



ILLUMINATING ENGINEERING SOCIETY
AVIATION LIGHTING COMMITTEE

The Future Of The Incandescent Fixture On Airfields





ILLUMINATING ENGINEERING SOCIETY
AVIATION LIGHTING COMMITTEE

BUT THIS IS YOUR SAFE SPACE





SYMPTOMS OF A LIGHT NERD





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The Future Of The Incandescent Fixture On Airfields



TYPES OF LIGHTING TECHNOLOGIES



Incandescent



Halogen



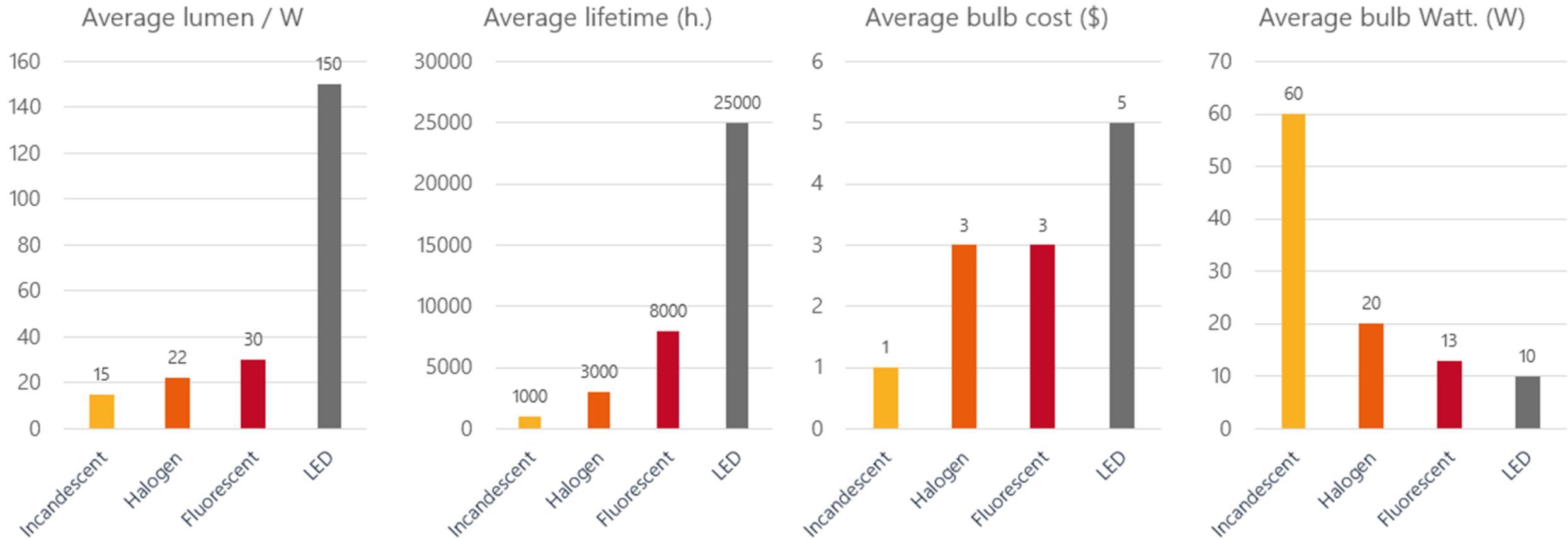
Fluorescent
(CFL)



