

Forward-looking Statements

Safe Harbor | Disclaimers

This presentation contains forward-looking statements within the meaning of federal securities laws, including statements regarding expectations for NAND revenue growth; market demand; bit growth and bit shipments; capital expenditure trends and requirements; capital intensity; cost structures; product performance and product innovations. These forward-looking statements are based on management's current expectations and are subject to risks and uncertainties that could cause actual results to differ materially from those expressed or implied in the forward-looking statements.

Key risks and uncertainties include volatility in global economic conditions; future responses to and effects of the COVID-19 pandemic or other similar global health crises; impact of business and market conditions; the outcome and impact of our ongoing strategic review, including with respect to customer and supplier relationships, regulatory and contractual restrictions, stock price volatility and the diversion of management's attention from ongoing business operations and opportunities; impact of competitive products and pricing; our development and introduction of products based on new technologies and expansion into new data storage markets; risks associated with cost saving initiatives, restructurings, acquisitions, divestitures, mergers, joint ventures and our strategic relationships; difficulties or delays in manufacturing or other supply chain disruptions; hiring and retention of key employees; our level of debt and other financial obligations; changes to our relationships with key customers; compromise, damage or interruption from cybersecurity incidents or other data system security risks; actions by competitors; risks associated with compliance with changing legal and regulatory requirements and the outcome of legal proceedings; and other risks and uncertainties listed in the company's filings with the Securities and Exchange Commission (the "SEC") and available on the SEC's website at www.sec.gov, including our Form 10-K filed with the SEC on August 25, 2022 and our Form 10-Q filed with the SEC on May 10, 2023, to which your attention is directed. You should not place undue reliance on these forward-looking statements, which speak only as of the date hereof, and the company undertakes no obligation to update or revise these forward-looking statements to reflect new information or events, except as required by law.

Behind every beautiful thing, there's some kind of **Pain**

-Bob Dylan



Western Digital

Wafer In, SSD Out

Famous last words of a test engineer
to manufacturing: “test all bits!”



Pradip Ghimire
Vice President

Western Digital Corporation

A day in a life of ...



Jerry
Product and Test
Engineering
US

*Nyi Nyi, we have a new product that will require **20% EXTRA** test time.*

*Sorry, but our technology is just more **complex** and coupled with **high density**, and we still need to ensure our **quality**.*

*Ok, let me talk to our team and **tester vendors** to see what else we can do.*

*Are you kidding, Jerry? You **KNOW** our **SPACE** and tight **delivery schedule**.*

*Quality is important, but we just can't **grow more factory space**, extra test time will also delay shipments to our customers.*

*Thanks, Jerry. Don't **scare** me like that again!*



Nyi Nyi
Manufacturing
Engineering
Asia

25 Years Ago...

0.001 EB

The new Secure Digital Memory Card will allow you to store and use video, audio, and PC information in ways you never imagined.

Tomorrow's smaller PDAs will be able to store more kinds of data, even allowing you to listen to audio and watch video.

Lightweight digital headphone players will let you listen to music in a comfortable, completely self-contained audio device.

Digital video cameras will store much more video and still images, and will be much more compact and easy to carry around.

Smaller and thinner storage will allow the quick and easy transport of navigation and travel data from your PC to your car.

Next generation cellular phones will allow you to wirelessly browse the Internet and securely download information.

Mini digital music players will allow you to enjoy high-quality music you download from the Internet.

Tomorrow's web tablets will be smaller and have expanded audio, video and image capabilities.

Matsushita Electric (Panasonic), SanDisk and Toshiba introduce a very big idea in a very small size.

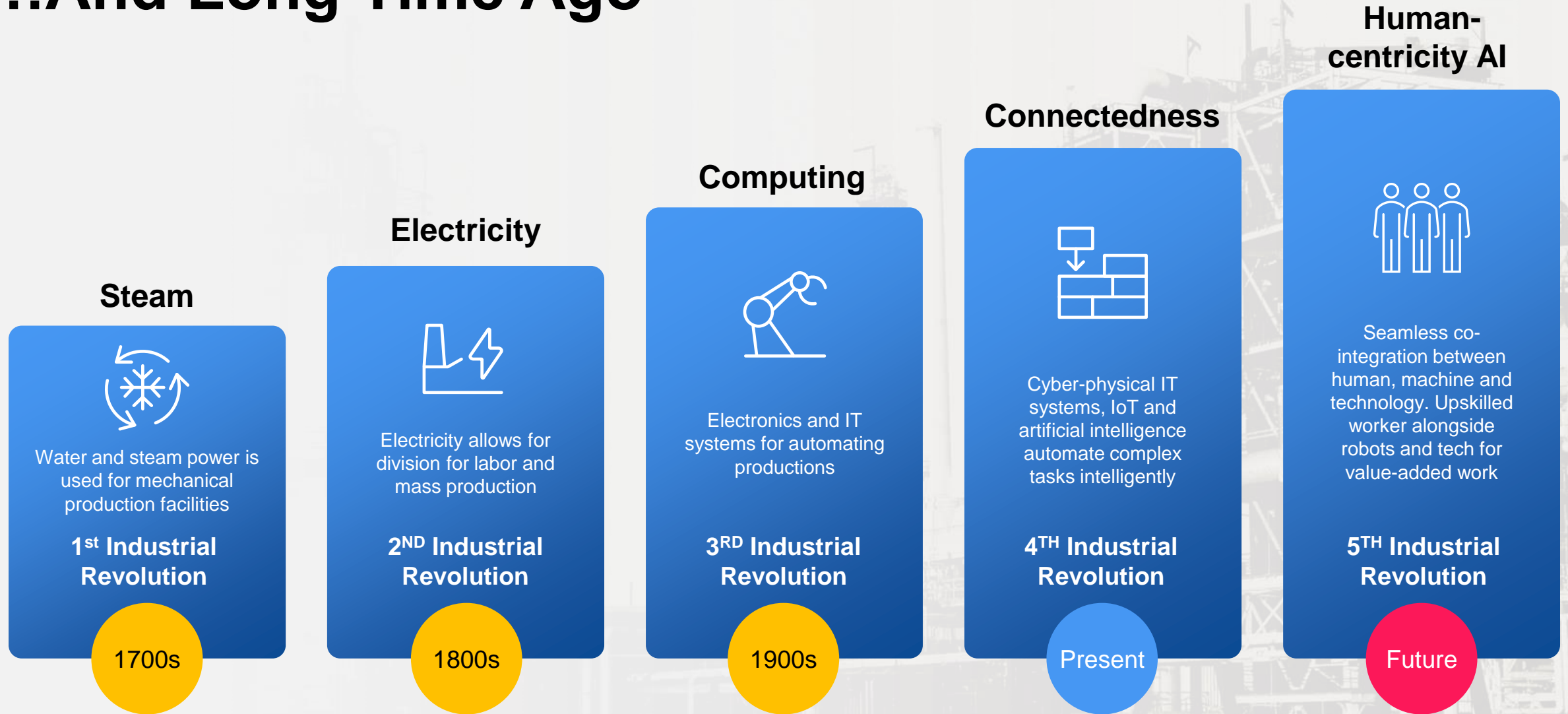
The amazingly small Secure Digital Memory Card is poised to make a significant impact on the way we work with and store digital data in the 21st century. In fact, very large files—everything from high-quality audio and video files to large digital image files and Internet data—will be stored on a postage-stamp-sized Secure Digital Memory Card. You'll be able to work with and enjoy all kinds of digital content—distributed, for example, via the Internet to your cellular phone—for playback as you move throughout your day. The visions that have previously defined science fiction are now rapidly coming to reality. On August 25, 1999, Matsushita Electric, SanDisk and Toshiba jointly announced that the Secure Digital Memory Card will be the de facto standard for the next generation of digital media. Which means that the biggest thing to happen to digital media in years just happens to be one of the smallest.

