APPLIED MATERIALS®
make possible

# A COLLABORATIVE PATHWAY TO NET ZERO

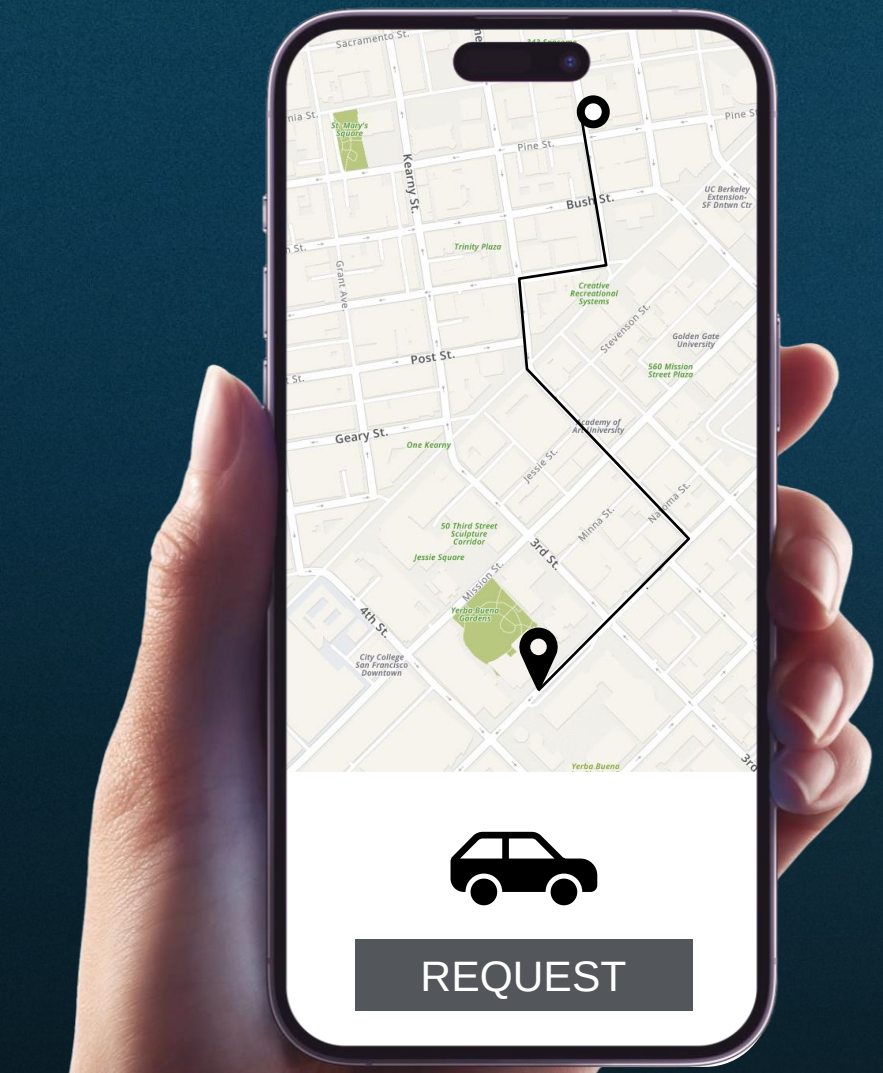
**Gary Dickerson**
President and CEO, Applied Materials

SEMICON WEST 2023

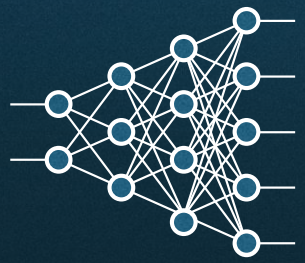
# Forward-Looking Statements and Reporting Uncertainties

This presentation contains forward-looking statements, including our sustainability strategies and targets and other statements that are not historical facts. These statements, and their underlying assumptions and projections, are subject to risks and uncertainties, and are not guarantees of future performance. Factors that could cause actual results to differ materially from those expressed or implied by such statements include, without limitation: our and the industry's ability to achieve sustainability strategies and goals; failure to realize the anticipated benefits of planned investments and technology innovations related to sustainability; the level of demand for semiconductors and our products; customers' technology and capacity requirements; the introduction of new and innovative technologies, and the timing of technology transitions; our ability to develop, deliver and support new products and technologies; market acceptance of existing and newly developed products; and other risks and uncertainties included in the "Risk Factors" section of our SEC filings, including our recent Forms 10-Q and 8-K. All forward-looking statements are based on management's current estimates, projections and assumptions, and we assume no obligation to update them.

Non-financial information is subject to measurement uncertainties resulting from limitations inherent in the nature and methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements.

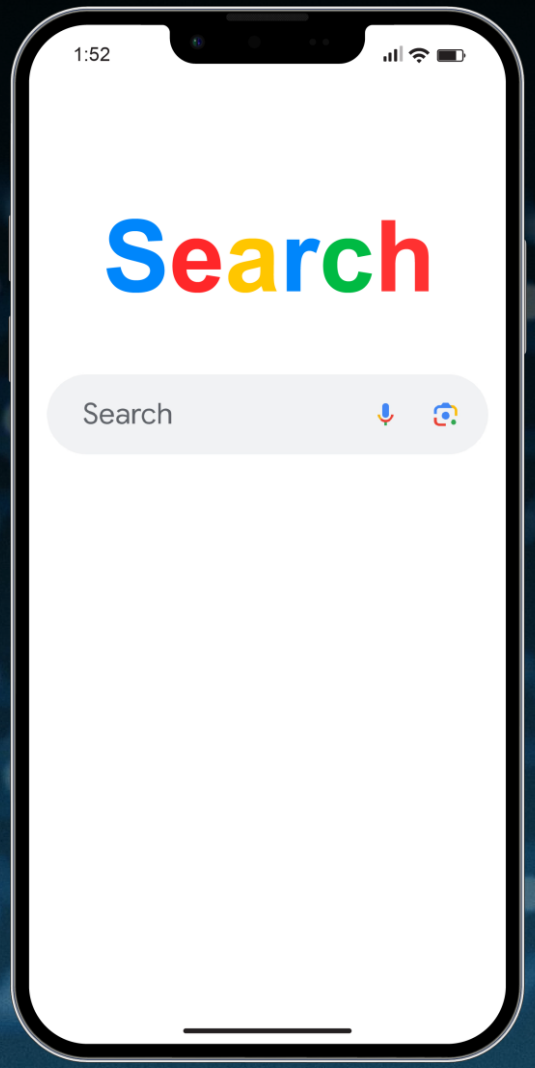



same

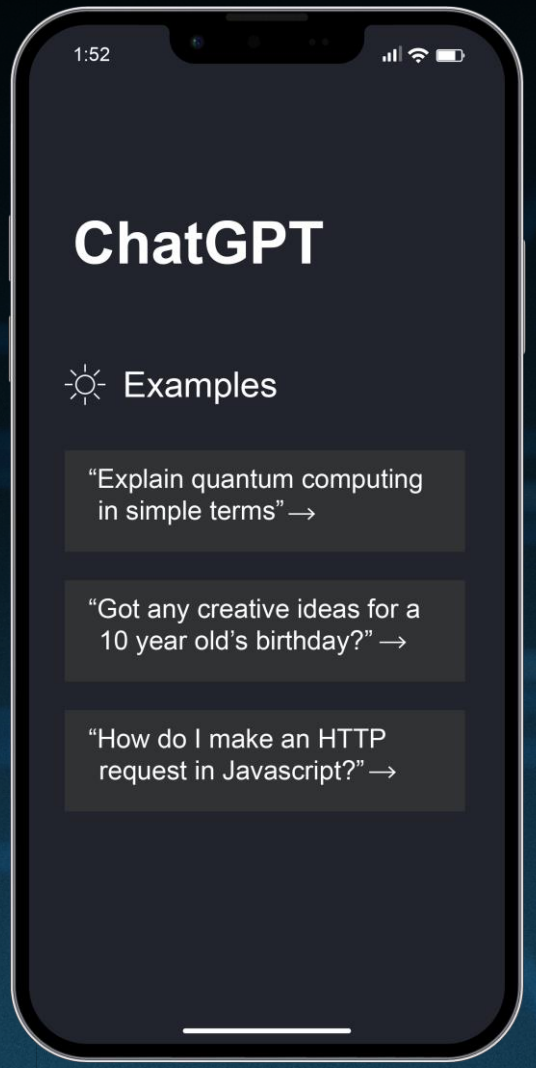


AI ..... HUMAN ..... 800x

**~2.4kWh** **~3Wh**




VS.




