

# ***“The Future is Faster than you Think”***

***How Converging Technologies Are Allowing  
Business to Accelerate, Thrive and Advance.***

Live Tweeting?

I'm @PeterDiamandis



**Peter H. Diamandis, MD**

# Human development over **150,000+ years...**

**Local + Linear**

Human development over  
**150,000+ years...**

**GLOBAL + EXPONENTIAL**

# EXPONENTIAL TECHNOLOGIES

Faster,  
Cheaper,  
Computing  
Power



**Sensors**

**Networks**

**Artificial Intelligence**

**Robotics**

**3D Printing**

**VR & AR**

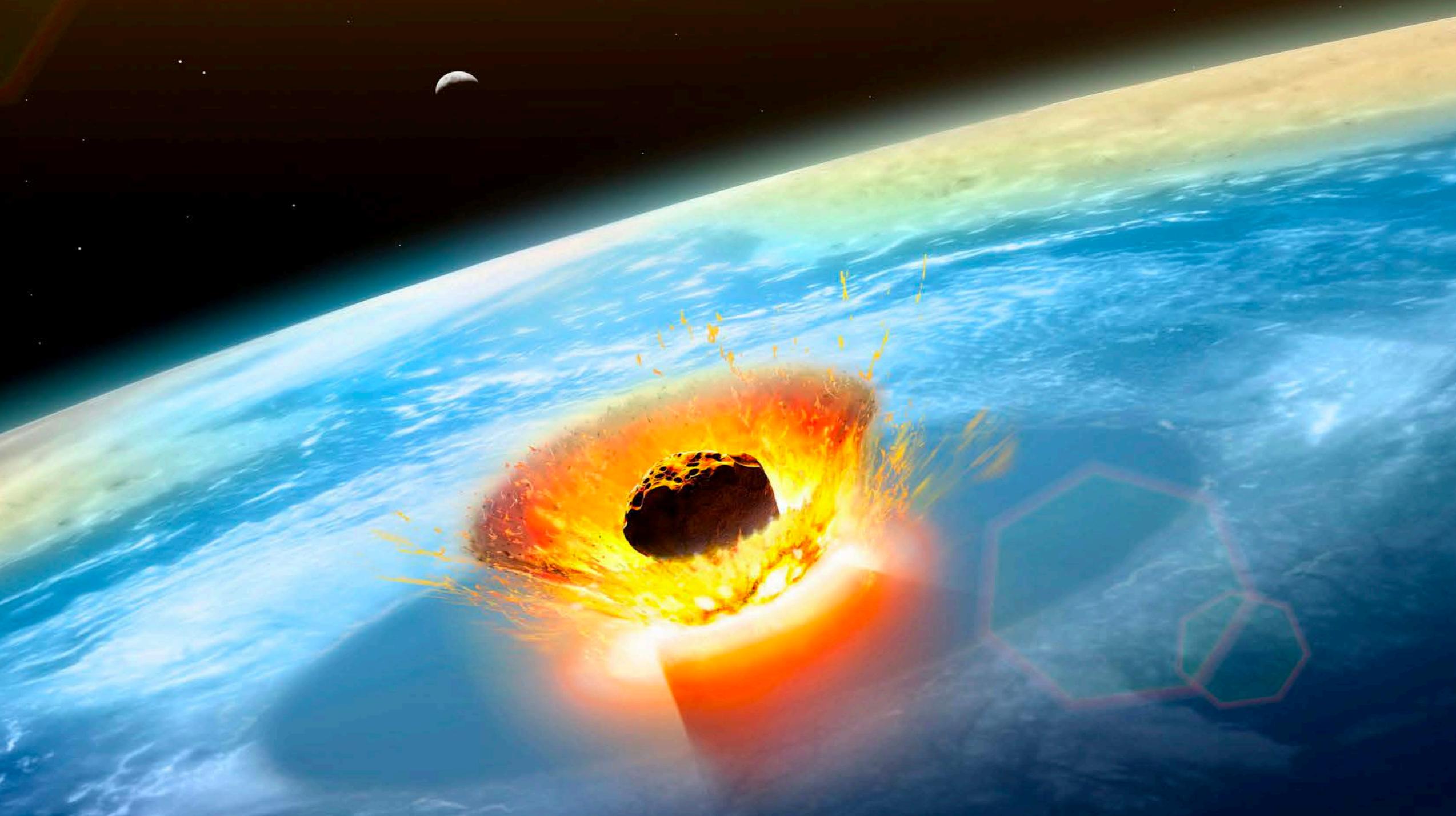
**Synthetic Biology**

**Blockchain**

**Reinventing  
Every Business**

**Model &  
Ecosystem**









**“People have no idea how fast things are changing.”**

*- Undisclosed Silicon Valley CEO*

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A dramatic space scene featuring a bright, glowing light source on the left, casting a wide, colorful beam of light across the frame. The light transitions from a bright yellow-white at the source to deep reds and oranges as it spreads. A curved horizon line, possibly of a planet or moon, is visible on the right side, with a thin blue atmosphere. The background is a dark, star-filled space.

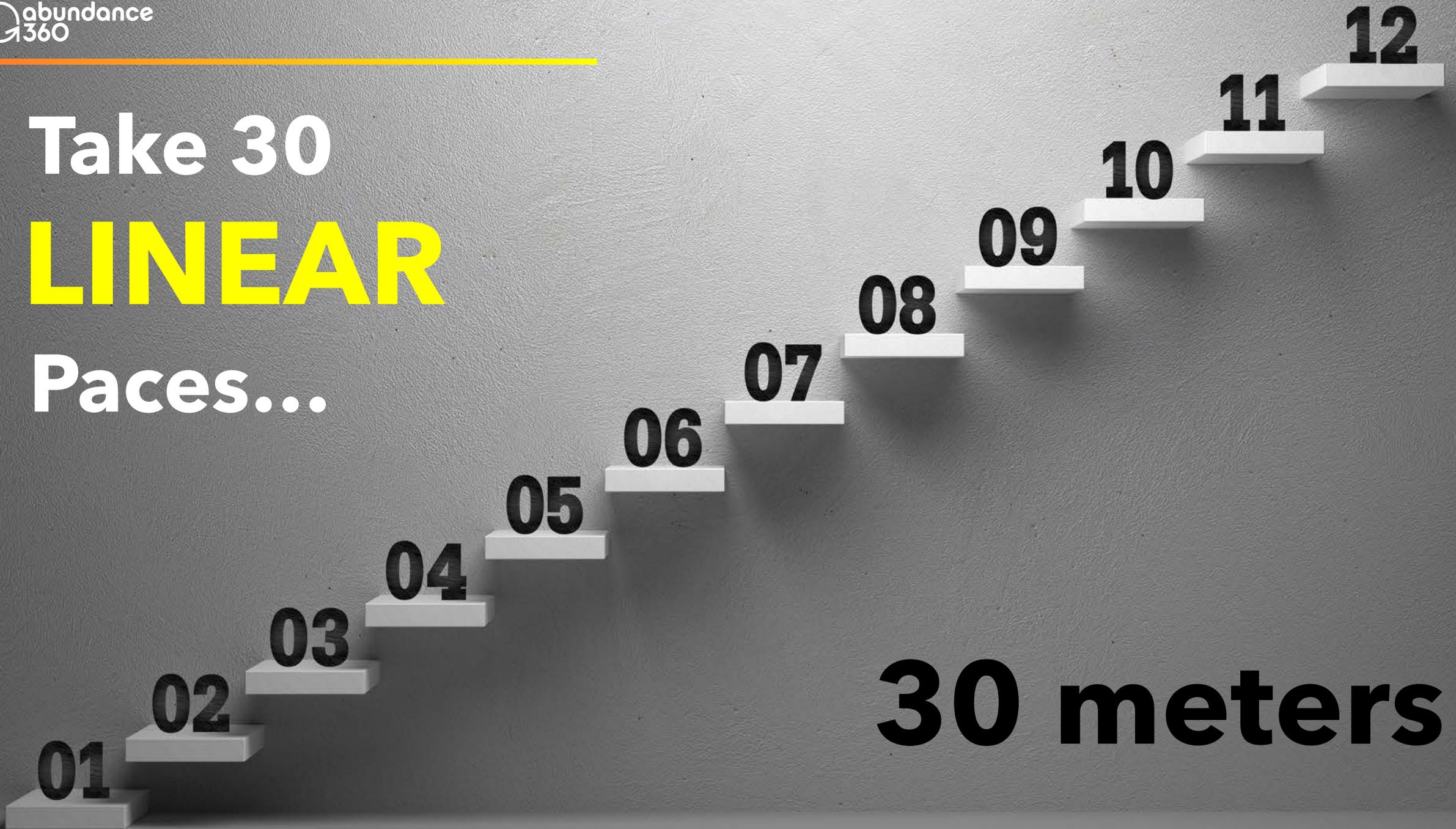
**SARS-CoV2**  
**COVID-19**

**"COVID-19 has taught the whole world the power of exponentials."**

A low-angle, upward-looking photograph of several modern skyscrapers with glass facades, creating a sense of height and scale. The sky is a clear, light blue.

# What does **EXPONENTIAL** growth feel like?

Take 30  
**LINEAR**  
Paces...



**30 meters**

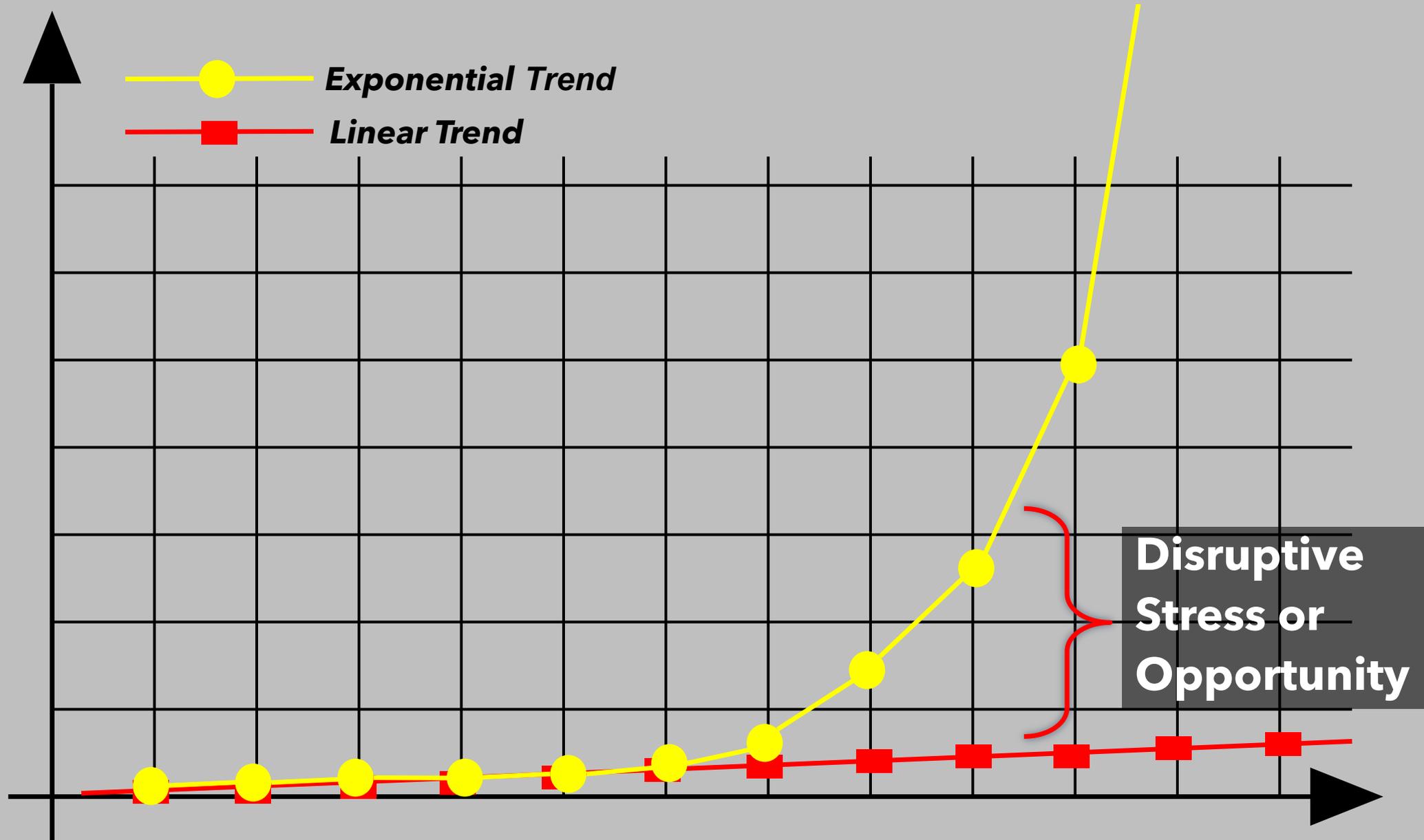
# Take 30 **EXPONENTIAL** Steps...