Panasonic **SanDisk** **TOSHIBA**

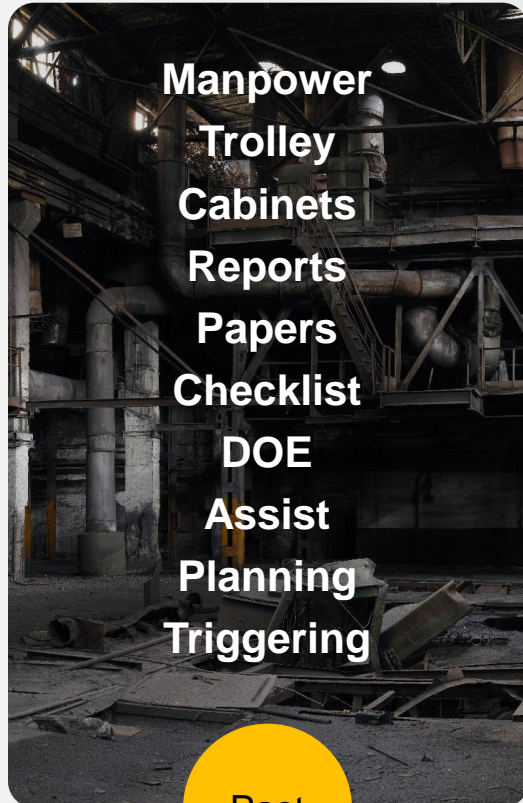
Panasonic is a registered trademark of Matsushita Electric Industrial Co., Ltd. SanDisk and the SanDisk logo are registered trademarks of SanDisk Corporation. Toshiba is a registered trademark of Toshiba Corporation.

