

Low-carbon PCB manufacturing with nanometal inkjet printing technology

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Elephantech Inc.

Shinya Shimizu, the founder/CEO/CTO of Elephantech

A completely new, sustainable method

of manufacturing electronic circuits for the first time in the past 100 years.

70% of copper, 75% of CO₂ and 95% of water

are saved during manufacturing.

Low-temperature nanometal inkjet printing

technology enables it. Our printer prints metal directly onto plastic substrates.

We are mass-producing.

This sounds like a future technology, but this is not the future.

\$50M+ raised and **9 years** spent since foundation,

we are now running the world's first and only mass-production plant, supplying to display production and others

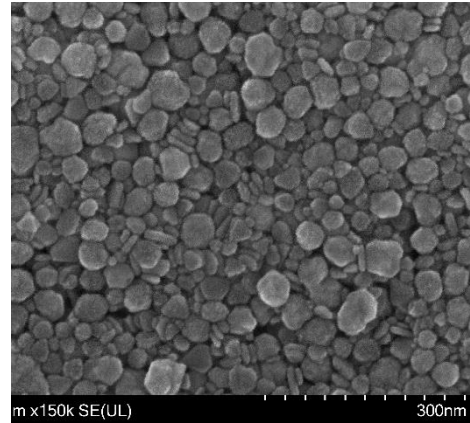
Elephantech offers additive manufacturing solution with nanometal inkjet printing technology

Vertically integrated additive manufacturing process

Metal



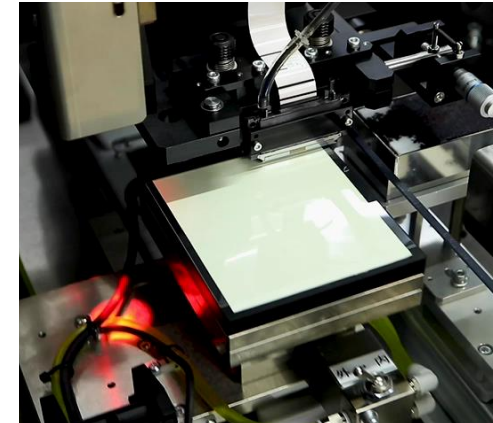
Nanoparticle



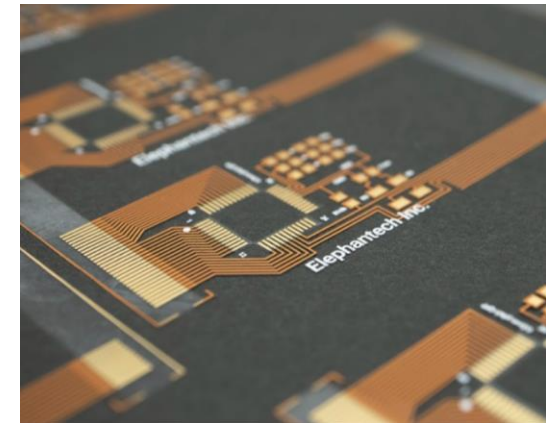
Ink



Inkjet printing



Product



Introducing a versatile technology: metal nanoparticle inkjet printing for a variety of applications, starting with PCB production

Elephantech Core business

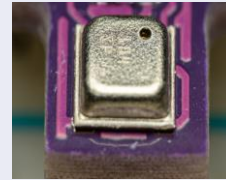
Printed Circuit Board (PCB)



- **\$90bn** market growing with 6% CAGR
- **Essential for anything electrified** (e.g., Smartphones, PC, Automotives)
- Responsible for **0.1% of total greenhouse gas(GHG) emissions**