01 02 04 08 16 32 64 128 256

**1,073,741,824 meters!**

**26X**  
around the Earth!





**LINEAR**



**EXPONENTIAL**



**1996**

MarketCap: \$28B

Employees: 140,000



**2012**

Bankrupt

Employees: 17,000



**April 2012**

MarketCap: \$1B

Employees: 13



**\$100 BILLION**

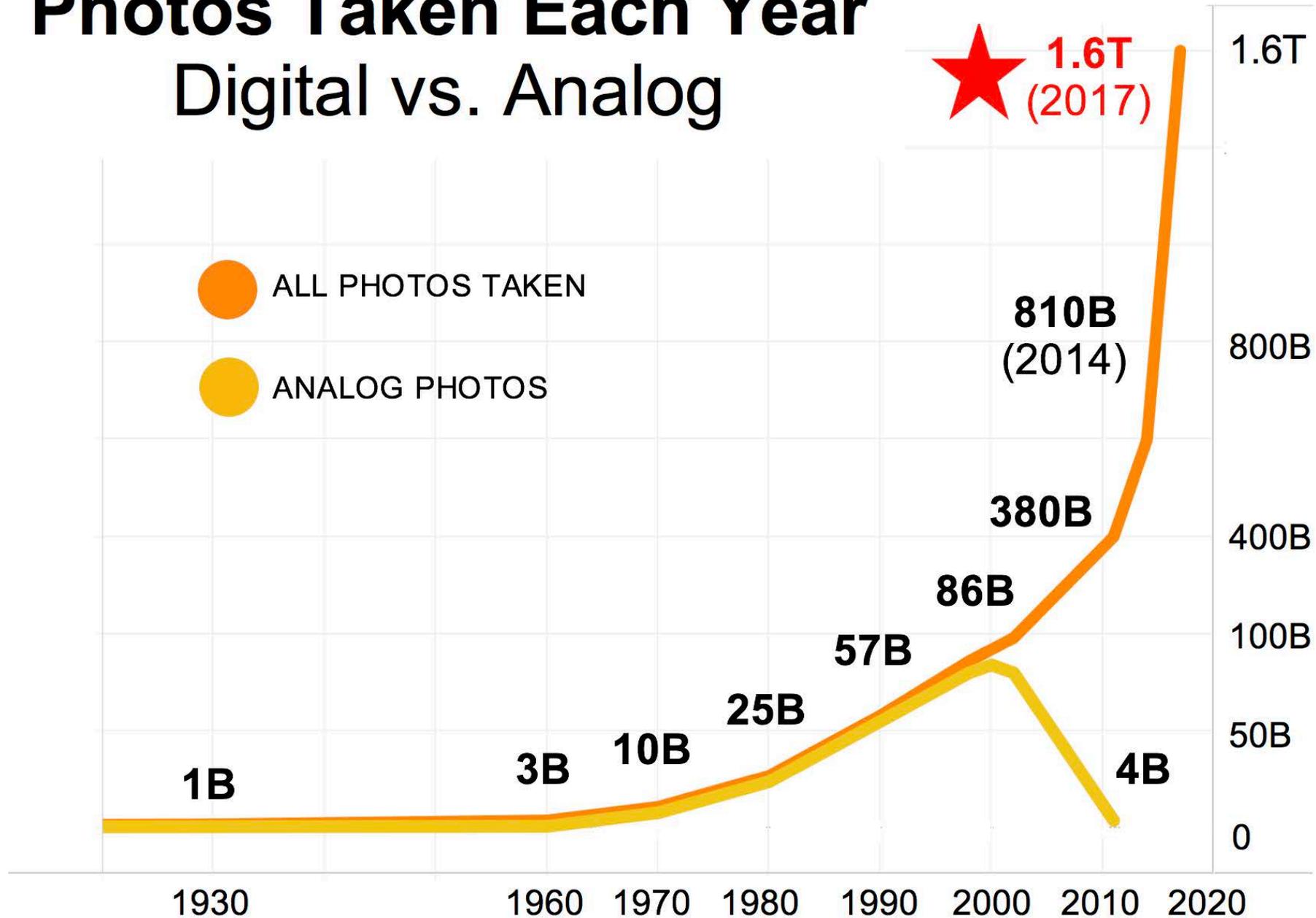
**1 BILLION**



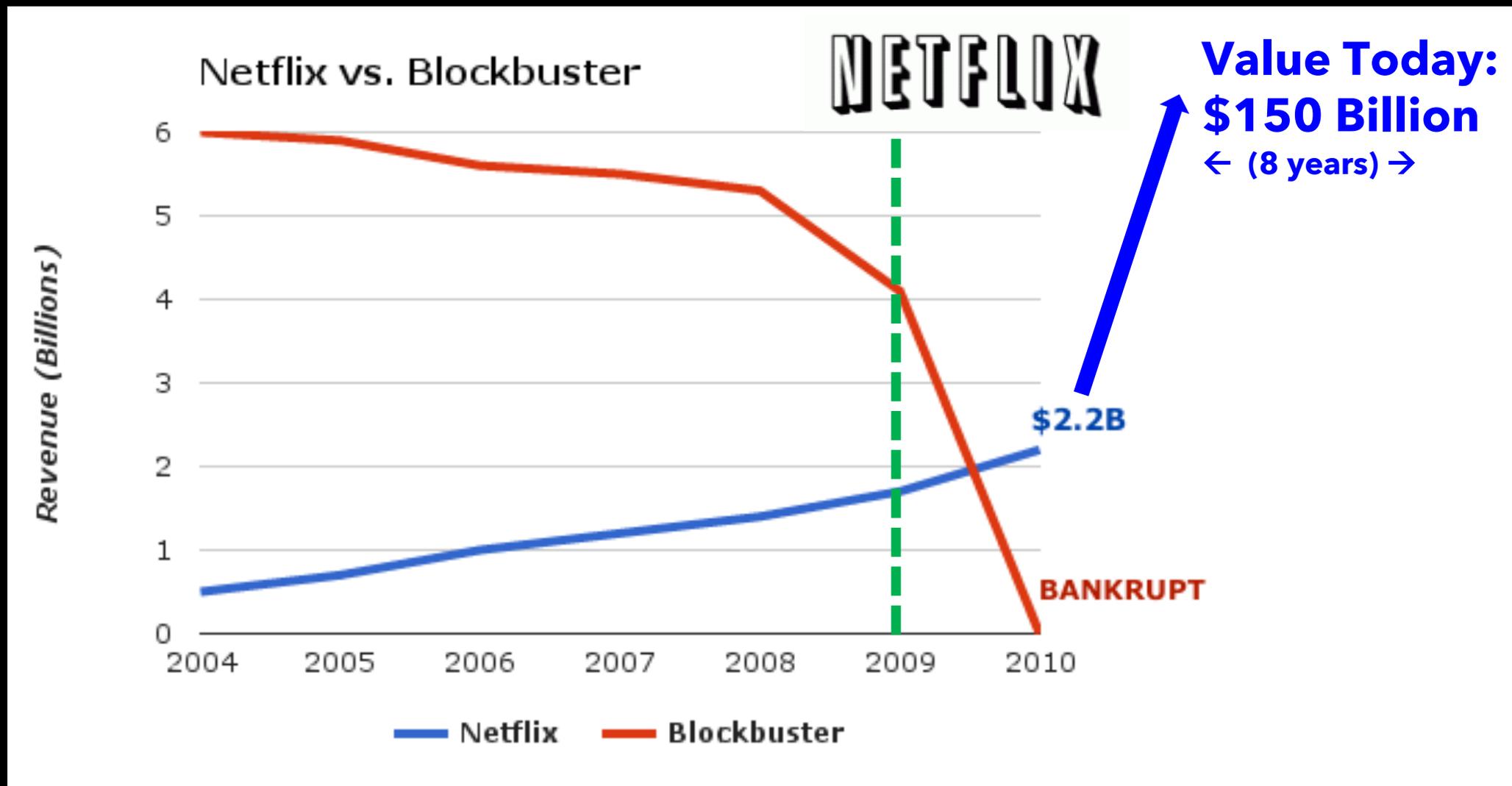
**INSTAGRAM VALUE SKYROCKETS TO OVER \$100 BILLION, REACHING 1 BILLION MONTHLY ACTIVE USERS IN JUNE 2018**

# Photos Taken Each Year

## Digital vs. Analog



# LINEAR → EXPONENTIAL



***“Netflix is not on the radar screen  
in terms of competition.”***

**- Jim Keyes, CEO, Blockbuster, Dec'08**

# HOW FAST CAN THINGS CHANGE IN 10 YRS?

<u>COMPANY</u>	<u>VALUE (2006)</u>
sears	\$14.3B
JCPenney	\$18.1B
NORDSTROM	\$12.4B
<b>KOHL'S</b>	\$24.2B
★macy's	\$24.2B
	\$28.4B
 TARGET	\$51.3B
Walmart 	\$214.0B
	\$17.5B

Source:

Yahoo Finance  
& visualcapitalist.com

# HOW FAST CAN THINGS CHANGE IN 10 YRS?

<u>COMPANY</u>	<u>VALUE (2006)</u>	<u>VALUE (2016)</u>	<u>% Change</u>
sears	\$14.3B	\$0.9B	94%
JCPenney	\$18.1B	\$1.7B	90%
NORDSTROM	\$12.4B	\$7.7B	38%
<b>KOHL'S</b>	\$24.2B	\$7.1B	71%
★macy's	\$24.2B	\$7.1B	71%
	\$28.4B	\$18.4B	41%
 TARGET	\$51.3B	\$31.7B	38%
Walmart 	\$214.0B	\$243.9B	15%
	\$17.5B	<del>\$474.4B</del>	>\$1.5 T

Source:

Yahoo Finance  
& visualcapitalist.com

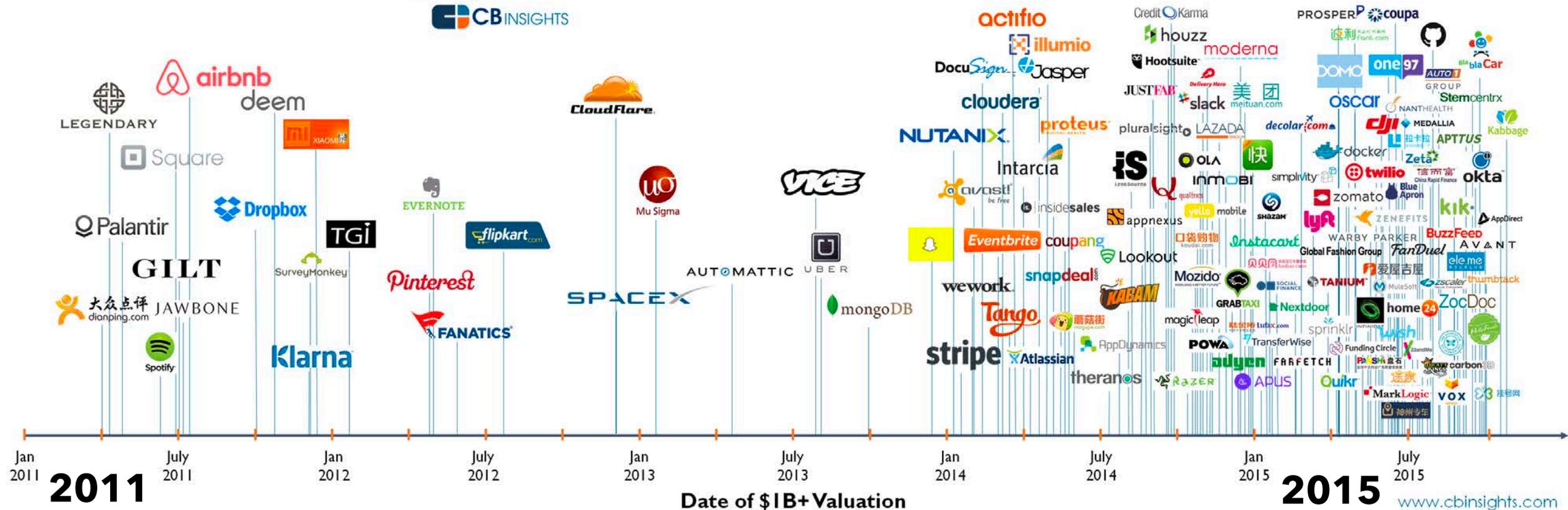
# "I've got an Idea!"

