

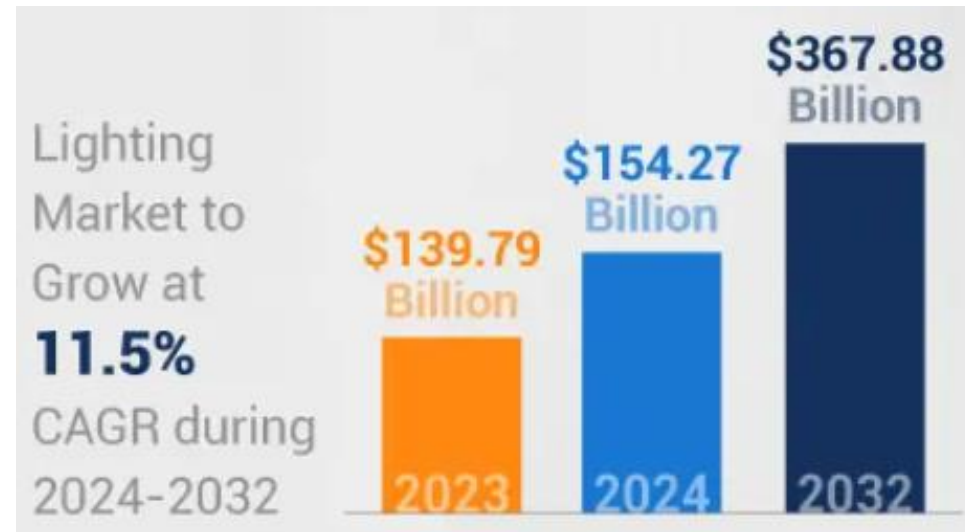
From OLED lighting to solar Panel
with the world's first continuous Dry Roll to roll process

2025. 7. 17

LOTI

In 2024, the global market for lighting and solar power is 200 trillion won and 400 trillion won respectively, with the market expected to reach 800 trillion won in five years

Most of the panels in this market are supplied from China



Solar Global Market Report 2025

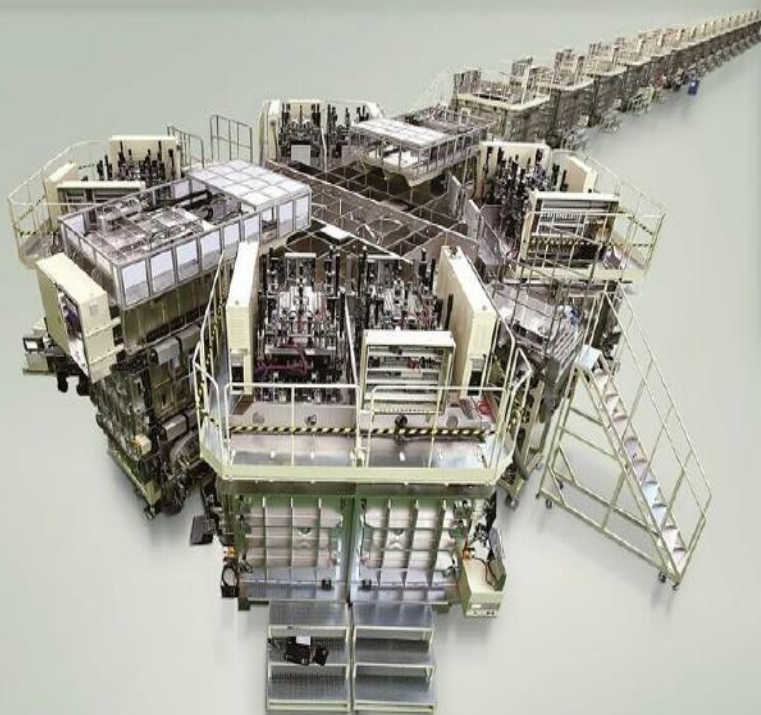


THE LIGHTING MARKET LANDSCAPE IS CHANGING

Healthy natural light OLED lighting has finally replaced extremely harmful LED lighting



WHY DOESN'T ANY COMPANY IN THE WORLD MAKE NATURAL LIGHT OLED LIGHTING



AVINGnetwork



The current structure cannot compete with the low price of LED due to the high cost of existing OLED equipment and the high operation costs. Only innovative equipment and technology that can reduce the manufacturing cost of OLED below LED make it possible.

TRANSITION FROM LED LIGHTING TO OLED LIGHTING WORLDWIDE USING LOTI TECHNOLOGY

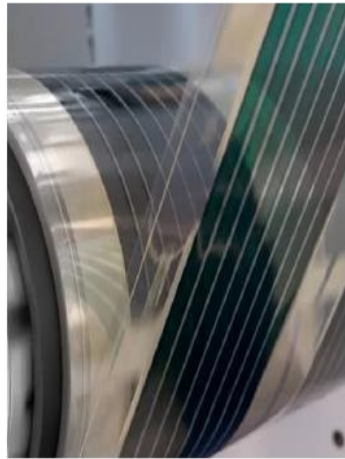
Development of innovative cost-saving manufacturing technologies such as eco-friendly Roll To Roll (R2R) methods and 'Photo-less Process'. Mass production of OLEDs at a cost lower than LEDs for the first time worldwide



Roll-to-Roll (R2R) OLED production equipment

WE PRINT OLED LIKE PAPER

Loti's core technology enables low-cost mass production of OLEDs based on the roll-to-roll process



Roll-to-Roll mask
change mechanism



The world's first OLED dry
manufacturing process



Thin film encapsulation
technology

Why is it that only LOTI can achieve mass production of OLED roll-to-roll?

OLEDs and perovskite solar cells are very vulnerable to moisture.

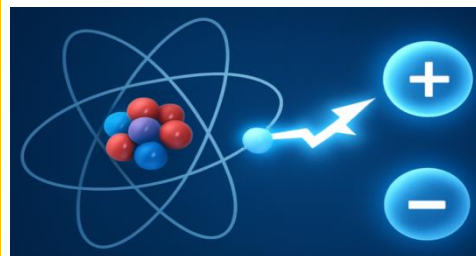
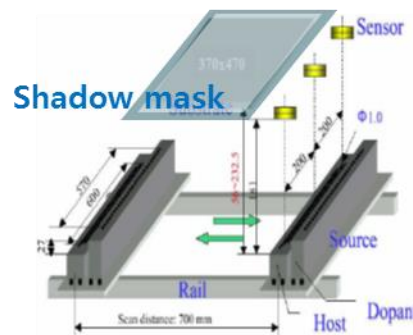
Completely blocking moisture is crucial.

If this fails, reliability cannot be secured.

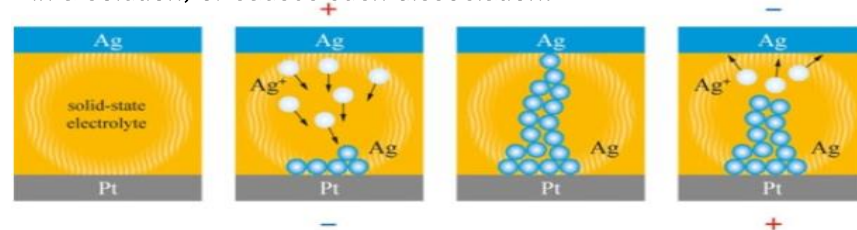
Currently available OLED products all use the vacuum deposition method

LOTI is the only company that has solved the mask replacement problem in the roll to roll vacuum deposition method (dry process)

진공 증착(Dry) vs. Solution(wet)



