



OLED Investor Presentation

2Q 2023

(updated: May 2023)



Forward- Looking Statements

All statements in this document that are not historical, such as those relating to the projected adoption, development and advancement of the Company's technologies, and the Company's expected results and future declaration of dividends, as well as the growth of the OLED market and the Company's opportunities in that market, are forward-looking financial statements within the meaning of the Private Securities Litigation Reform Act of 1995. You are cautioned not to place undue reliance on any forward-looking statements in this document, as they reflect Universal Display Corporation's current views with respect to future events and are subject to risks and uncertainties that could cause actual results to differ materially from those contemplated. These risks and uncertainties are discussed in greater detail in Universal Display Corporation's periodic reports on Form 10-K and Form 10-Q filed with the Securities and Exchange Commission, including, in particular, the section entitled "Risk Factors" in Universal Display Corporation's Annual Report on Form 10-K for the year ended December 31, 2022. Universal Display Corporation disclaims any obligation to update any forward-looking statement contained in this document.



Universal Display Corporation

**Critical OLED
Innovator &
Enabler**



**Highly
Energy-
Efficient
PHOLED**



Fabless



**OLED
Materials
Supplier & IP
Licensor**



**5,500+
Global
Patents***

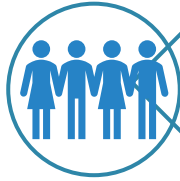




UDC's Energy-Efficient Phosphorescent Materials: 100% UniversalPHOLED® emitters save energy and do not use conflict minerals



Diverse & Inclusive Workplace: Geographically (from more than 25 countries), culturally and gender-wise (22% female and 78% male*) diverse



Board of Directors: 38% Female, 62% Male
Named a *2022 Champion of Board Diversity* by The Forum of Executive Women



Community Outreach: UDC supports a range of global educational initiatives, community service organizations and an employee charity matching program



Strong Balance Sheet: \$845M in cash**, no debt



Forbes' America's Best Mid-Size Companies 2022
Newsweek's America's Most Responsible Companies 2023
Bloomberg's 50 Companies to Watch in 2023

UDC Highlights

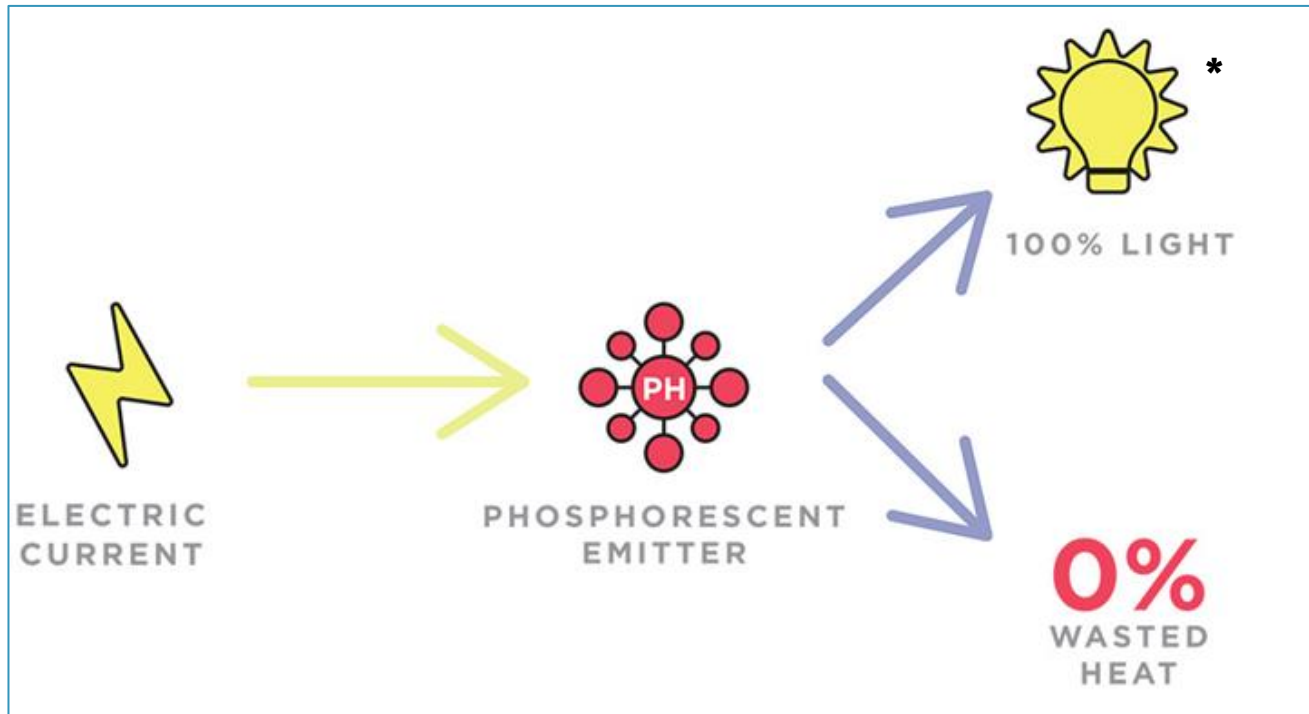
*As of 12/31/2022

**Cash, cash equivalents and short-term and long-term investments, excluding minority interest as of 03/31/2023



UniversalPHOLED® = Energy Efficiency

With energy efficiencies that are up to four times higher than conventional fluorescent OLED materials, UDC's patented and award-winning phosphorescent OLED technology and materials are integral to enabling low power consumption in OLED displays and lighting.