# → "I run a \$Billion company."

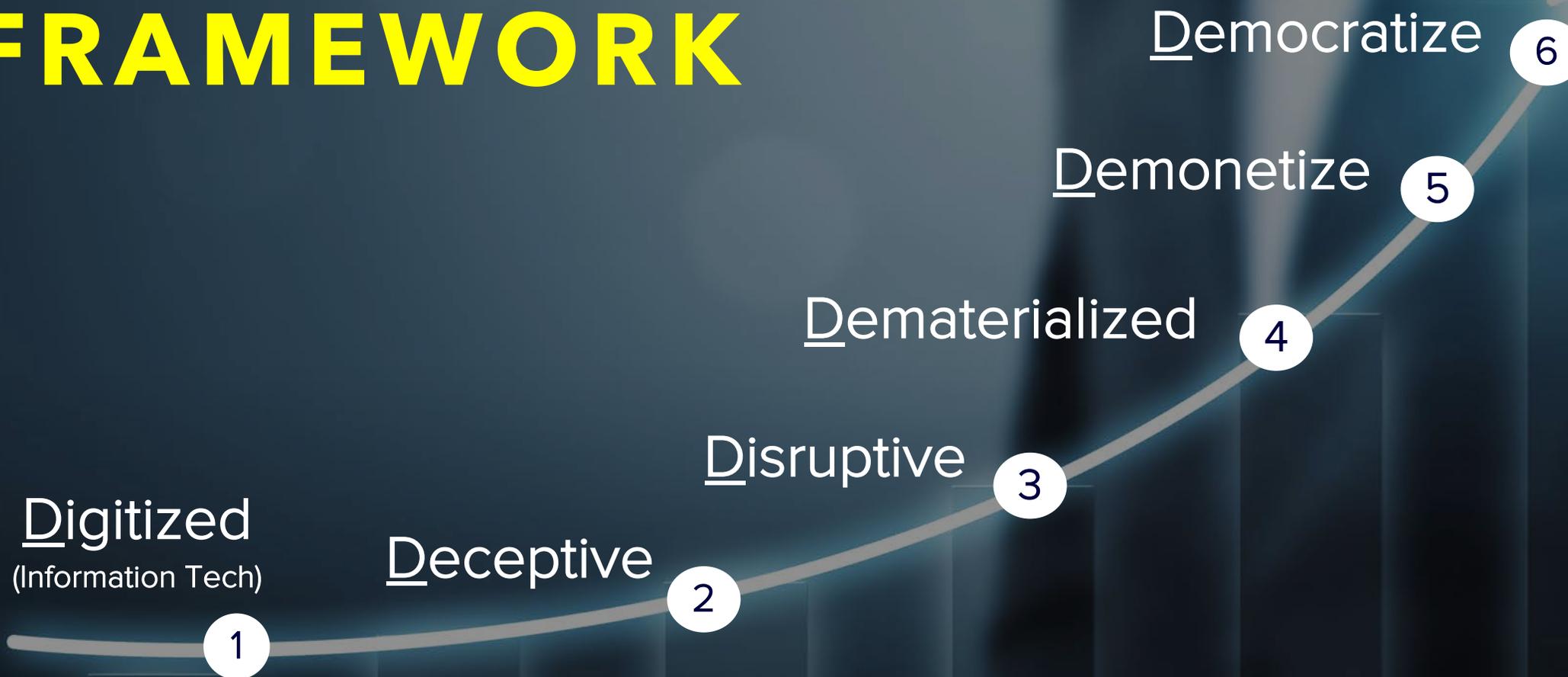
## The Increasingly Crowded Unicorn Club

Created by:  
**CB INSIGHTS**

Private Unicorns since 2011



# 6D's EXPONENTIAL FRAMEWORK



# Dematerialization



**20 Years Later,  
All of These Fit in  
Your Pocket**

# Demonetization



~~Taxi Fleets~~



~~Book Stores~~



~~Long Distance~~



~~Research/Libraries~~



~~Classifieds~~

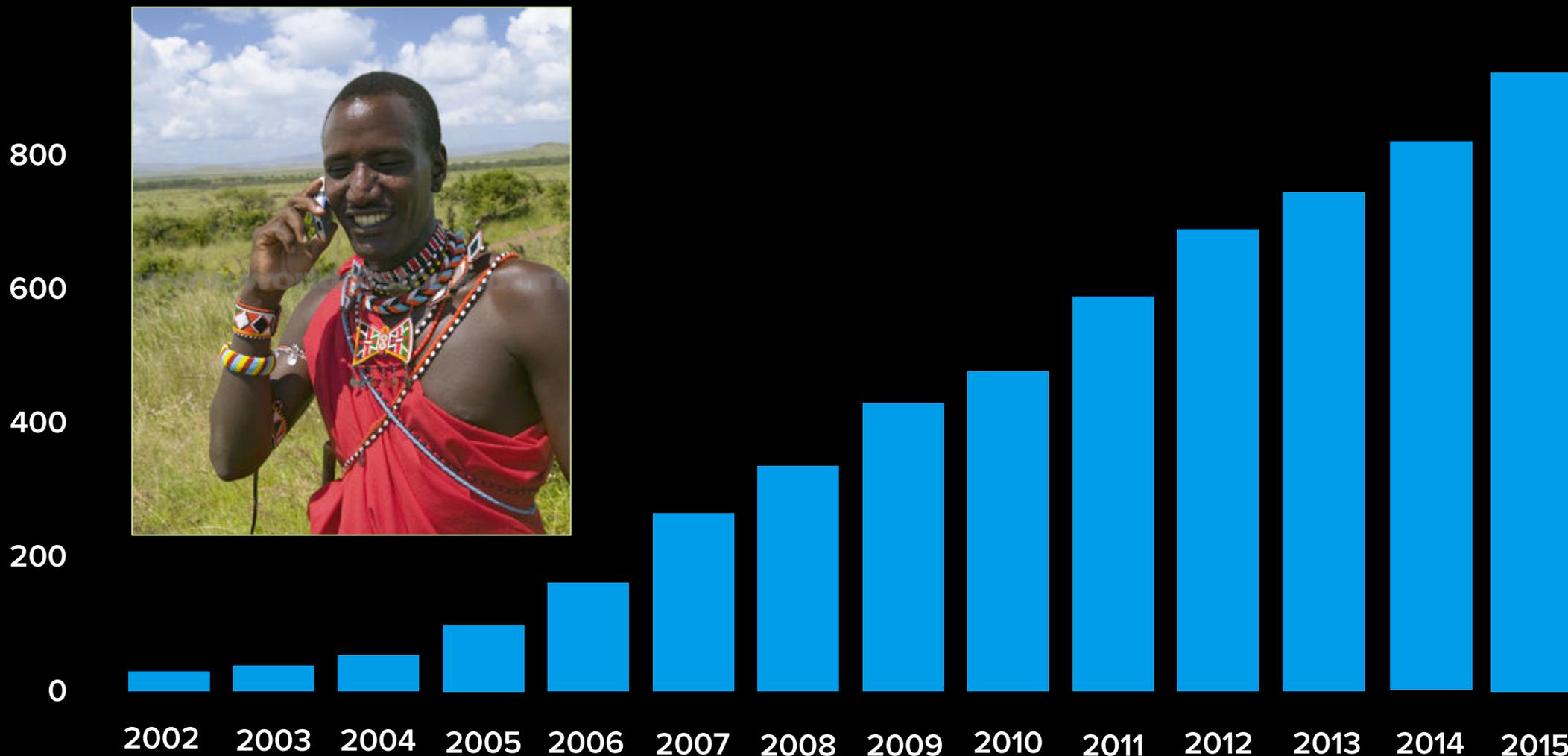


~~Hotel Chains~~

# Democratization

## African Mobile Phone Growth: > 1B in 2017

Number of Mobile Handsets (Millions)



A low-angle, upward-looking photograph of several modern skyscrapers with glass facades, creating a sense of height and architectural scale. The sky is a clear, light blue.

# What's Driving **EXPONENTIAL TECHNOLOGICAL** growth?

# What's Driving This?

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**1965 Publication:**  
Moore's Law: "Number of transistors doubled every year from 1958 until 1965... and it's likely to continue."

**... and it's continued for 50+ years.**

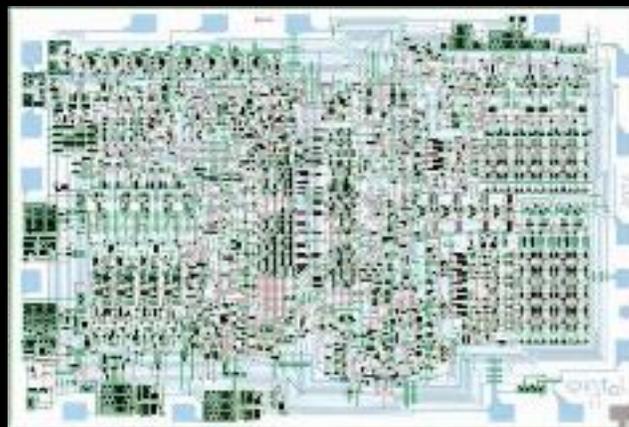
# Integrated Circuits

## 1958: 2 Transistors



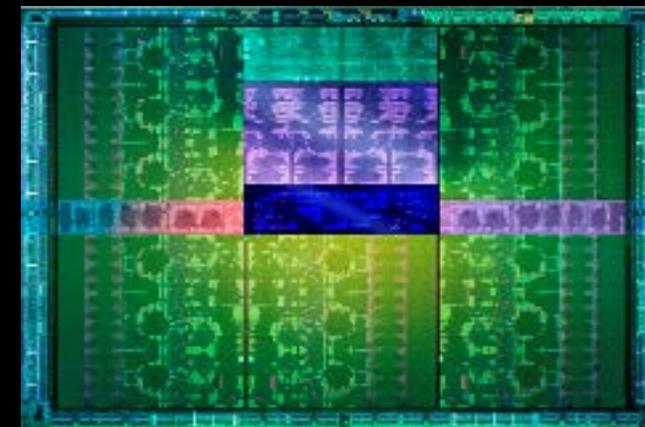
**Transistor Count:** 2  
**Gate Process Length:** 1/2 inch  
**Speed:**  
**Cost of a Transistor:**