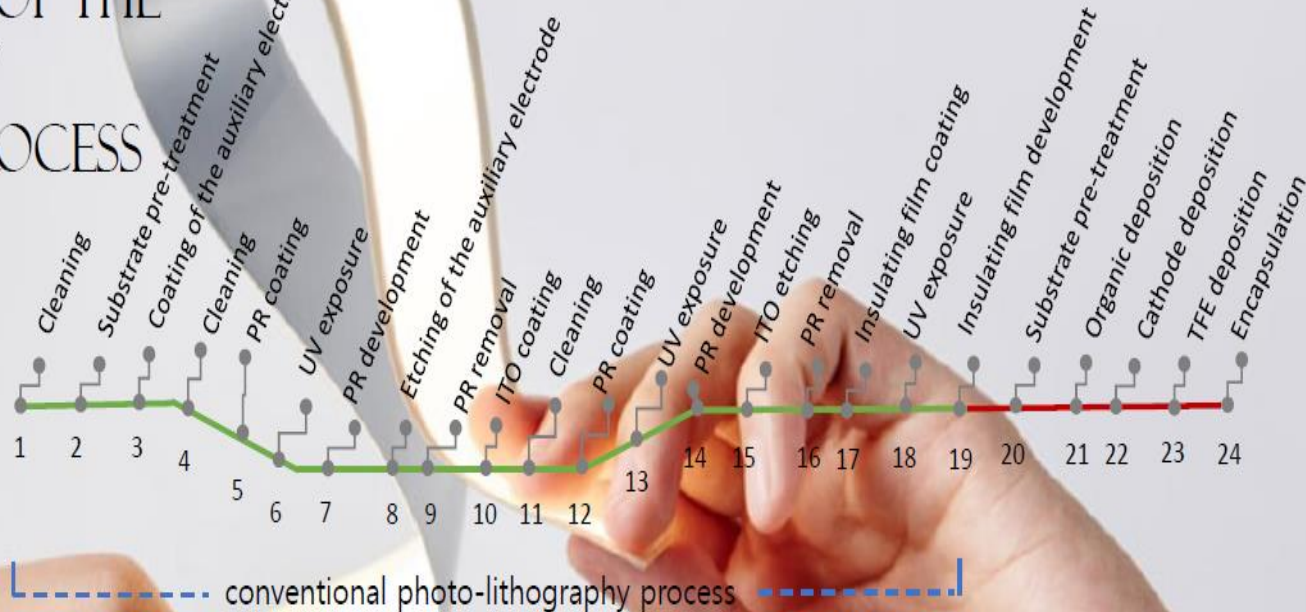
Ionisation is when an electrolyte dissociates into cations or anions in a solution, or causes such dissociation.



Ion Migration(이온 마이그레이션) 출처: KETI 후원식

ADVANCED OPTIMIZATION OF THE WORLD'S ONLY SHORTENED PROCESS FOR OLED

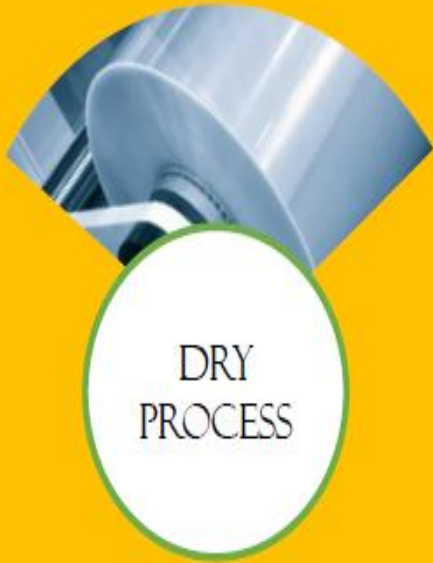
Conventional OLED
panel process



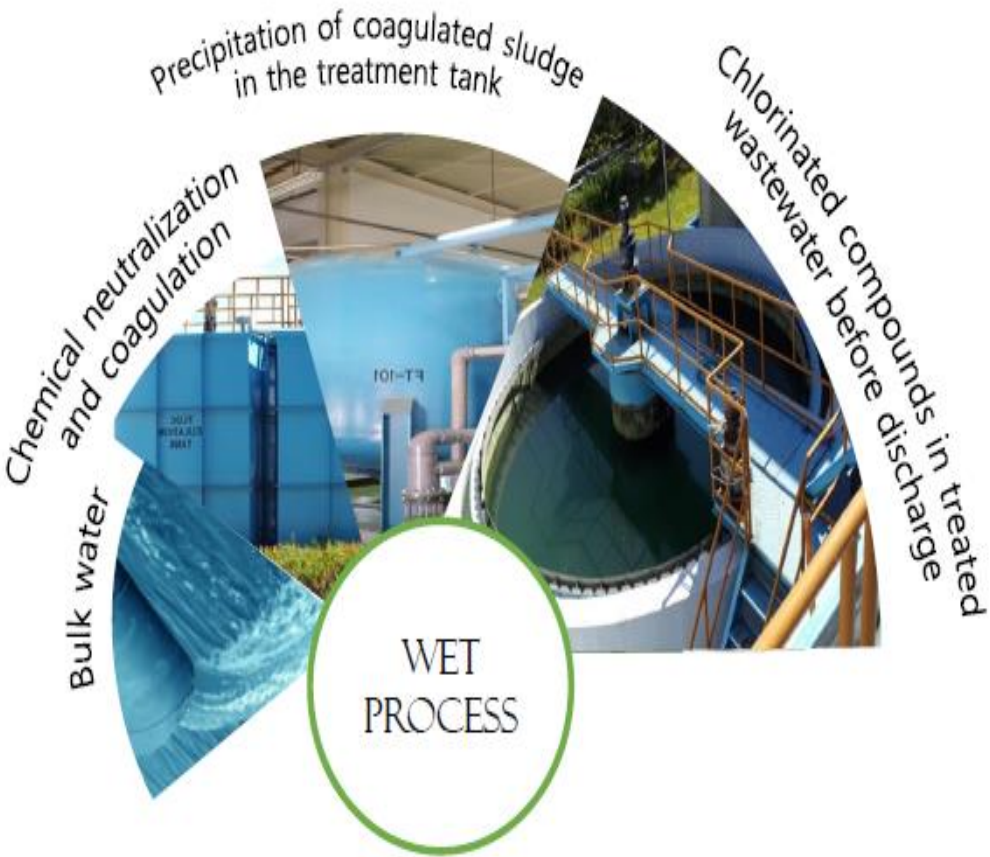
Loti's Roll-to-Roll
process



LOTI'S ECO-FRIENDLY OLED PROCESS

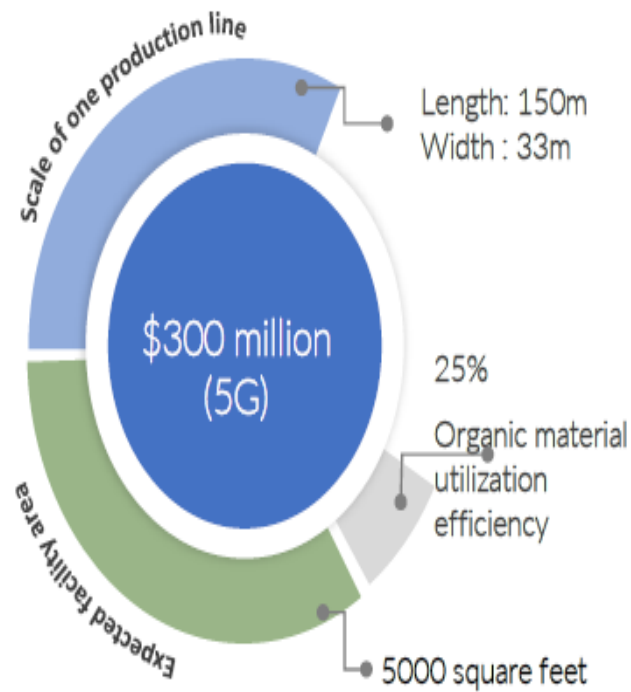


An ultra-environmentally friendly process that achieves a completely dry process without using any water or chemicals

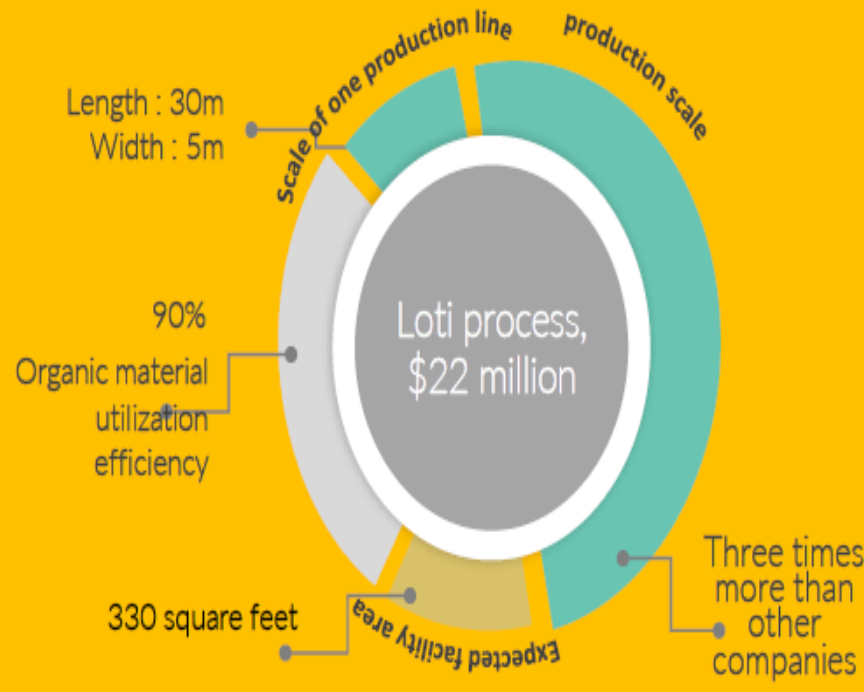


The conventional OLED manufacturing process generates large volumes of industrial water and chemical wastewater through wet processes

HOW CAN LOTI ACHIEVE LOW-COST PRODUCTION OF OLED LIGHTING?