0.0003 kWh
standard Google search

0.004 kWh

13x
energy consumption

Advances in IoT and AI computing

ACCELERATES

Digital transformation of the economy

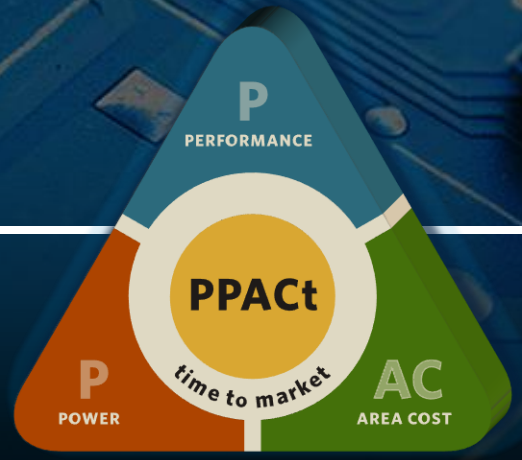
ACCELERATES

Energy consumption driven by ICs and computing

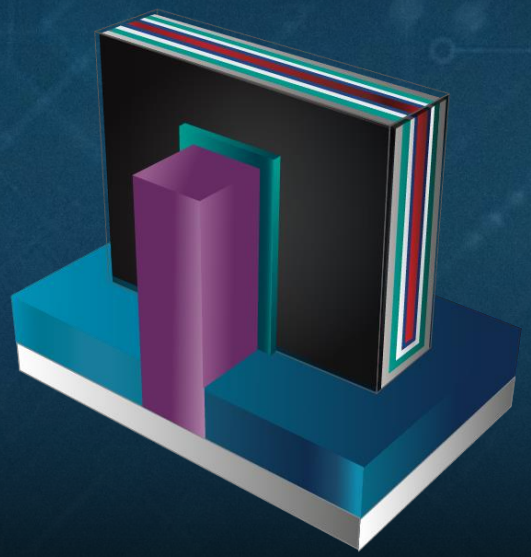
ACCELERATES

Demand for lower power, higher performance ICs and clean energy

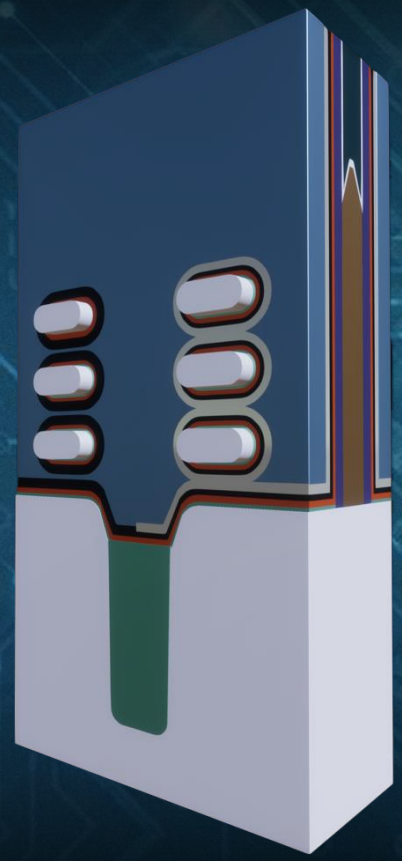
‘ENERGY-EFFICIENT COMPUTING’



# Energy-Efficient Computing enabled by **complexity**…



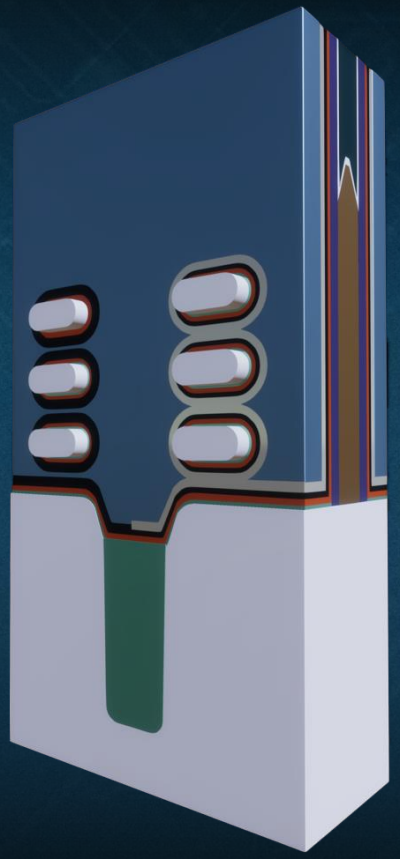
**FinFET**

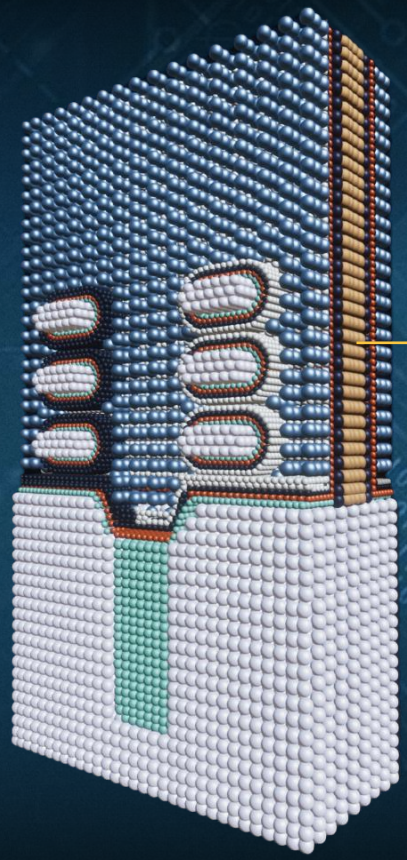


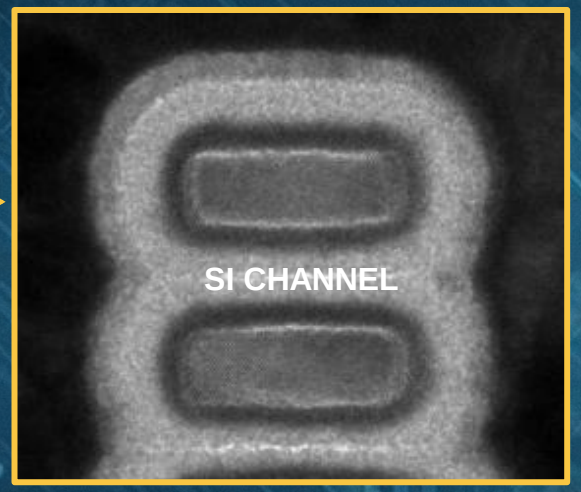
**GAA**
33% improvement
in energy efficiency*