## 1971: Intel 4004



**2,300 Transistors**  
**10,000 Nanometers**  
**740 KHz (.00074 GHz)**  
**≈ \$1 (1968)**

## 2018: Intel Core i9-8950HK



**> 7 Billion Transistors\***  
**14 Nanometers**  
**4.80 GHz**  
**≈ \$ .00000024**

**← 6.5K (faster) & 4.2M (cheaper) →**  
**27+ Billion-fold improvement (47 yrs.)**



5 Mbytes - \$120,000

2005



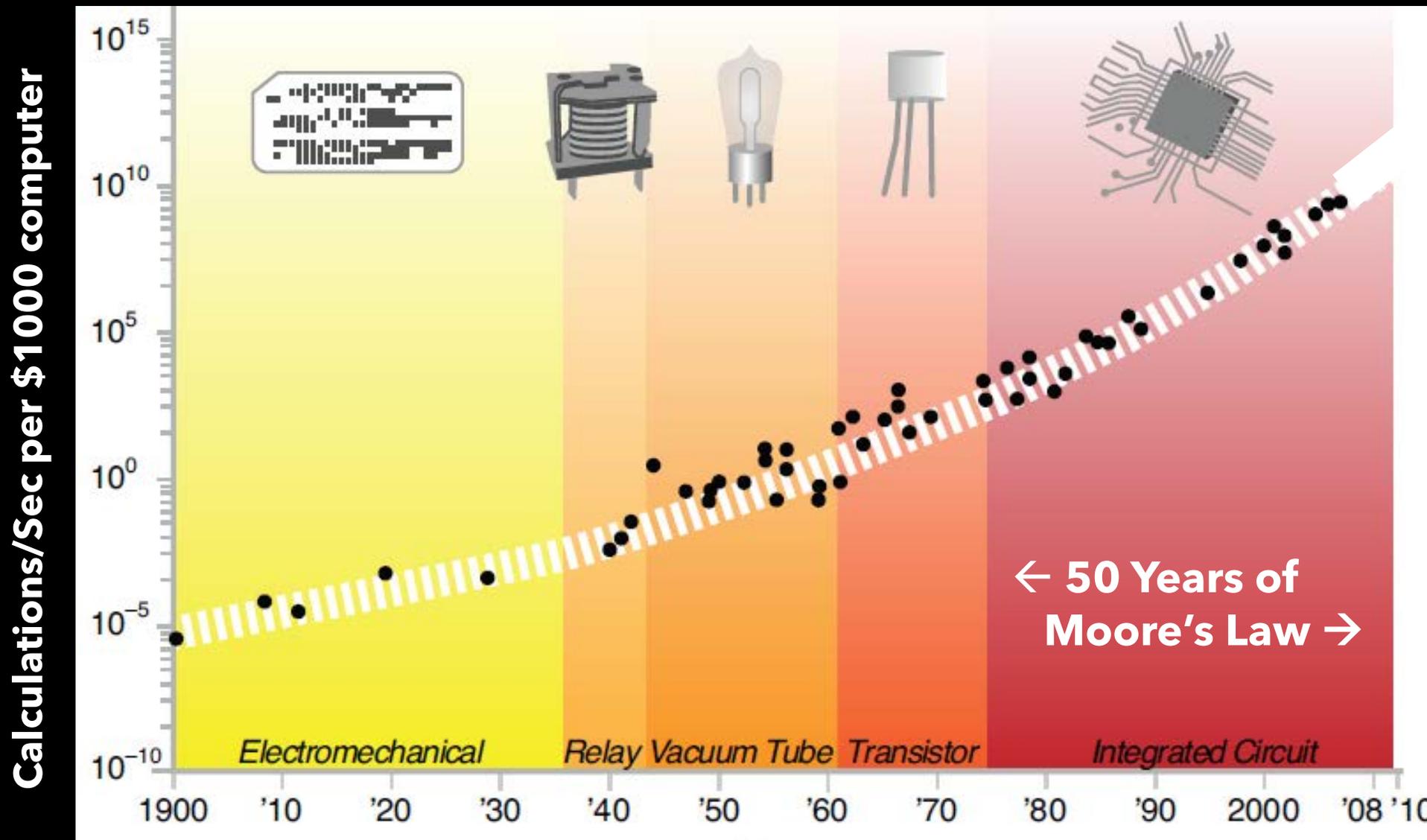
128 Mbytes - \$99



128 Gbytes - \$99

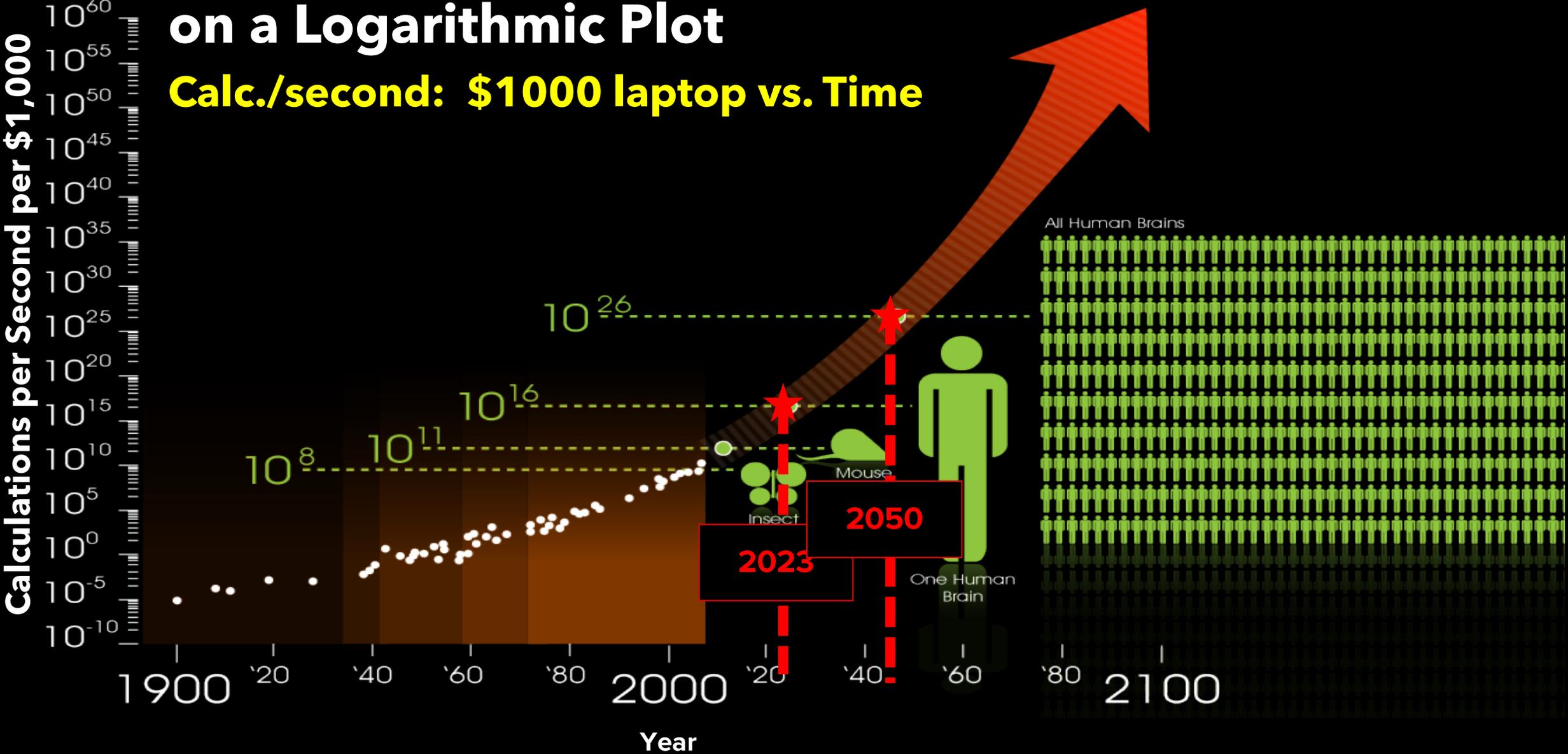
← A 10 Trillion-fold Improvement →

# Law of Accelerating Returns



# The exponential growth of computing on a Logarithmic Plot

Calc./second: \$1000 laptop vs. Time



**TECHNOLOGY CONVERTS**  
**"Scarcity" into "Abundance"**



**Designed By Jony Ive  
& Marc Newson**

# CREATING ABUNDANCE

What do you think of as scarce?