The current OLED production process does not allow for continuous deposition



The world's first and only deposition process that enables continuous deposition while allowing for the patterning of components

LOTI's market strategy



Bio OLED

2026

Entrance Skin care &
Bio medical market



OLED Lighting

2027

OLED lighting
cheaper than LED



Solar Panel

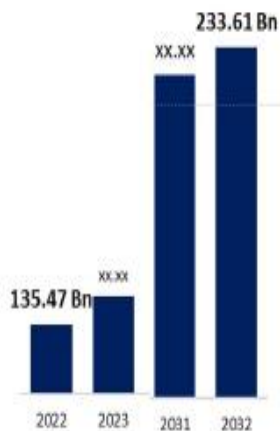
2027

Production of
Perovskite solar panel

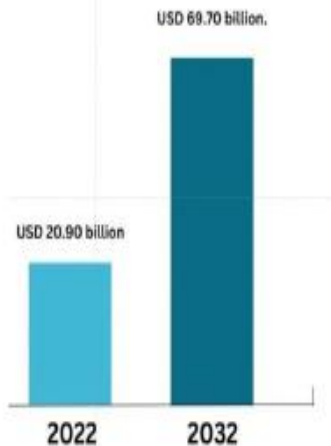
WHY RED LIGHT?

The bio market has experienced rapid growth with the emergence of LEDs and advancements in medical technology. Using only red light, it helps prevent skin cell aging and activates human regeneration

Global Skincare Market



Global Skin Care Devices Market

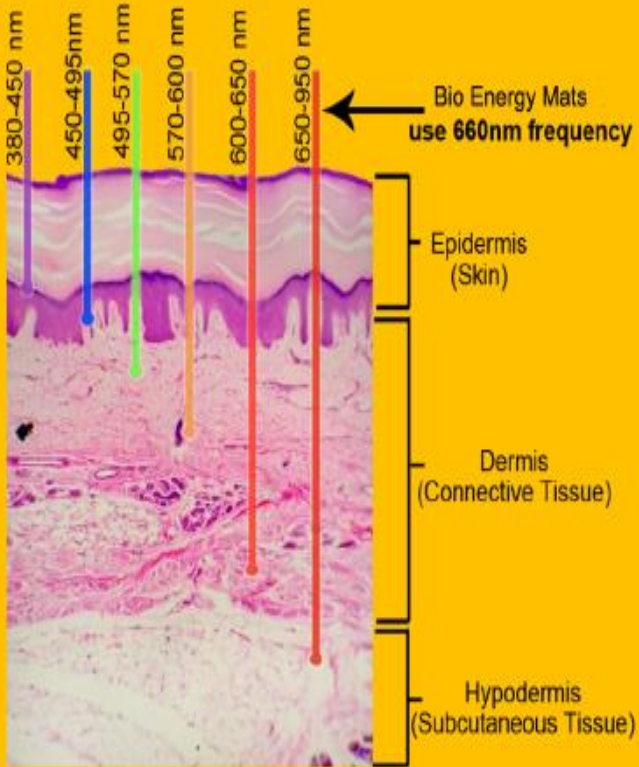


Red light therapy uses LED lighting, but due to the heat generated by LEDs, there is a restriction of 10-20 minutes of use to avoid skin damage. To avoid such inconvenience and risks, OLED, with significantly less heat and surface-emitting properties, offers safety comparable to natural light

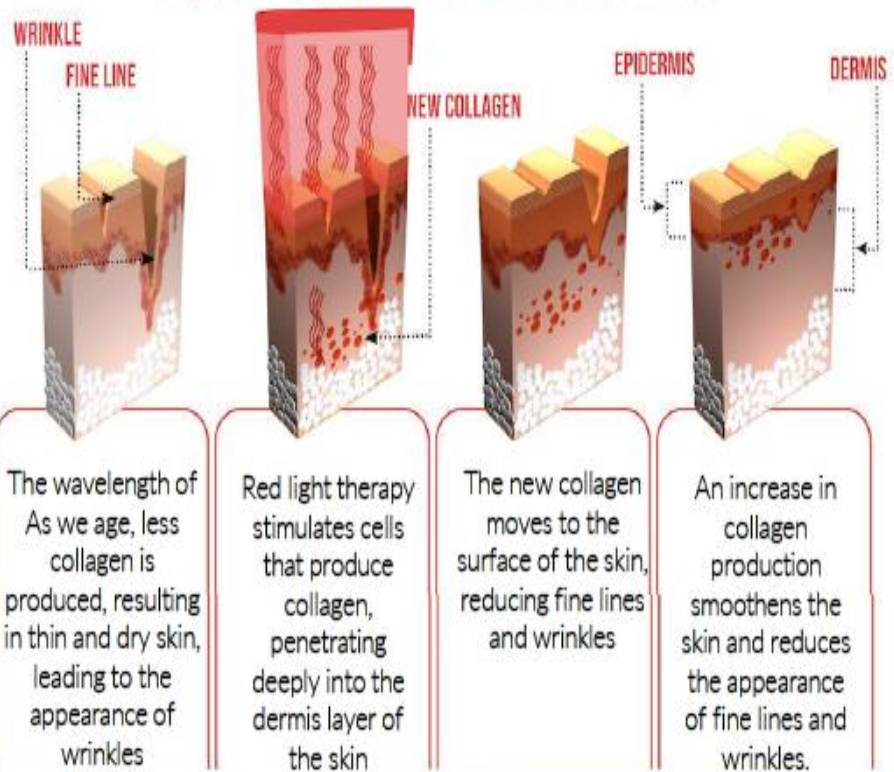
THE SKIN COMES ALIVE

The red light penetrates deeply into the skin

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HOW RED LIGHT THERAPY WORKS



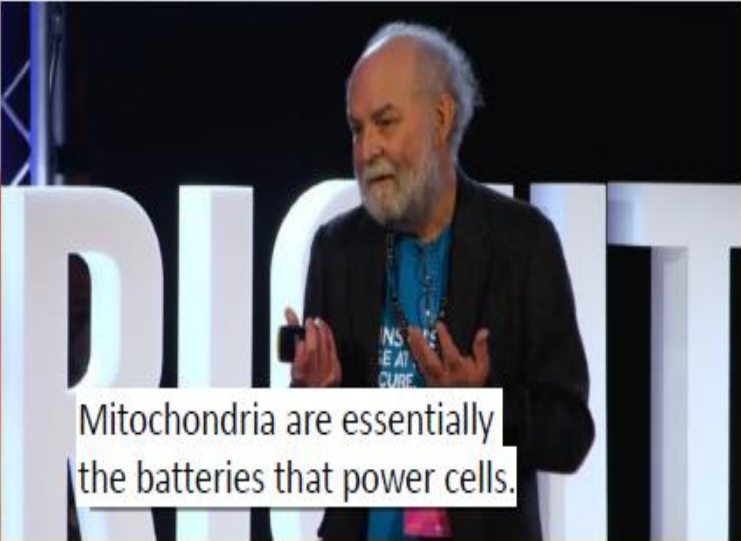
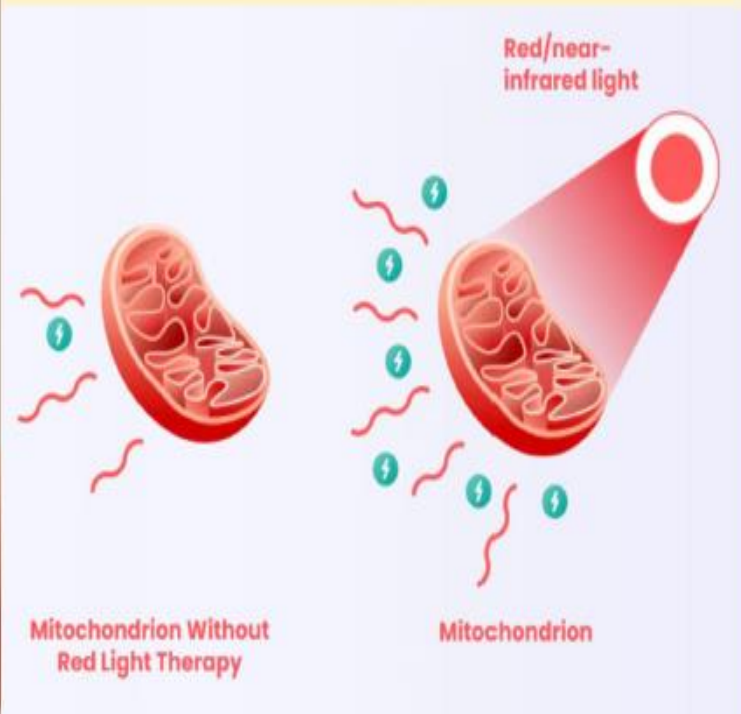
WHY DOES THE SKIN COME ALIVE?