Potential metal inkjet printing applications

MEMS



MLCC



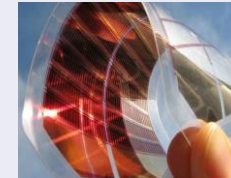
Display



Touch Panel



Solar Cell



Battery



Electromagnetic Shielding



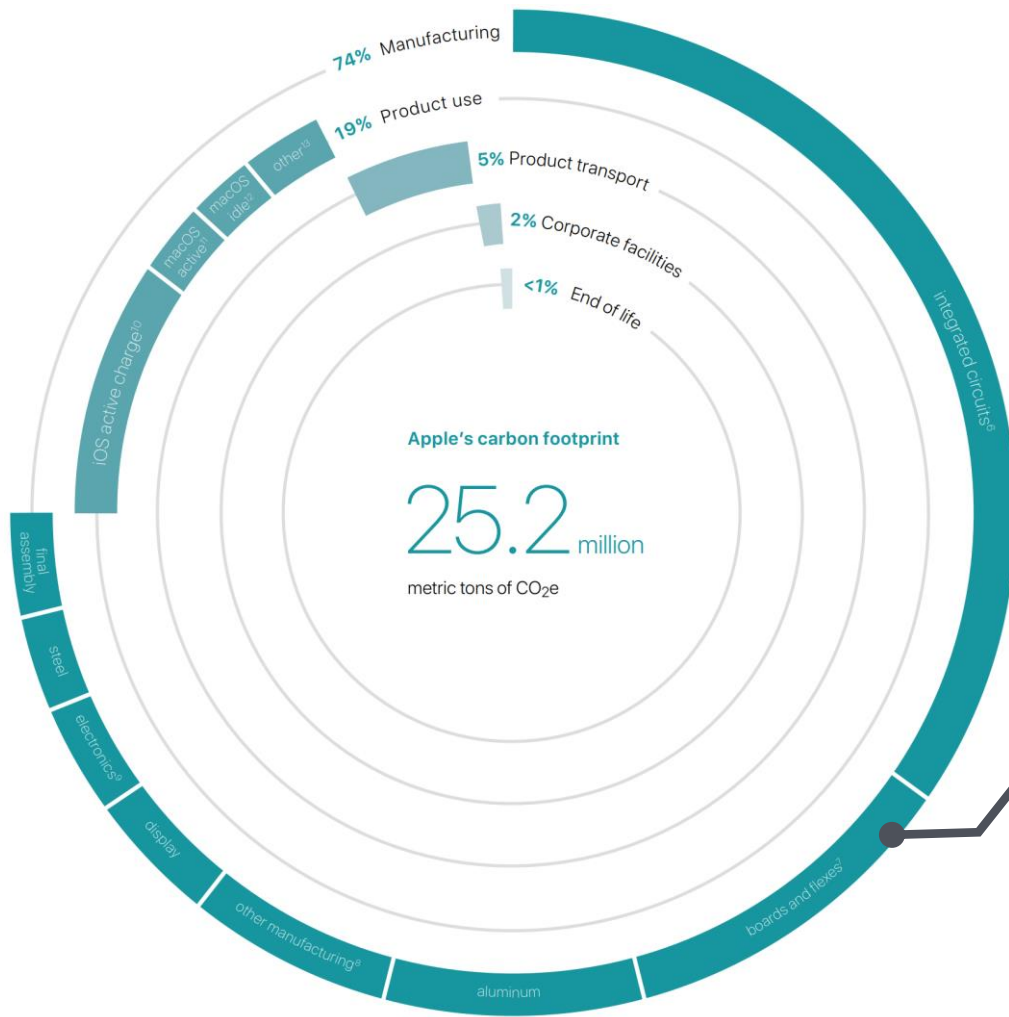
RFID



Biosensor



10% of Apple's manufacturing emission comes from bare PCBs



“In 2020, we’ve made clear gains with our work on integrated circuits and boards and flexes—components we’ve prioritized because they are carbon-intensive.”

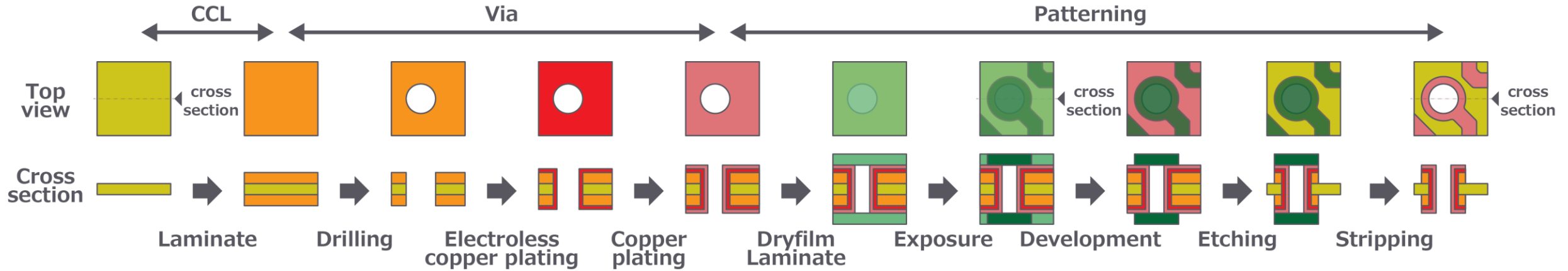
Apple Environmental Progress Report 2021