1. Energy

2. Water

3. Health

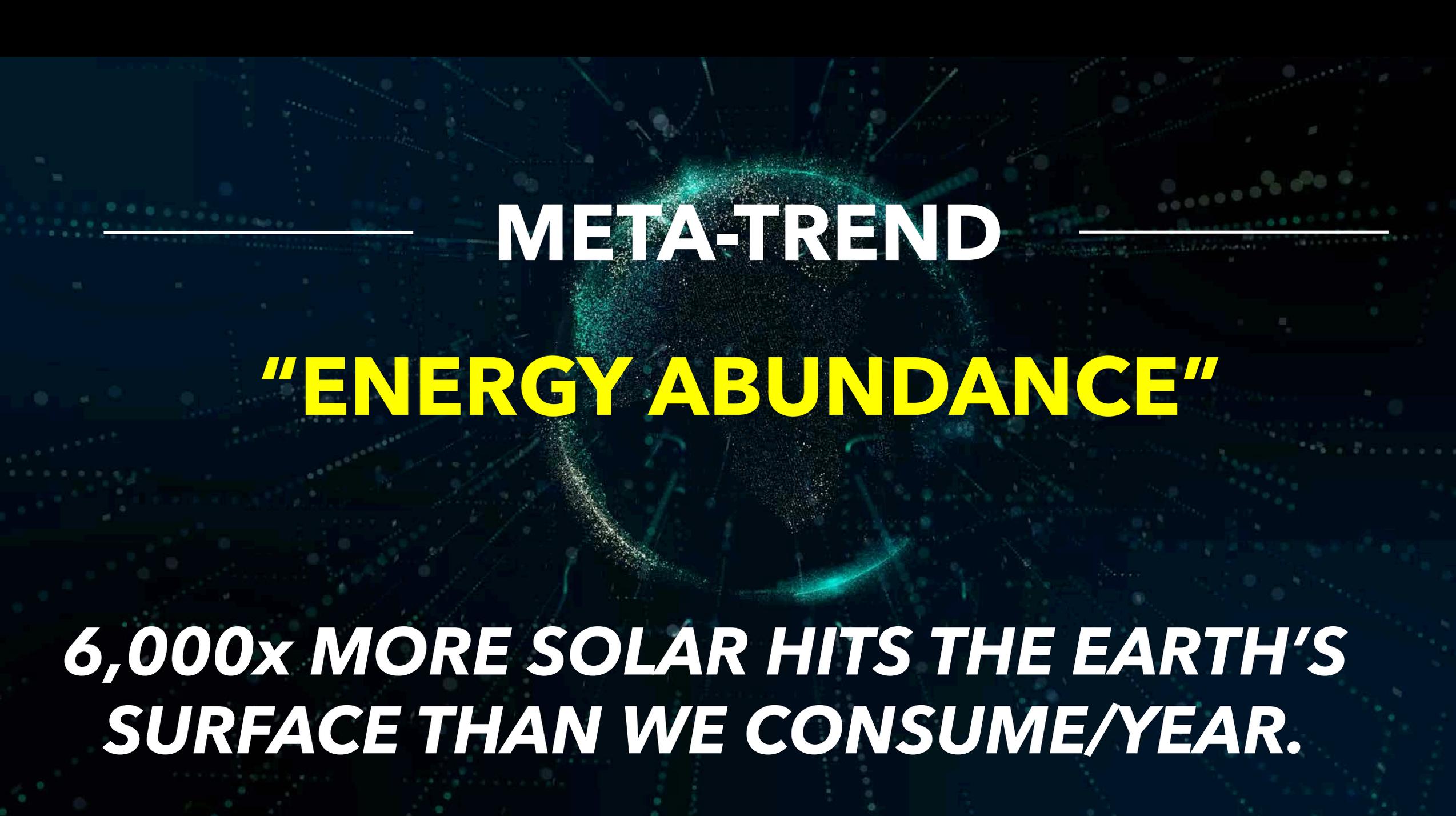
4. Learning

5. Time

6. Money

7. Resources

8. Expertise



**META-TREND**

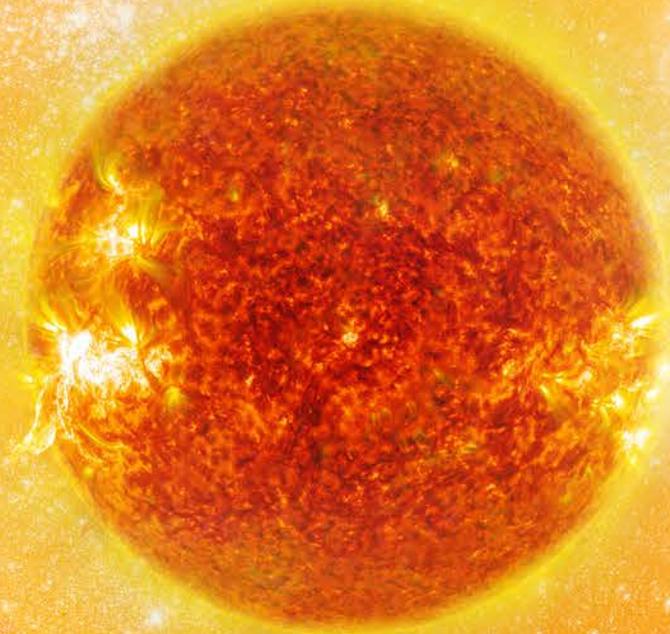
**"ENERGY ABUNDANCE"**

***6,000x MORE SOLAR HITS THE EARTH'S  
SURFACE THAN WE CONSUME/YEAR.***

# ENERGY PRICES



**Price of Coal:**  
**5-6 cents / kwh**



**All-Time LOW Cost**  
**For SOLAR ENERGY**

**Abu Dhabi (2017): 2.4 CENTS / KWH**



**Chile: 2.15 CENTS / KWH**

**Mexico: 2.0 CENTS / KWH**

**Brazil (2019): 1.75 CENTS / KWH**



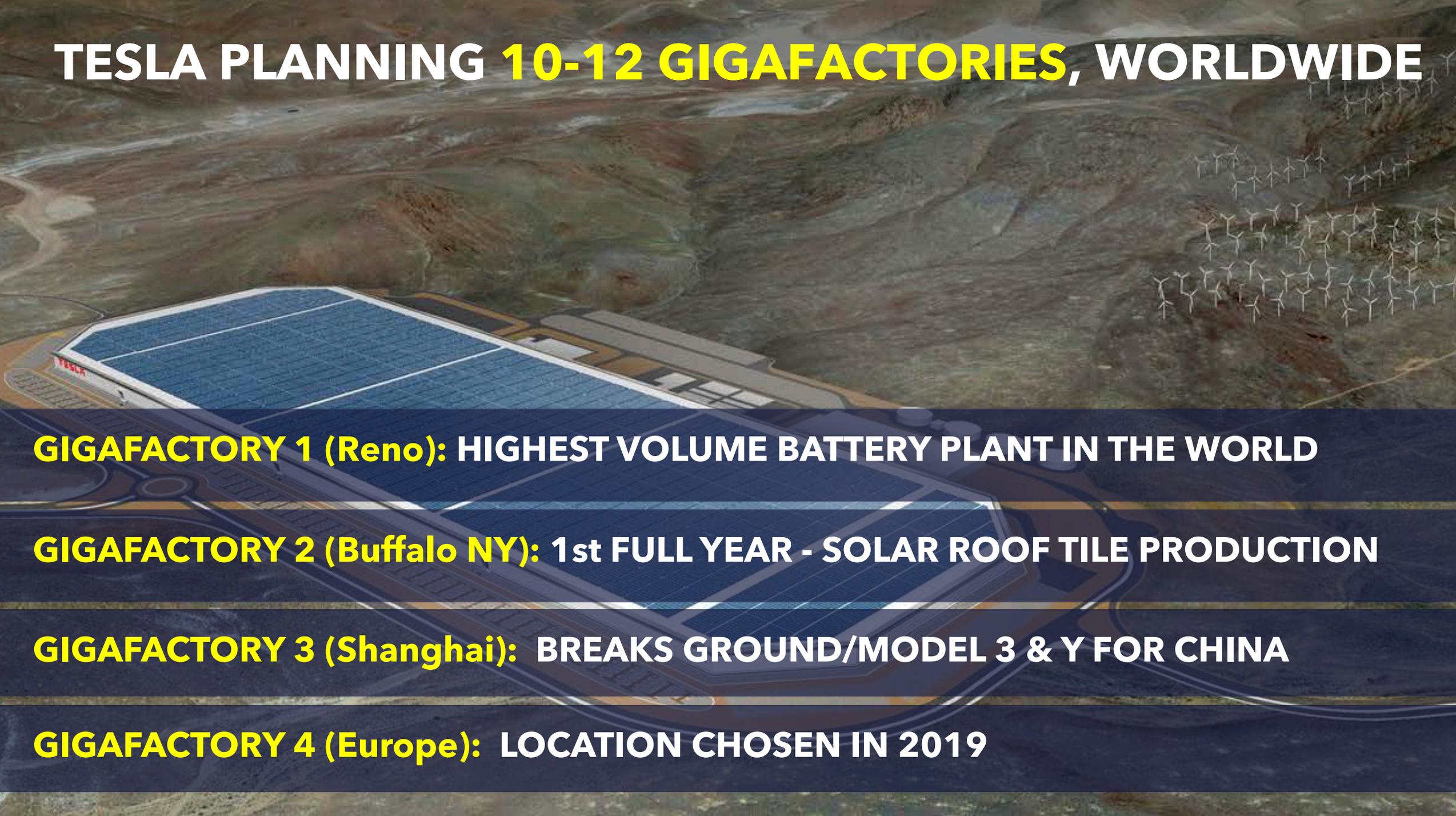
# LITHIUM-ION BATTERY PRICE (\$/KWH) (2010-2018)

Battery pack price (real 2018 \$/kWh)



BloombergNEF. Note: The data in this chart has been adjusted to be in real 2018 dollars.

# TESLA PLANNING 10-12 GIGAFACTORIES, WORLDWIDE

An aerial photograph of a large industrial facility, identified as a Tesla Gigafactory. The building has a prominent blue solar panel roof. In the background, a large wind farm is visible on a hillside. The image is overlaid with text boxes providing information about various Tesla Gigafactories.

**GIGAFACTORY 1 (Reno): HIGHEST VOLUME BATTERY PLANT IN THE WORLD**

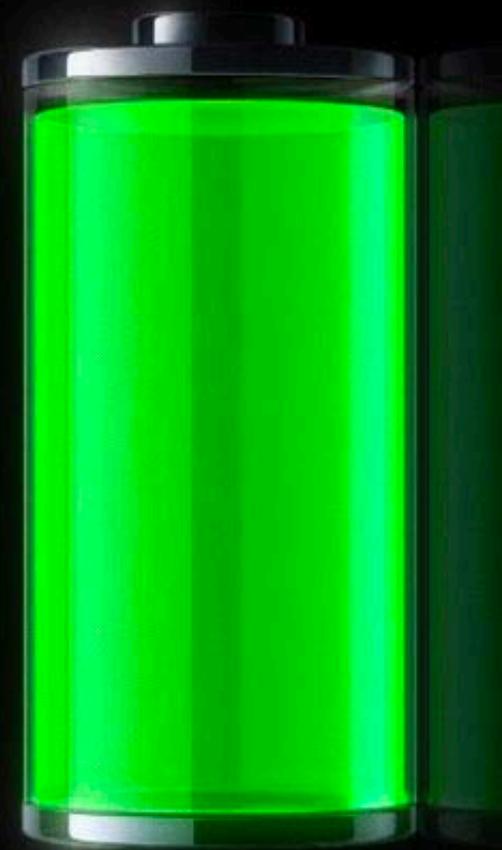
**GIGAFACTORY 2 (Buffalo NY): 1st FULL YEAR - SOLAR ROOF TILE PRODUCTION**

**GIGAFACTORY 3 (Shanghai): BREAKS GROUND/MODEL 3 & Y FOR CHINA**

**GIGAFACTORY 4 (Europe): LOCATION CHOSEN IN 2019**

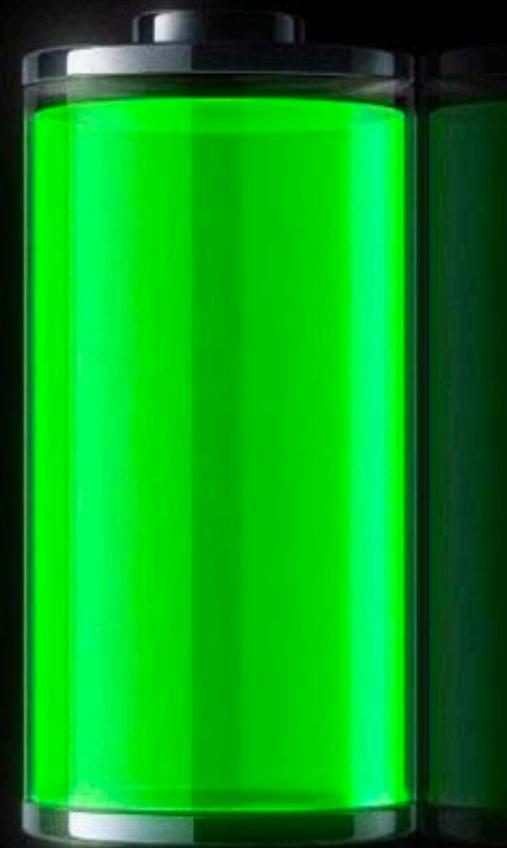
# TESLA BATTERY DAY - 2020

- **Holy Grail: <math>< \\$100/\text{KWhr}</math> (a \$25K Tesla)**
- **Fossil Fuel will go away**
- **>500 Mile Range**



# AUTOMOTIVE INDUSTRY COMMITS >\$300 BILLION ON EVs

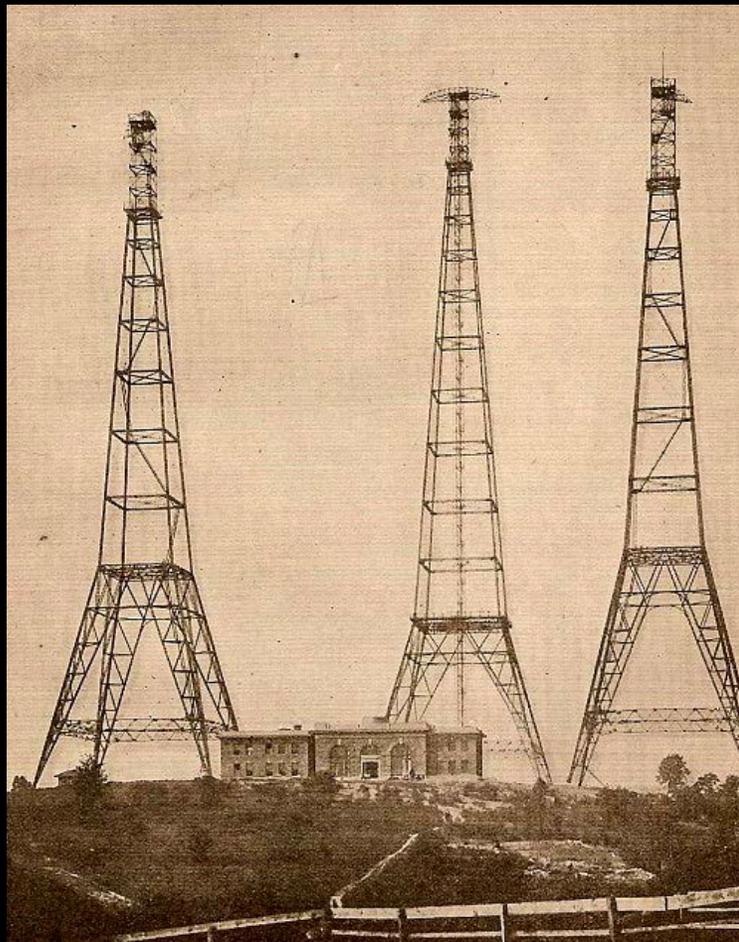
- **Toyota** & Panasonic are teaming up on batteries
- **BMW** is teaming up with solid-state battery developer Solid Power
- **Porsche** & BMW are collaborating on ultra-fast electric car charge in 15 min
- **Volkswagen** has invested in stealth battery startup QuantumScape



**100 Years Ago.... 1920**

**(4 Innovations)**

# 1920 – 1<sup>st</sup> Commercial Radio Station



The first commercial radio station (KDKA) begins operation in Pittsburgh.

(Broadcasts results of the Harding-Cox presidential election.)