RECHARGING THE MITOCHONDRIA

Mitochondria are cellular organelles that constantly supply energy to our bodies, providing youthfulness and vitality.

As we age, there is a decrease in mitochondrial mass and function, leading to increased production of reactive oxygen species (ROS) that damage cells and telomeres, causing premature cellular aging.

Furthermore, mitochondrial dysfunction is associated with impaired organ function in organs such as the brain, pancreas, and heart, as well as various diseases. Research has also linked mitochondrial abnormalities to cancer and genetic disorders.



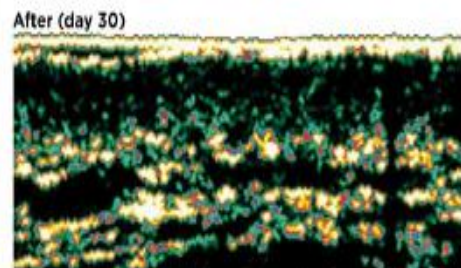
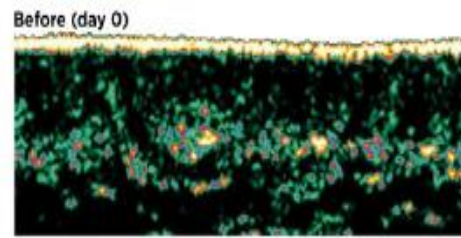
Mitochondria are essentially the batteries that power cells.

IT MAKES YOU LOSE WEIGHT

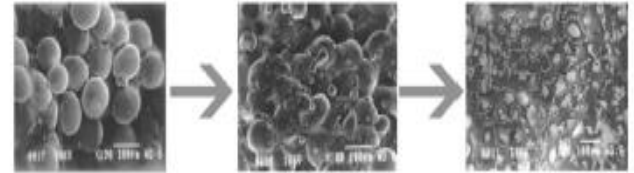
Many medical studies are being conducted on the effects of red light on the human body, and the results show remarkable healing and recovery without the need for medication or dietary changes

The skins' collagen density increased significantly from day 0 to day 30 using red light therapy

Collagen = light yellow areas Treatment dose: 8.9 J/cm²
Wavelength range: 570-850 nanometers



Observation under an electron microscope:



Normal status: round and full, the main ingredient is triglyceride

During light irradiation: exudation of small fat droplets, free fatty acids and glycerol molecules

After light irradiation: shrink and collapse completely



Before After Before After

Source: WUNSCHE AND MATUSCH-WA: Photomedicine and Laser Surgery Vol 32, No. 2 2014

WHY RED LIGHT?

We remove fat with light alone

HAIR GROWS BACK

The perennial problem of male pattern alopecia is resolved with red light. The global alopecia market was valued at 8.77 billion dollars as of 2023, and is expected to reach 16 billion dollars by 2030

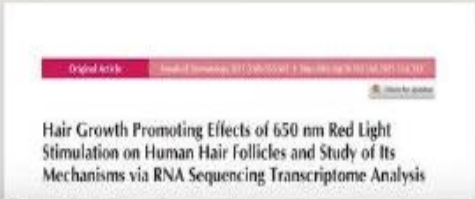
Leader Of Technology Innovation



Male-pattern hair loss

Alopecia areata

Androgenetic alopecia



Results: Low-level 650 nm red light promoted the proliferation of human hair follicles in the experimental cultured-tissue model. Consistently, 650 nm red light significantly delayed the transition of hair cycle from anagen to catagen *in vitro*. RNA-seq analysis and gene clustering for the differentially expressed genes suggests that leukocyte transendothelial migration, metabolism, adherens junction and other biological process maybe involved in stimulation of hair follicles by 650-nm red light treatment.

Conclusion: The effect of 650-nm red light on *ex vivo* hair follicles and the transcriptome set which implicates the role of red light in promoting hair growth and reversing of miniaturization process of AGA were identified.



Home / Red Light Therapy / Red Light Therapy for Hair Growth: All You Need to Know

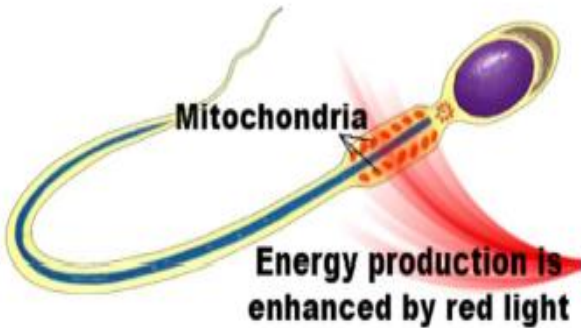
Hair Growth

Red Light Therapy for Hair Growth: All You Need to Know



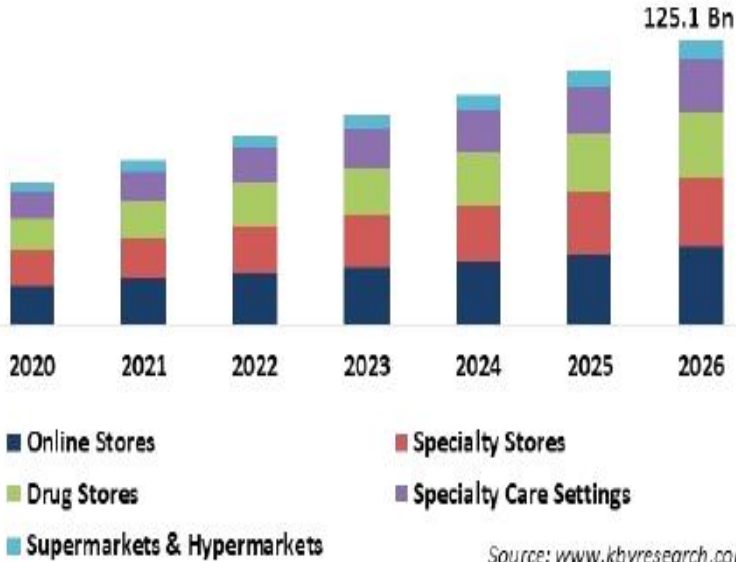
SEXUAL FUNCTION INCREASES

The market size for sexual function enhancement products is over 100 billion dollars annually. Rather than ingestible products with potential risks to the body, simple red light enhances blood flow, increases sperm volume, and boosts vitality