10% of total manufacturing carbon footprint comes from boards and flexes

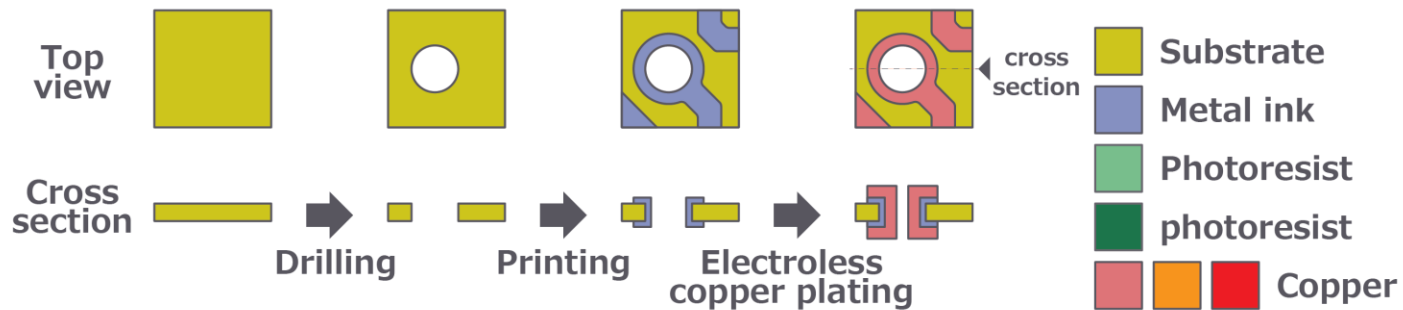
Source: Apple Environmental Responsibility Report 2019

Details of the Pure Additive™ process – minimal process required

Subtractive Method (Conventional Method)

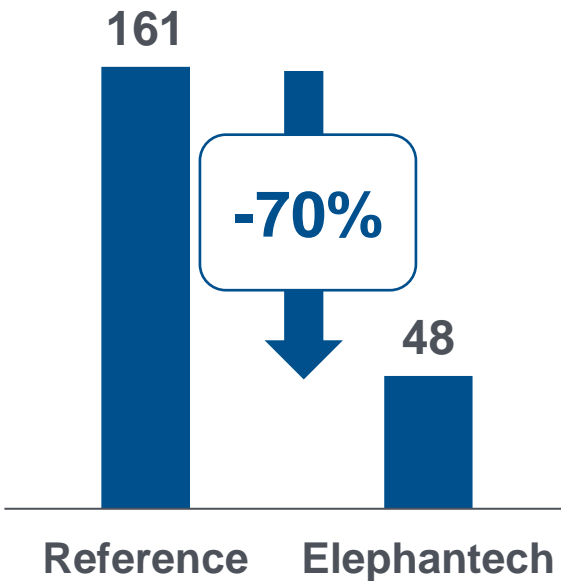


Pure Additive® Processing (Elephantech's Manufacturing Method)