Phosphorescent Emitters

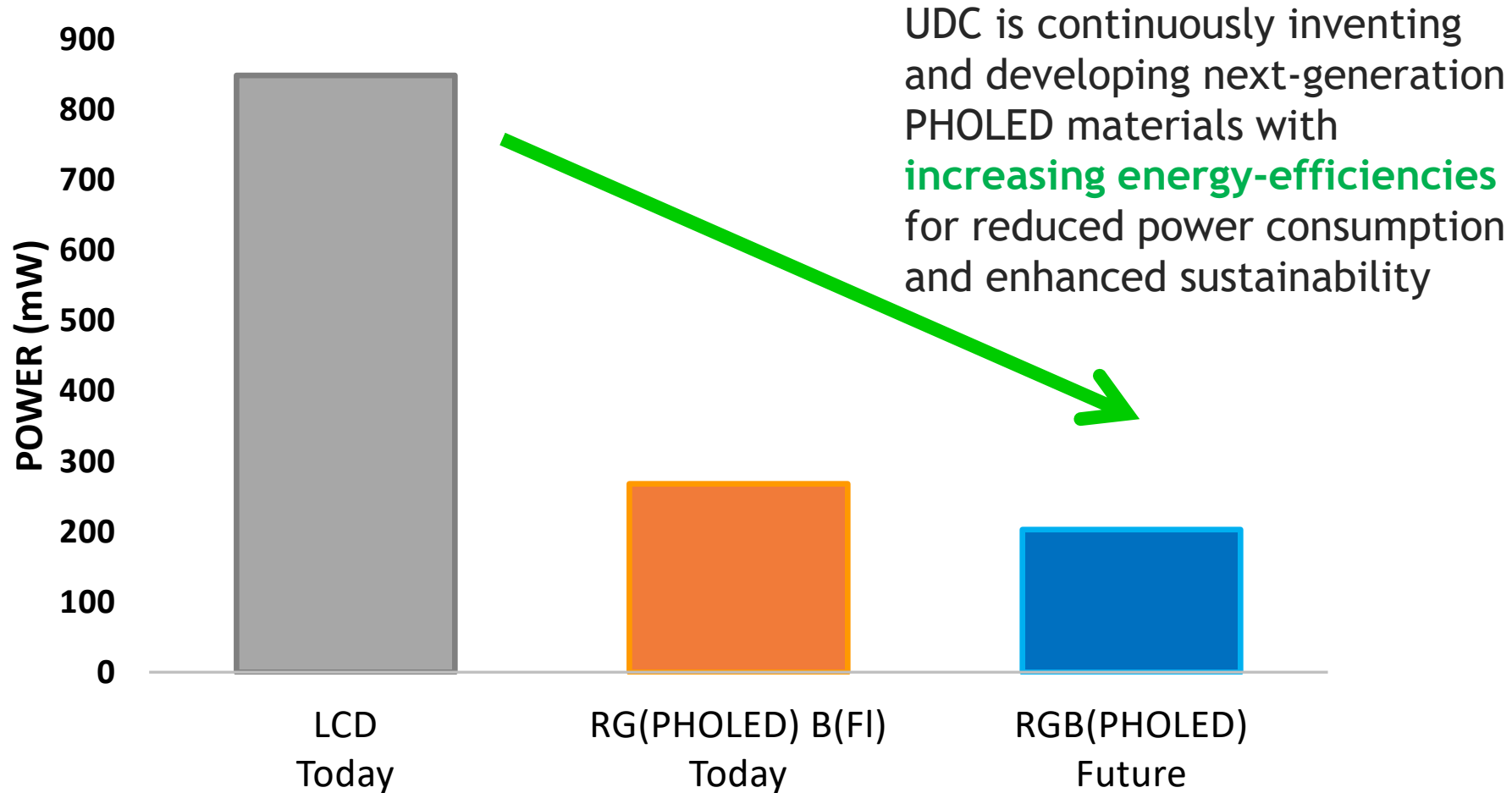
- Enables energy efficiency
- Reduces requirements for heat dissipation components
- Increases lifetime
- Lowers product cost

*100% Internal Quantum Efficiency

[M. A. Baldo et. al., Nature, 395, 151 \(1998\)](#)



Our PHOLED Power Roadmap Supports Sustainability



Notes:

- Based on a 5.0" OLED display and comparable contrast LCD operating at 600 cd/m² with video (50% pixels on).
- LCD data based on published smartphone display power consumption data. PHOLED data is based on UDC estimates.
- R=Red; G=Green; B=Blue
- PHOLED=Phosphorescent; FI=Fluorescent

Phosphorescent OLED Carbon Savings

Calculated assumptions: There are at least 1.8 billion active OLED smartphones using our PHOLED materials and technology in the world today and

Average use is 4 hours per day

Average luminance at 600 nits with 50% pixels on

Power savings is 30% over LCD

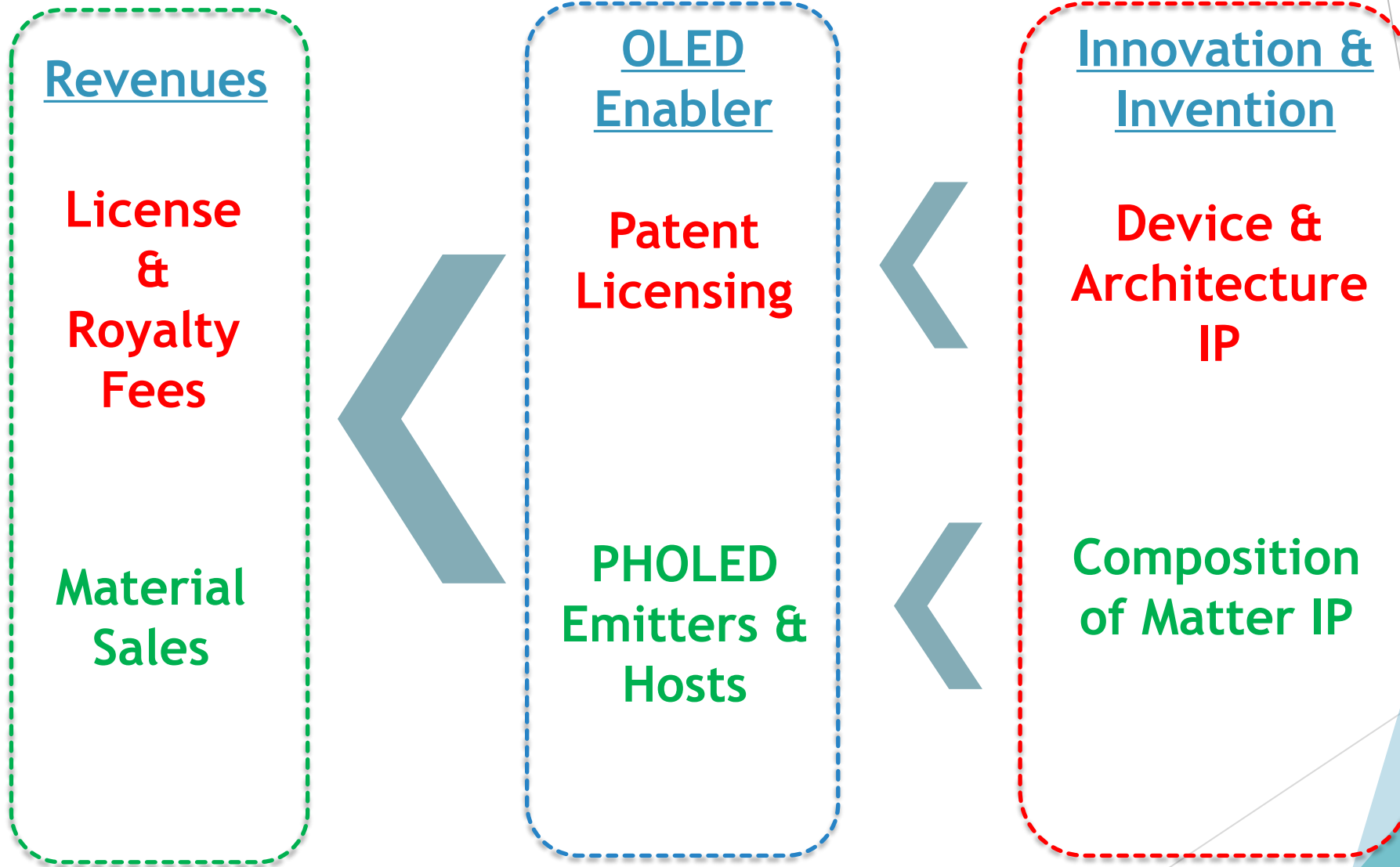
Power saving per display is 0.46W; Total savings per year is an estimated 1,216 GW-h per year