# 1920 – The Handheld Hair Dryer



# 1920 – The Band-Aid

**J & J BAND-AID**  
FOR CUTS AND MINOR INJURIES  
The New First Aid—Have You Tried It?



Cut off piece you need    Remove protective covering    Apply to the wound

An Adhesive Bandage with an Absorbent Center  
*Economical    Handy    Aseptic*

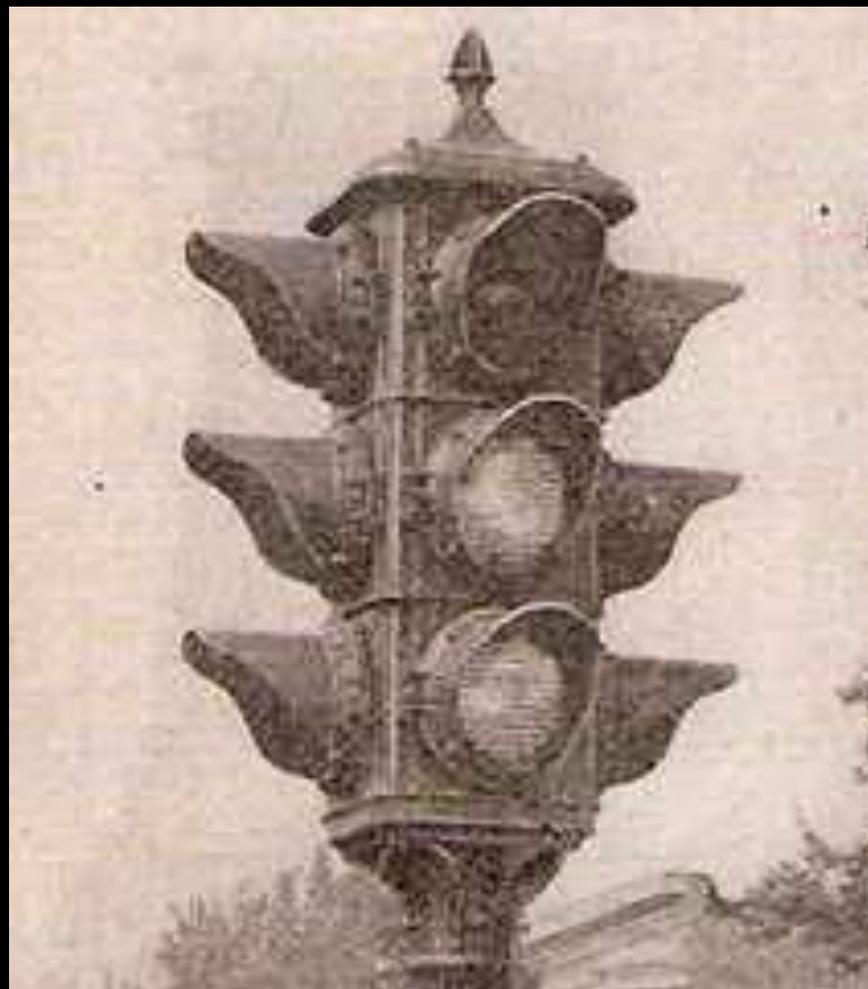
**ADHESIVE DRESSING INSTANTLY APPLIED**  
SAMPLE  
**BAND-AID**



**BAND-AID**  
Adhesive Bandage  
Protective dressing for minor cuts,  
burns and abrasions.  
6 strips, 1 1/2 inches wide ready for application.  
3 priced. This advertising insert extra.  
Saves steps in house  
**PRICE 25c.**  
Pat. Applied For  
Johnson & Johnson

MADE IN U.S.A.

# 1920 – The Three-Lens Traffic Light



The background features a central, glowing teal globe composed of numerous small particles. Radiating from the globe are numerous thin, teal-colored lines and dotted patterns, creating a sense of a complex digital network or data flow. The overall color palette is dark blue and teal, with white text and lines.

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# META-TREND

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**META-TREND**

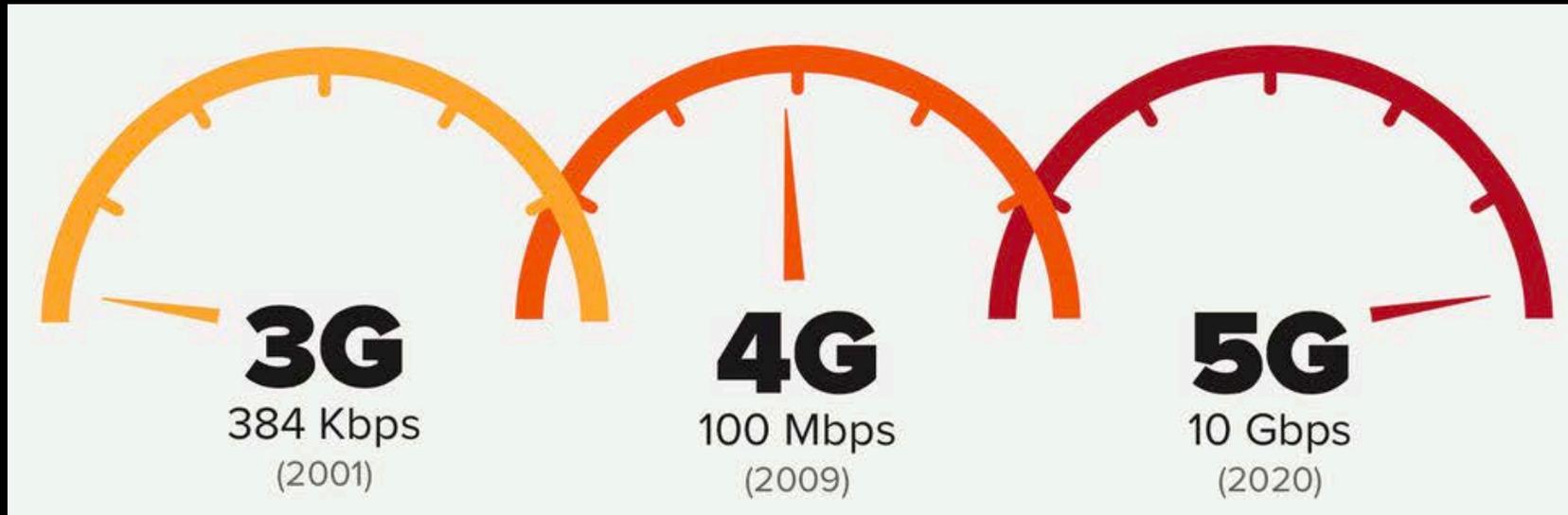
**“EVERYONE” IS CONNECTED  
AT GIGABIT SPEED**

*Everyone, everywhere, at ultra-low cost.*

# "Connecting the Globe..."

## THE 5G WORLD

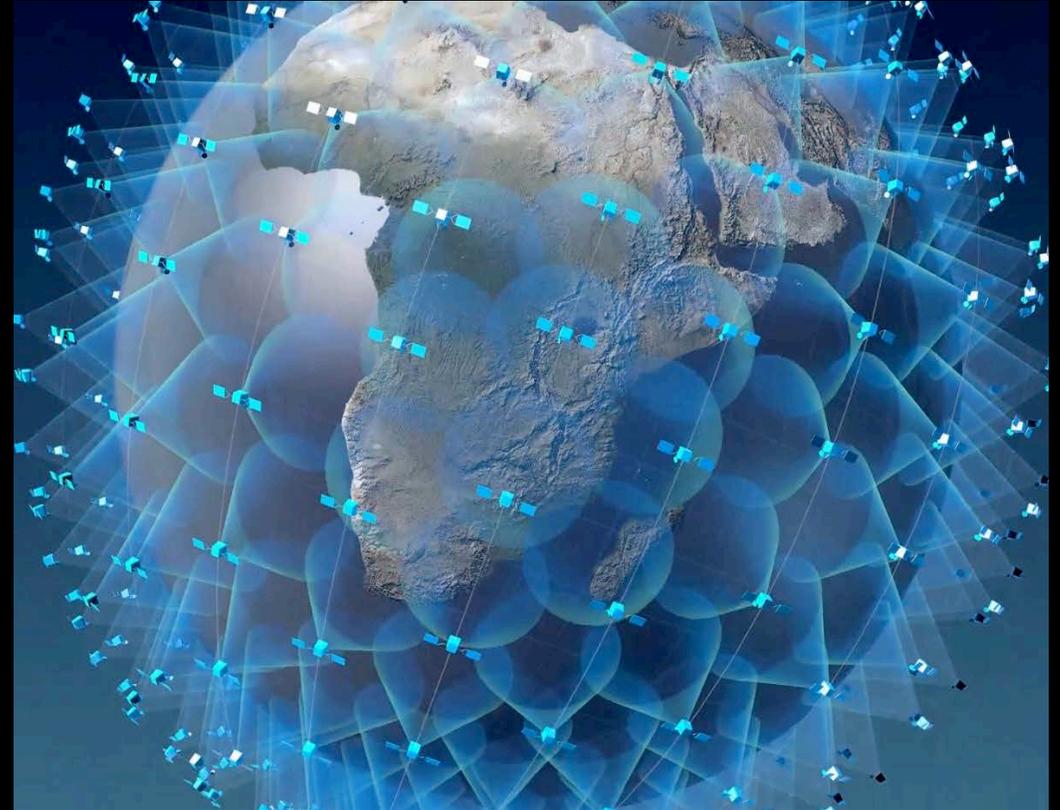
1. Testing in 2019
2. Deployment in 2020
3. 10 - 100 Gbps speeds



# SPACEX LAUNCHING 12,000+ **STARLINK** **INTERNET SATELLITES** (up to 42,000)



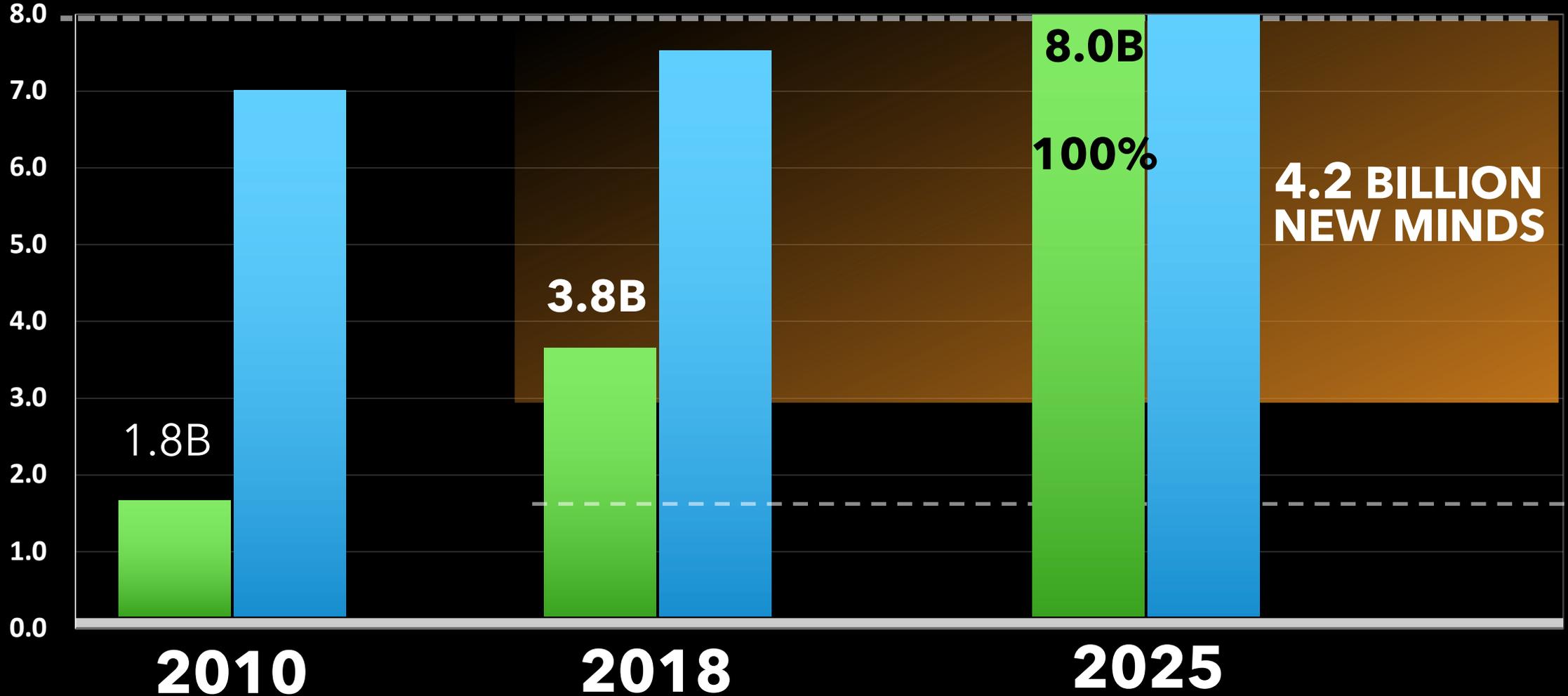
© 2019 MICHAEL HOWARD / SPACEFLIGHT INSIDER SFI



# GLOBAL UBIQUITOUS CONNECTIVITY



## GLOBAL POPULATION (BILLIONS)



# What will 4+ Billion New Minds...

create

discover

consume

invent

desire

***...Tens of trillions of annual PP***

***...Greatest period of Innovation (ever)***



**META-TREND**

**“EVERYTHING” IS  
CONNECTED/  
SENSORS EVERYWHERE**

**It's not just people being connected, we are connecting everything, everywhere...**

**2020: 20B+ connected devices & >1 Trillion Sensors**

**2030: 500B+ connected devices & >100 Trillion Sensors**

# An Explosion of Data



# Data-Driven A.I.

"A future of perfect knowledge, where you can know anything you want, anytime, anywhere.... And ask questions never before possible."