* Source: TSMC

# What complexity **really looks like**…








ENABLED BY
Atomic-level processing
**Thinnest layer is 1nm**

# COMPREHENSIVE APPROACH TO ESG

**NET ZERO PLAYBOOK**
(focus for today)

**Applied SCOPE 1 and 2**

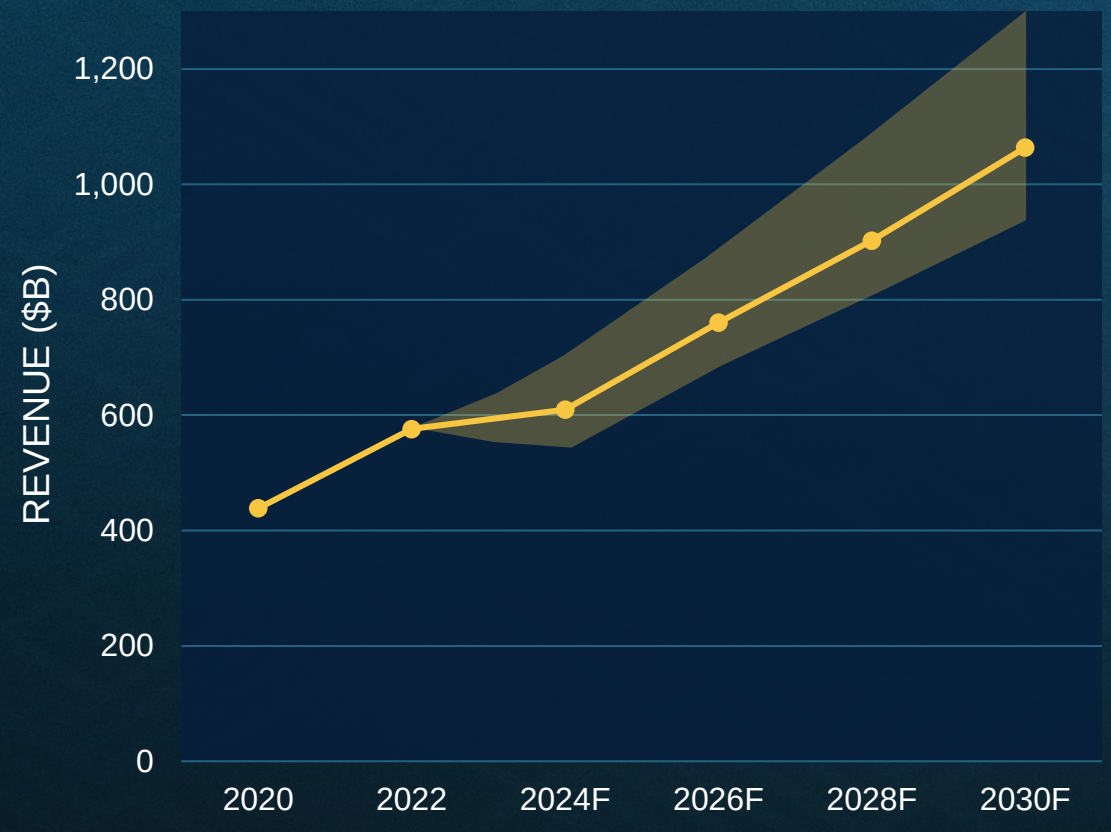
**Applied SCOPE 3**

**1X**
OUR OPERATIONS

**100X**
SEMI INDUSTRY OPERATIONS

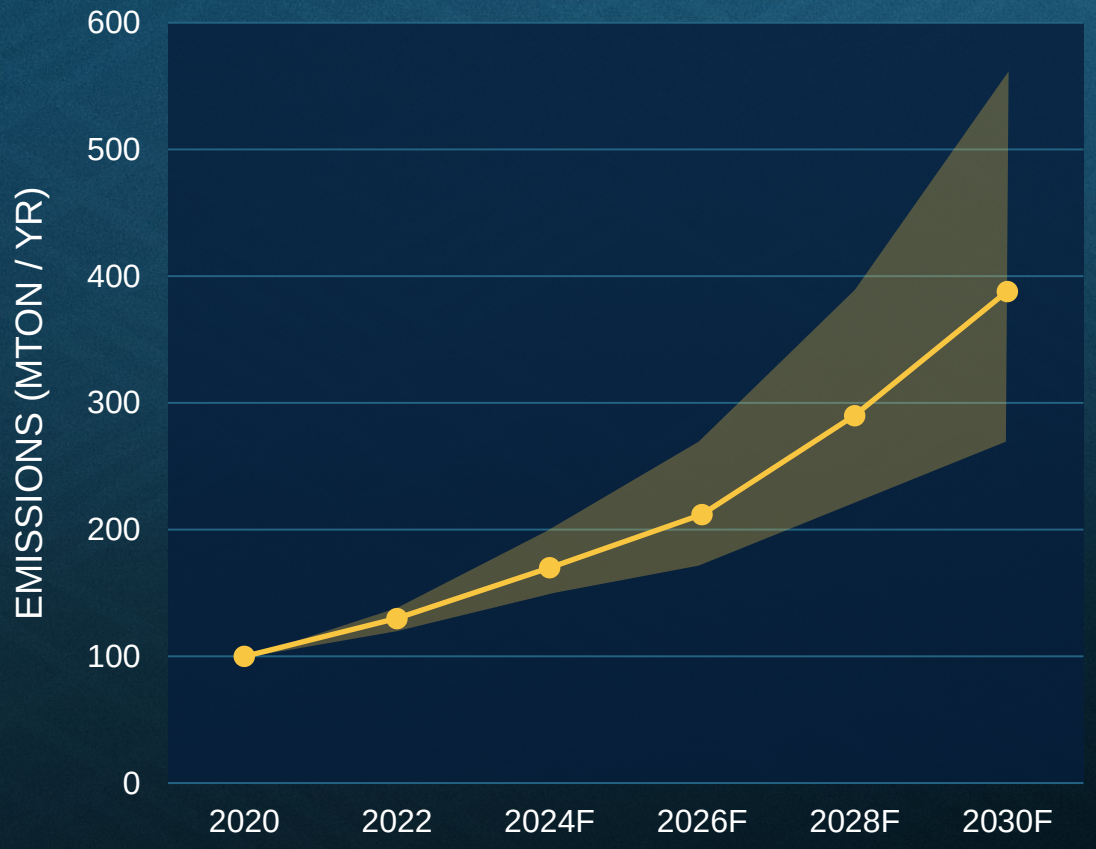
**10,000X**
GLOBAL ELECTRONICS

## Semiconductor Industry Revenues[1]




**>2x in 10 years**

## Semiconductor Manufacturing Carbon Emissions[2]




**>4x in 10 years**

Sources: 1) McKinsey and Company, SEMI, TechInsights, Applied Materials 2) imec

# Applied's Greenhouse Gas Emissions

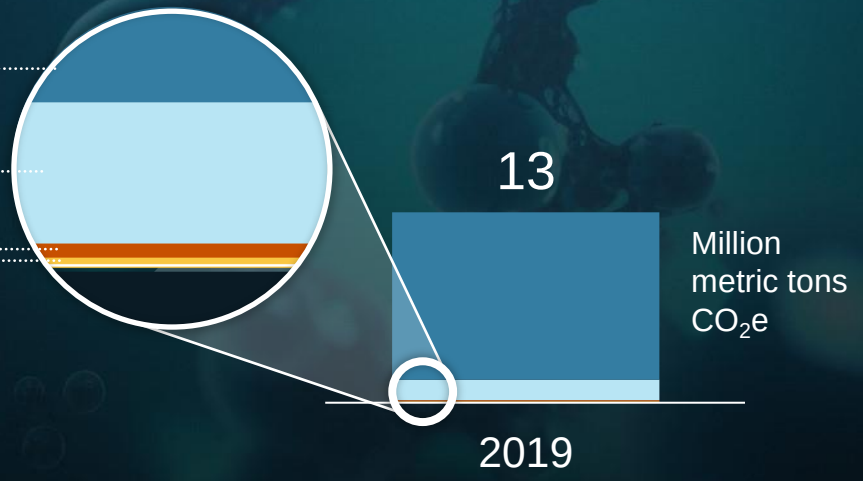
**SCOPE 3 Product Use:**
Downstream value chain emissions, tracked across 7 categories

**SCOPE 3 Supply Chain:**
Upstream value chain emissions, tracked across 8 categories

**SCOPE 2:**
Purchased electricity for our operations

**SCOPE 1:**
Fuels used in our operations (natural gas, process gases)

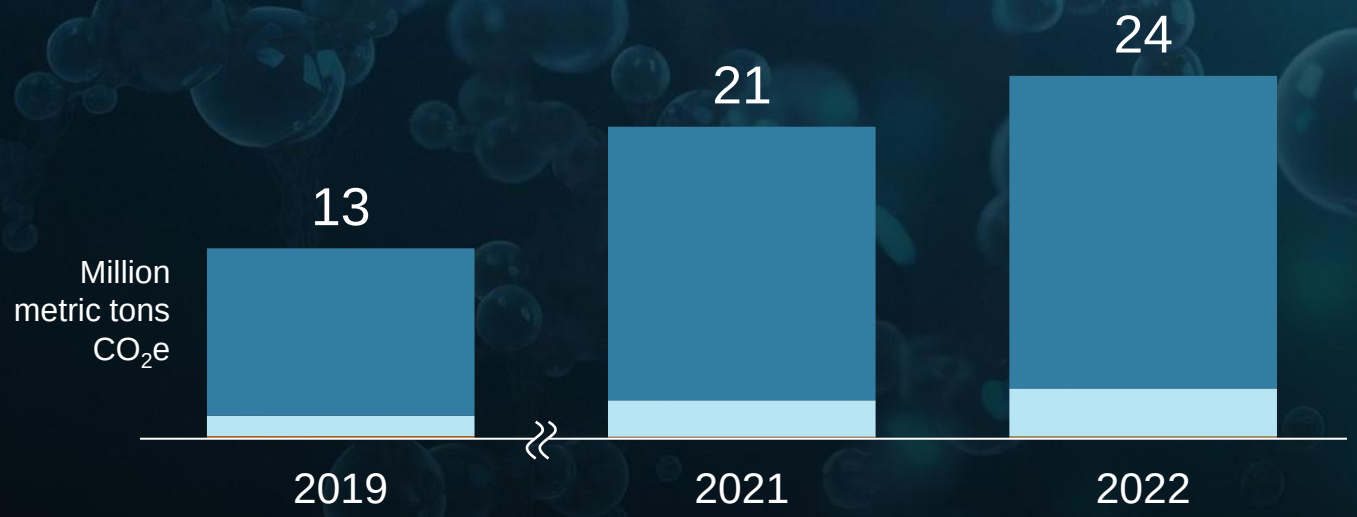
| | |
|---|---|
| Scope 1 and 2 | **<1%** |
| S3 Supply Chain* | **~12%** |
| S3 Use of Products* | **~87%** |




* Predominantly Category 1: purchased goods and services and Category 11: use of sold products. Other Scope 3 categories total ~5%

