

# Making Possible a Better Future

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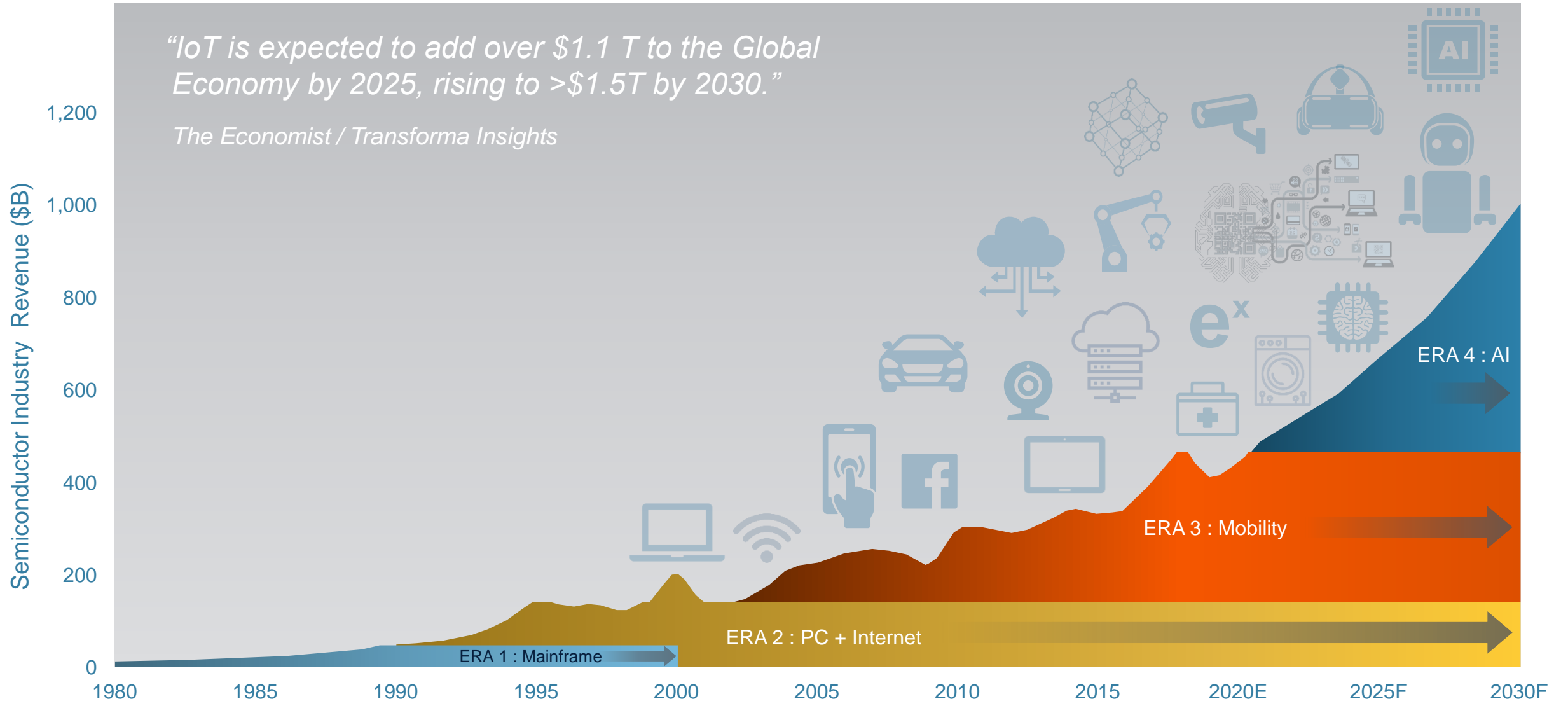
Applied Materials External



# The **BIGGEST** Computing Wave Yet: AI

*"IoT is expected to add over \$1.1 T to the Global Economy by 2025, rising to >\$1.5T by 2030."*