**"AI algorithms are only as good as the data you feed it. *We're heading towards a decade of powerful data-driven AI.*"**

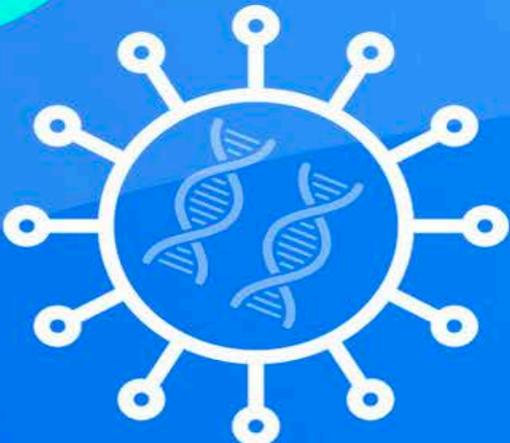
A white and blue humanoid robot, likely a Boston Dynamics model, is shown in a dark environment. The robot is standing and facing forward, with its arms slightly away from its body. The text "Boston Dynamics" is visible on its chest. The robot is the central focus of the image, with the text overlaid on top of it.

**META-TREND**

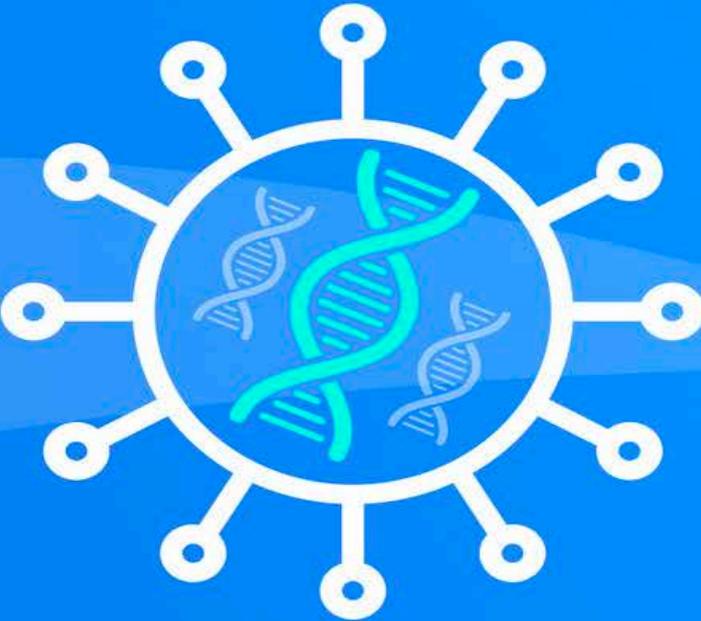
**HEALTH & BIOTECH**

# 20 Gene Therapy Treatments Approved... >400 Trials On-Going.

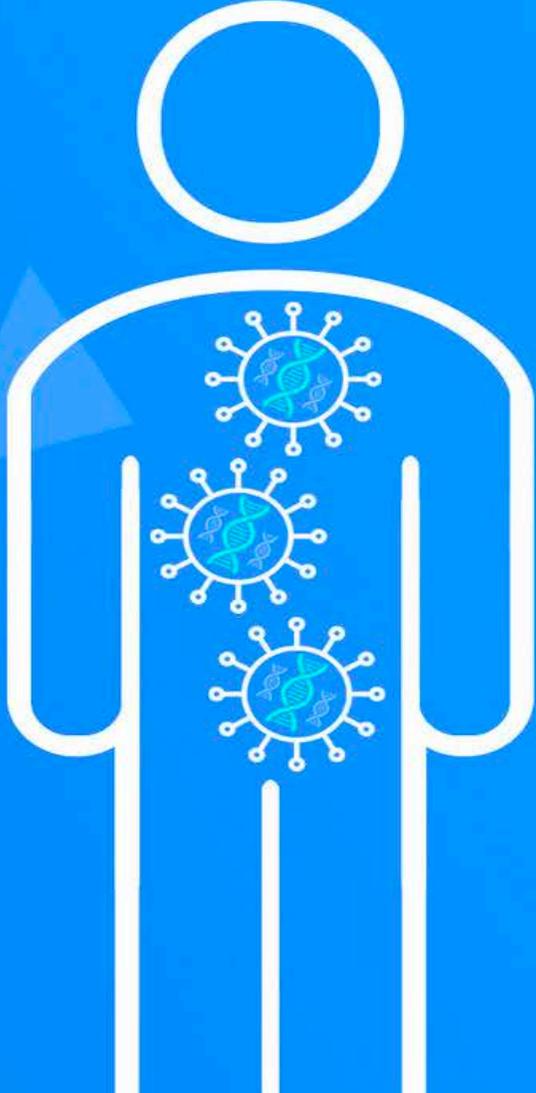
Healthy Gene

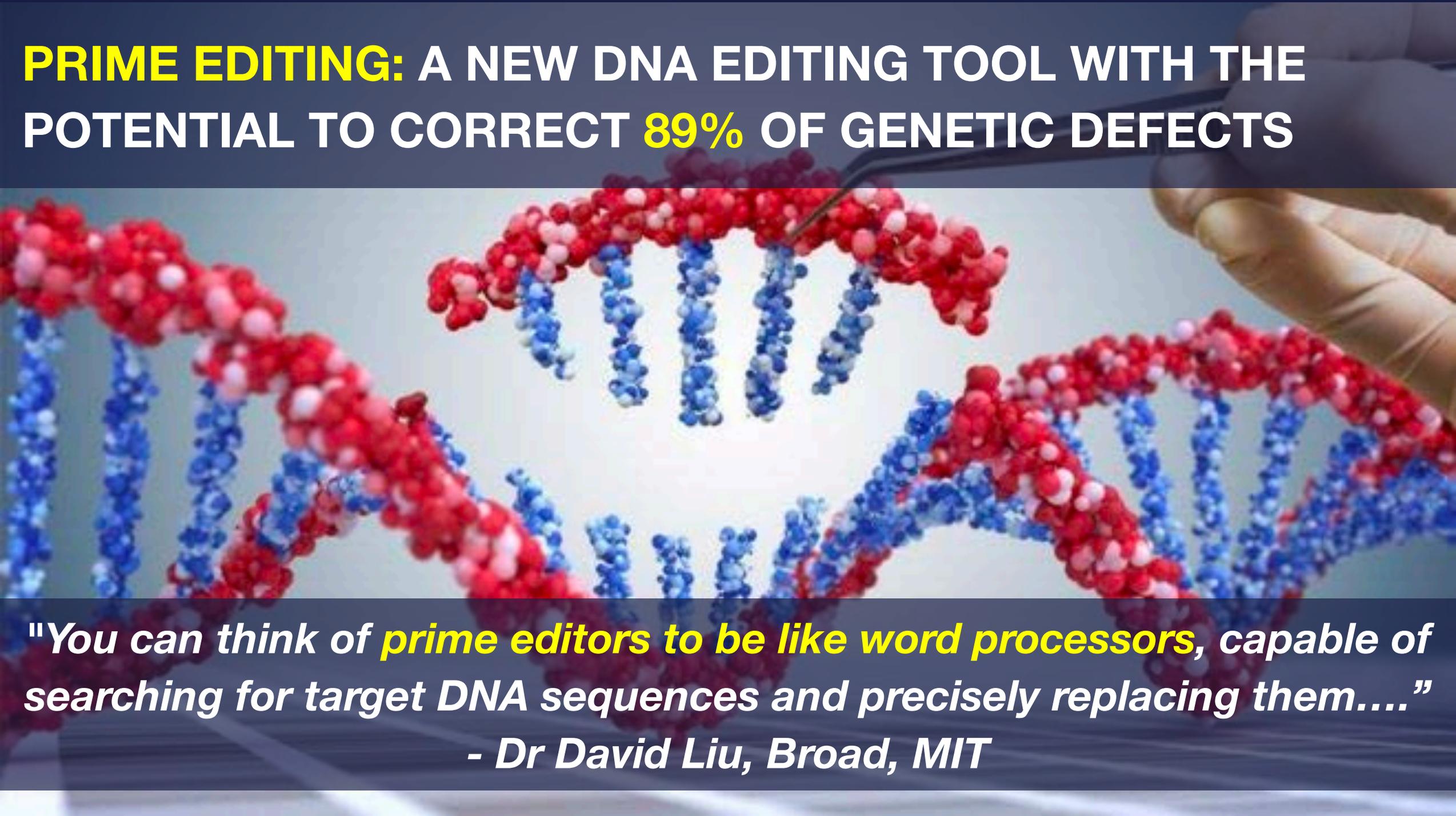


Virus Vector



Virus Vector with Healthy Gene



A hand wearing a white glove uses tweezers to precisely edit a DNA double helix structure. The DNA is represented by red and blue spheres forming a helical shape. The background is a soft, out-of-focus light blue.