# Applied’s Greenhouse Gas Emissions

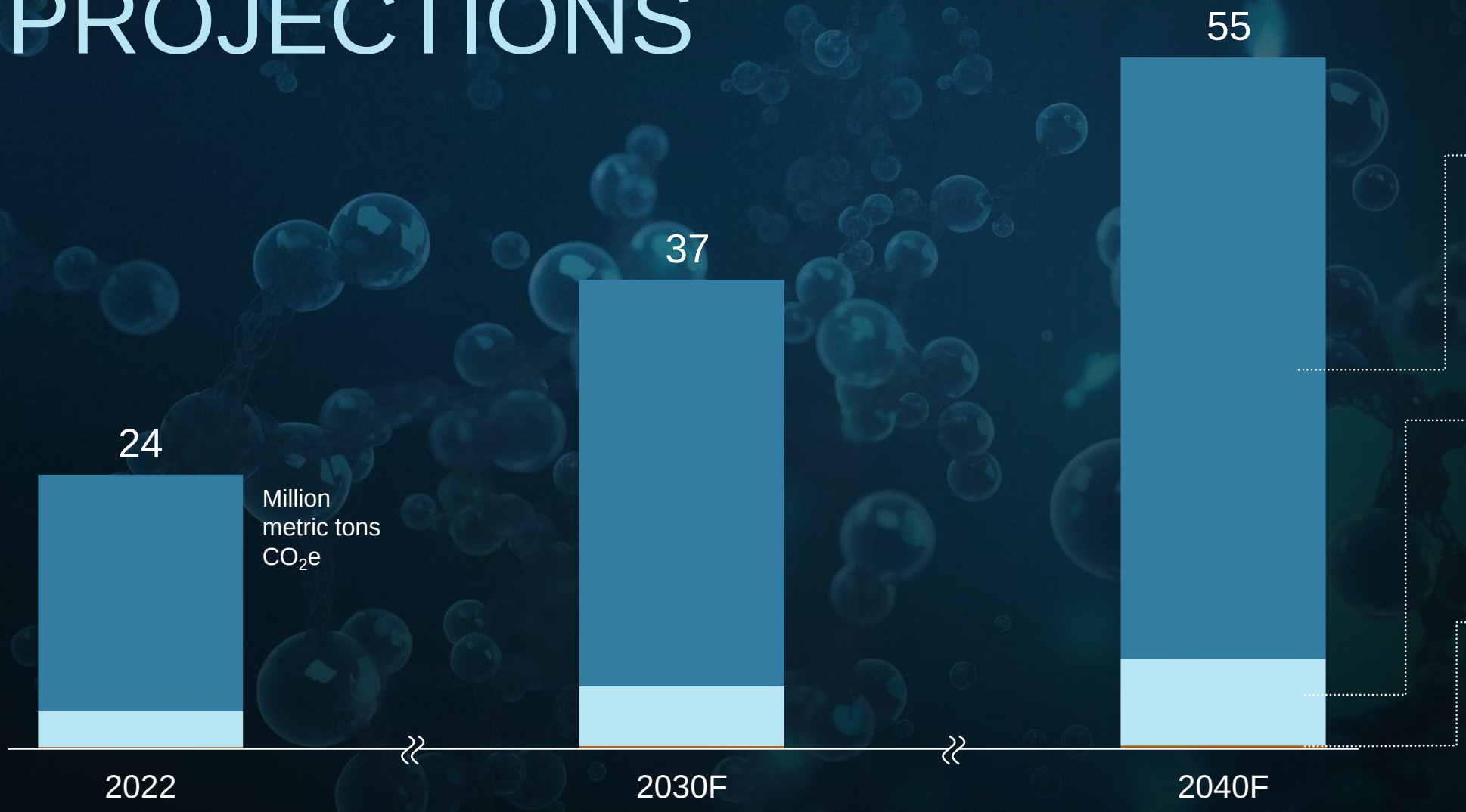
# ACTUALS





# Applied's Greenhouse Gas Emissions

# PROJECTIONS



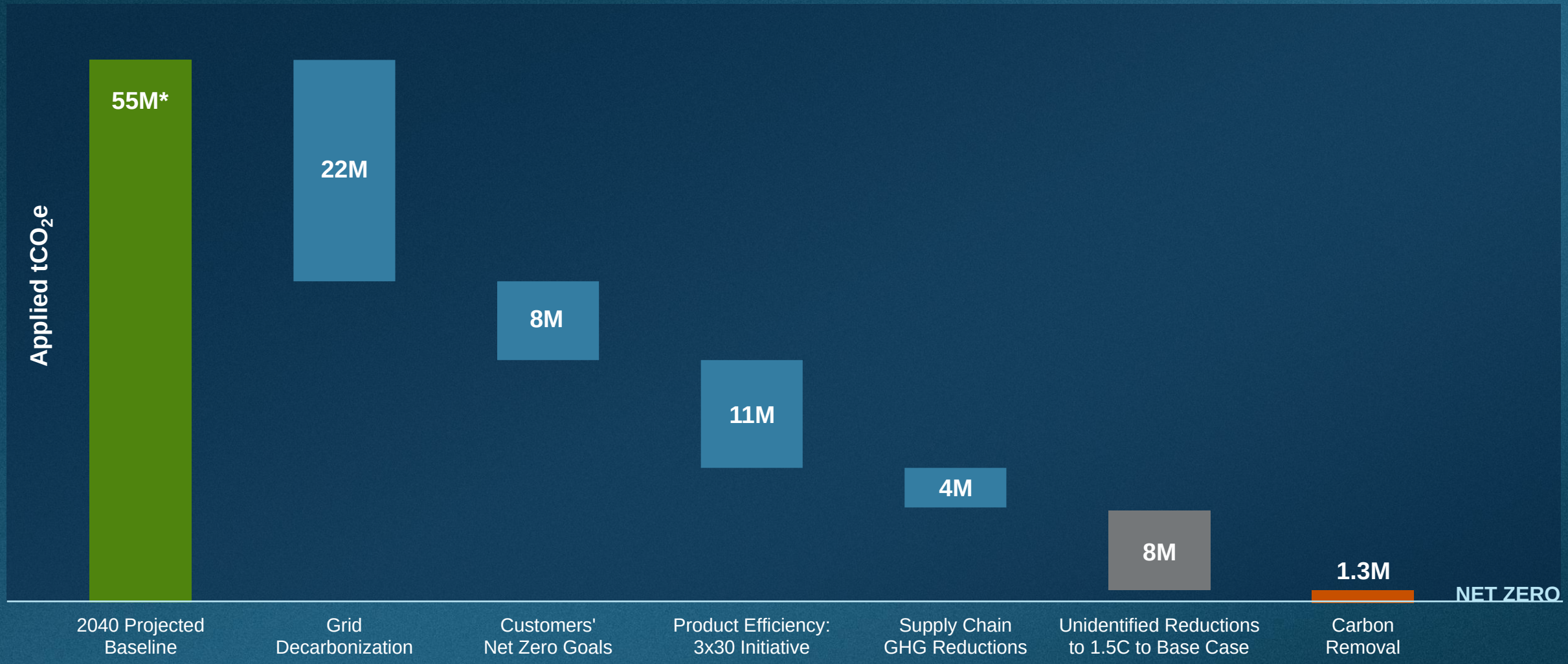

**SCOPE 3 Product Use:**
**~87%** of total emissions shared with customers

**SCOPE 3 Supply Chain:**
**~12%** of total emissions shared with supply chain

**SCOPE 1&2**
**<1%** of emissions

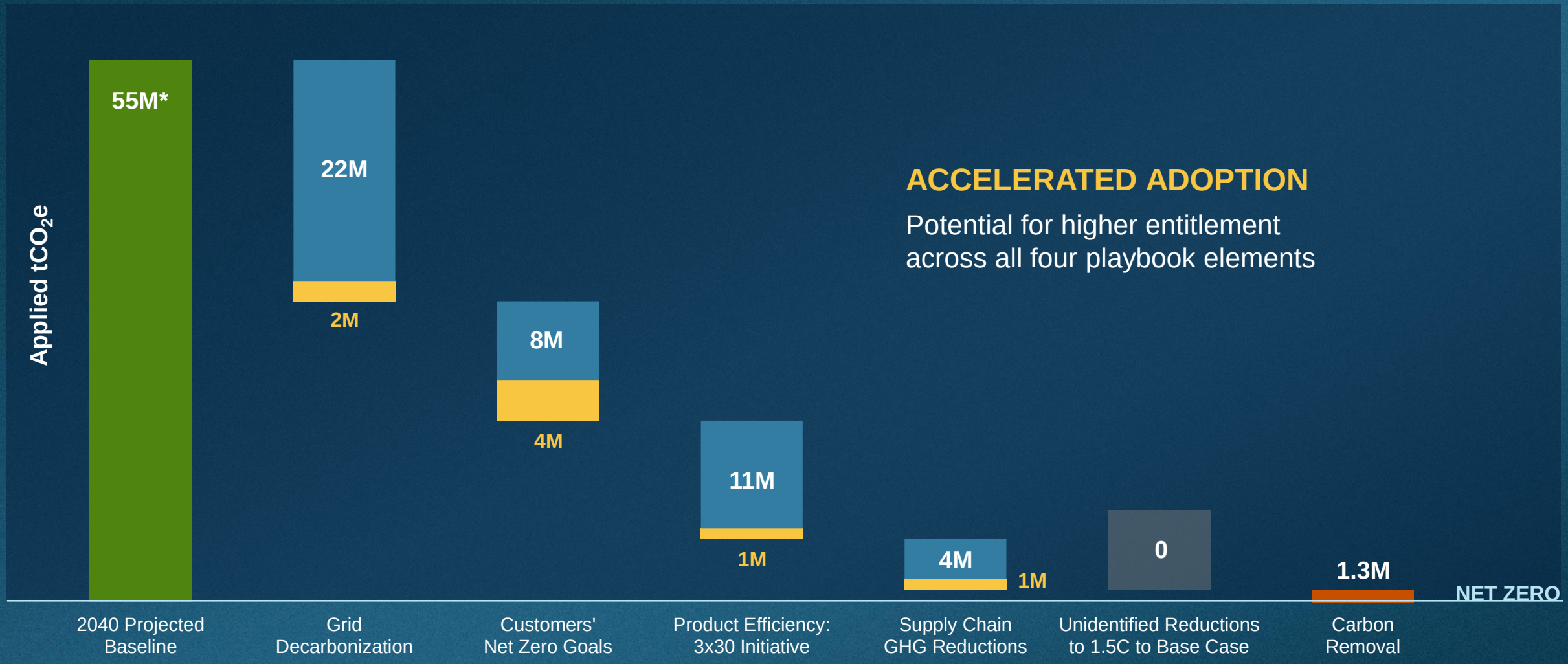
* Covers 90% of Applied's Scope 3 emissions per SBTi Net Zero standard