= 861,758 Metric tons of Carbon Dioxide (CO₂) equivalent avoided per year*
Equivalent to carbon sequestered by 14,249,241 tree seedlings grown for 10 years*

*<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>



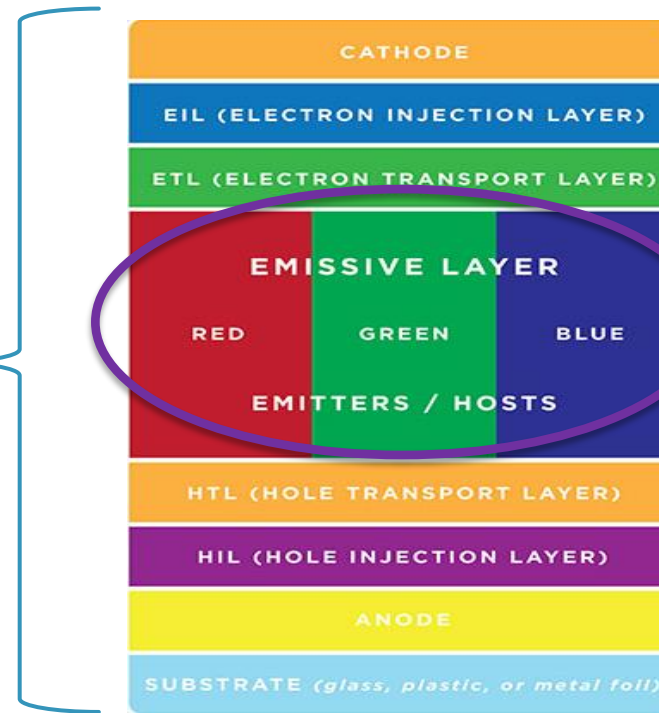
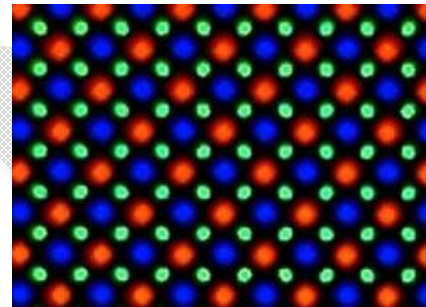
Business Model





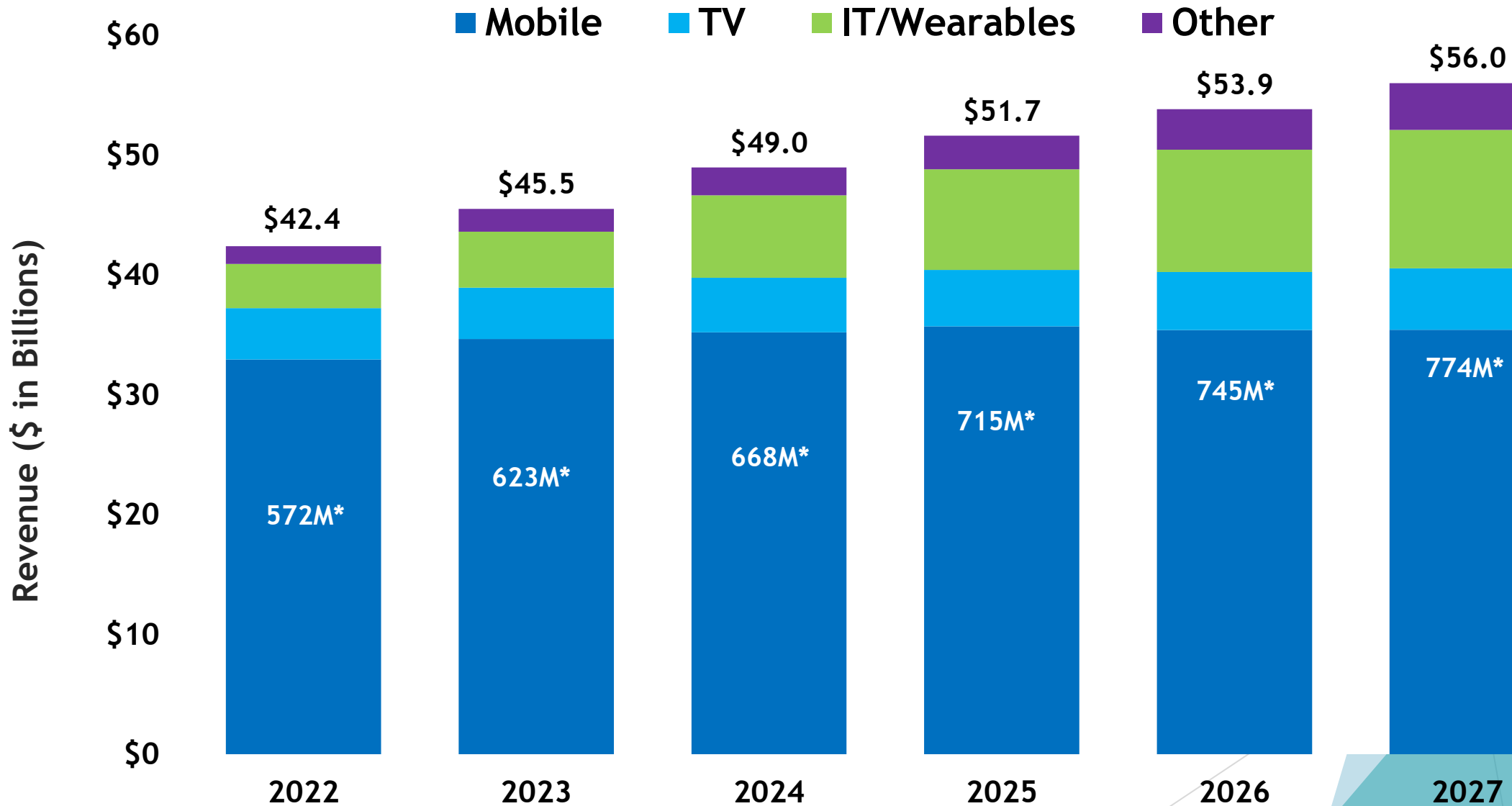
What is an OLED?