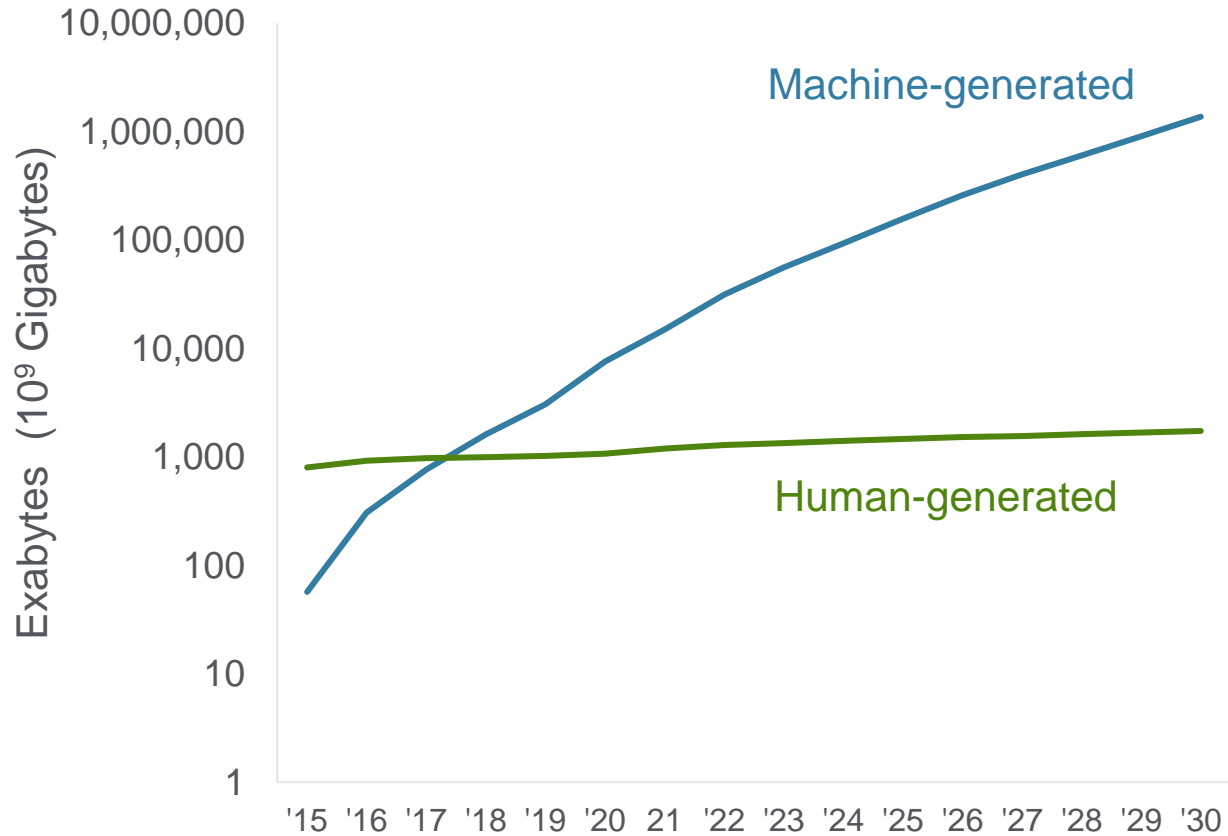
*The Economist / Transforma Insights*



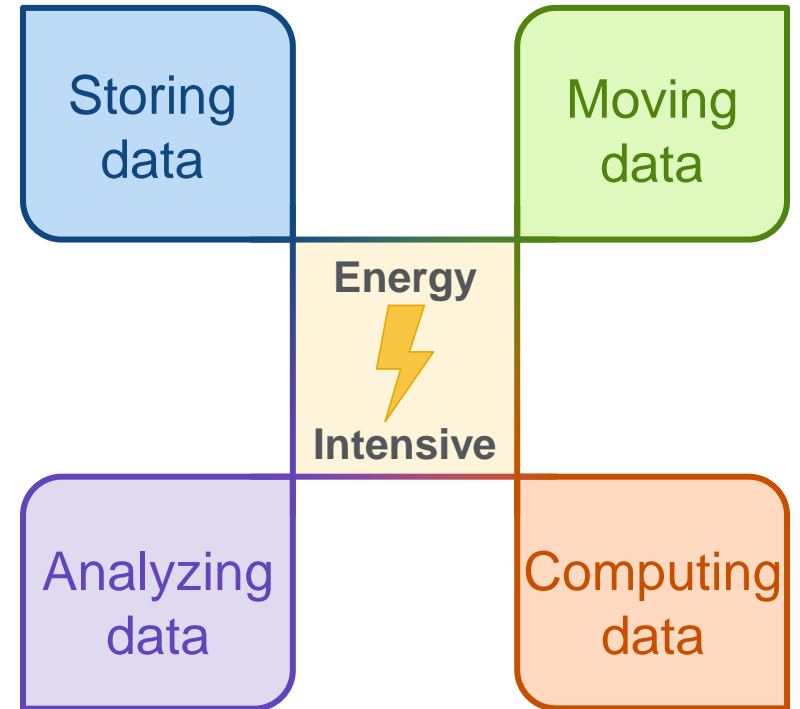
IoT – Internet of things  
PC – Personal computer  