# Applied's Net Zero Playbook – Base Case




*Covers 90% of Applied's Scope 3 per SBTi (87% product use emissions; 13% supply chain). GHG = Greenhouse Gas

# Applied's Net Zero Playbook – Accelerated Adoption

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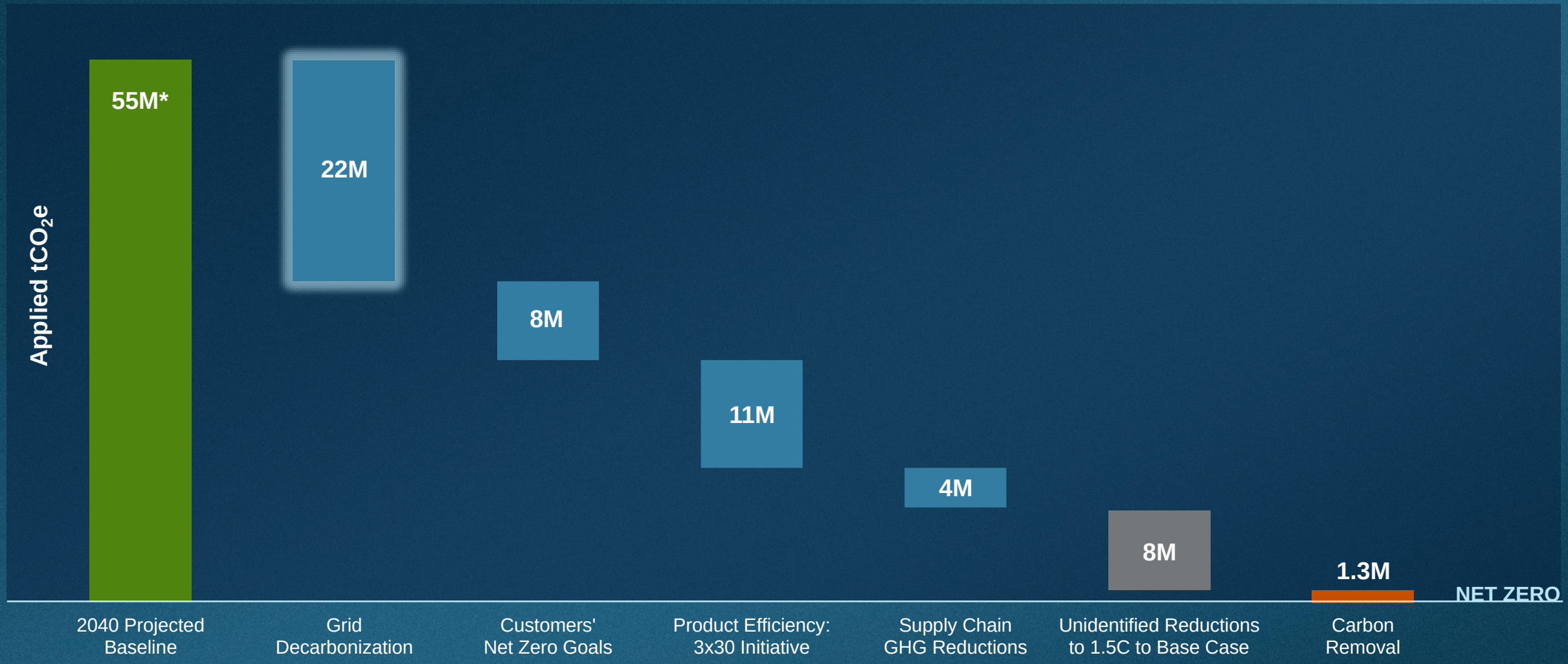
# Applied's Net Zero Playbook – Base Case

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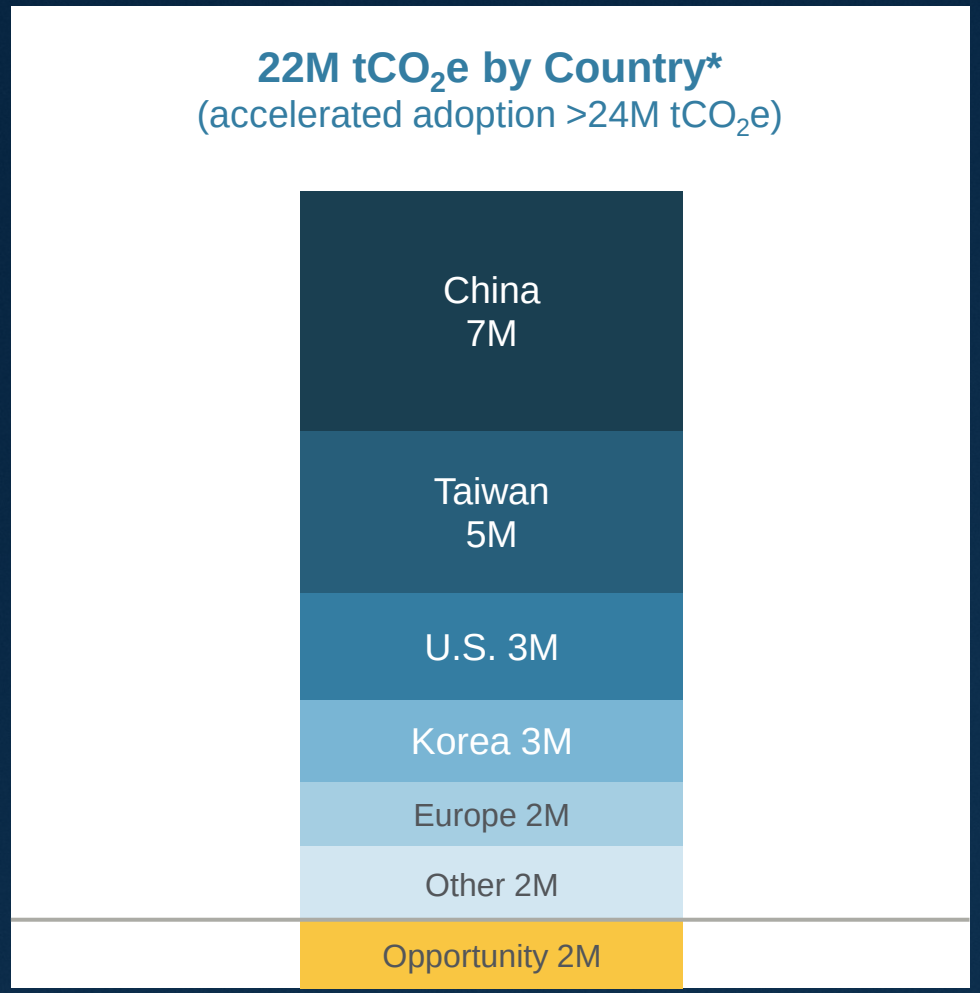
# Accelerate Grid Decarbonization and Efficiency




*Reduction size is driven by a combination of volume of systems by destination and projected rate of renewables in that region by 2040 (IEA)

## CALL TO ACTION:

Amplify industry's combined voice as buyer of energy (increase entitlement)