LED

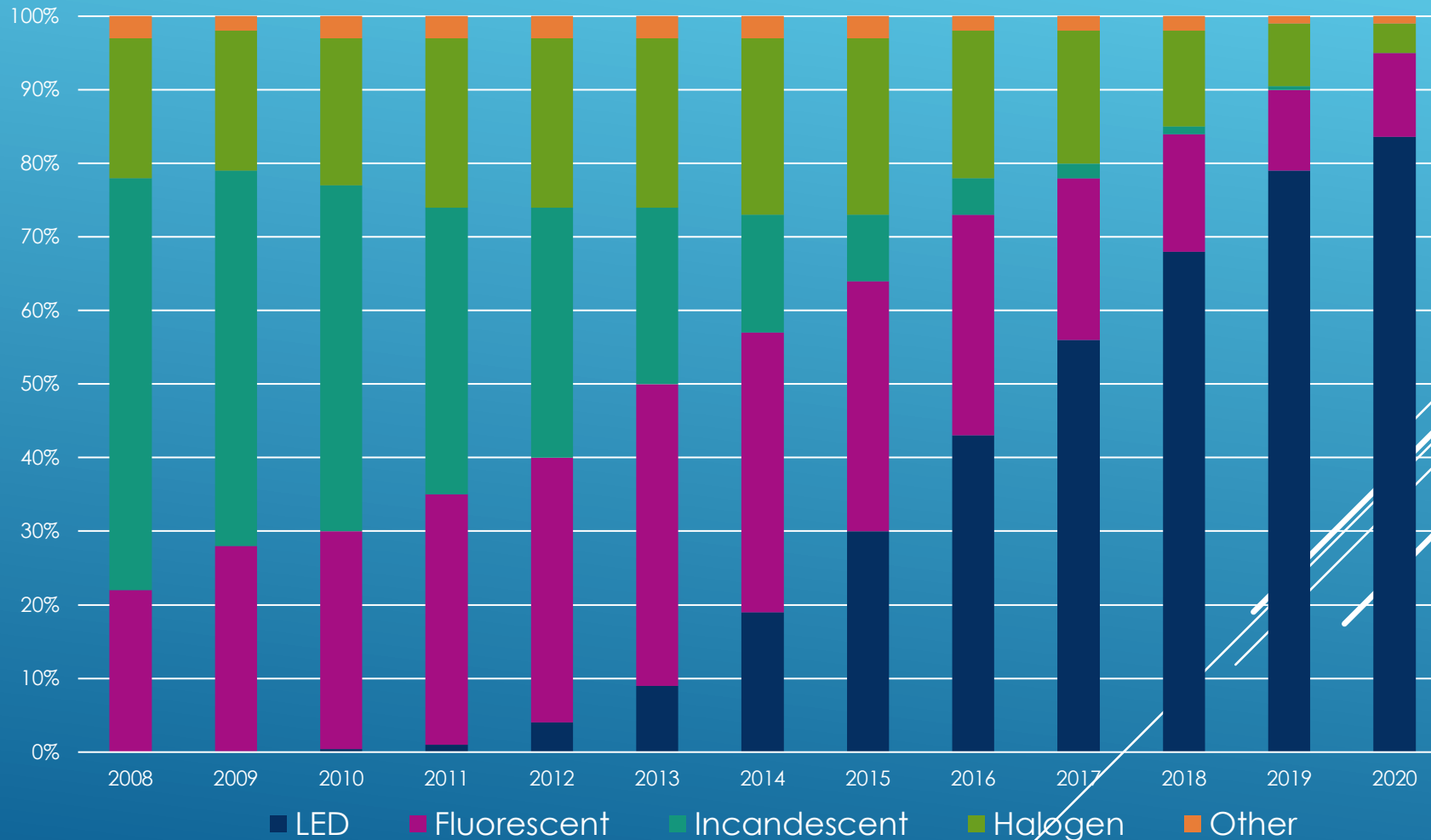


TYPES OF LIGHTING TECHNOLOGIES (COMPARISON)



MARKET

LED Penetration rate in General Lighting



Some conclusions:

- ▲ Manufacturers are focused on LED product.
- ▲ Only alive technologies: LED, Fluorescent and Halogen.
- ▲ Incandescent lamp vendors going away.
- ▲ LED Cost decrease.