AI – Artificial intelligence

Source: SEMI, VLSI, Applied Materials

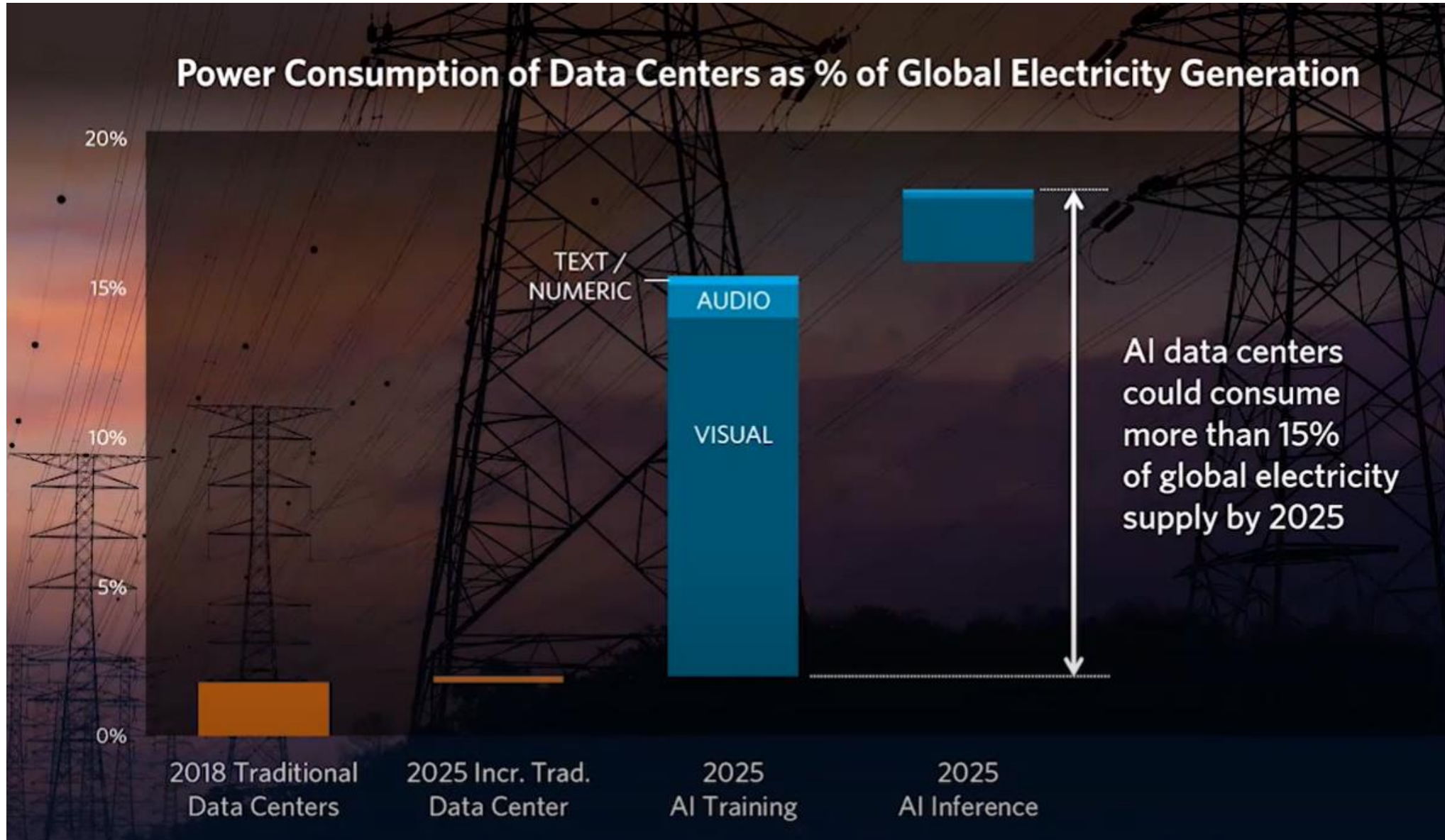
# AI's Massive Data Growth Foretells a Larger Energy Problem