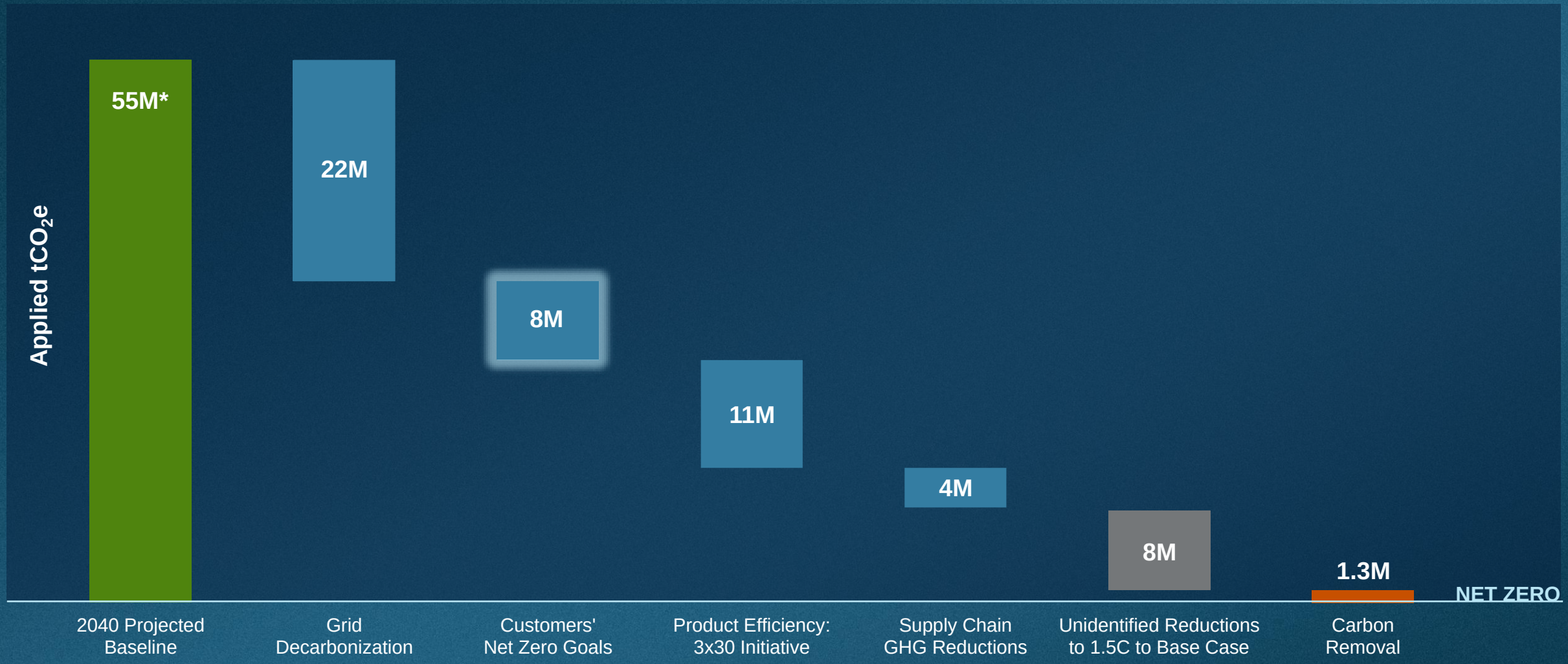
Increase focus on proximity to clean energy as key factor in **fab location choice**

Help accelerate grid transformation (can drive up to $50B of semi demand by 2030)

RE 100

CEBA
Clean Energy Buyers Association

# Applied's Net Zero Playbook – Base Case




*Covers 90% of Applied's Scope 3 per SBTi (87% product use emissions; 13% supply chain). GHG = Greenhouse Gas

# Support and Expand Customers' Net Zero Goals


*Reductions from energy powering the fab, based on customers' publicly stated goals

~65% of current global IC production from chipmakers with Net Zero goals

**CALL TO ACTION:**

Drive to 100% of companies with Net Zero strategies

Support companies with existing plans to achieve their goals

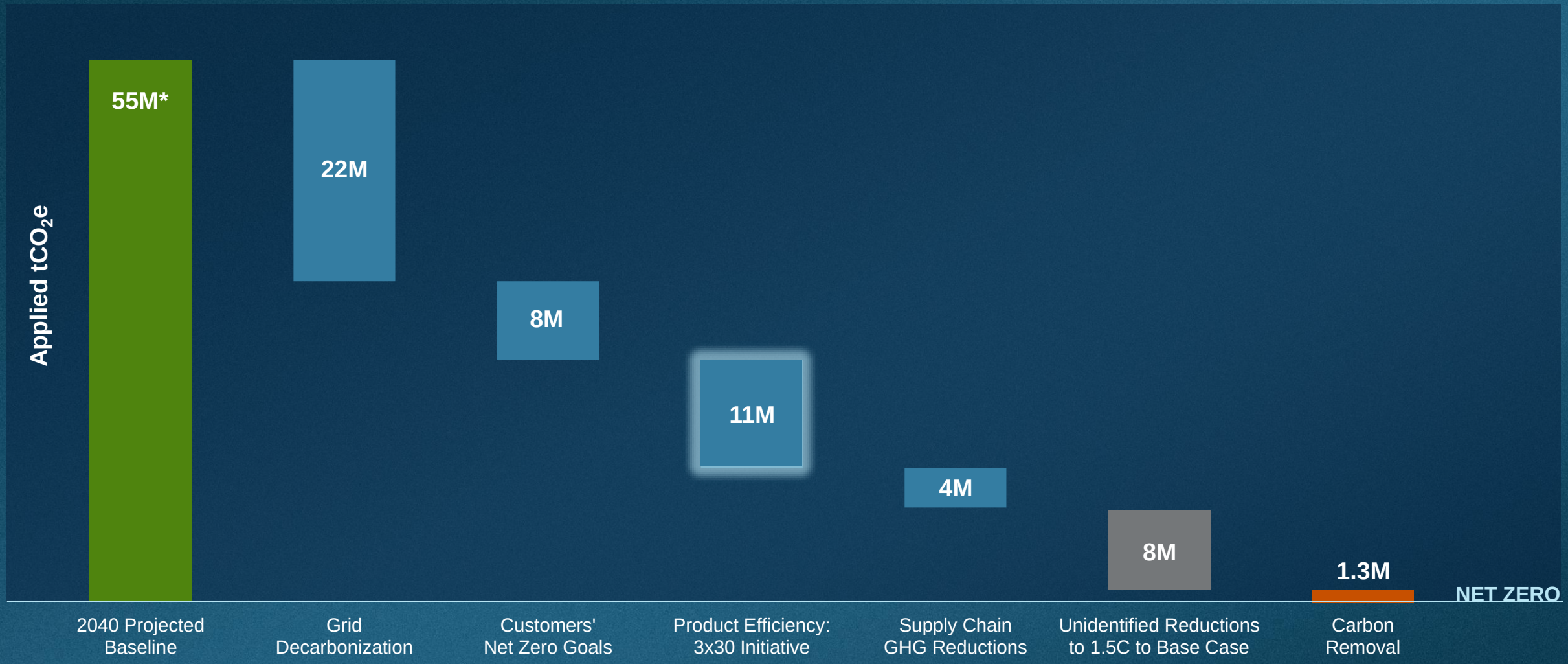
Share Net Zero playbooks and BKMs

SCIENCE BASED TARGETS

semi

McKinsey & Company

# Applied's Net Zero Playbook – Base Case

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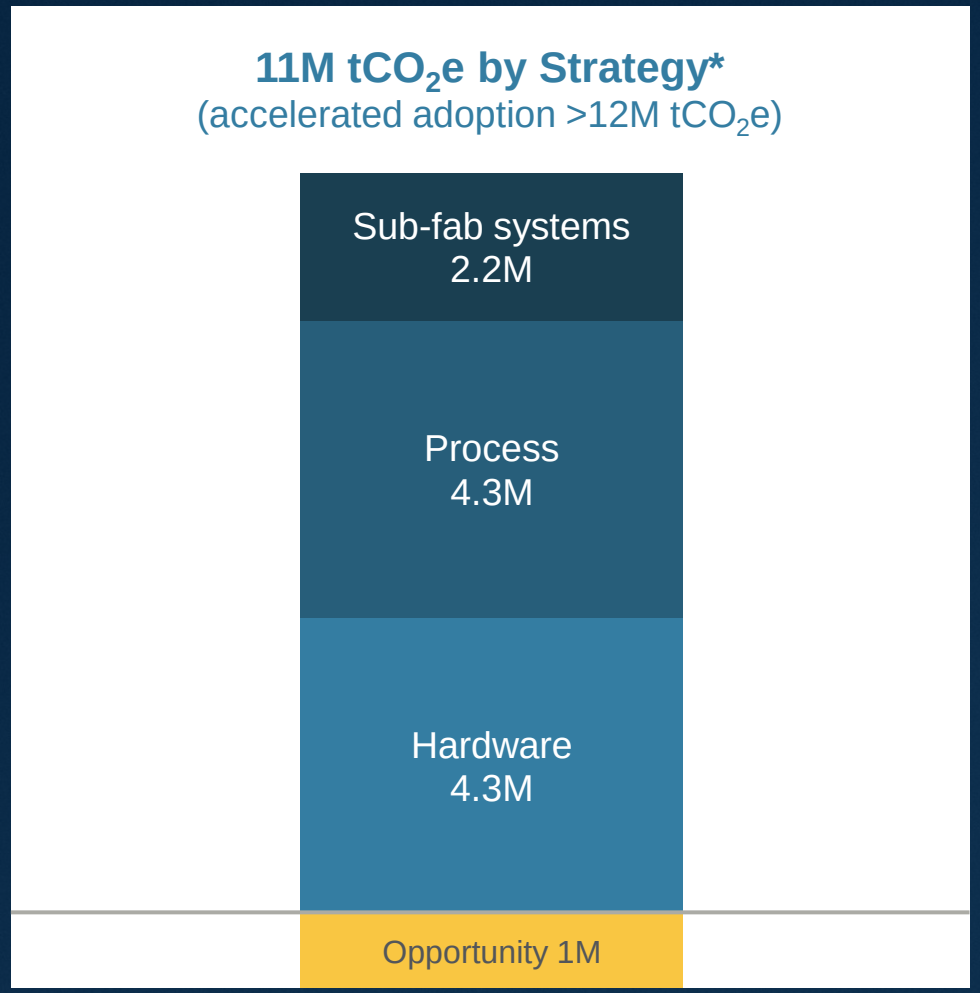
# Improving Product Efficiency




* Current model based on available data in 2023.