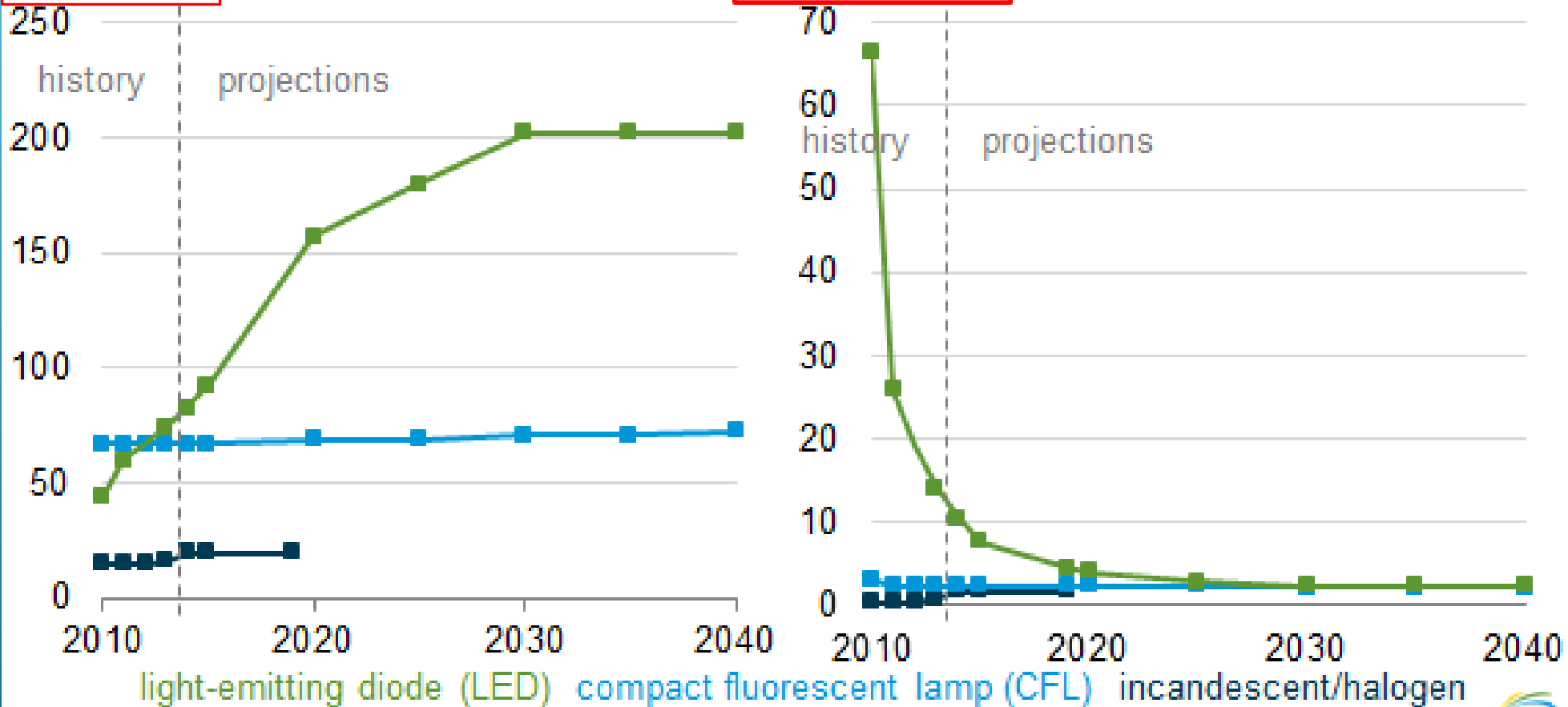
FUTURE MARKET



Average lighting efficacy (light output per unit of energy consumed) and cost per bulb

lumens/watt

\$ dollars



BACKGROUND IN THE US - REGULATIONS

2007: Signature of **EISA** (Energy Independence and Security Act) -> Promotion of Energy Efficiency and guidelines for GSLs (General Service Lamps)

2017: DoE-> **Minimum efficiency of 45 lumen/W** -> Most incandescent and halogen bulbs would be illegal (restrictions on January 1st, 2020), **BUT DoE** (February 2019) **withdrew new definitions** for a GSL and reverted to old standards.

2022: Revised definition of GSL & **Minimum standard of 45 lm/W** for light bulbs that meet definition of GSL -> **End of incandescent and halogen bulbs** -> Lighting industry will not manufacture, in general, these bulbs.