Sperm may have more energy to 'swim' after stimulation by red light

Sexual Wellness Market Size, By Distribution Channel, 2020 - 2026

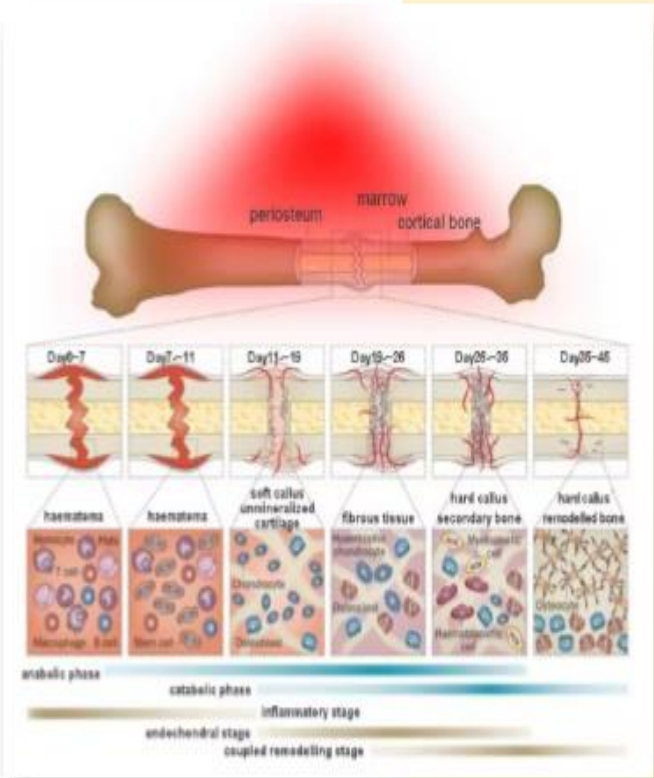


Source: www.kbvresearch.com

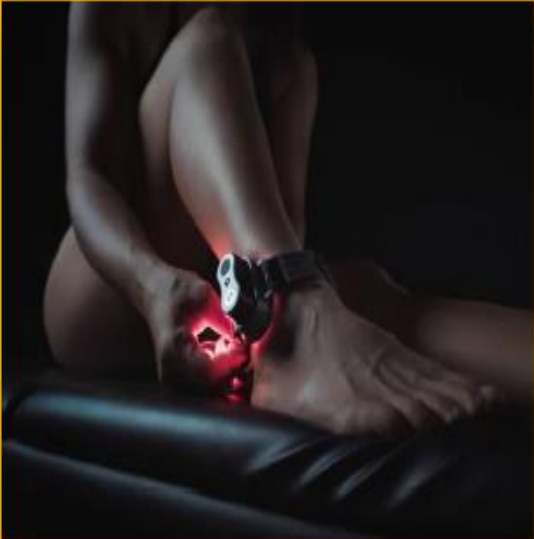


EXCELLENT FOR BONE AND TISSUE HEALING

Many medical studies and clinical trials are underway, demonstrating rapid healing and recovery in damaged biological tissues with red light therapy. Even simple red light irradiation alone leads to remarkable therapeutic effects



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THE REASONS WHY LOTI OLED RED LIGHT THERAPY IS BOUND TO SUCCEED

LED heat damages the skin and accelerates aging

OLEDs are harmless to the human body

Michael A. Persky, M.D., F.A.C.S.

OUR DOCTOR ▾ PRACTICE OVERVIEW PROCEDURES ▾ BLOG PATIENT RESOURCES ▾ BTL

Hot News! Heat: A New Cause of Premature Aging

Okay, but how 'hot' is hot? In development and testing, we found that the heatsink of a fully lit LED bulb was around 60°C-100°C (140°F-212°F) depending on the make and model of the LED bulb, room temperature, and airflow. Feb 7, 2014



LED temperature: 60°C - 100°C. Use for a maximum of 20 minutes on average

OLED temperature: Below 35°C. It maximizes efficiency by allowing prolonged continuous usage

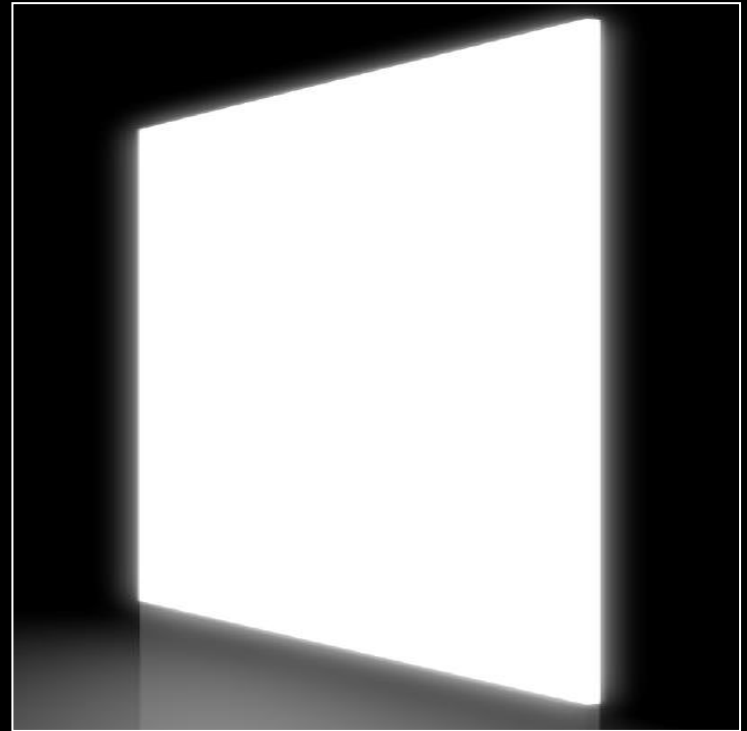
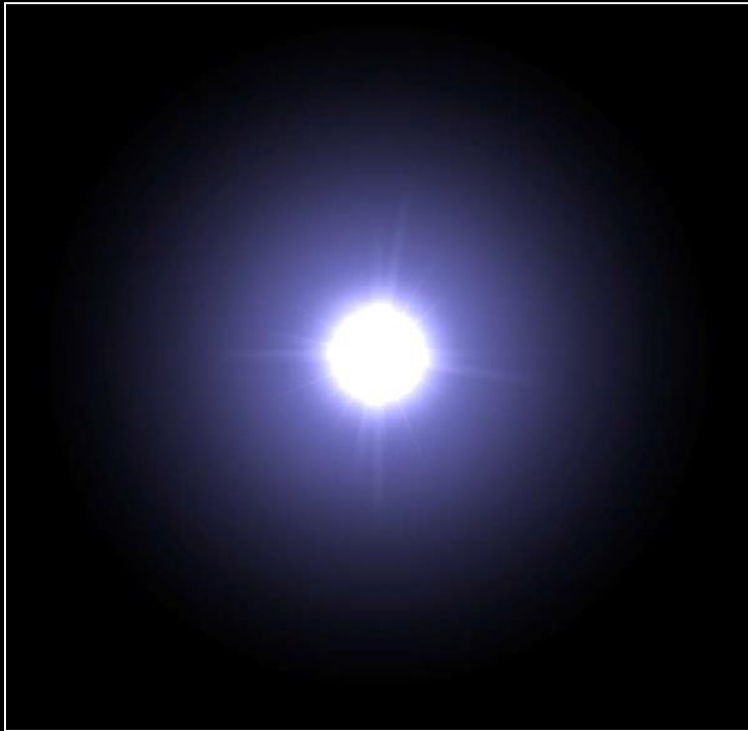
AAMSCO Lighting
<https://www.aamsco.com> > OLED

OLED Light Bulb vs LED Lighting

The emitted light has virtually zero glare and is produced at an extremely low heat that averages under 35 degrees C (95 degrees F). Due to its wide spectrum ...



The difference bet. LED & OLED lighting



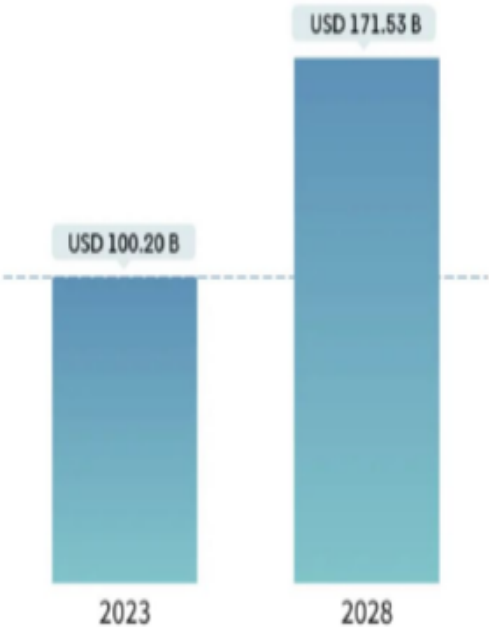
LED LIGHTING
COULD ONLY
EXPERIENCE RAPID
GROWTH

Leader Of Technology Innovation

Due to China's low-cost offensive, LED products from China dominate the global market, and compared to traditional lighting, LEDs have become an economically viable option for modernization with their low power consumption and long durability

THE GROWTH FACTORS OF
THE LED LIGHTING MARKET

LED Lighting Market
Market Size in USD Billion
CAGR 11.35%



Source : Mordor Intelligence



01

Energy efficiency
Low power high output compared to traditional lighting

02

Longevity and durability
Less frequent bulb replacement due to long lifespan, making it economical

03

Miniaturization and lightweight design
LED lighting used in various application areas