Dedicated engineering team for sustainability (equipment, sub-fab, process recipes and operations)

3x30 initiative launched in 2020:
30% reduction in energy, chemical impact and cleanroom footprint by 2030

24 products and services in ecoUP portfolio

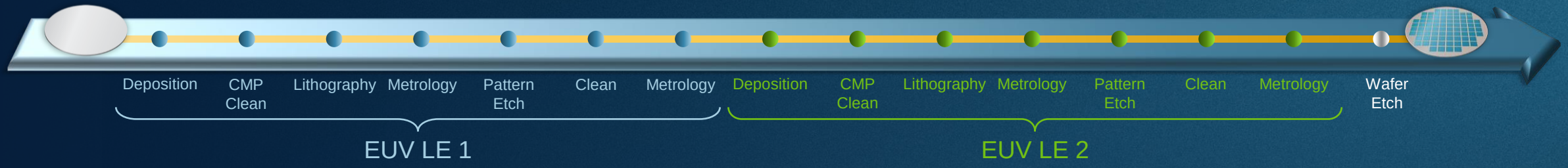
**CALL TO ACTION:**

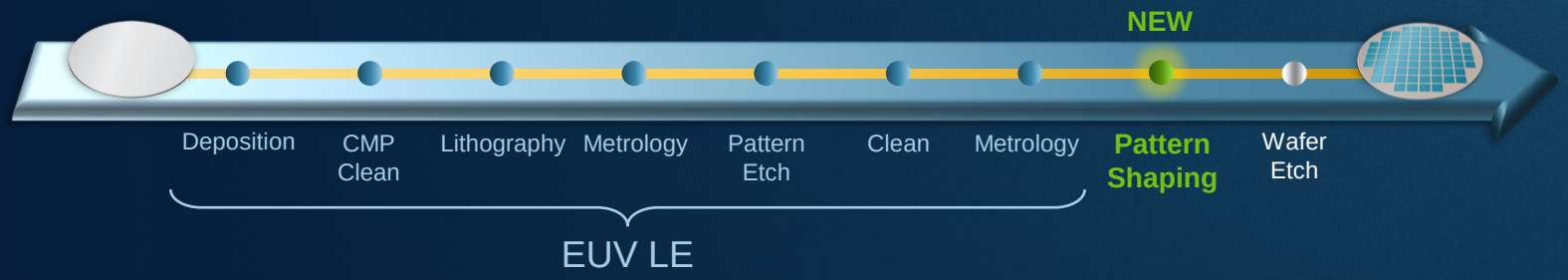
Accelerate adoption of ecoUp solutions

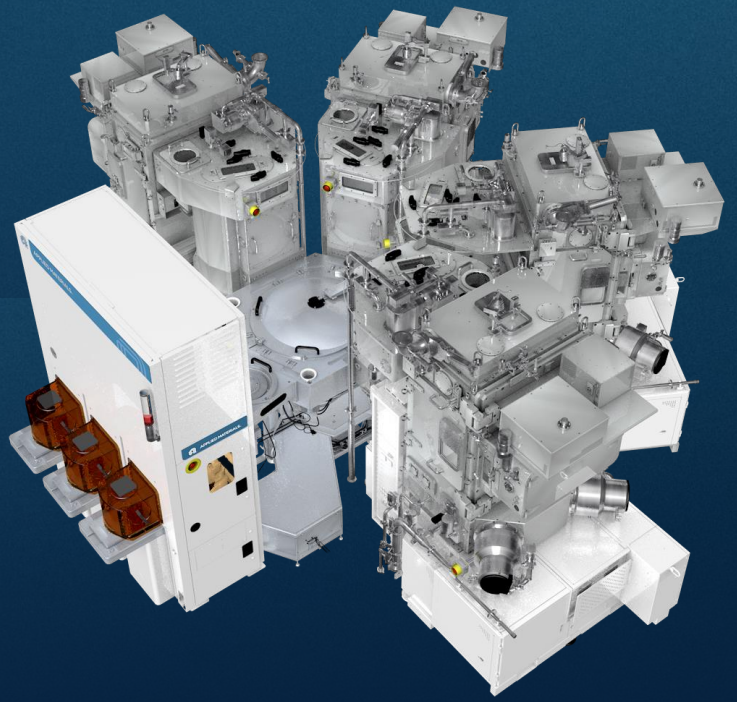
3 X 30 ecoUP™

# Case Study – Sculpta® Pattern Shaping

SIMPLIFIED PROCESS FLOWS



- Eliminates alignment errors
- Lowers capital costs
- Provides energy and materials savings

**PER LAYER:**

>15kWh per wafer

>0.35kg $CO_2$e per wafer

~15L of water per wafer


# EcoTwin®

## Eco-Efficiency Software

**COMPARE** resource consumption of different recipes to **OPTIMIZE** carbon footprint

**MONITOR** energy and gases in real-time to assess environmental impact of chambers, platform and sub-fab components

**REPORT** continuous improvements in environmental performance

## Endura®

IMS workhorse for small chambers

## Centura®

Large-chamber compatibility

## Producer®

High throughput density for small chambers

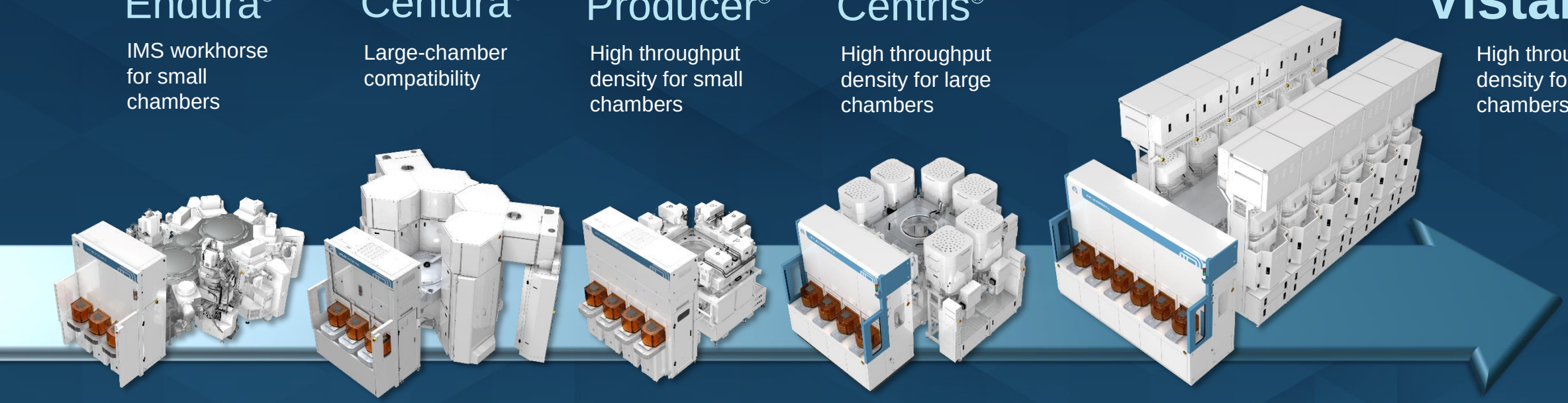
## Centris®

High throughput density for large chambers

INTRODUCING

## Vistara™

High throughput density for large chambers



# Applied's first purpose-built **low-carbon platform**

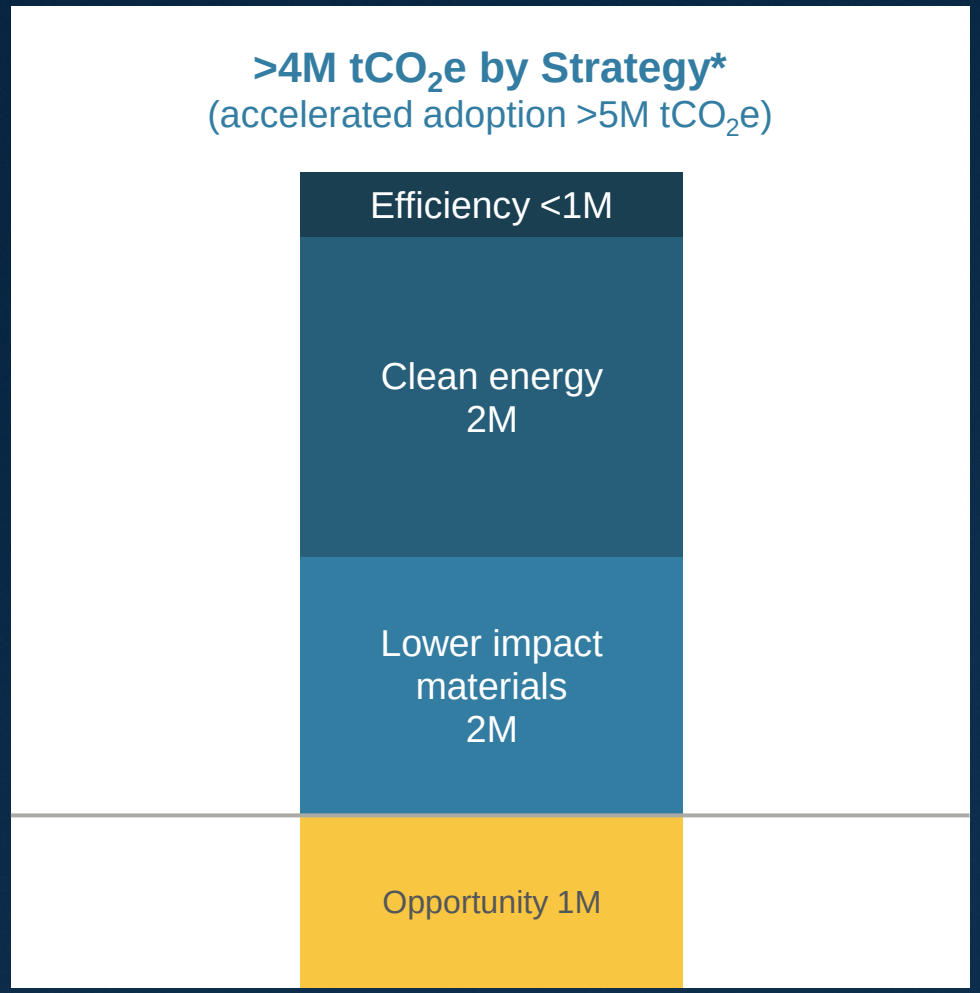
**~35%** reduction in platform energy consumption