Source: Applied internal models



# What Could Slow us Down?



# Our Environmental, Social and Governance Framework



**1x**

Our direct impact and how we run our business

**100x**

Our industry's impact, including that of our customers and suppliers

**10,000x**

How our technology can be designed and used to advance sustainability on a global scale

**We are uniquely positioned to shape a more equitable and sustainable world**



ENABLING A MORE SUSTAINABLE COMPANY, INDUSTRY AND WORLD

**100%**

Renewable energy in the US as of 2022

**100%**

Renewable energy globally by 2030

**50%**

Reduction in scope 1+2 CO<sub>2</sub> emissions by 2030



SCIENCE  
BASED  
TARGETS

**TCFD**

TASK FORCE ON  
CLIMATE-RELATED  
FINANCIAL  
DISCLOSURES

# Renewable Energy

## ■ On-site solar power generation

- » Applied Materials maintains on-site solar generating capacity at our facilities in
  - Singapore
  - Bangalore, India
  - Austin, TX
  - Xi'an, China
- » Combined, these arrays generated 286 MWh of clean power in 2021.

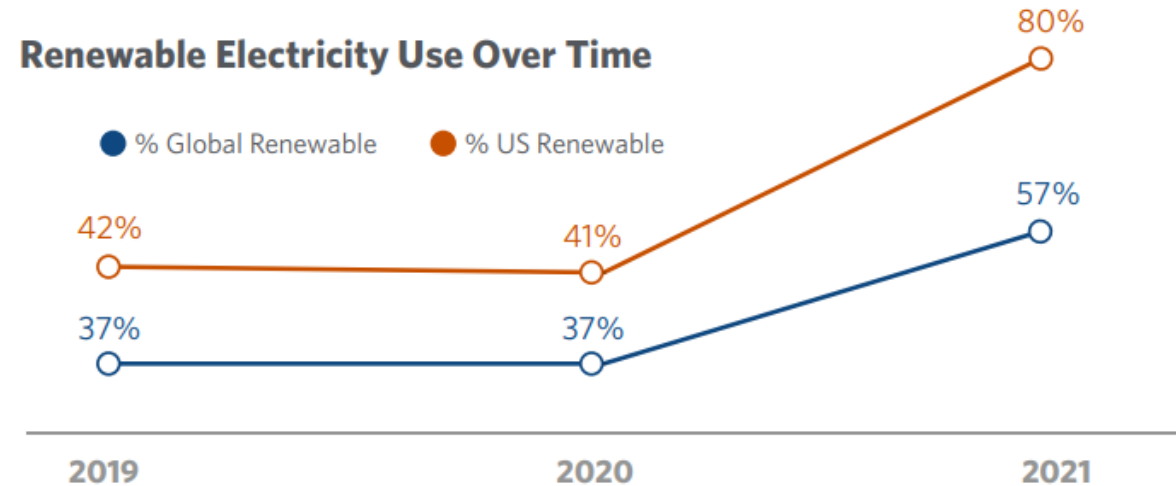
## ■ Utility green procurement programs

- » Direct purchase of renewable energy from a utility provider.

## ■ Virtual Power Purchase Agreements

- » Financial contracts with external solar, wind, and other renewable energy generating projects reduce our Scope 2 emissions inventory by delivering clean power to the grid. Each Renewable Energy Certificate (REC) provided by project owners represents the environmental benefits of 1MWh of electricity generated from renewable sources.

Renewable Electricity Use Over Time



**100%**  
renewable energy  
in the US as of 2022

# Scope 1, 2, 3 Emissions



**28% REDUCTION IN SCOPE 1 & 2 MARKET-BASED EMISSIONS**

- Scope 1 and Scope 2 CO<sub>2</sub> emissions declined 28% in 2021, contributing to a 31% total reduction from our 2019 baseline

2019 SCOPE 3 BASELINE CALCULATED:

**~12M MT CO<sub>2</sub>E**

- In early 2022 we completed our Scope 3 emissions inventory, using 2019 as a base year.

	MT CO <sub>2</sub> e	% OF TOTAL
<b>SCOPE 3 (2019 BASE YEAR)</b>		
1. Purchased goods and services	1,862,516	15%
2. Capital goods	61,953	1%
3. Fuel- and energy-related activities	36,012	0%
4. Upstream transportation and distribution	155,478	1%
5. Waste generated in operations	531	0%
6. Business travel	97,953	1%
7. Employee commuting	76,751	1%
8. Upstream leased assets	2,601	0%
9. Downstream transportation and distribution	191,577	2%
10. Processing of sold products	NA	0%
11. Use of sold products	9,610,156	79%
12. End-of-life treatment of sold products	713	0%
13. Downstream leased assets	NA	0%
14. Franchises	NA	0%
15. Investment	5,584	0%
<b>Scope 3 Total</b>	<b>12,101,823</b>	<b>100%</b>



SCIENCE  
BASED  
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

- We are currently evaluating science-based targets (SBTs) across Scope 1, 2 and 3 emissions to ensure our goals are aligned with the latest climate science.



# Reducing the Environmental Footprint of our Products



1 Tool  $\approx$  1M KWh / yr

**ecoUP**

Hardware and Software Upgrades

Advanced Services

**3 X 30 GOAL**

- ↓30% Equivalent Energy
- ↓30% Chemical Consumption
- ↓30% Cleanroom sq. ft. / wafer

**by 2030**

# Approach to Reducing Environmental Impact of Our Tools



## Analyze Environmental Impact

- Identify and quantify using proprietary analytical software
  - Gas and electric energy consumption identified
  - Breakdown by location and by component
  - Breakdown by recipe, operation, running, clean, idle, etc



## Design Eco Efficient Alternative

- Improvements from design, components or modified operating methods
- Reduction in emission (gCO<sub>2</sub> eq.) by lower gas usage and more efficient abatement