- An Organic Light Emitting Diode is a series of organic thin films between two conductors
- When electrical current is applied, bright light is emitted
- OLEDs can be used for displays and lighting
- OLEDs are not just thin and efficient - they can also be made *flexible* and *transparent*





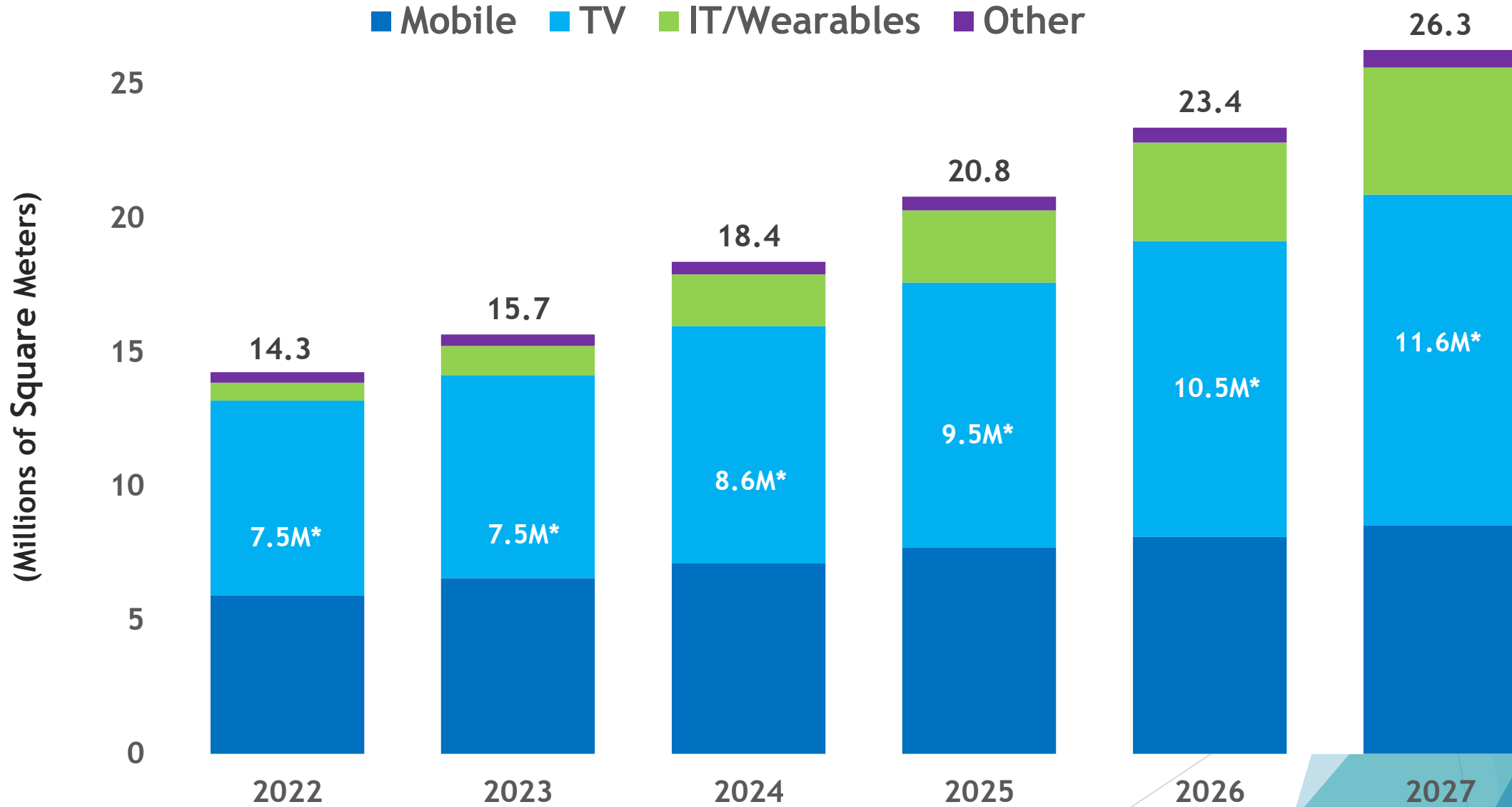
OLED Display Market Potential



*Unit Numbers are for OLED mobile phones only
Source: Omdia OLED Display Market Tracker - Q4 2022 (April 2023)



OLED Panel Area Demand



*Unit Numbers are for OLED TVs only

Source: Omdia OLED Display Market Tracker - Q4 2022 (April 2023)

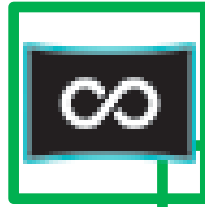


Strong OLED Display Market Drivers



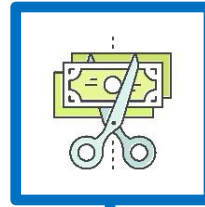
Lower Power Usage

- **RED** Phosphorescence reduces power consumption by 25%
- **Add GREEN**: 45% cumulative reduction
- **Add BLUE**: 75% cumulative reduction
- Enabled by PHOLEDs



Superior Aesthetics

- Improved image quality
- Thin and Light
- 180 degree viewing angle
- 2,000,000+: 1 contrast ratio - TRUE BLACK
- Real-time video speeds - excellent for 3D
- Self-emissive display
- Low UV output
- Minimal Bezel
- *Flexible*



More Cost Effective

- Fewer manufacturing process steps
- Lower bill-of-materials
 - No backlight required
 - No color filter required
 - No liquid crystal required
- Reduced driver IC costs
- Enables non-glass substrates