**~30%** reduction in cleanroom footprint

# Applied's Net Zero Playbook – Base Case


*Covers 90% of Applied's Scope 3 per SBTi (87% product use emissions; 13% supply chain). GHG = Greenhouse Gas

# Transforming Applied's Supply Chain




*indicative based on available data; further analysis required

SuCCESS 2030 initiative launched in 2020

Working with >100 suppliers on greenhouse gas emissions data collection + reduction programs in place with top suppliers

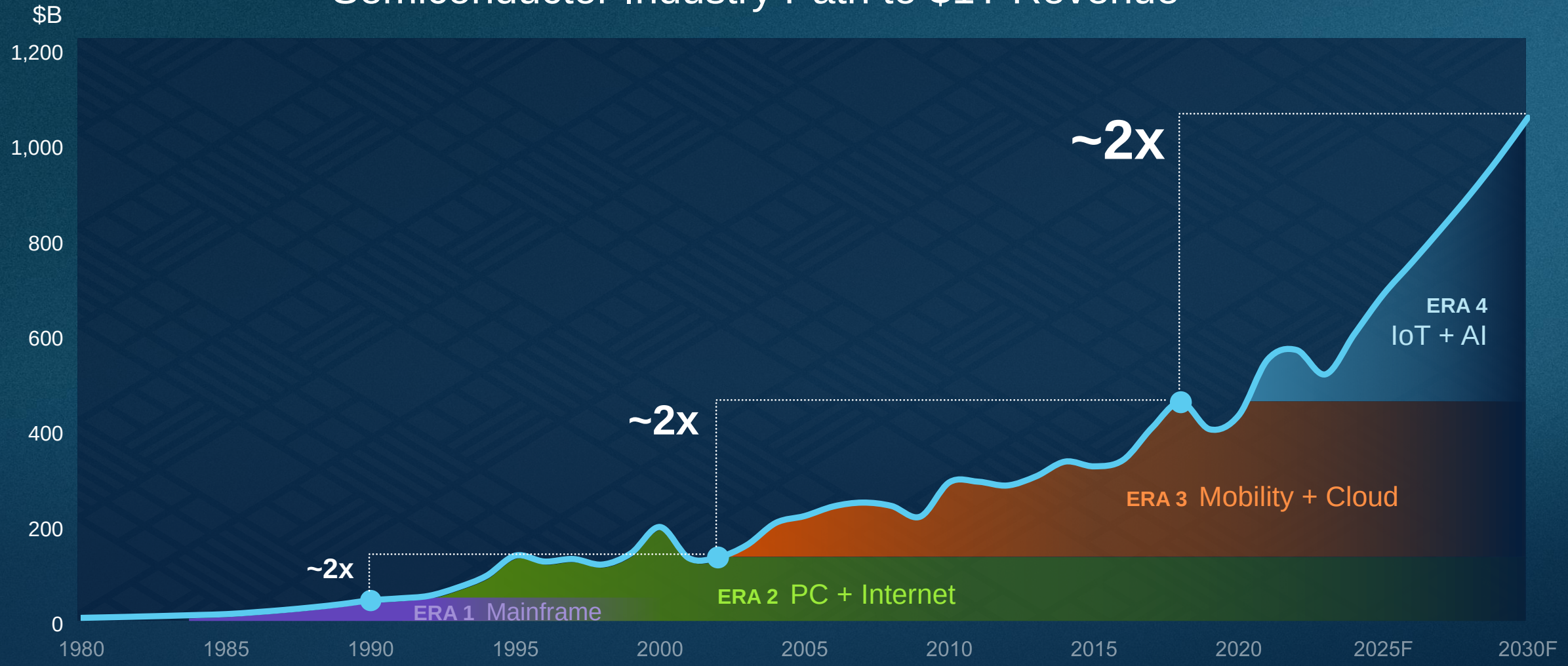
Increased spend with diverse suppliers by $0.5B in past two years

Launching new supply chain energy partnership program

SuCCESS 2030

Schneider Electric

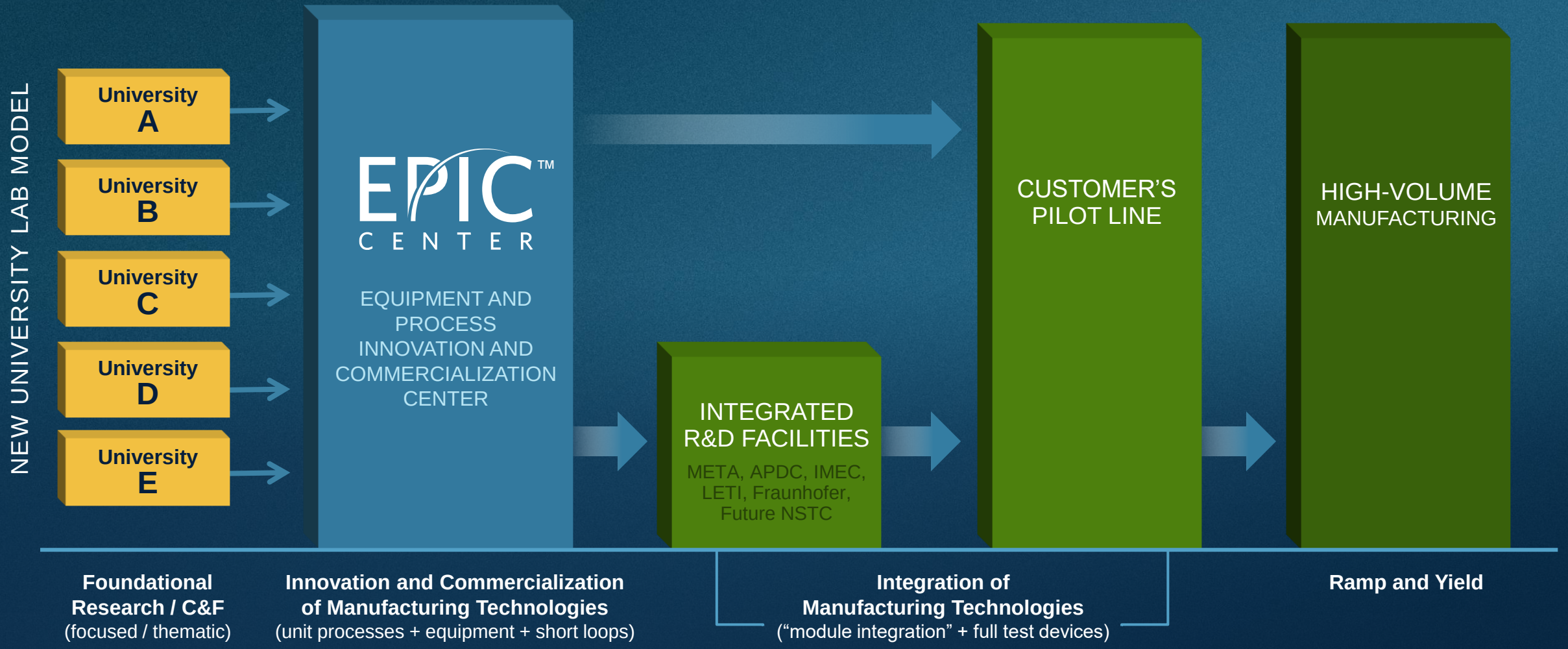
# Semiconductor Industry Path to $1T Revenue




**Each computing era ~doubles size of semiconductor market and accelerates the need for energy efficient computing**

Source: SIA, Applied Materials - SMI

# Innovating The Way We Innovate…



MAKE POSSIBLE

*a better*

FUTURE

Accelerate the energy-efficient computing roadmap (10,000x)

**AND**

Deliver Net Zero semiconductor manufacturing (1x, 100x)


APPLIED
MATERIALS®
make possible