMARY REPORT TO eNOW
Jan 6th 2015

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REDUCING FLEET OPERATION COSTS USING SOLAR POWERED IDLE REDUCTION TECHNOLOGY



WHITEPAPER

Background

Conventional Idle Reduction Approaches

Solar Powered Approach

Operating Cost Savings

eNow Innovation

eNow's solar powered idle reduction systems are designed to meet a wide range of auxiliary energy needs for medium and heavy duty trucks and buses.

Highlights

- High fuel costs, stringent anti-idling regulations, and state and federal emissions reductions targets are boosting demand for idle reduction technologies. Typical long-haul trucks can use 2,400 gallons of fuel per year idling its engine to run auxiliary equipment. Fuel used for this idling costs \$9,600 per truck per year assuming \$4/gal diesel. This avoidable idling fuel cost erodes a trucker's bottom line (see Figure 1).
- Conventional idle reduction systems include diesel, battery and grid-powered technologies. Performance of these idle reduction systems varies greatly in terms of fuel and other operating and maintenance (O&M) costs, emissions, and performance (see pages 2-3).
- eNow's solar powered eCharge System for In Cab HVAC offers the lowest O&M costs, zero emissions, and superior performance compared with conventional idle reduction systems (see Figures 2-5).
- The operating costs of producing a kilowatt-hour (kWh) of electricity using eNow's solar powered system is \$0, compared with between \$2-3 for truck stop electrification and a diesel auxiliary power unit (APU), and \$0.75 for a battery-only APU due to fuel costs associated with over-the-road battery charging (see Figure 5).
- Solar-powered APU systems provide additional savings of \$400 to \$3,400 per year compared with conventional battery-only APU systems (see Figure 6).

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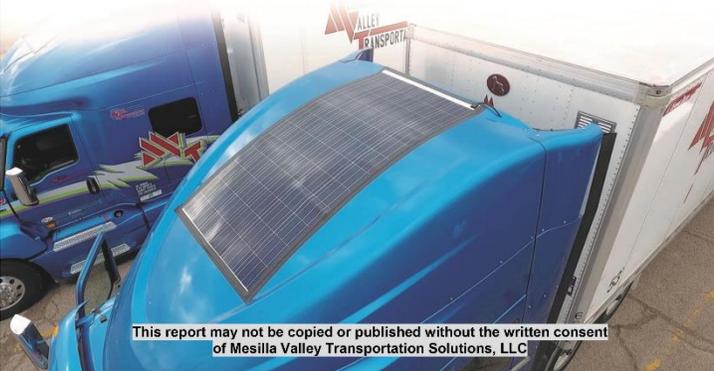
TEST REPORT



MVT SOLUTIONS CERTIFIED™ FUEL ECONOMY TEST

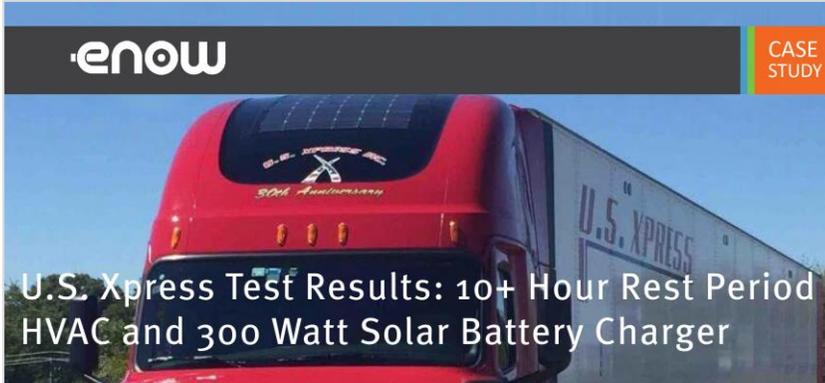
eNow Energy Solar System

0.15 gal/1000 miles	0.02 MPG	0.15%
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> CASE STUDY – US XPRESS



U.S. Xpress Test Results: 10+ Hour Rest Period HVAC and 300 Watt Solar Battery Charger

> SUMMARY RESULTS

Over the past several years, eNow, Inc. collected data from a U.S. Xpress Class 8 Sleeper Truck equipped with a battery-powered Air Conditioning (A/C) system and 300 W Solar Battery Charging system during an extended rest period. Based on the data collected during this period, we can conclude:

- A/C with the 300 Watt solar system kept the cabin temperature below 75°F, and usually below 70°F throughout a 10-hour rest period despite outside tractor cabin temperatures that reached well over 100°F. Based on the slope of the discharge, we estimate the A/C could have been run for an additional 1.5 hours.
- Solar connected to the truck battery did effectively charge both the truck battery and auxiliary battery, even during this period of heavy auxiliary load use.
- Solar charge current to the auxiliary battery during the 10-hour rest period was 47 amp-hours, which we estimate to be approximately one additional hour of A/C operation.
- In addition, solar charged the truck battery over the same 10-hour period, keeping the truck battery fully charged at well over 12.8 volts, instead of being depleted by truck parasitic loads.
- Total solar charge current to both batteries could not be quantified, but it was clearly greater than the 47 amp-hours that was transferred to the auxiliary battery.