2023: In August 2023, new standards began being enforced.

Lighting plant going dark



These were among GE Lighting's more than 200 Circleville employees in 2014, when the plant added a production line for halogen bulbs. Employment had peaked previously at more than 1,100. The plant is to close in August. TOM DODGE/DISPATCH

GE says market forces likely to force bulb factory to close

By Dan Gearino
The Columbus Dispatch

Once a major employer, the GE Lighting plant in Circleville is now slated to close because of a drop in demand for the light bulbs made there.

The company, part of

General Electric, said Wednesday that the plant will close in August 2017. It had more than 200 employees two years ago and more than 1,100 at its peak. The company declined to say how many people work there now.

"In the last decade,

the lighting industry has seen a major technology pivot away from traditional lighting products including incandescent, halogen and specialty linear fluorescent lamps," spokeswoman Alicia Gauer said in an e-mail.

"Consumer demand for

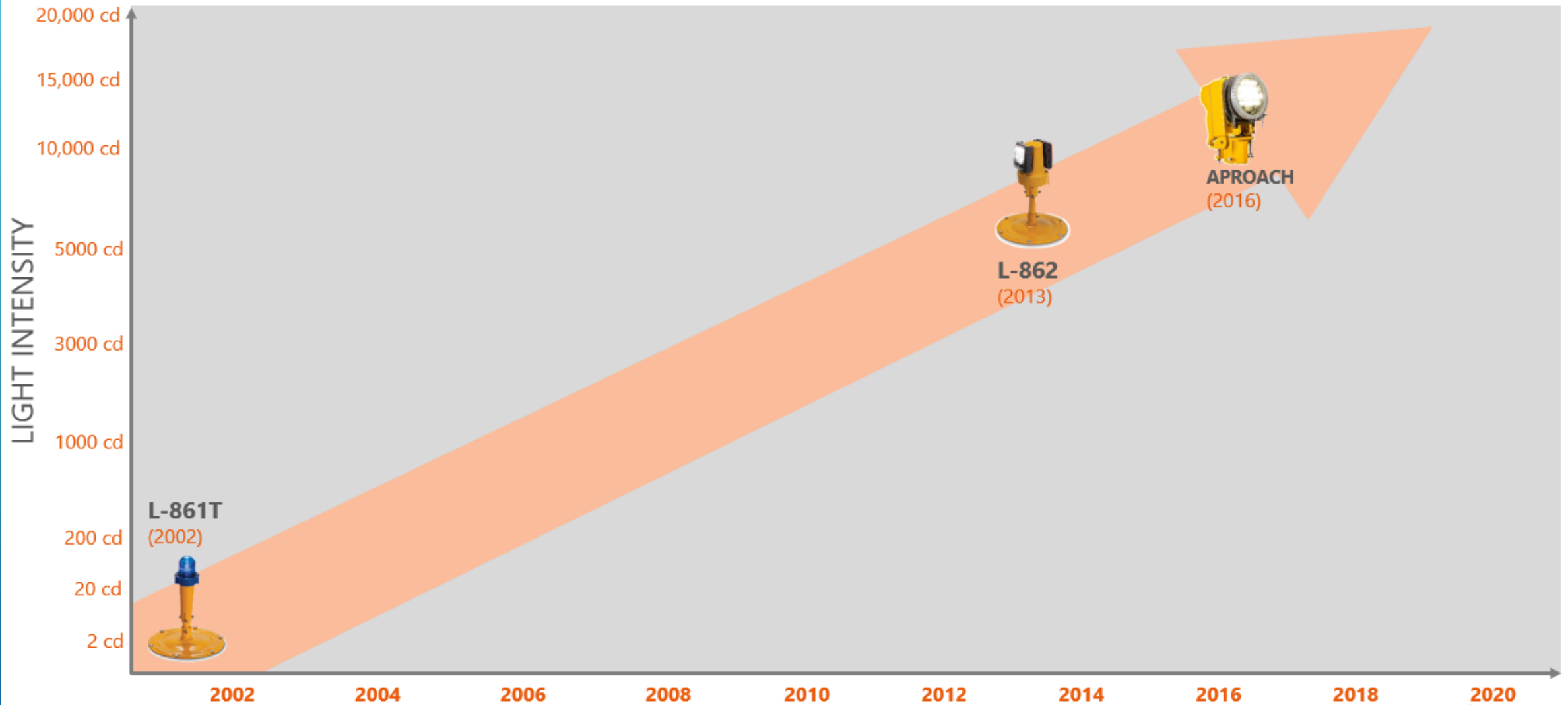
traditional lighting is at an all-time low, and that shift has been supported by the U.S. government phasing out incandescent bulbs. As a result, volume is down dramatically at the Circleville Lamp Plant, and the facility is operating