04

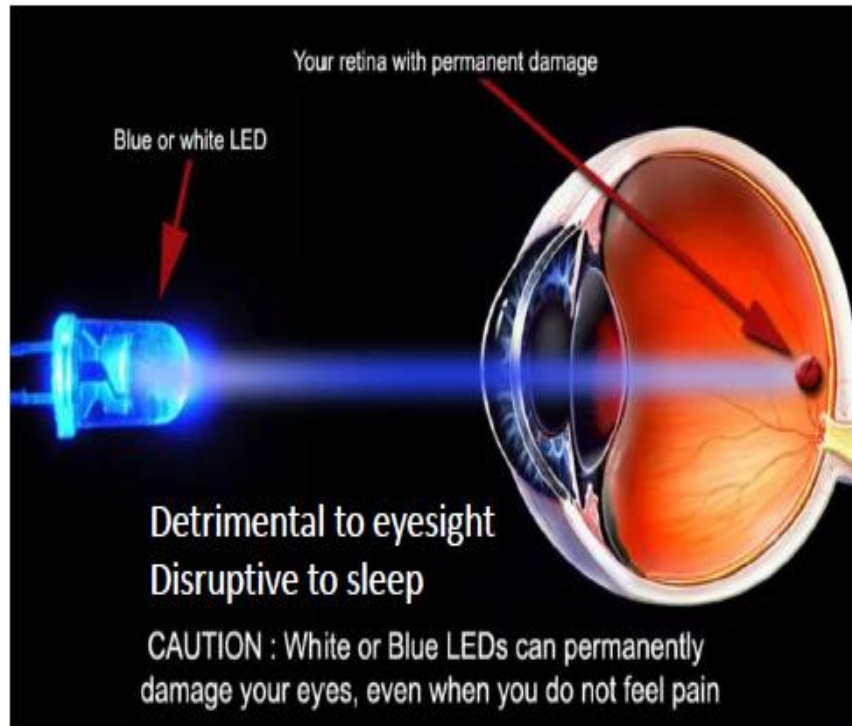
Cost savings
The energy efficiency and durability of LED lighting result in cost savings

THE BLUE AND WHITE LIGHT EMITTED BY LEDs CAN BE HARMFUL TO HUMAN HEALTH.

LED lighting has grown solely for economic reasons. However, LEDs should not be used considering health concerns

LED light can damage your eyes - warning

'Exposure to an intense and powerful [LED] light is 'photo-toxic' and can lead to irreversible loss of retinal cells.'



THE ERA OF HEALTHY LIGHT OLED IS COMING

The traditional lighting market was not environmentally friendly and lacked efficiency, but the economically efficient era of LED lighting has arrived. However, beyond the limitations of LED technology, healthy OLED lighting at the level of natural light will lead the next generation of lighting markets

OLED PROVIDES NATURAL LIGHT WITH A SPECTRUM SIMILAR TO SUNLIGHT, CREATING A SAFE AND COMFORTABLE ENVIRONMENT FOR HUMAN EYES AND SKIN



OLED: TV Designed for Health

The Pioneering Low Blue Light Technology of Eyesafe® Certified OLED, Designed to Lower Impact on Circadian Rhythm and Promote Eye Comfort

LG Display | eyesafe



OLED | eyesafe

GENERAL CONSUMER OLED LIGHTING

Entry into the household indoor OLED market, offering OLED lighting that is more affordable than LED and provides better economic efficiency. Surface-emitting OLEDs offer healthy light without causing vision impairment, unlike point-emitting LEDs

WE ARE LIVING IN AN ERA WHERE HEALTH IS A PRIORITY

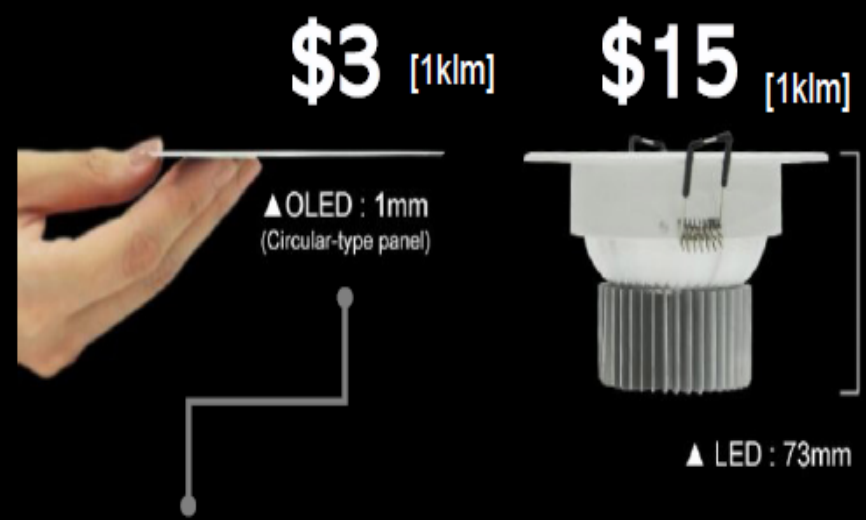


COMMERCIAL AND INDUSTRIAL OLED LIGHTING

OLED lighting that can be bent and is as thin as paper allows for various designs. This opens up a new era of OLED lighting worldwide, as OLED panels in various sizes for commercial and industrial purposes are supplied more affordably than LEDs in each industry

A NEW ERA OF LIGHTING
WITHOUT DESIGN CONSTRAINTS
IS OPENING UP

THROUGH LOTI'S TECHNOLOGY, MASS PRODUCTION IS POSSIBLE, REPLACING THE LED MARKET WITH A LOWER PRICE



- LG's supply price is \$70 for 75lm - no price competition/ business withdrawal
- The current supply price of OLED Works' OLED lighting panel for 100lm (size 100mmX100mm) is \$65

THE REASONS WHY LOTI OLED LIGHTING IS BOUND TO SUCCEED

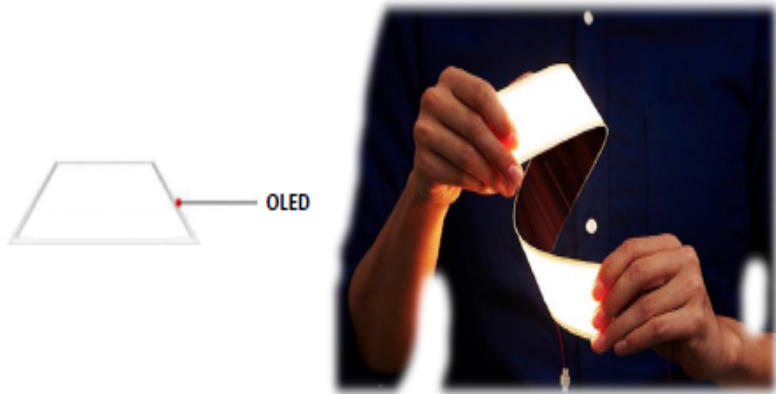
The limitations of LED product development

Due to the heat generated by LEDs, heat dissipation is essential. LEDs, due to their point-emitting nature, require numerous components in product configuration, leading to issues such as weight, mobility, and installation



Implementation of infinite scalability for Loti OLE

OLED emits minimal heat, is surface-emitting, can be bent like paper, and has minimal components, making it very convenient for weight, mobility, design, wearability, and installation