OLED Smartwatches & Smartphones

Samsung Galaxy Watch5



Apple Watch Series 8



Garmin Forerunner 265 / 965



Huawei Band 8



Motorola Moto Watch 200



Oppo Find X6



vivo Y78+



Samsung Galaxy M54



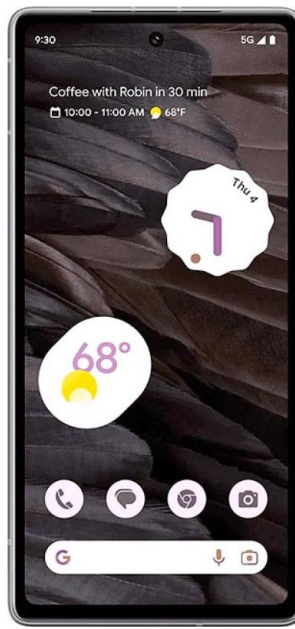
iPhone 14 Pro



Honor Magic5



Motorola Edge 40



Google Pixel 7a



Tecno Camon 20 Premier



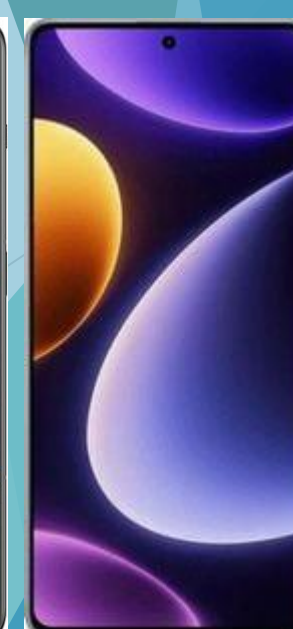
Meizu 20 Pro



Huawei Pocket S



OnePlus 11



Xiaomi Poco F5 Pro

More OLED Products



BRAVIA XR A80K 4K HDR OLED TV



Samsung S90C - OLED TV



LG OLED B3 Evo TV



2025 Buick Electra E5: Curved 30-Inch 6K OLED Display



Nintendo Switch (OLED model)



Lenovo ThinkPad X13 Gen 4 (2023)