SEE PLANT, C5

Columbus Dispatch Sept 2, 2016

- 1100 employees at its peak
- 200+ employees in 2015
- Factory closes August 2017

LED Historical Timeline



LAMP DESCRIPTIONS

Lamp	Designation	Watts	Volts	Amps	Lamp Manufacturer
(263)	8671301 Xenon Flashtube				Flash Technology
(265)	0100-3752 LED		120		Hali-Brite Inc.
(267)	48A0009	69	120		ADB Airfield Solutions, LLC
(268)	1413.05.100 Green LED			6.6	ADB Airfield Solutions, LLC
(269)	1413.05.110 Yellow LED			6.6	ADB Airfield Solutions, LLC
(272)	48A0376	18			ADB Airfield Solutions, LLC
(273)	48A0078 PAR 38	120			Sylvania
(274)	48A0375	100			Regent
(276)	150/CL RF Option-GE	150	120		Crouse Hinds ALP
(277)	11047-2882 Floodlight, GE Par 38	250	120		Crouse Hinds ALP
(278)	40600536R Red LED Array				Automatic Power Inc.
(279)	10047-2888 Osram	45		6.6	Crouse Hinds ALP
(281)	PL10630-F-8 LED				Point Lighting Corporation
(282)	55-00145 Par 56 Flashtube				Strobe Approach Lighting Technology, LLC
(283)	Lighthouse 120 LED		120		Farlight LLC
(284)	Lighthouse 240 LED		240		Farlight LLC
(285)	6102	40		6.6	Philips
(286)	6116	100		6.6	Philips pk30d
(287)	55-00211 Helical Xenon Flashtube				Strobe Approach Lighting Technology, LLC
(289)	58750	200		6.6	Osram
(290)	64320 Quartz	45		6.6	Osram
(291)	64322 Quartz	30		6.6	Osram
(292)	760.2190 (Osram 64339)	105		6.6	OCEM SpA
(293)	760.2186 (Osram 64337))	48		6.6	OCEM SpA
(294)	116A21/TS-120V	116	120		General Electric
(295)	620PS40P-120V	620	120		General Electric
(296)	LA-RO-3-1-O1 LED				Orga
(297)	STD 05006 LED				TWR
(298)	21312 LED			6.6	Crouse Hinds ALP
(299)	620PS40120V	620	120		H&H
(300)	860-1R02 LED		220		Dialight
(302)	H1-808Q Triple Helix Xenon Arc		120		Amglo Kemlite
(303)	803-0419-B Xenon Flashtube		1000		Skytec Inc.
(304)	D164-1010LED		120		Dialight
(305)	411.024.025A LED			6.6	Youyang
(306)	LED-T			6.6	Airport Lighting Co.
(308)	21355 LED			6.6	Crouse Hinds ALP
(309)	21354 LED			6.6	Crouse Hinds ALP
(310)	21317 LED			6.6	Crouse Hinds ALP
(311)	21318 LED			6.6	Crouse Hinds ALP
(312)	6110	40		6.6	Philips
(313)	Farlight LED3 Beacon 120VAC		120		Farlight LLC
(314)	Farlight LED3 Beacon 240VAC		240		Farlight LLC
(315)	2990.40.827 SLI MR 16	48		6.6	ADB Airfield Solutions, LLC
(316)	44A5911 Osram MR 16	30		6.6	ADB Airfield Solutions, LLC
(317)	2990.48.360 Osram PK30d	45		6.6	ADB Airfield Solutions, LLC
(318)	48A0386GE	62			ADB Airfield Solutions, LLC
(319)	H29316-1 Luxeon LED	6			Alstom Power Ltd.
(320)	H29316-2 Luxeon LED	3			Alstom Power Ltd.
(321)	LXK2-PW14-T00 LED Lumiled		240		ADB Airfield Solutions, LLC
(325)	W10090 LED	0.5			Seoul
(326)	3400-0133 Par 38 Philips 25° Flood	90	120		Hali-Brite Inc.
(327)	59194 Venture Lighting metal halide	320	120		Hali-Brite Inc.
(328)	44A6702-1 LED				ADB Airfield Solutions, LLC
(329)	44A6722 LED				ADB Airfield Solutions, LLC
(330)	LXML-PH01-0050 Red LumiLeds LED				Dialight
(331)	Luxeon LXHL-FB-3C LED Philips				Astronics DME Corporation