1 ZB

...And Long Time Ago

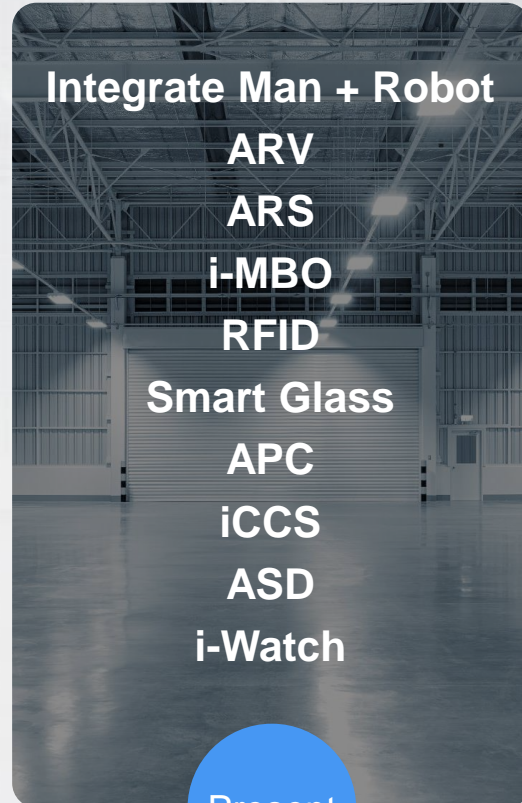


Factory Revolution



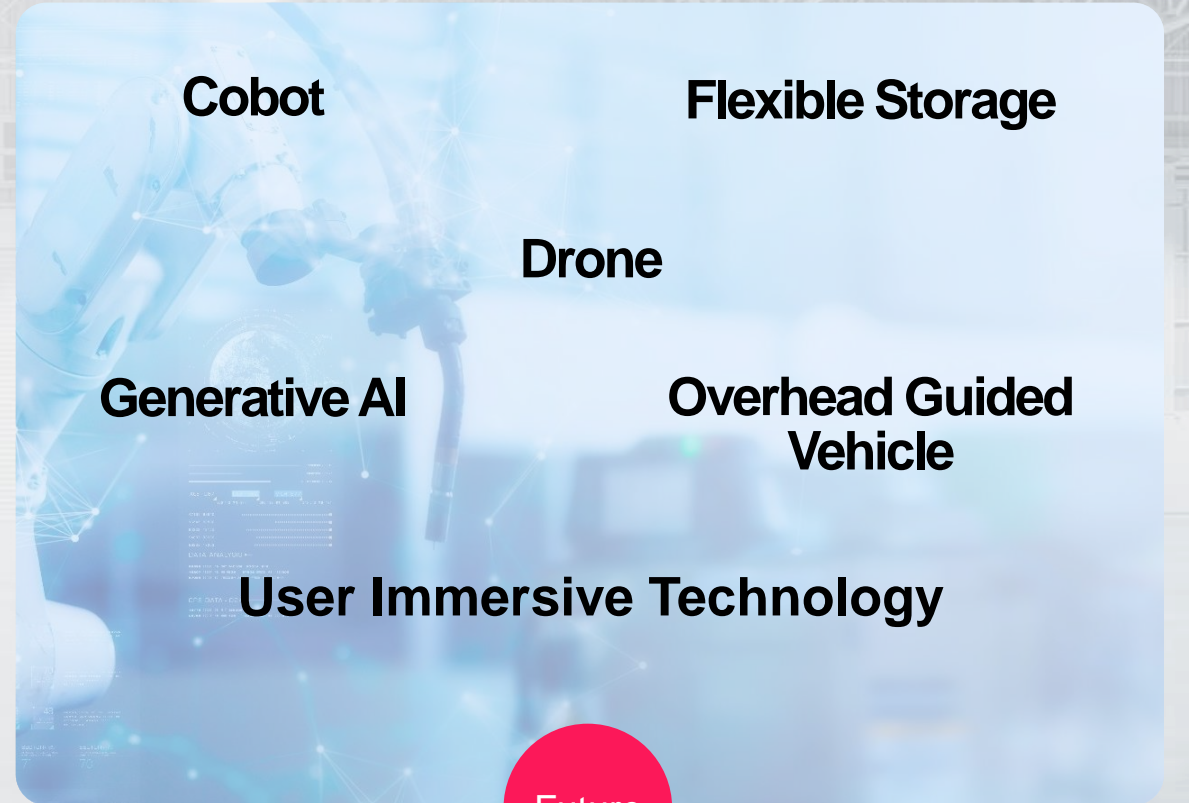
Manpower
Trolley
Cabinets
Reports
Papers
Checklist
DOE
Assist
Planning
Triggering

Past



Integrate Man + Robot
ARV
ARS
i-MBO
RFID
Smart Glass
APC
iCCS
ASD
i-Watch

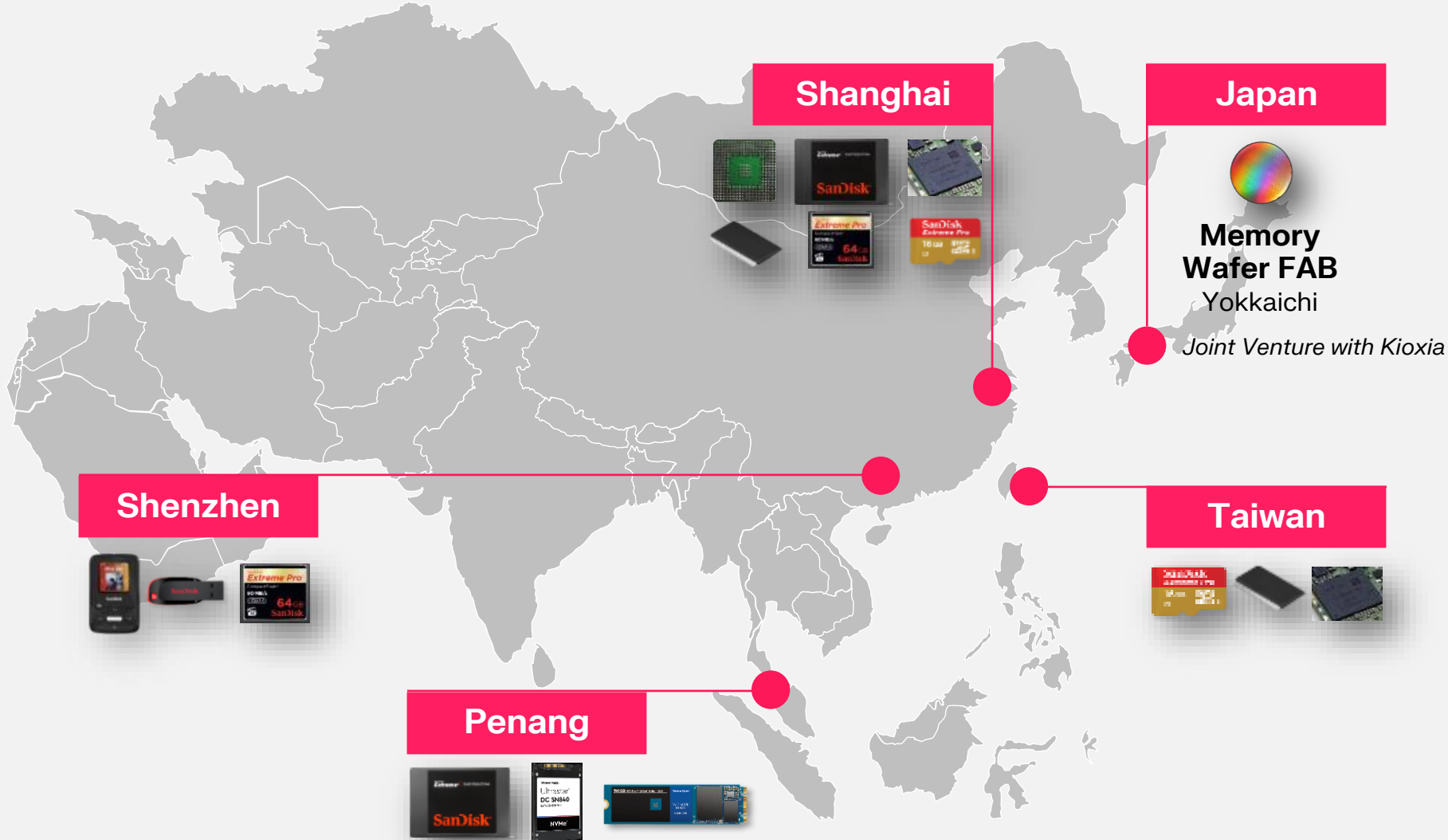
Present



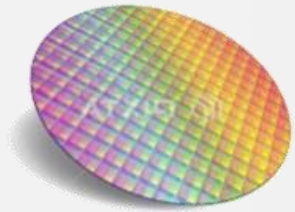
Cobot
Flexible Storage
Drone
Overhead Guided Vehicle
Generative AI
User Immersive Technology