Test and System Design Overview

eNow installed our 300 Watt Solar Battery Charger to power HVAC and other auxiliary loads on a Peterbilt 579 tractor operated by U.S. Xpress. In order to monitor the effectiveness of the system with the addition of solar, eNow installed an Onset HOB0 data collector, which records current, voltage, and temperature data from the truck's main (crank or starter) battery and the auxiliary battery banks. The data is sampled from various sensors every 10 seconds, averaged, and logged in 5 minute increments.

Thus, the reading at the time stamp is the average reading for the previous 5 minutes. The data is uploaded to the cloud every hour via the cellular network. If the tractor is not in an area with sufficient cellular coverage, the data is stored until the next good cellular service area is entered. The data may be downloaded into a CSV file format which can be directly opened in Excel. The data can be further analyzed and graphed. Although driver logs were not available during this period, it is our understanding that the tractor was being operated by a team of two drivers in long haul operations in the southern U.S.



> CASE STUDY – CHALLENGE DAIRY



ENOW "RAYFRIGERATION" ZERO EMISSIONS TRU

eNow demonstrated the effectiveness of its solar energy-producing systems for transportation by powering the first zero-emissions commercial-use Transport Refrigeration Unit (TRU) on a truck making deliveries in an urban environment.

The new zero-emissions TRU, branded "Rayfrigeration," was tested in California's San Joaquin Valley. In the first five months of testing, emission reductions of 98% nitrous oxide, 86% carbon dioxide, and 97% particulate matter were achieved. TRUs are refrigeration units mounted on trucks and are traditionally powered by high-polluting, small diesel engines to provide the needed cooling to transport chilled products. The Rayfrigeration TRU is the first-to-market battery-powered unit for commercial use and was tested on a Challenge Dairy Class 7 truck delivering fresh dairy products throughout Fresno, CA.

Designed to support medium-temperature refrigeration applications, the Rayfrigeration system employs two forms of energy storage: eutectic medium (cold plates) and a high-capacity auxiliary battery system. The cold plates and auxiliary batteries are initially charged from utility power delivered to the vehicle when plugged in overnight. When the truck is operated on a delivery route, power is provided by eNow's solar photovoltaic (PV) panels mounted on the truck's roof. eNow joined Johnson Refrigerated Truck Bodies, Emerson Climate Technologies, and Challenge Dairy Products in the summer-long trial that took place in California's San Joaquin Valley.

The eNow team calculated that average emissions of CO₂ over a four-day week with an average delivery day of 7.7 hours was reduced from 2,525 lbs/week to 159 lbs. Nitrous Oxide emissions were reduced from 7162 grams to 1. This is after adjusting for the emissions from the power plant supplying grid electricity that was used overnight. (Emissions from solar are 0.)

In addition to eliminating harmful emissions, Rayfrigeration is projected to reduce operations and maintenance costs by up to 90% over a diesel-powered TRU. The cost savings are achieved by eliminating fuel costs, eliminating maintenance costs for the diesel APU engine, and increasing battery life (reducing replacement costs) thanks to consistent charge maintenance by eNow solar.

The 1,800 Watt eNow solar system provided more than enough

energy to maintain optimum temperature throughout a typical day of opening and closing the doors while the truck delivered fresh dairy products in California's summer heat. The Rayfrigeration system features eNow solar in combination with a Johnson refrigeration unit and Emerson's highly efficient compressor technology.

"The Rayfrigeration product is an important step forward in reducing emissions while maintaining the highest levels of efficiency and customer satisfaction for companies delivering perishable goods," says Jeff Flath, President & CEO of eNow. "eNow's solar technology is powerful, reliable, and efficient, and more than up to the task of providing emissions-free energy for critical tasks such as refrigeration of fresh foods, even the most challenging conditions. We are proud to be a part of this important project."

The Rayfrigeration solar-charging technology is available through eNow, which currently has more than 4,000 solar systems operating nationwide on Class 8 trucks, buses, emergency and utility vehicles, supporting applications as diverse as heating and cooling, liftgates, wheelchair lifts, safety lights, telematics, and other transportation applications. Upon completion of the testing period, Challenge Dairy plans to transition its entire fleet of distribution trucks to solar-powered TRUs.