PlayStation VR2



Rokid Max AR Glasses



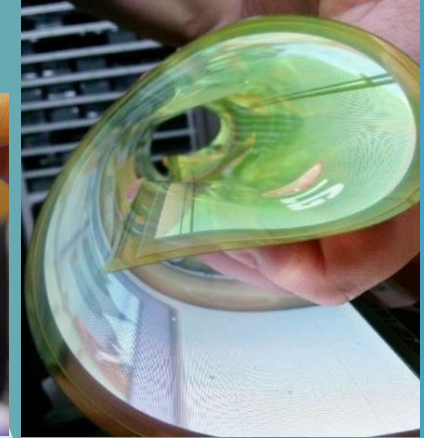
Samsung Galaxy Book 3 Pro



Form Factor: Flexible, Foldable, Rollable



Google Pixel Fold



Tecno Phantom V Fold



Samsung Galaxy Z Fold4 and Galaxy Z Flip4



Xiaomi Mix Fold 2



Oppo Find N2 Flip



Honor Magic Vs



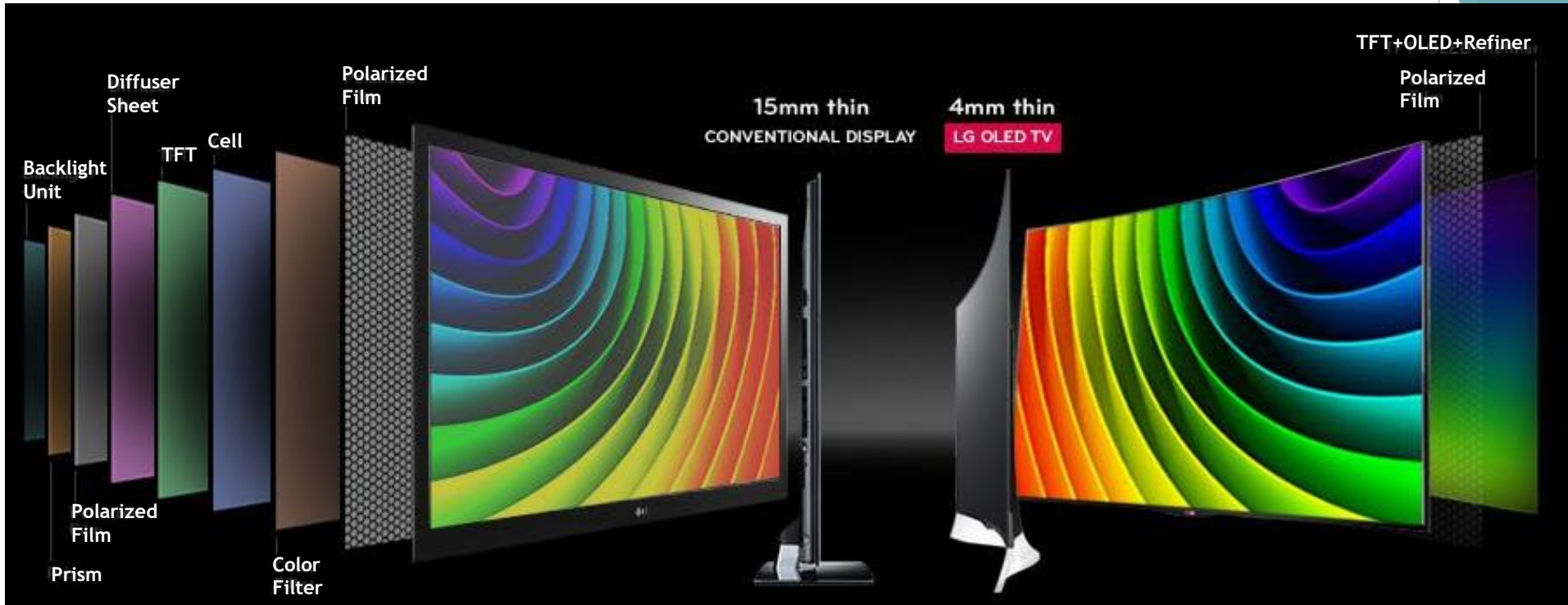
vivo X Fold2



Asus ZenBook 17 Fold



LCD vs. OLED



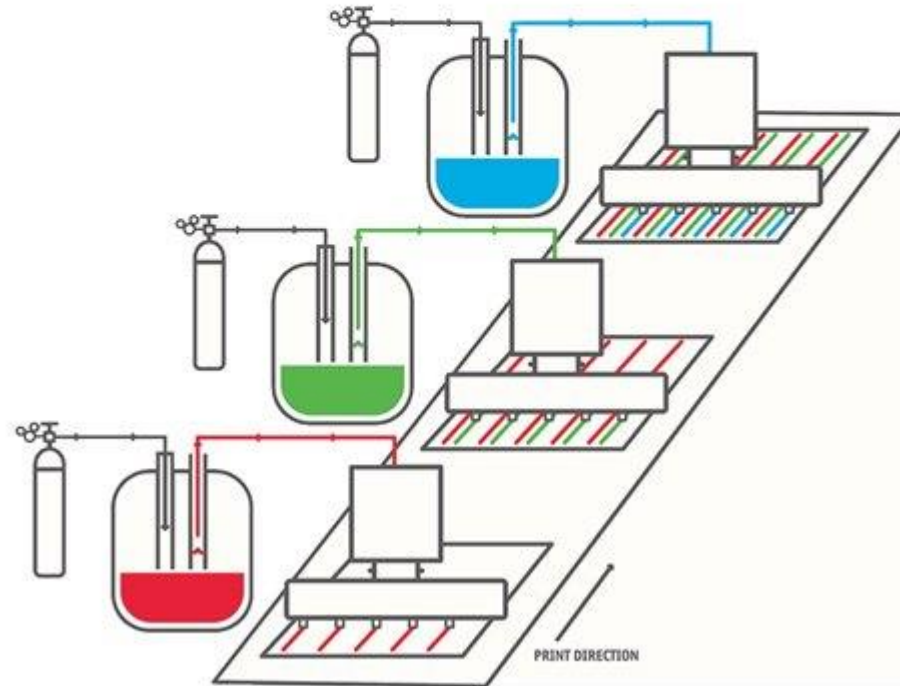
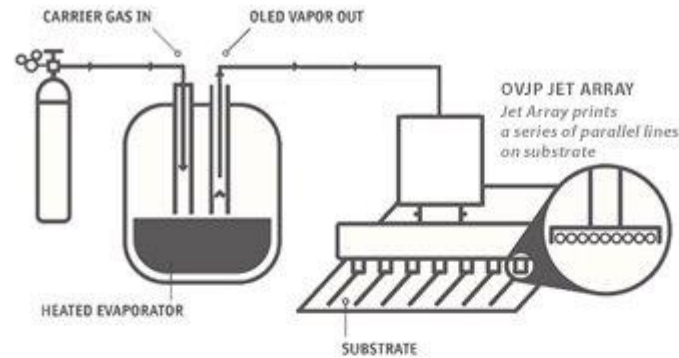
- ✓ Lower BOM (bill of materials)
- ✓ Better Performance, More Efficient
- ✓ Thinner and Flexible Form Factor
- ✓ Vivid Colors and Superior Contrast Ratio

Image source: LG

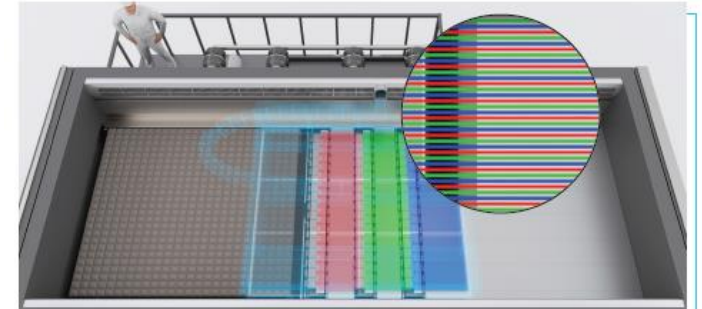


Groundbreaking Organic Vapor Jet Printing (OVJP)

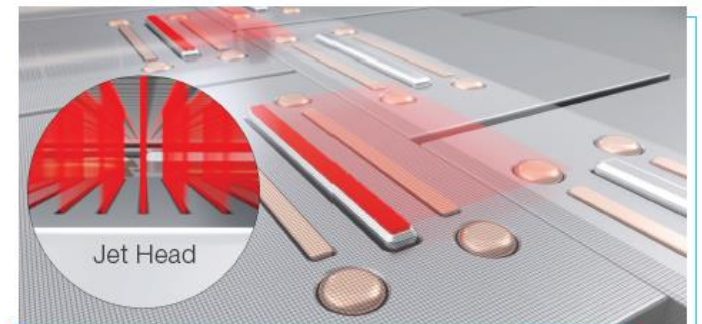
- Mask-less, solvent-less (dry) Printing OLED technology
- High material utilization and fast TAKT time
- Scalable to Gen 10.5+
- Enables advanced OLED performance with process control
- Multi-color deposition in one chamber
- Small molecule OLED materials
- Supports 4K and 8K resolution



Small Footprint
Scalable to Gen 10.5+



One Chamber – Multiple Layers
Three colors printed in a single pass



Vapor Jets Print High Resolution Lines
Without masks, without solvents



Strong OLED Lighting Market Drivers



Energy-efficient & environmentally friendly

- Low drive voltage
- Low operating temperatures, cool to touch
- Long lifetime
- Easy to control



Highly desirable color quality

- Wide range of CCT, high CRI possible
- Color tunable
- Instant “ON” , Dimmable without flicker
- No glare, no noise
- Low UV content



Image source: LG Display

Novel form factor & Low-Cost Potential

- Thin and lightweight
- Transparent
- Non-breakable, Conformable, Flexible, Foldable, Rollable
- Scaling advantage
- Roll-to-roll process