## Design Eco Efficiency into New Products

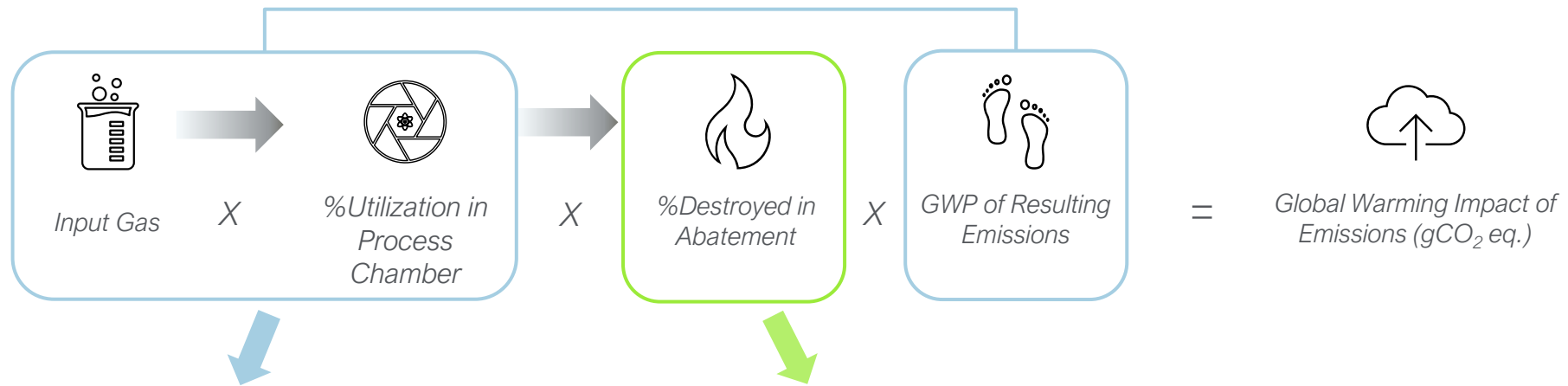
- Combine energy efficient designs and components in our new products



## Create Green Upgrade Kits for Installed Tools

- Many of the improved designs and components can be installed on existing tools
- We have created green upgrade kits to allow these energy savings to be available to improve the fab fleet performance

# GHG Emissions Reduction | Applied Solution Approaches



## ① Alternative Gases

Replace Etch PFC gases with greener option having **lower GWP** or with **higher abatement DRE**

	CF <sub>4</sub>	NF <sub>3</sub>	COF <sub>2</sub>	F <sub>2</sub>
<b>GWP Rating</b> (g CO <sub>2</sub> eq / g)	6630	16100	<1	0
<b>DRE (%)*</b> Burn-Wet Abatement	89	98	100	100
<b>Est. GHG Emissions</b> (g CO <sub>2</sub> eq / wafer)* Burn-Wet Abatement	293	48	Est. 25	Est. 25
<b>Est. GHG Emissions</b> (g CO <sub>2</sub> eq / wafer)* Aeris-G	70~140	15~20	Est. <5	Est. <5

## ② High Efficiency Abatement System

Pre-pump plasma abatement for **high-efficiency GHG destruction** prior to N<sub>2</sub> dilution