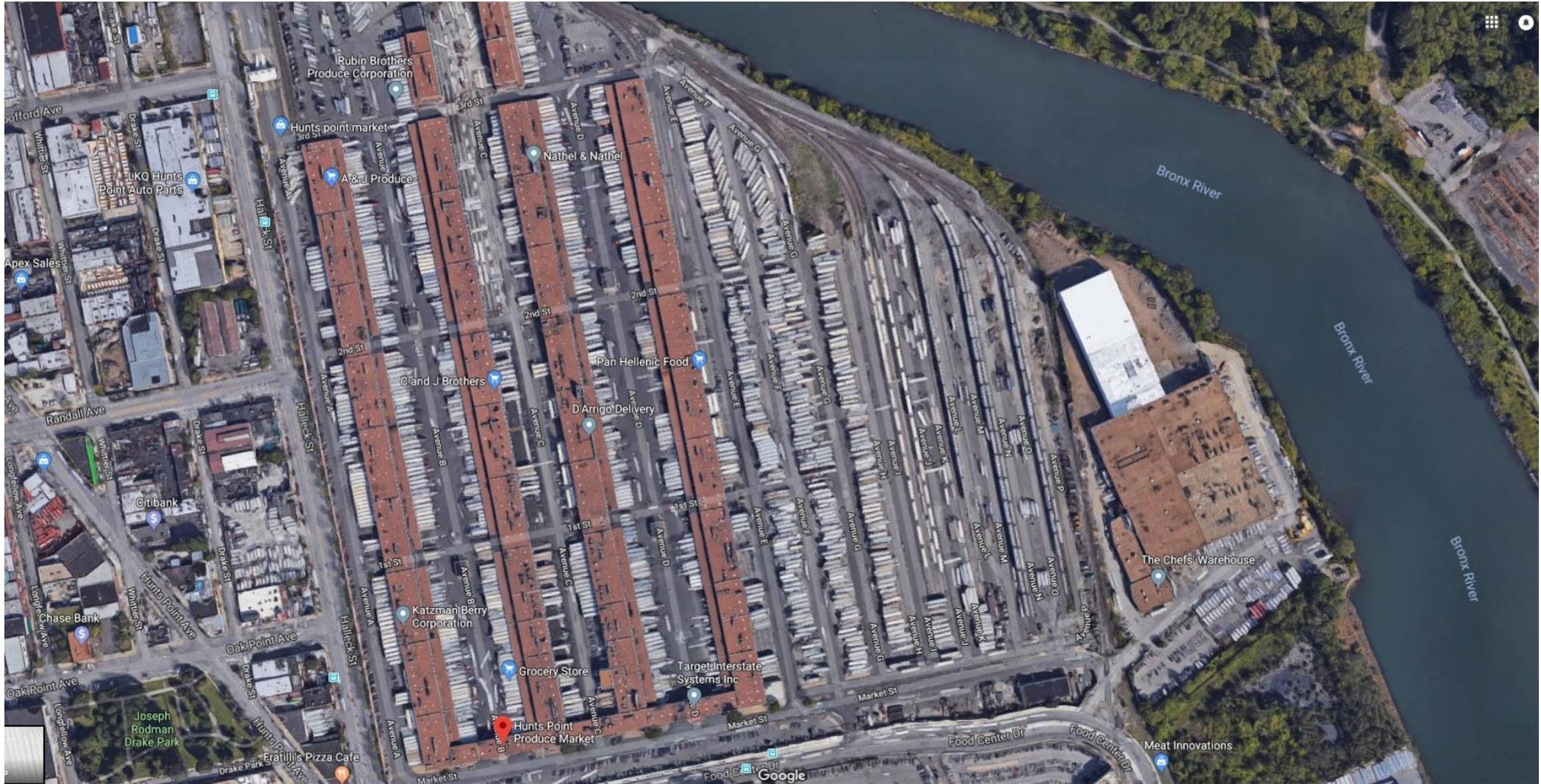


> PROJECTS UNDER DEVELOPMENT

- Refrigerated eCanter Project – Mitsubishi Fuso/Fresh Direct
- Refrigerated Trailer Project – C&S Wholesale
- Navistar Super Truck II Program
- Navistar Electric School Bus
- Winnebago Electric RV
- Refrigerated Truck/Trailer Project – Hunts Point



> HUNTS POINT



> HUNTS POINT



> ENOW HAS OVER 4,500 UNITS ALREADY DEPLOYED





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