LOTI'S TECHNOLOGY
GENERATES ENERGY

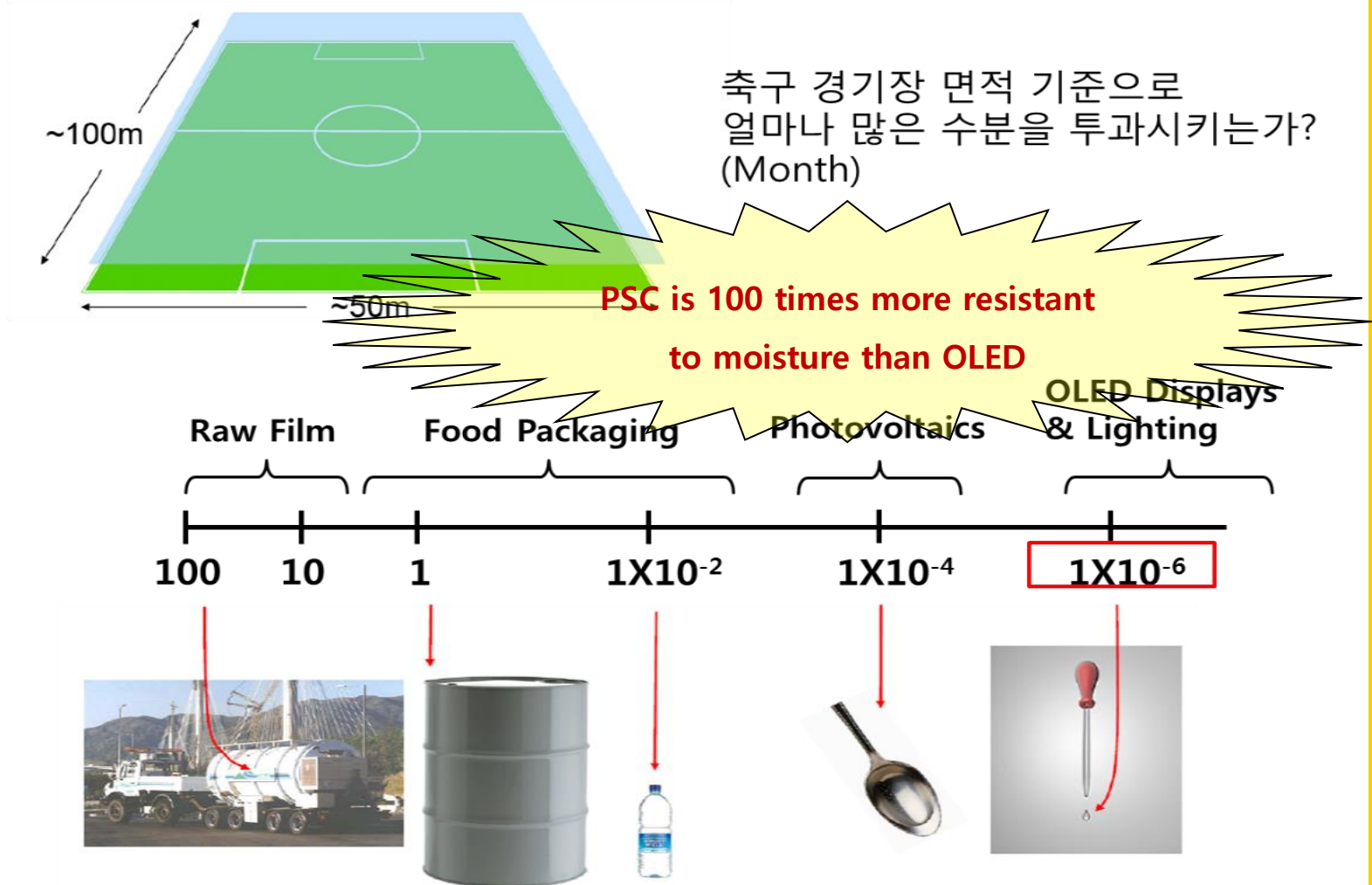
PEROVSKITE SOLAR CELLS

Loti's Roll-to-Roll OLED deposition technology enables mass production of the next-generation perovskite solar panels, which are lightweight, flexible, and transparent, heralding a transition to a new era of solar energy in the future

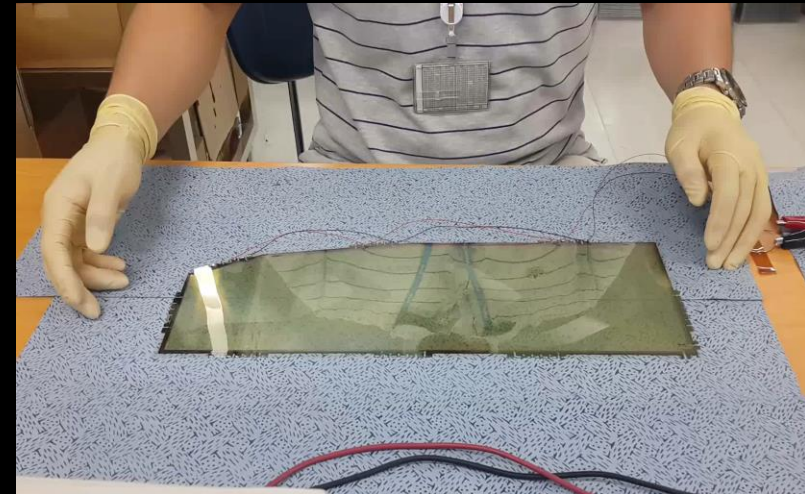
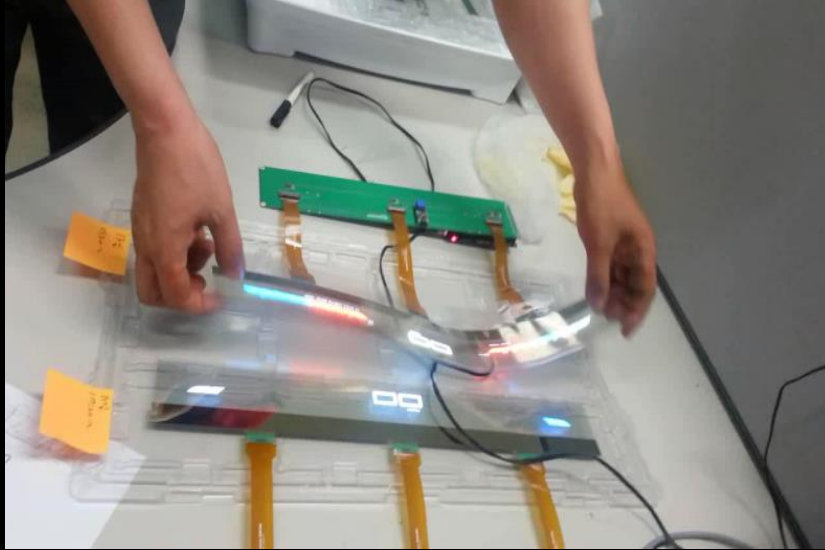
Currently, other companies' Perovskite solar panels have achieved efficiency levels exceeding 20%, but they primarily use wet deposition methods, leading to limitations in reliability

The key to ensuring reliability is moisture control

WVTR(Water vapor transmission rate, g/m²·day) 수치

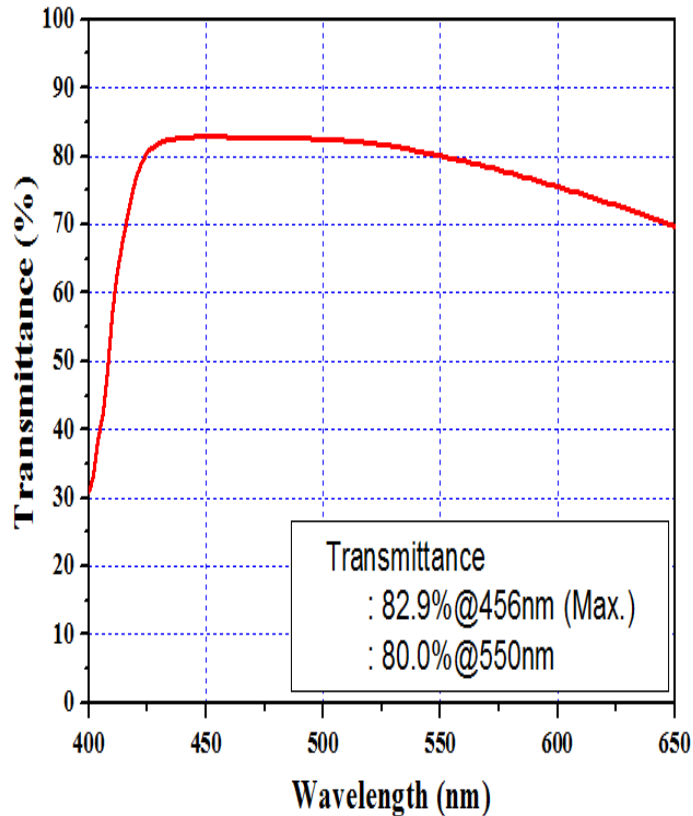


LOTI is a condensation of OLED technology



The world's best transmittance technology

- Achieved the world's highest transmittance of 83%
(The transmittance of ordinary flat glass is 70%)
- Jang Yeong-sil Award Winner: Display Using Transparent OLED



IR52 장영실상 네오뷰코오롱 / 운전 지원 단말시스템

투명 OLED 화면에 내비게이션 기능까지

가수영 2014.10.15 17:31:42 | 최홍수영 2014.10.15 23:31:46



왼쪽부터 안기범·이수창·임우빈·정재식·전익수 연구원.

디스플레이 전문업체인 네오뷰코오롱이 개발한 운전 지원 단말시스템인 '투명 유기발광다이오드(OLED)를 이용한 차량용 직시 헤드업디스플레이(HUD)'가 2014년 제41주차 IR52 장영실상을 수상했다. HUD는 머리를 숙이거나 돌리지 않고 시선을 전방에 고정한 채 운전 정보를 볼 수 있게 해주는 장치를 말한다. 차량의 내비게이션은 차량 속도와 방향 정보 등을 제공해 목적지까지 편안하게 운전할 수 있게 하지만 운전자는 시선을 아래나 옆으로 돌려야 하기 때문에 사고 위험이 있다. 이런 불편을 줄이기 위해 차량의 앞 유리에 광선을 발사해 운전 정보를 제공하는 제품도 있지만 이 장비는 부피가 크고 소모 전력이 높은 단점이 있다.

네오뷰코오롱은 운전자의 전방에 투명 OLED를 사용해 운전자 시야에 방해되지 않게 △차량의 방향 정보 △속도 △경고 표시 정보 등을 제공하는 장치를 개발했다. 또 스마트폰 내비게이션과 연동 가능한 애플리케이션을 개발해 실시간으로 교통 정보를 반영할 수 있는 장점을 갖고 있다.