OLED Lighting Around the World Today

AcuityBrands



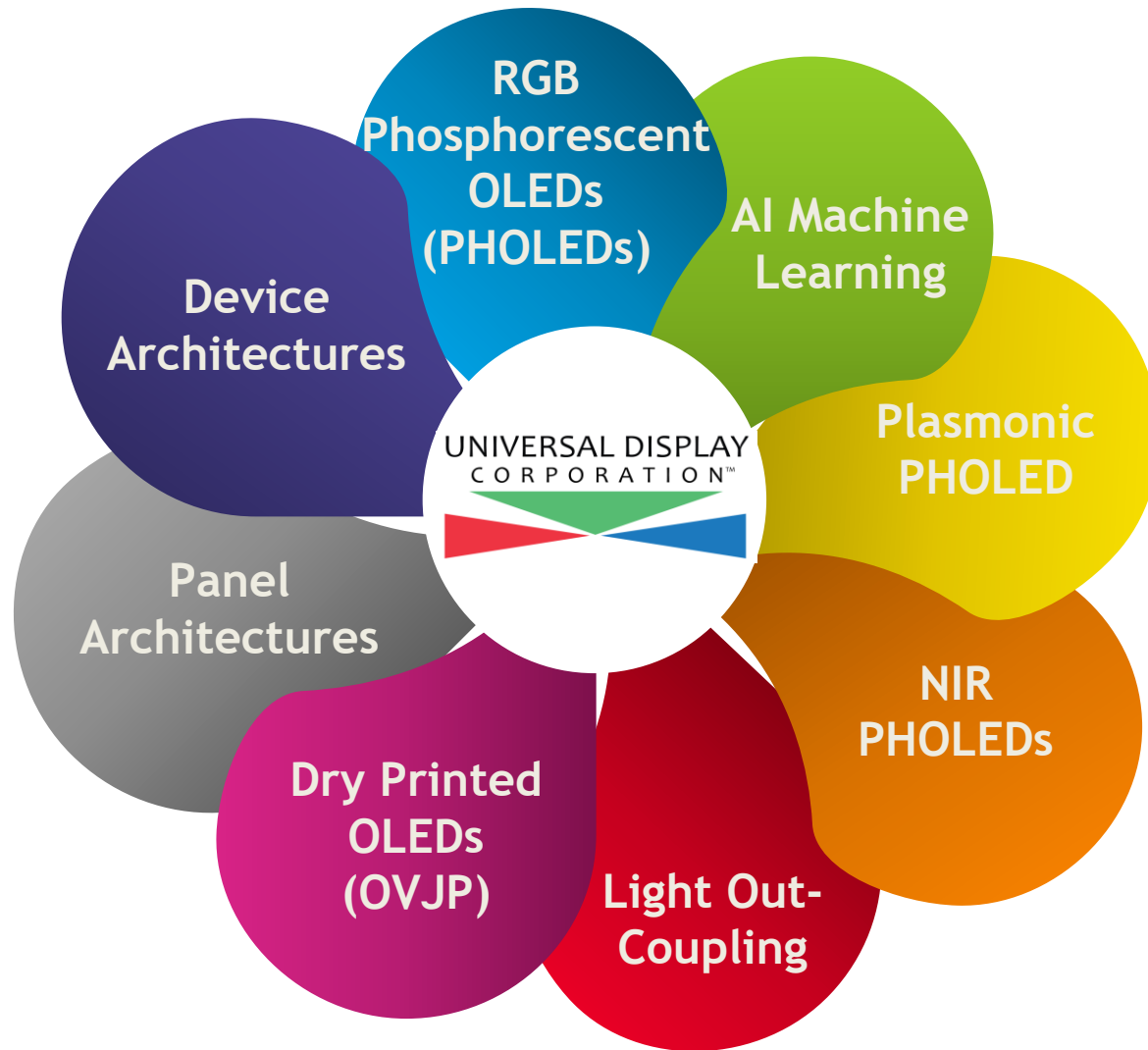
OLEDWorks
CERTIFIED CHANNEL PARTNER



Mercedes-Benz



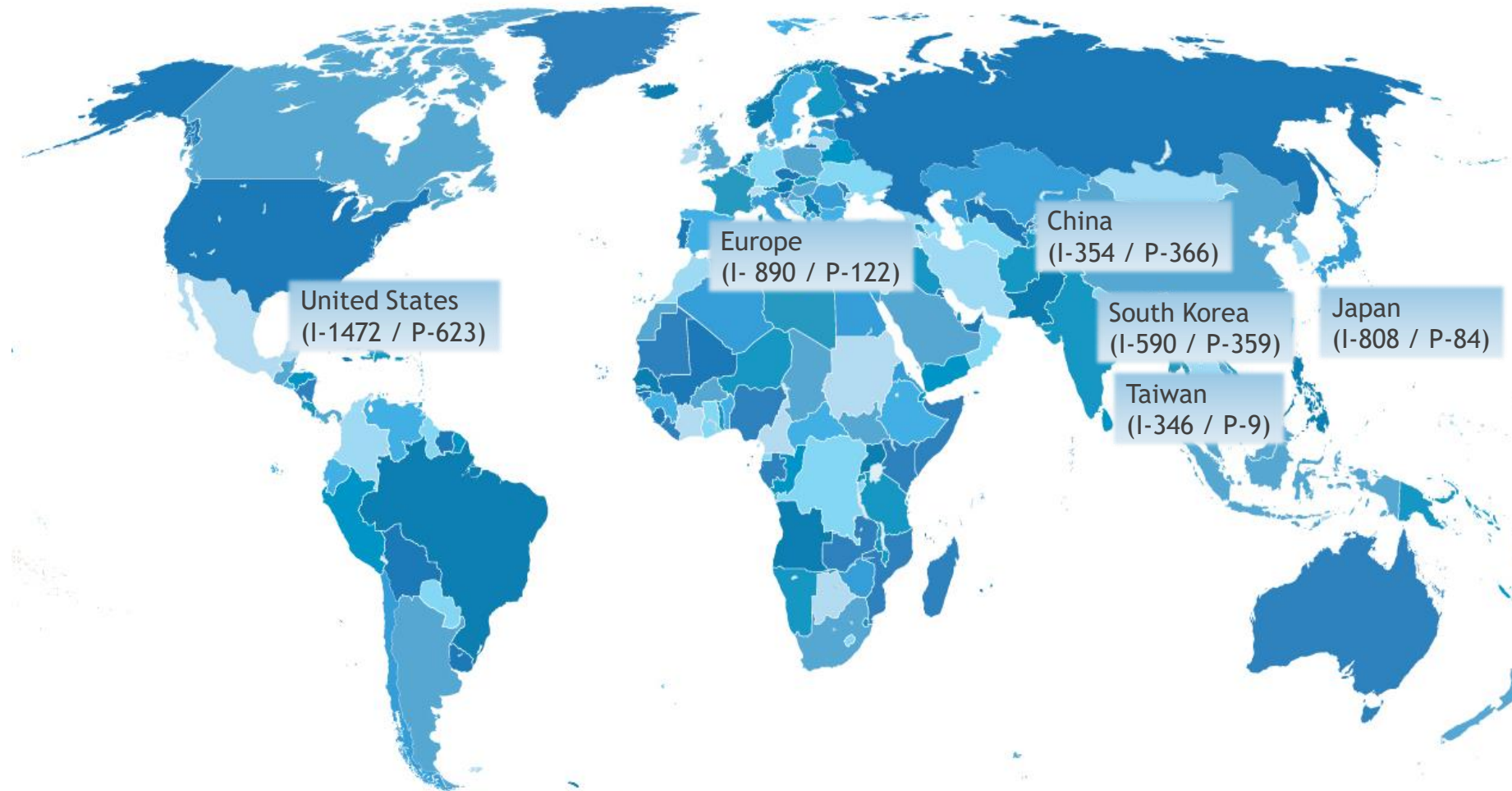
Strong, Broad and Deep Patent Portfolio



- ▶ We develop and license enabling technologies that are at the heart of consumer OLED products worldwide, from AR/VR, smartwatches, smartphones, IT, automotive and TVs to lighting products.
- ▶ We believe that our extensive portfolio of patents, trade secrets and non-patented know-how enable our leadership position in the OLED ecosystem.
- ▶ Our R&D innovations allow us to continuously bolster the depth and breadth of our global OLED intellectual property framework, which currently stands at more than 5,500 issued and pending patents worldwide (as of February 28, 2023).