Future

Western Digital Flash Operations



Vertically Optimized Factory



Wafer In



SSD Out



Keep it Simple

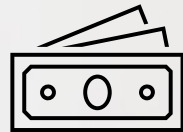
Standardize

Eliminate

Streamline



Loading Coverage



Revenue Pull In



Volume Pull In

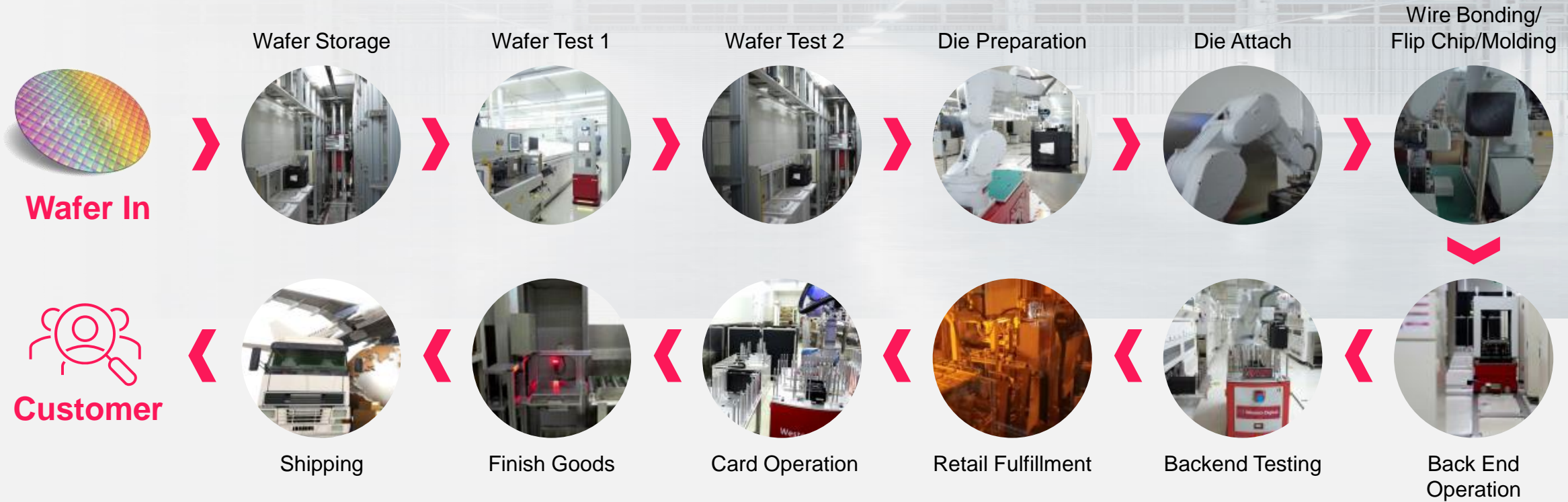


Inventory Reduction




OEE Improvement

Smart Factory



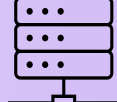

 Process Automation



 Robotics Transportation


 Storage Automation


 Material Management


 Data Analytics


 System Integration


 Artificial Intelligent

**~95%
 Lights-out
 Automation!**

Our Sustainability Commitments



Energy & Emissions

Emissions Scope 1&2

42%↓

By 2030

Renewable Energy

100%

MFG sites by 2030

Emissions Scope 1&2

Net Zero

By 2032



Water

Water Withdrawn

20%↓

MFG sites by 2030



Waste

Waste to Landfill

<5%

MFG sites by 2030

Lighthouse Recognitions

Global Lighthouse Network – Community of manufacturers shows leadership in using Fourth Industrial Revolution technologies to transform factories, value chains, and business models, for compelling financial and operation returns.



**Penang,
Malaysia**

1st IR 4.0 Lighthouse in Malaysia &
1st Sustainability Lighthouse in Asia



**Prachinburi,
Thailand**

1st IR 4.0 Lighthouse in Thailand



**Shanghai,
China**

IR 4.0 Lighthouse &
1st Sustainability Lighthouse in China



**Laguna,
Philippines**

1st IR 4.0 Lighthouse in Philippines



**Bang Pa-In,
Thailand**

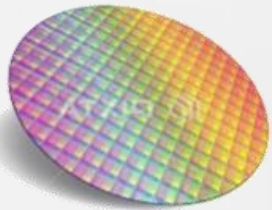
IR 4.0 Lighthouse



Now, Let's Look into Manufacturing Flash Testing

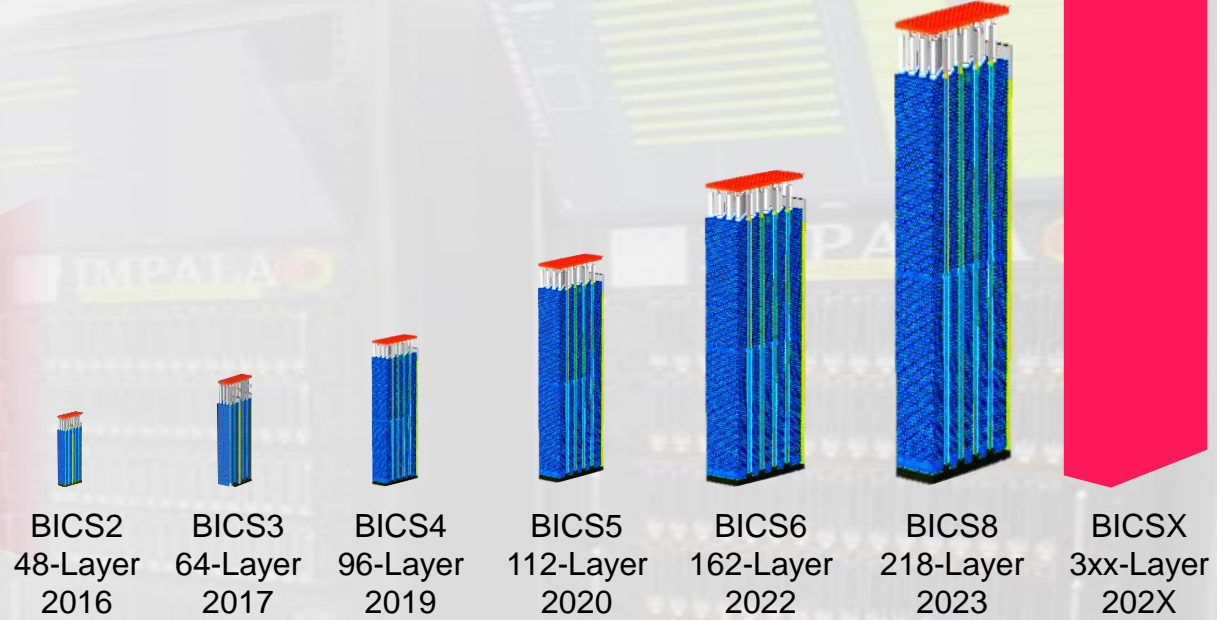
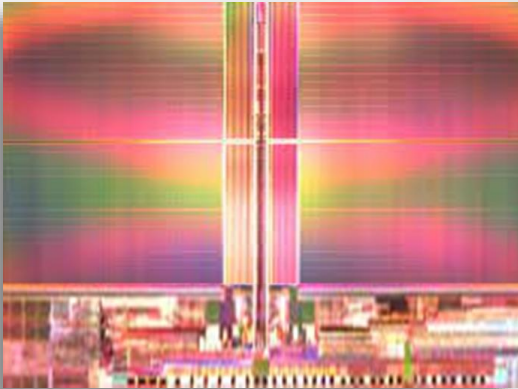