LAMP	DESIGNATION	WATTS	VOLTS	AMPS	Lamp Manufacturer
144	125006022	Xenon			HUGHEY & PHILLIPS
152	HLX64342	100		6.6	Osram
153	HLX64361-2	150		6.6	Osram
157	9017	Xenon			FLASH TECHNOLOGY
160	SLC 008075	105		6.6	ATG
163	64338	48		6.6	Osram
164	64339	105		6.6	Osram
181	21127	32		6.6	GE
208	3400-0400/U/ED28/PS	400	120		VENTURE
216	21496	48		6.6	SYLVANIA
217	XFT 200	Xenon			ORGA
219	21116	48		6.6	OSRAM
220	64337 A45-15	45		6.6	OSRAM
226	59036	75	120		SYLVANIA
231	GE MR-16 EXT	50	12		GE
232	860-1R03	LED	12		Dialight
240	STFLSHTB5	Xenon			ADVANCED STROBE PRODUCTS
254	20058	120		6.6	GE
260	8384309	Xenon			FLASH TECHNOLOGY
282	55-00145	Xenon			STROBE APPROACH LIGHTING TECHNOLOGY
287	55-00360	Xenon			STROBE APPROACH LIGHTING TECHNOLOGY
289	58750	200		6.6	OSRAM
290	64320	45		6.6	OSRAM
291	64322	30		6.6	OSRAM
296	LA-RO-36-1-O1	LED			ORGA
297	STD 05006	LED	120		TWR
316	44A5911	30		6.6	OSRAM
318	48A0386	62		6.6	GE
321	44A6672	LED		6.6	ADB SAFEGATE AMERICAS, LLC
334	FHD-3400-000	Xenon	120		ITL
373	10V/20W Quartz	20	10		WAMCO

AC 150/5345-53D

Changes From

2012 to 2023

What Happens to a product when Volume Decreases?

Design Decision made by the Airport and Engineering Firm
Engineering Firms design the Projects.
Vendors Bid the plan set with contractors
Volume of LED Projects increases
Production Volume of Incandescent Lights decreases
Lamp Manufacturer Volume decreases
Material pricing goes up
Lead times increase

Decisions of Vendors

Recertification Costs of Products \$7-15K
Stock Quantity of Multiple Products
Price Increases from Manufacturers

Decisions of Lamp Manufacturers

Manufacturing Plant vs New Volume
Material Price Increases

What is being built currently?