Patents are Universal



More than 5,500 patents and pending applications*

*as of February 28, 2023



Strategic Display & Lighting Partnerships

AUO

Kaneka

SAMSUNG
SAMSUNG DISPLAY

BOE



KONICA MINOLTA



SEEYA
TECHNOLOGY



LG Display

SHARP

Fraunhofer

Lumiotec

SUMITOMO CHEMICAL

INNOLUX

OLEDWorks

TIANMA

JDI
Japan Display Inc.

ROYOLE

Visionox

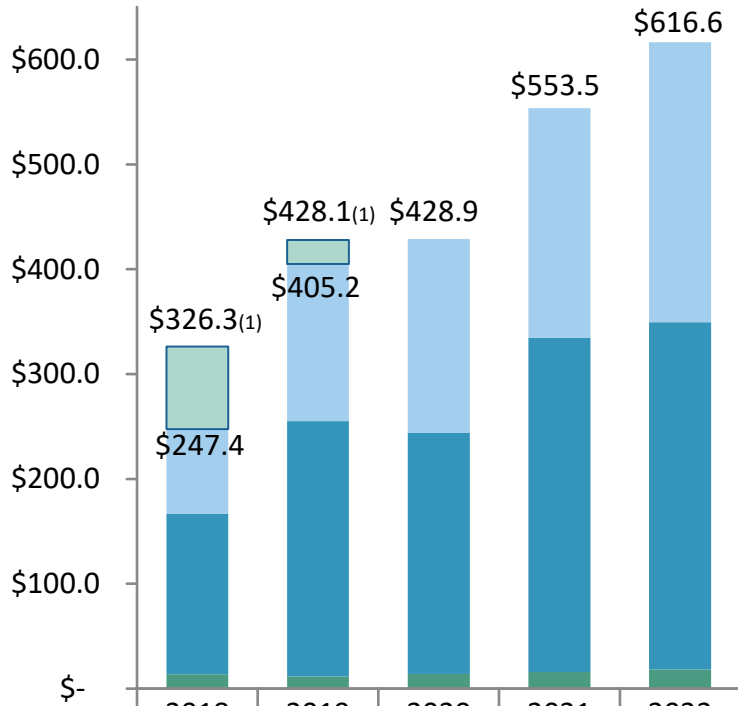


Historical Financial Performance

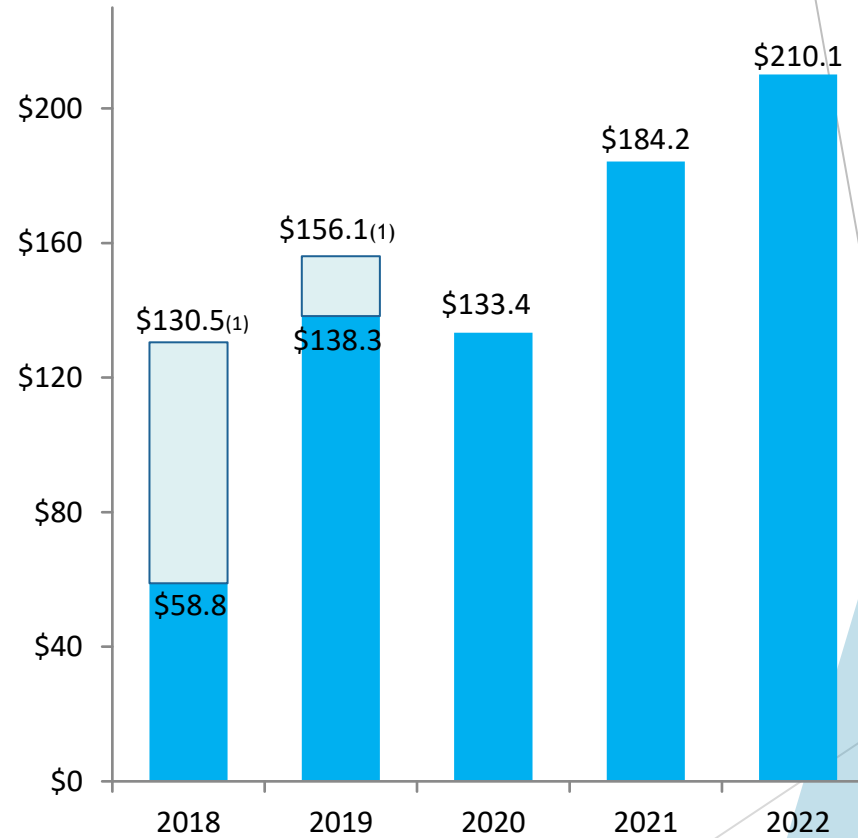
Revenue

Income

(\$ in millions)



	2018	2019	2020	2021	2022
ASC 605 Adjustment	\$78.9	\$22.9	\$-	\$-	\$-
Royalty & License	\$80.6	\$150.0	\$185.1	\$219.0	\$267.1
Emitters	\$153.2	\$243.4	\$229.7	\$318.6	\$331.1
Contract Research Services	\$13.6	\$11.7	\$14.1	\$15.9	\$18.4



(1) Reflecting ASC 605 Adjustments.



Robust Capital Structure

March 31, 2023

Cash, Cash Equivalents, Short-Term and Long-Term Investments	\$845,429 *
Total Assets	\$1,535,712
Long-term Debt	-----
A/P and Accrued Liab.	\$35,087
Deferred Revenue	\$55,262
Shareholders' Equity	\$1,299,465
Total Shares Outstanding	47,567,007

*Weighted average diluted shares used in computing net income per common share

*Please refer to our recent 10Q filing for information regarding minority investments.



Company Summary

Global OLED Materials & Technology Leader

- Lighting up the OLED Revolution
- License & Sell Proprietary Phosphorescent OLED Technology and Materials to Display & Solid-State Lighting Manufacturers
- Fabless Model; Partnering w/ PPG
- ~444 Employees (305 R&D, 124 PhDs); Largest Global PHOLED Team

Blue-Chip Customer Base

- Displays: Samsung, LG Display, BOE, Tianma, CSOT, Visionox, Sharp
- Lighting: Kaneka, Konica Minolta, Lumiotec, OLEDWorks, Sumitomo Chemical
- Working with More than 25 companies



Strong Financial Performance

- \$845M Cash, No Debt*
- \$17.77 in Cash/Share*
- High Margin Business
- Lean Operating Model

**as of 03/31/23 and excluding minority interest*

Comprehensive & Robust IP

- Largest Phosphorescent OLED (PHOLED) Technology & Materials Portfolio
- More than 5,500 Issued & Pending Patents Worldwide and Growing**

***as of Feb 28, 2023*