Source of Density Growth



70%
Array
scales with
density

30%
Periphery
similar in each
generation



20 MB
1991

256TB+
2026

Effects of Density Growth on Manufacturing Testing



**More
Bits to
Test**



**More Test
Data to
Analyze**

Effects of Density Growth on Manufacturing Testing



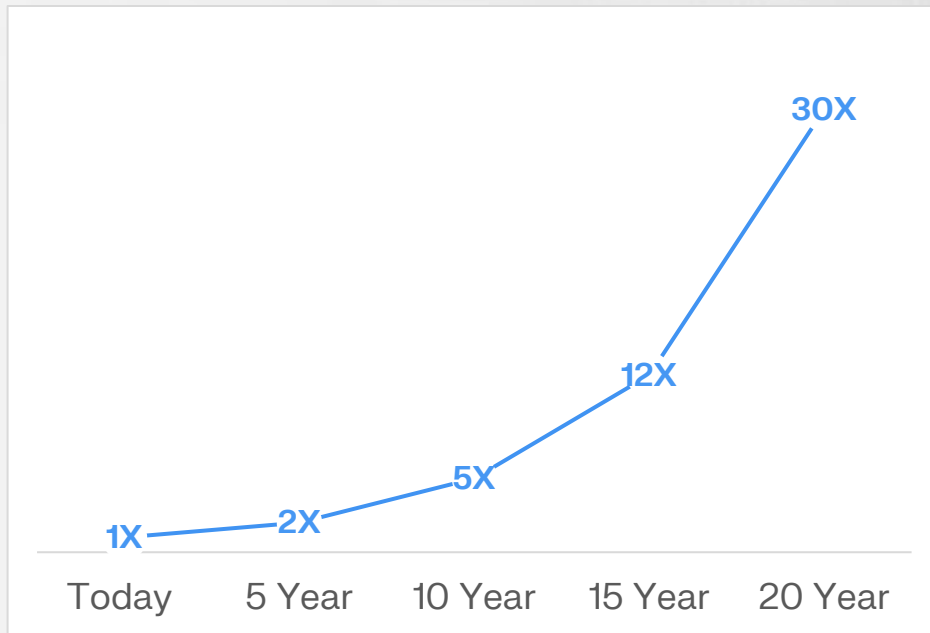
More
Bits to
Test



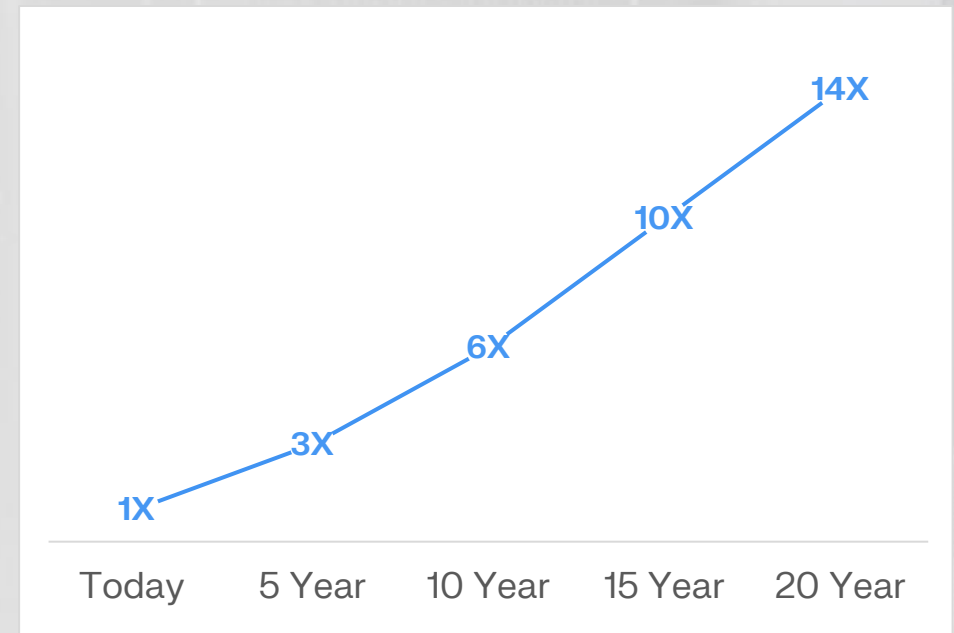
More Test
Data to
Analyze

Can We Do This Economically?...