### Aeris-G



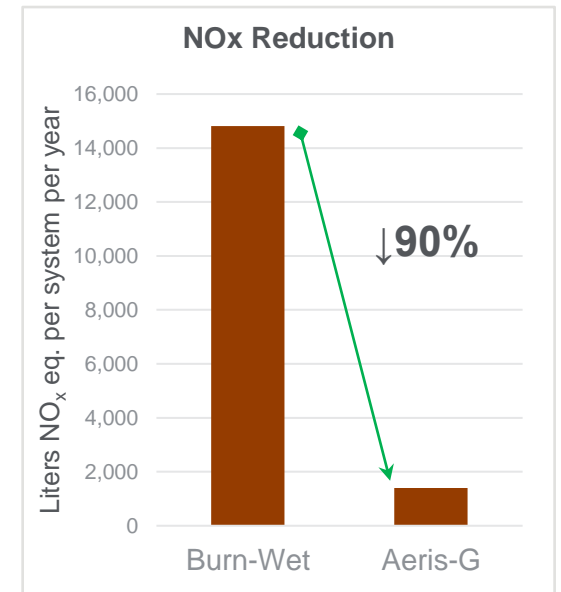
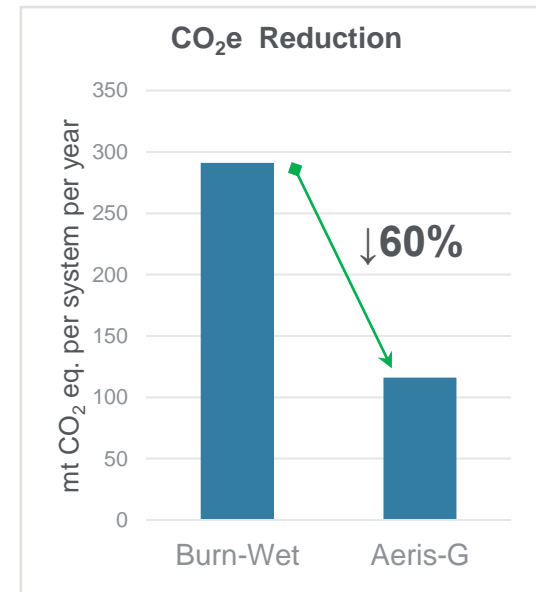
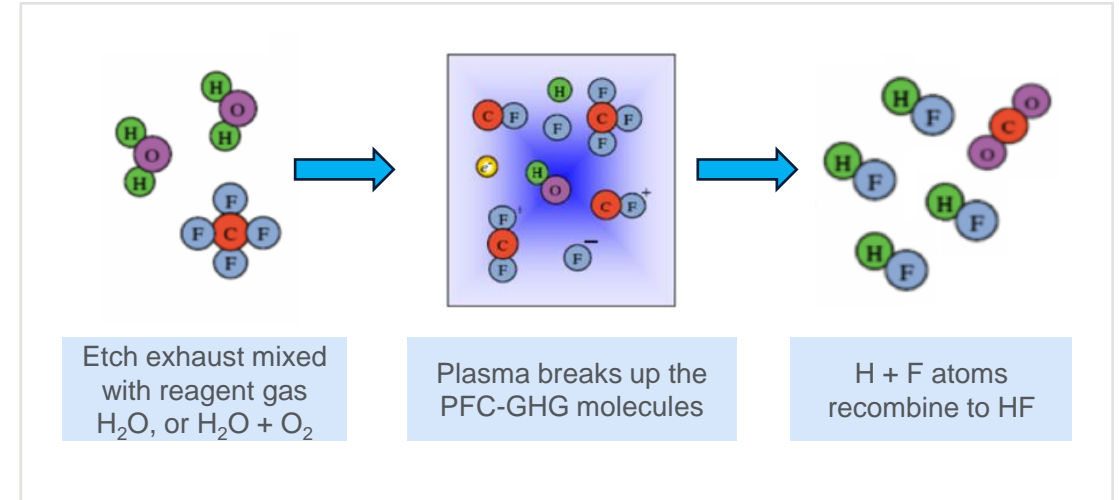
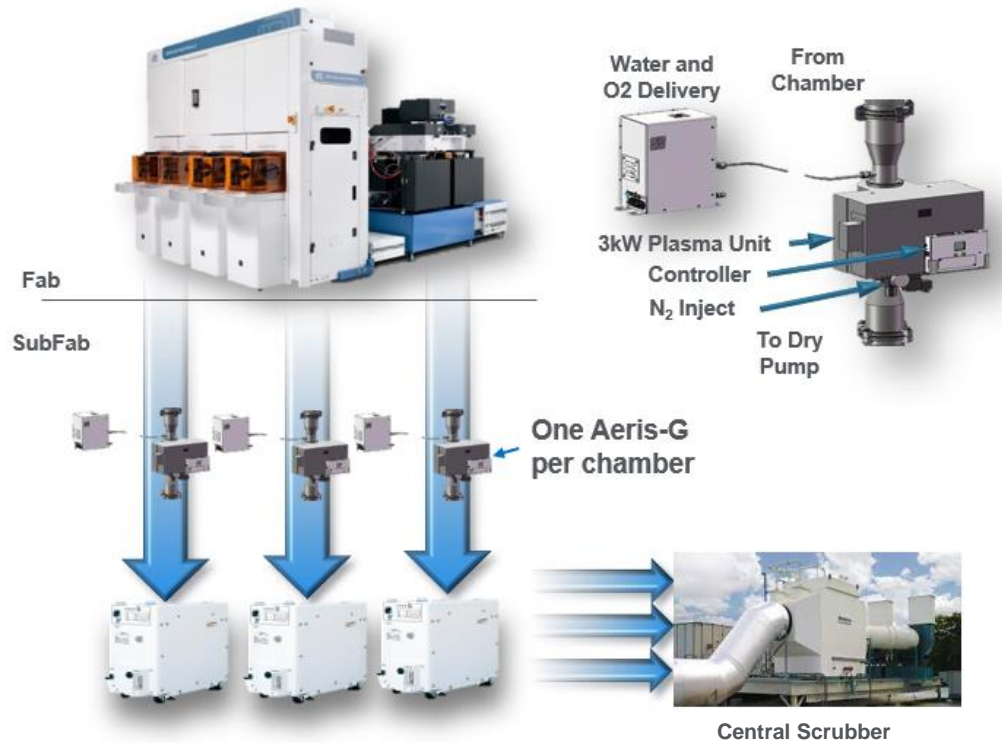
- Highest DRE performance in the industry (>95% for CF<sub>4</sub>, >98% for others)
- Designed to abate all Etch poly-fluorocarbon gases