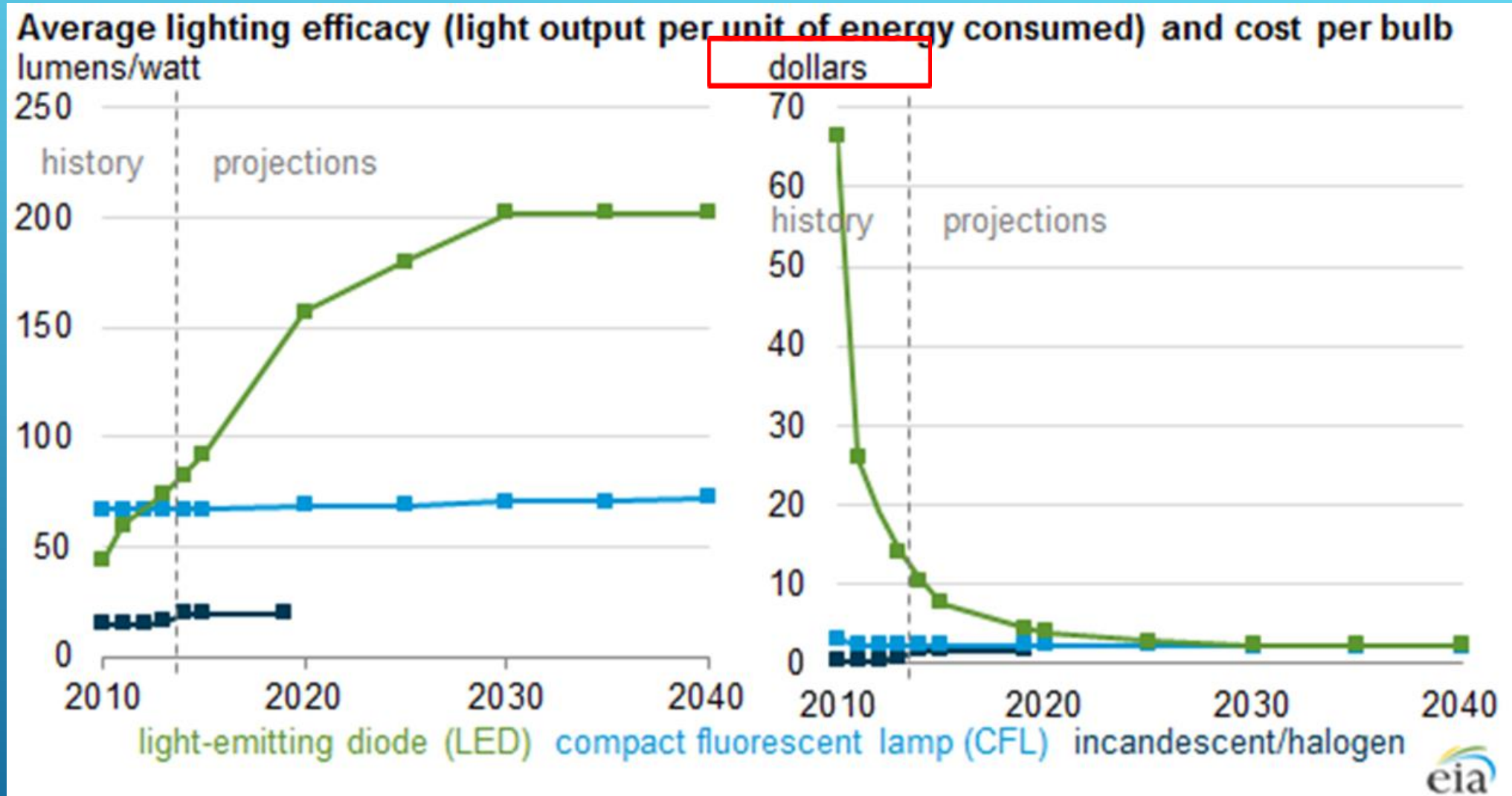
2005: LED 10% vs Halogen 90%

2012: LED 50% vs Halogen 50%

2018: LED 70% vs Halogen 30%

2021: LED 80% vs Halogen 20%

Let's Look At This Again



What Happens to Products?



- **PAR-38 – 60W 120V MALSR Lamp**

- 4 or 5 suppliers is now down to One
- Demand is still the same
- FAA is working on a solution Lamp

Market Pricing has more than tripled

Alternative Incandescent Lamps (AIL) Project



- **Objective:**
 - To approve AIL to support over 900 MALSR systems
- **Issue:**
 - GE discontinued lamps used in the MALSR system. Replacement Lamps are difficult to find.
- **Status:**
 - Tested four (4) lamps for photometric, chromaticity
 - Amglo (53w HIR)
 - Amglo (60w Halogen)
 - Sylvania (60w)
 - BLC (120W)

What are the Airports Looking For?