CapEx



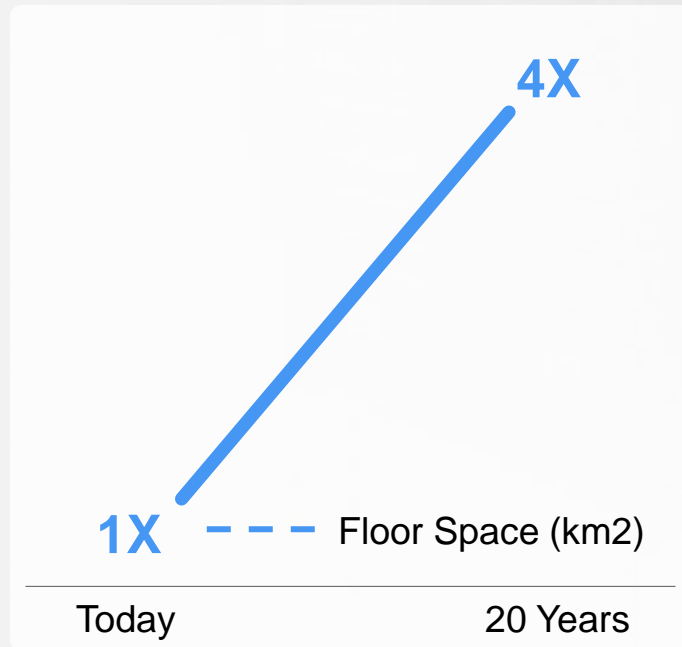
Test Cost



...And Impact to Factories!