\* Assumes IPCC default etch chamber conversion ratios and DRE values where available for POU burn-wet abatement; includes CO<sub>2</sub> from abatement NG

# Aeris-G Advanced Abatement

## Pre-pump Plasma Abatement

- Optimized for Poly and Oxide Etch PFC-GHG abatement
- Improved energy efficiency by destructing GHG prior to N2 dilution
- One unit per chamber ensures consistent performance



*These estimates are based on specific process, availability per Semi S23 guidelines, IPCC default values for standard abatement, and EPA standards for NG combustion. The values can differ based on type of recipe, flows, operating duty cycle, etc. of abatement modes.*

# SUCCESS

2030

SUPPLY CHAIN CERTIFICATION FOR ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

LAUNCH PARTNERS



Transition the supply chain to recyclable packaging, with a target of 80% recyclability by end of 2023

Eliminate 100% of phosphate-based pre-treatment of metal surfaces by 2024

Increase the percentage of spend with, and representation of, women- and minority-owned businesses, by 2024

Comply with Responsible Business Alliance Code of Conduct and Applied Materials' Standards of Business Conduct

# 10-Yr Roadmap | Environmental and Social Responsibility

APPLIED'S  
OPERATIONS

**1x**

SEMI INDUSTRY'S  
OPERATIONS

**100x**

GLOBAL  
ELECTRONICS

**10,000x**

On-track for  
**100% renewable energy**  
in US by 2022 and  
globally by 2030

Assessments underway to  
support science-based targets  
and TCFD during 2022

Embedding  
**'Culture of Inclusion'**  
across the company

Significant momentum  
and broad engagement  
with **SuCCESS2030**  
supply chain initiative

Strong collaboration with  
leading customers on  
**3x30 sustainability upgrades**  
and new product features

PPACt engagements across  
ecosystem focus on energy-efficient  
devices and computing

## LATEST 3<sup>rd</sup> PARTY RATINGS

CDP Climate	<b>B</b>
CDP Supplier Engagement	<b>B</b>
MSCI	<b>AA</b>
Sustainalytics Risk Rating	<b>Low</b>
ISS (E/S/G)	<b>2/1/1</b>

## Make Possible<sup>®</sup> a Better Future

For more details, please refer to our 2021 Sustainability Report



APPLIED  
MATERIALS®

make possible