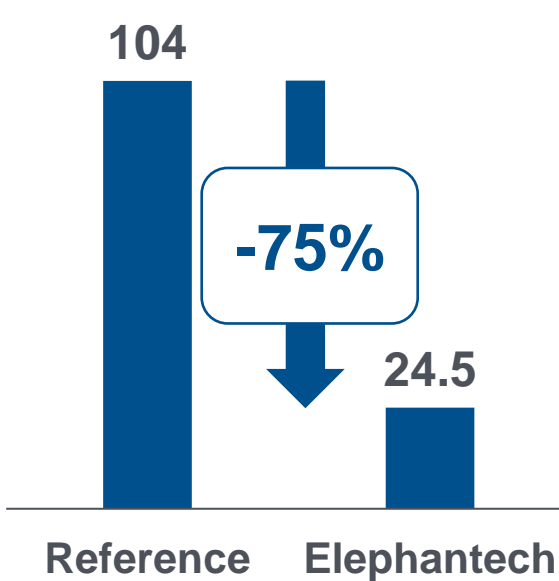


Impact of introducing inkjet printing technology in PCB industry

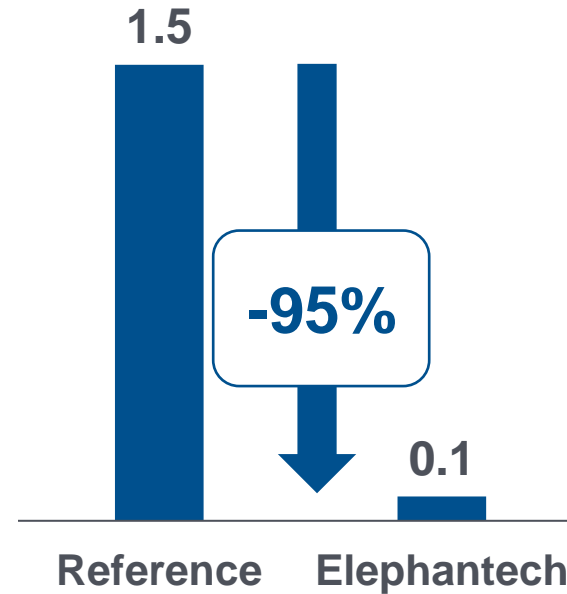
Copper consumption¹
[g/m²]



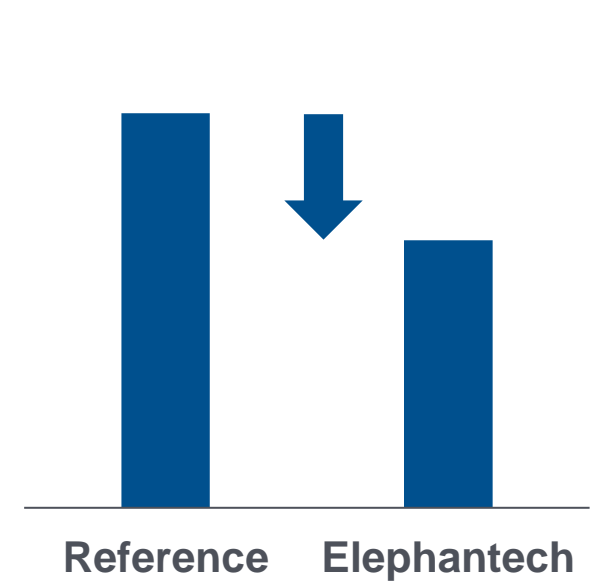
Carbon footprint²
[kg-CO₂/m²]



Water consumption²
[m³/m²]



Manufacturing cost
[USD/m²]



Our factory in Aichi, Japan for mass production

9 years
since foundation

\$50M+
fundraised

Mass-production
is successfully ongoing



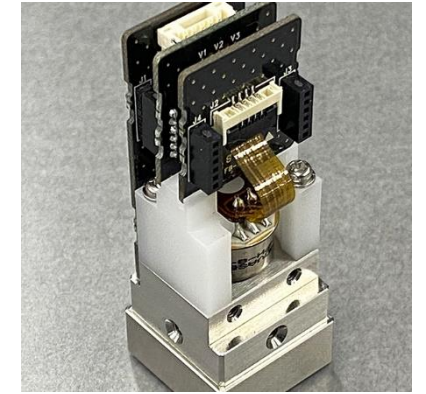
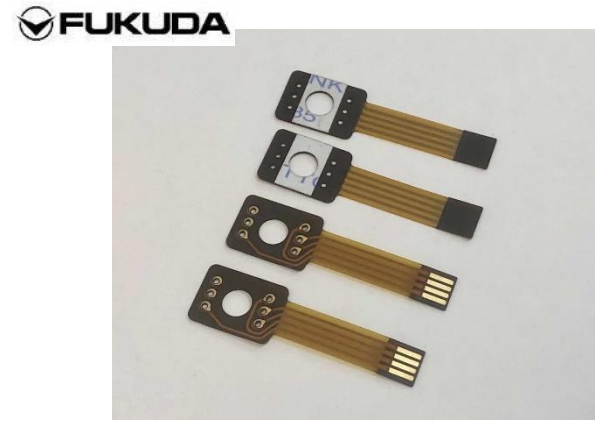
Mass production examples: single-sided flexible circuits

EIZO – Display switches



FlexScan EV3895

Fukuda – Pressure Sensor Module



**Passed all the quality tests
and started replacing PCBs**