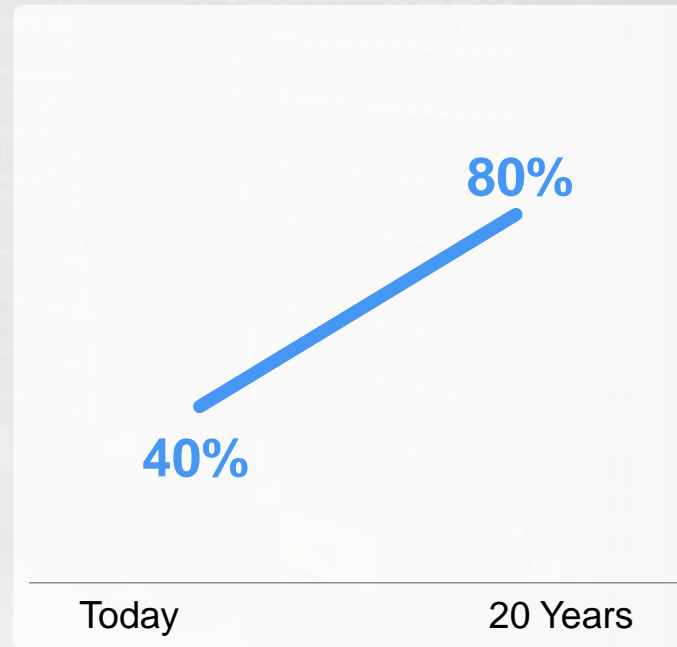
4X

Floor Space



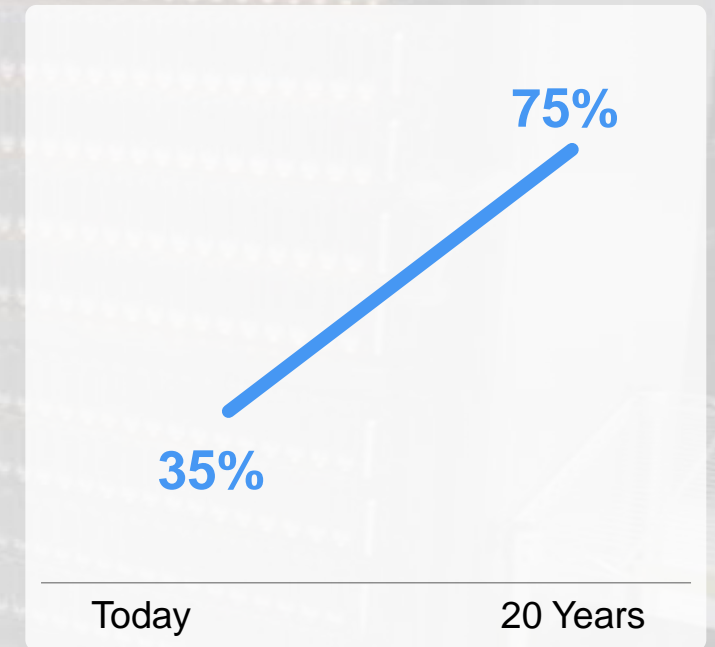
80%

Tester Space

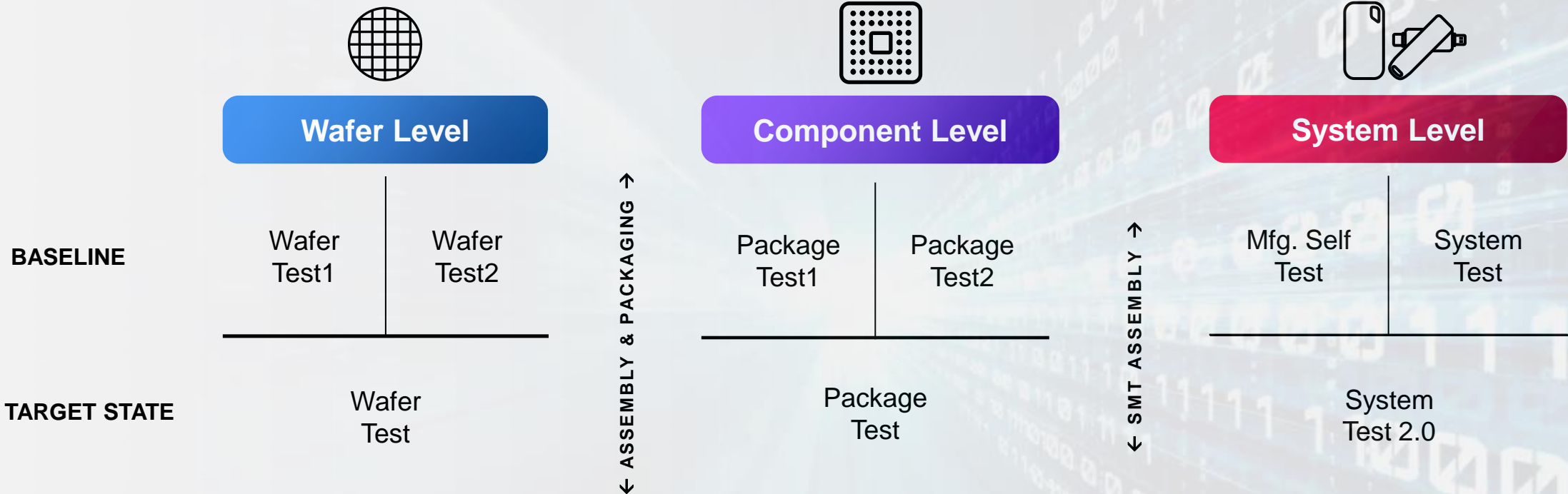


75%

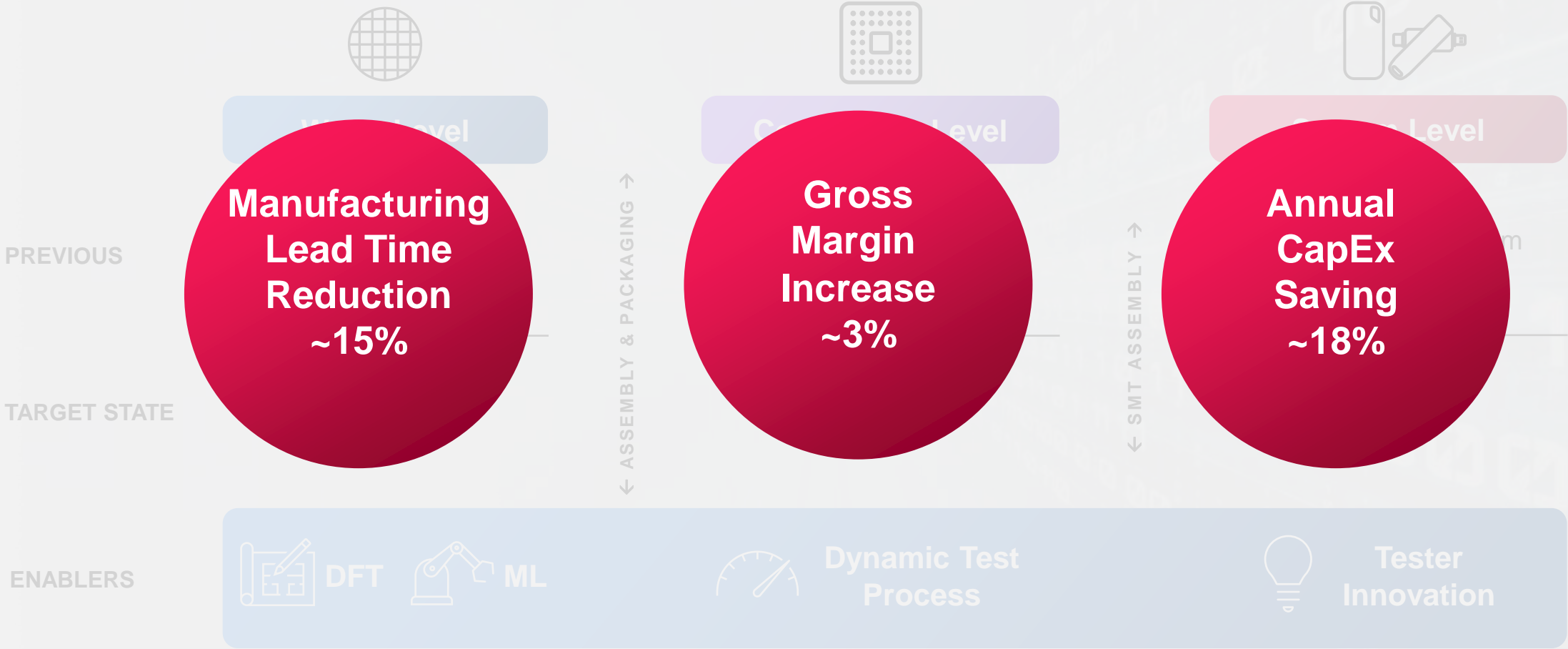
Test Time Impact on
Manufacture Lead Time



