



Today's Transit for Tomorrow's World

SunLine's Hydrogen Fuel Cell Program

Lauren Skiver
CEO/General Manager

SunLine Facts

- **SunLine Transit Agency**

- The Consolidated Transportation service for the Coachella Valley

- 1,120 square mile service area
- 74 fixed route buses (5 Hydrogen Fuel Cell, 3 All-Electric, 66 CNG)
- 33 CNG paratransit vehicles
- 14 local and 1 express line, 1 commuter line to Riverside
- Operate 4.2 million revenue miles more than 4 million passenger rides annually

- **SunLine Services Group**

- Regulates taxi service

- 180 taxicabs in the Coachella Valley
- 276 taxicab drivers
- 3 franchises

- **SunFuels**

- SunFuels (Thousand Palms) provides CNG & Hydrogen Fleet and Public access 24/7
- SunFuels (Indio) provides CNG Fleet and Public access 24/7

Definition of Opportunity

- **Commercialization of Zero Emission Technology must include the Transit Industry's perspective in three key areas:**
 - Risk associated with the investment in the technology (purchase readily accepted vs. introductory technology)
 - Performance associated with the reliability of the equipment
 - Mission focus and organization communication focused on Zero Emission Program that starts at the top but is routinely reinforced at all levels
 - Affordability of initial investment and support costs

Leaders In Alternative Fuel Technology Early and Current Hydrogen Projects



1st
GENERATION



2nd
GENERATION



3rd
GENERATION



4th
GENERATION



5th
GENERATION



6th
GENERATION



7th
GENERATION



8th
GENERATION



9th
GENERATION

**Leaders in Hydrogen Electric Fuel Cell Bus
Technology for over a decade**

Hydrogen Program Data

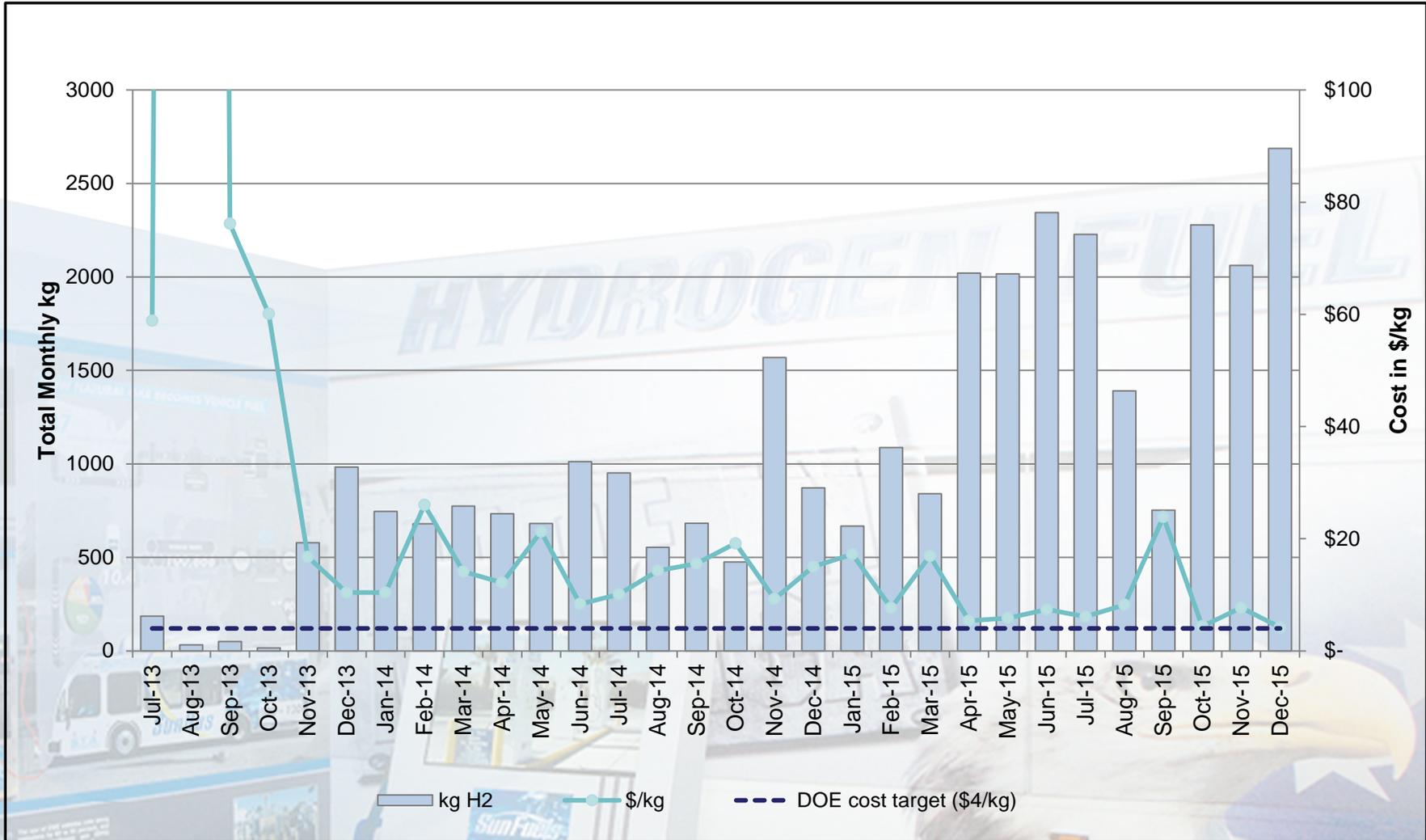


Bus Configuration	Year	Hours	Miles	Hydrogen Fuel Kg
FC2 – New Flyer Ballard Fuel Cell, ISE Drive Sys.	2010	6,664	90,302	13,009 Kg
FC3 40' El Dorado Axess, BAE Drive Sys, Ballard Fuel Cell	2012	6,818	103,700	15,152 Kg
FC4 40' El Dorado Axess, BAE Drive Sys, Ballard Fuel Cell	2014	3,051	40,615	6,085 Kg
FC5 40' El Dorado Axess, BAE Drive Sys, Ballard Fuel Cell	2014	2,299	22,065	3,347 Kg
FC6 40' El Dorado Axess, BAE Drive Sys, Ballard Fuel Cell	2015	786	9,760	1,466 Kg