Reduction in Costs Labor and Materials

Energy Savings

Availability and Manufacturing Lead Times for Spares

Sustainability Goals of the Airport

Carbon Neutral

Construction Closes Middlebelt Rd.



DTW ranked by J.D. Power as #1 in Customer Satisfaction for Mega Airports
I-275 Construction Underway

3 ACTIVE ALERTS

HOME / SUSTAINABILITY

Business

ABOUT WCAA

DOING BUSINESS WITH
WCAA

DEVELOPMENT

ENVIRONMENT &
SUSTAINABILITY

Environmental
Operations

Sustainability

People

Planes

Planet

Energy Saving
Suggestions

MEDIA CENTER

CAREERS

DTW AIRPORT ID
BADGES

Sustainability

Wayne County Airport Authority's Sustainability Program was started in 2015, when a committed group of employees came together to elevate sustainability concerns at the airport. This Sustainability Working Group worked together to identify sustainability goals that would aim to achieve higher levels of sustainability, while balancing financial and staff resources, local economic and community concerns, and environmental priorities. The hard work of the Sustainability Working Group is reflected in the Sustainability Accomplishments Report, and Airport Authority's Sustainability Plan. This group continues to work to further the sustainability goals and initiatives that make Detroit Metropolitan Airport a leader in sustainability.

Wayne County Airport Authority's Sustainability Program is focused on three themes: People, Planes & Planet. People reflects the Authority's commitment to its employees, tenants, neighboring communities, and the flying public. Planes focuses on the operational components of the airports, including safety and efficient infrastructure. Planet addresses the Authority's pledge to protect and conserve environmental resources.

- Sustainability Accomplishments Report
- Sustainability Program
- Carbon Reduction Statement
- Zero Emissions Roadmap

Sustainability Goals



People



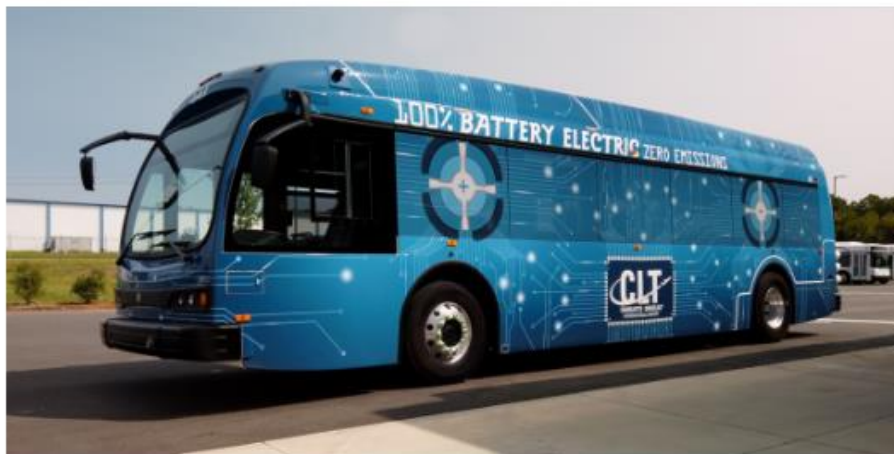
Planes



Planet

[◀ Community Engagement](#)

Sustainability



Sustainability Initiatives

Charlotte Douglas International Airport is committed to sustainability by pursuing fiscally responsible practices that minimize environmental impacts. We believe we have the responsibility to provide economically viable sustainable solutions to our employees, our tenants, passengers, local community and region. We are committed to maintaining a balanced, integrated approach to future development and operations based on economic stability, environmental sustainability and social responsibility.

What are the Small Airports going to do?

Our Panel Today

Ryan Patton – Garver Engineering

David Garrett – Detroit Metropolitan Airport

Matt Cowden – Charlotte International Airport

Steven Brown – OSRAM Corporation

What are you
seeing at your
Airport?