Test Insertions Optimization



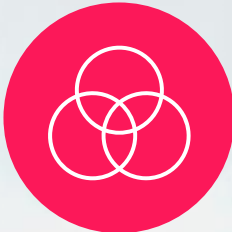
Test Insertions Optimization



Tester Innovation

Modular Tester Architecture

Independent CPU/ALPG per site



60%

Cost Saving

Power Supply Modules

Low voltage, High current



High Parallelism

Tester footprint, Temperature control

Areas of Focus



Increased DFT
at a device level



Shift left to generate
richer data



High prediction accuracy
in data analytics



Focus on compact, eco-friendly,
low-cost, parallel testers

Effects of Density Growth on Manufacturing Testing

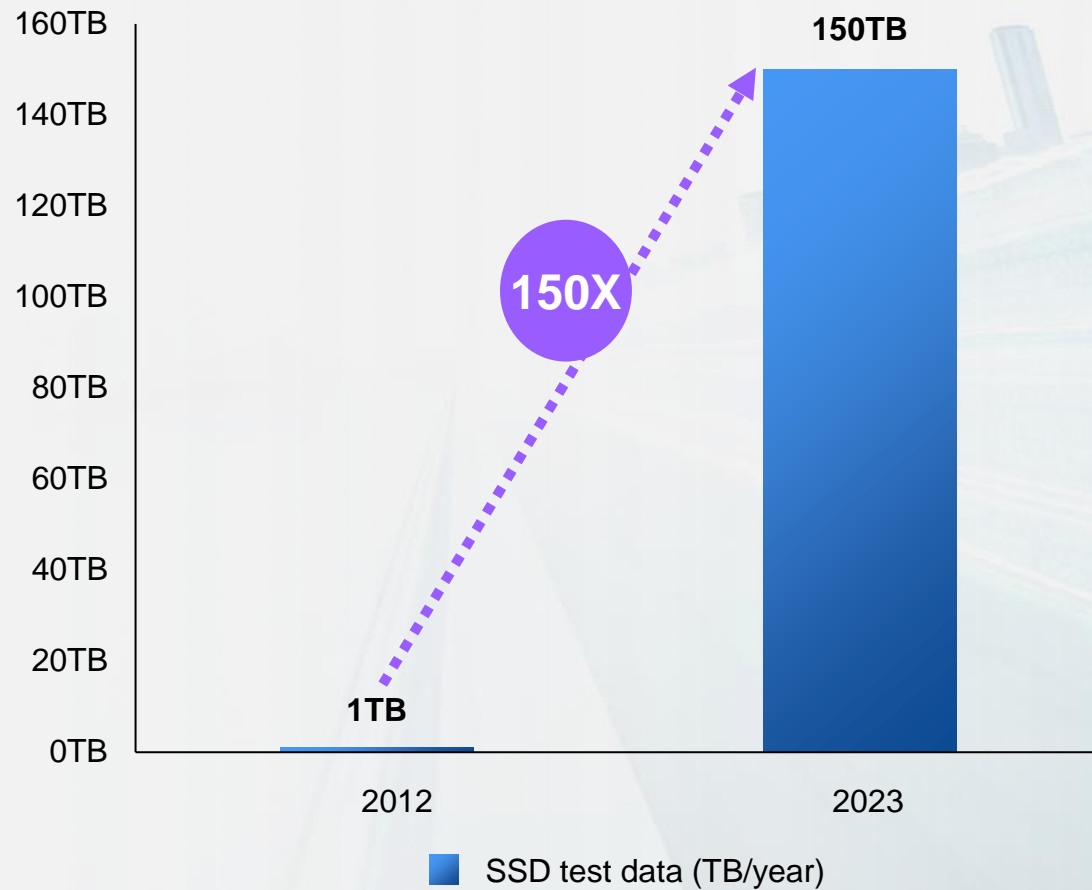


**More
Bits to
Test**



**More Test
Data to
Analyze**

Case Study: SSD Test Data



2X
ANNUALLY

**Test data growth
moving forward**

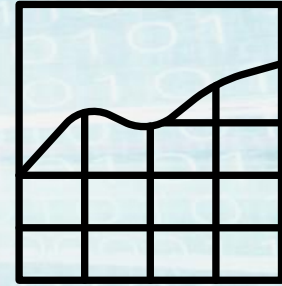
DATA NEEDS EXPECTED TO CONTINUE SCALING

35%
ANNUALLY

**Tester log
size growth**

Make Data Work for AI

01011
10101
11010



**Are we generating
the right data?**

**Are we
over-testing?**

**Which Data is
meaningful?**

Build Infrastructure Ready for AI Era

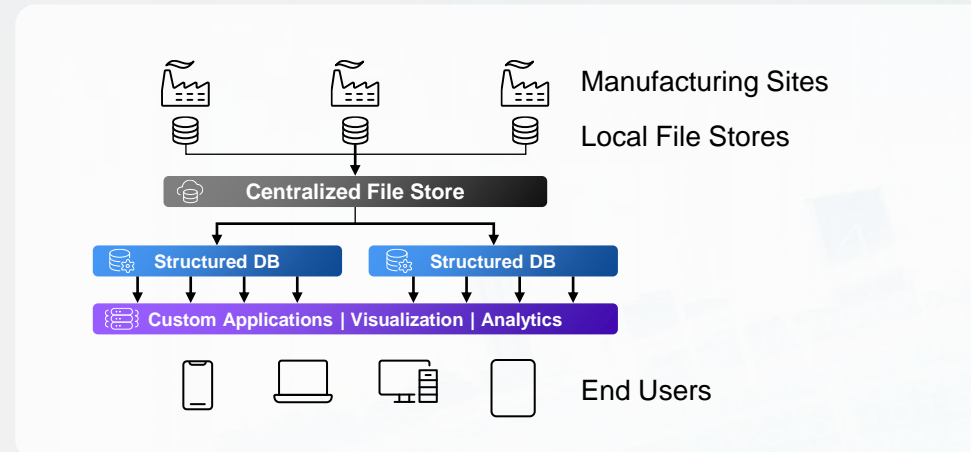
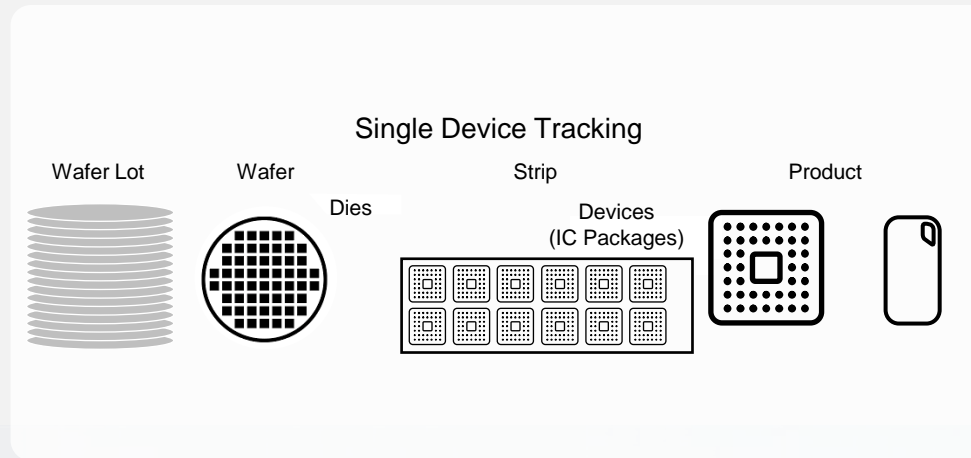
Data Generation



Data Pipeline



Data Consumption



Descriptive Analytics

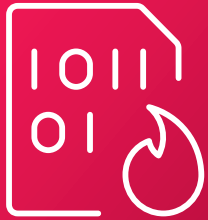


Predictive Analytics

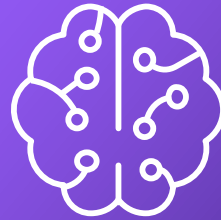


Prescriptive Analytics

Areas of Focus



Process richer volume
of data without
impacting test time



Improve data logging in
device/tester level



Vendor collaboration
on data standards

Call for Action

Dive into Data Processing

Testers is not just about testing anymore

Adapt & Align

Gear up for DFT and AI enablement on tester

Modular Mindset

Test system re-usability and upgradability

Standardize Together

Champion cross-vendor data standards

We Have a Plan

*We understand your **factory challenges**, and what has been discussed in this keynote gave us a few ideas to explore.*



Eva
Test Vendor

Thanks, Eva for your partnership! Nyi Nyi, let's all work together to **minimize impact** to the factory.



Jerry
Product and Test
Engineering
US

Thanks, Eva and Jerry. We will be ready for the next **Factory Revolution!**



Nyi Nyi
Manufacturing
Engineering
Asia

Behind every beautiful thing, there's some kind of **Purpose!**



Western Digital®

Create What's Next