LEADING A REVOLUTION
IN THE FIELD OF
AGRICULTURE.



A NEW PARADIGM IN ARCHITECTURAL CULTURE

LOTI

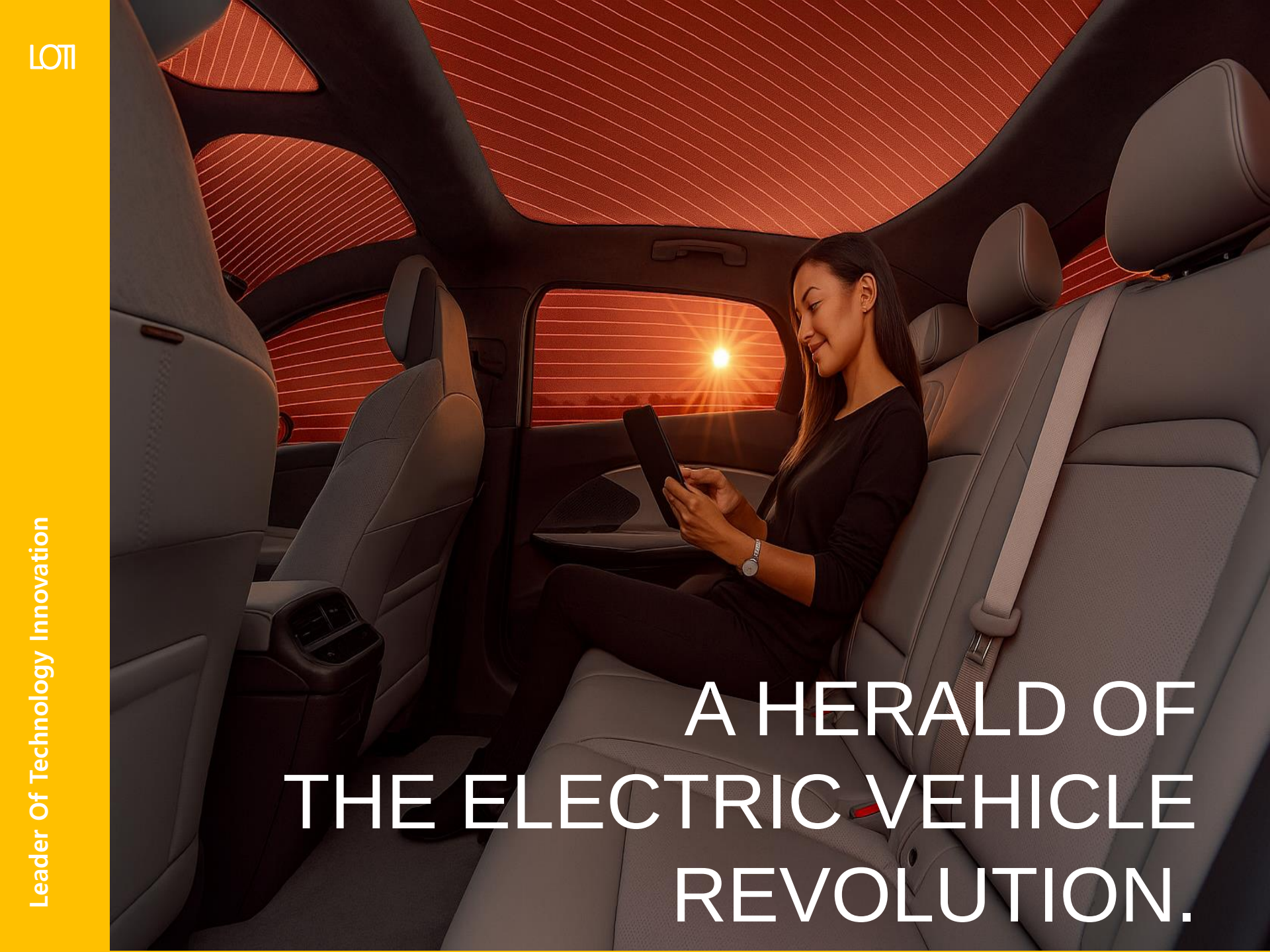
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A MAJOR TRANSFORMATION
IN RESIDENTIAL LIVING.

LOTI

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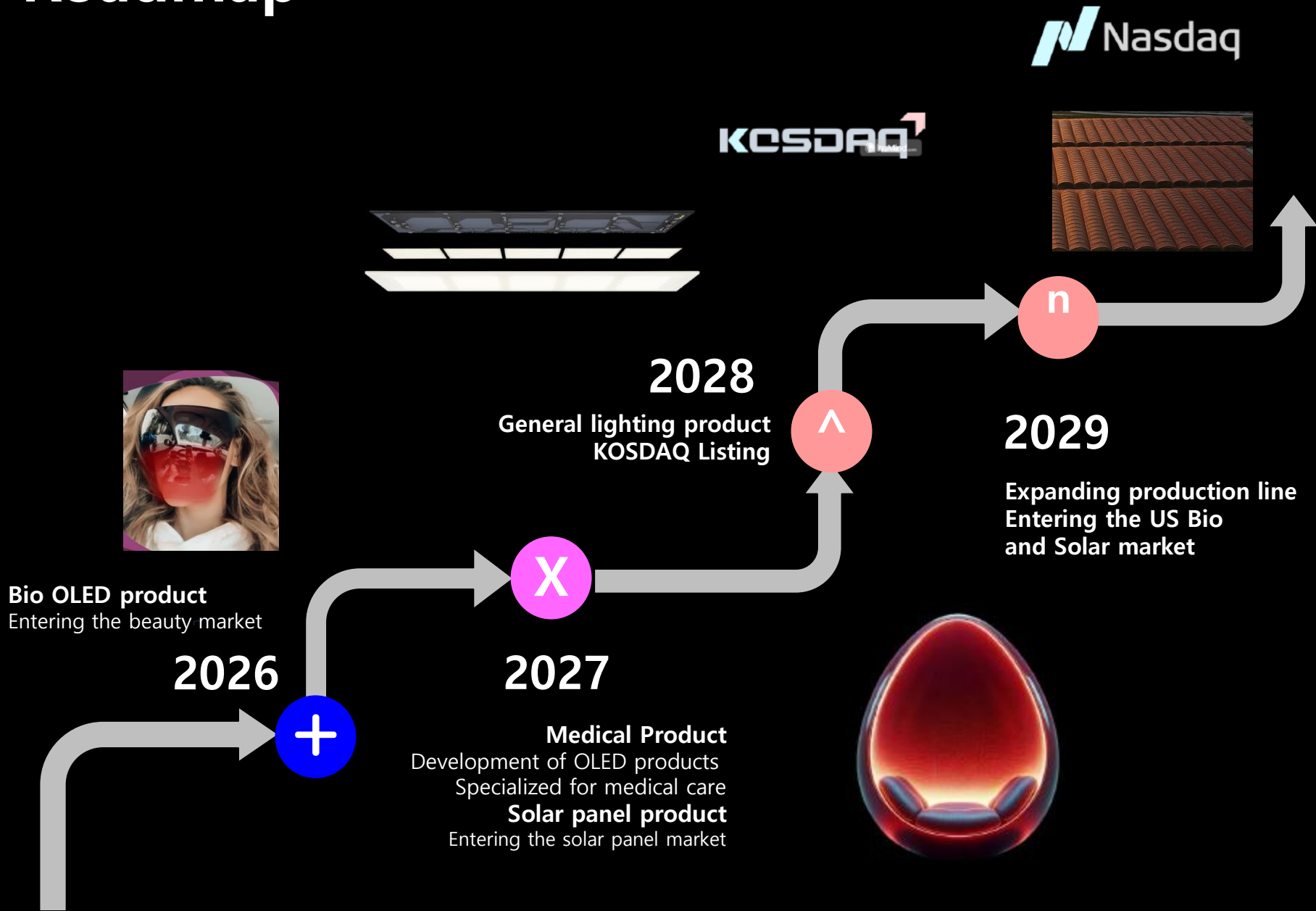
A woman with long dark hair is sitting in the back seat of a car, looking at a tablet. The car has a large sunroof that shows a bright sunset or sunrise. The interior of the car is dark, and the seats are grey. The overall atmosphere is warm and modern.

A HERALD OF
THE ELECTRIC VEHICLE
REVOLUTION.

THE EVOLUTION INTO THE NEXT GENERATION OF TRANSPORTATION.



Roadmap



Thank you

Leader Of Technology Innovation