Maintenance Costs Comparison

Bus	Mileage	Parts (\$)	Labor Hours	Cost (\$) per Mile	Scheduled Cost per Mile (\$)	Unscheduled Cost per Mile (\$)
FC3	60,388	6,995	847.3	0.82	0.07	0.75
FC4	51,091	1,687	344.0	0.37	0.07	0.30
FC5	34,170	1,033	213.8	0.34	0.06	0.28
FC6	21,299	392	154.5	0.38	0.04	0.34
Total AFCB	166,948	10,106	1,559.5	0.53	0.06	0.46
603 CNG	162,510	40,341	972.0	0.55	0.10	0.45
604 CNG	171,608	45,791	1,012.5	0.56	0.08	0.48
605 CNG	162,799	47,931	946.8	0.59	0.08	0.50
606 CNG	161,891	39,349	847.7	0.50	0.10	0.40
608 CNG	162,920	36,402	888.0	0.50	0.09	0.41
Total CNG	821,728	209,815	4,667.0	0.54	0.09	0.45

Hydrogen Costs



Total Hydrogen dispensed and cost per Kilogram by month

ZEB Risk Versus Reward

- **What did SunLine experience in these areas?**
 - Strong Board of Directors support
 - Strategic public awareness campaigns
 - Operating mission that reinforces our commitment with internal employees, customers and community leaders
- **What are the benefits?**
 - Reduction in environmental impacts
 - Less dependence on fossil fuels
 - Increased vehicle and infrastructure funding
- **What are the differences in managing these fleets?**
 - Complex configuration and integration compared to diesel and CNG
 - Training needs for technicians and support personnel
 - Replacement component costs and availability

SunLine's Vision Statement



- **SunLine is committed to working with Transit Operators to:**
 - Enhance the demand for Hydrogen/Zero Emission fuel technologies
 - Eliminate or mitigate risks
 - Buy America
 - Reliability of Vehicles and Infrastructure
 - Availability of Hydrogen/price analysis
 - Lack of competition
 - DBE Program requirements
 - Life Cycle Costs and useful life calculations
 - FTA Spare Ratio calculations
 - Increase competition
 - Support manufacturer efforts to create competition

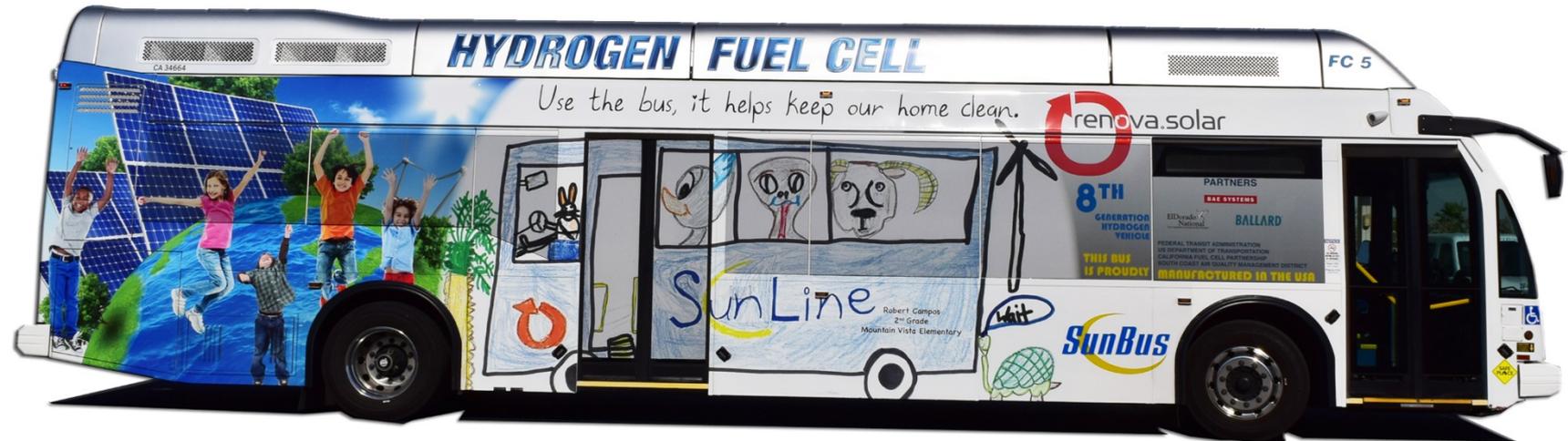
SunLine's Center of Excellence

- **Establish a Center of Excellence to house investments in learning**
 - For every investment in technology, there is investment in training and learning
 - Funding partners have already made substantial investments in the technology
 - Center of Excellence would be a site to preserve and enhance those learning investments
 - Acquisition and in-service management
 - Leverages prior investments and prevents duplication in future technology projects
 - Is not limited to transit technology and can transcend other “spill over” applications

KEY TAKEAWAYS

- A strong commitment to zero emission technology must be in place at project initiation
- Reliability, competition, value proposition, and successful partnerships must be communicated
- Risk must be accepted by all partners
- Zero emission technology works
- Don't wait to create a renewable energy mission/focus at your agency!

Engaging the Community



Thank You