**PRIME EDITING:** A NEW DNA EDITING TOOL WITH THE POTENTIAL TO CORRECT **89%** OF GENETIC DEFECTS

*"You can think of **prime editors to be like word processors**, capable of searching for target DNA sequences and precisely replacing them...."*

*- Dr David Liu, Broad, MIT*



**META-TREND**

**INCREASING HUMAN  
LONGEVITY &  
HEALTHSPAN**

# "Making 100 Years old, the new 60"

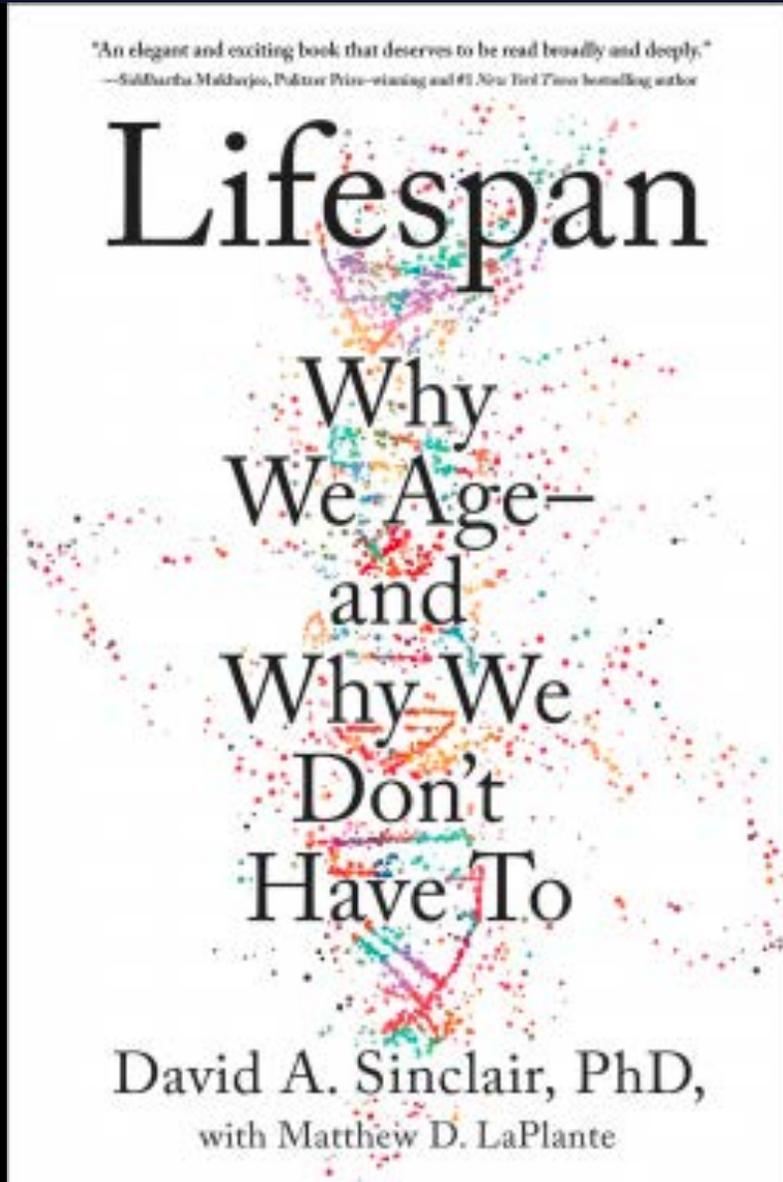


# "Making 100 Years old, the new 60"



- **Advanced Diagnostics** (HLI)
- **Stem Cells** (Celularity & Fountain)
- **NAD+** (Harvard University)
- **Senolytic Medicines** (Unity Bio)
- **wnt Pathway** (Samumed)
- **New Organs** (UnitedTherapeutics)
- **mRNA** (Moderna)
- **Vaccines** (United Neurosciences)
- **GDF-11** (Elevian)
- **CrispR/Gene Therapy** (Editas)
- **wnt Pathway** (Samumed)

# Dr. DAVID SINCLAIR: INFO THEORY OF AGING



Dr. David Sinclair, reveals a bold new theory for why we age: "The Information Theory of Aging".

***"Aging is a disease, and that disease is treatable."***

- David Sinclair, PhD



**META-TREND**

**ARTIFICIAL INTELLIGENCE**

“Artificial intelligence could have more profound implications for humanity than electricity or fire.”

- *Sundar Pichai, CEO, Alphabet*





**“Companies have to race to build AI or they will be made uncompetitive. Essentially, if your competitor is racing to build AI, they will crush you.”**

***- Elon Musk***

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## ***MY THOUGHTS....***

**“There will be two kinds of companies at the end of this decade....**

**...those who are using AI.**

**...and those who are out of business.”**

# POTENTIAL OF AI

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**AI-driven companies will take \$1.2 trillion from competitors by 2020.**

**Forrester Predictions:**  
*Artificial Intelligence Will Drive The Insights Revolution*

# POTENTIAL OF AI

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AI will generate **\$2.9 trillion** in business value and recover 6.2 billion hours of worker productivity by **2021**.

- Gartner Predictions (Forbes)

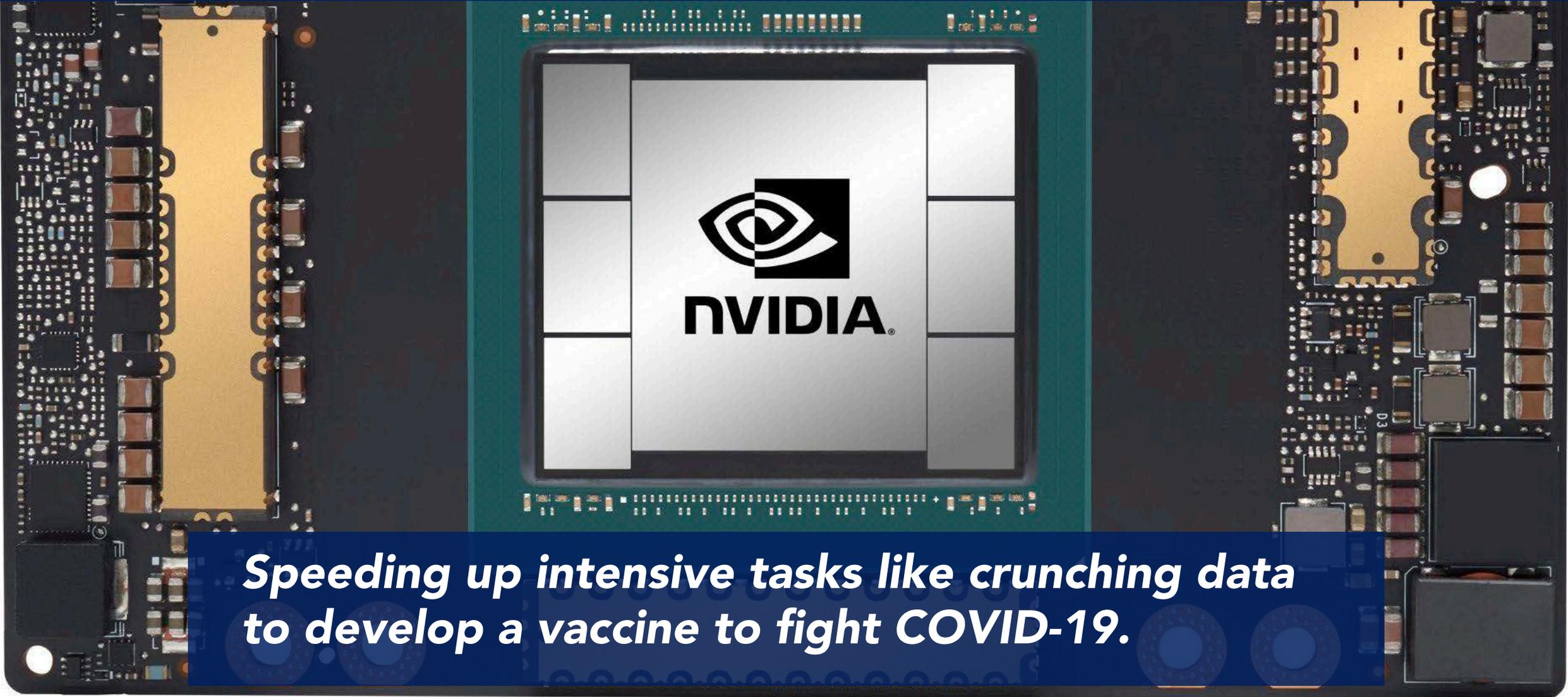
# POTENTIAL OF AI



By **2030**, the potential contribution to the economy from Artificial Intelligence will be **\$15.7 trillion**, and global GDP could increase by 14% as a result of AI.

- **PwC Global Estimates**

# Nvidia's new data center A100 GPU packs **20 times the performance** of its predecessor



*Speeding up intensive tasks like crunching data to develop a vaccine to fight COVID-19.*

**"AI will reach human level  
intelligence by 2029."**

*Ray Kurzweil, Google, Singularity Univ.*

# AI WILL DRIVE STARSHIP AUTONOMOUS DELIVERY ROBOTS ON COLLEGE CAMPUSES



- Each on-demand delivery costs only **\$2.00**
- **100+ Universities** to be added within 24 months

# AI WILL PILOT AMAZON PRIME DRONE DELIVERIES



FAA issued AMAZON PRIME AIR "Part 135 air carrier certificate" allowing it to begin commercial drone deliveries in the US.

# WAYMO BECOMES 1<sup>st</sup> AUTONOMOUS CAR ON ROAD **WITHOUT SAFETY DRIVER** (25 Cities)



**WAYMO 01**

**WAYMO:** Driven >10 million miles in the real world  
>10 billion miles in *simulation*

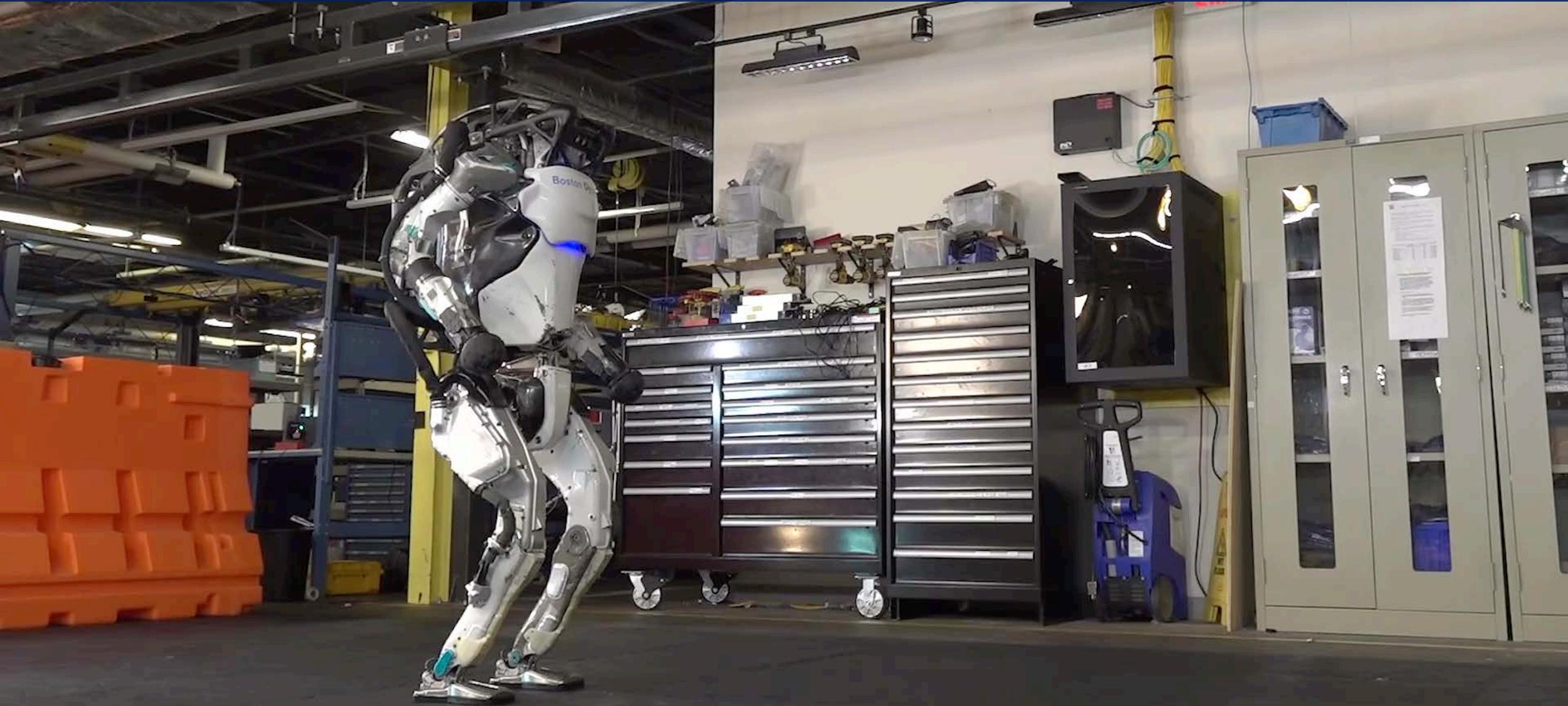
# FLYING CARS ARE HERE

150 Startups / >\$1 Billion per year



**JOBY RAISES \$590M (TOYOTA) - AIR TAXI SERVICE**

# BOSTON DYNAMICS' ATLAS ROBOT (2019)



Boston Dynamics

# AI (LAWGEEX) BEATS HUMAN LAWYERS IN CONTRACT READING COMPETITION

**Humans vs. AI in reading a contract:**

- **Humans: 92 min, 85% accuracy**
- **AI: 26 seconds, 94% accuracy**

**The decade ahead is about  
"Human-AI Collaboration."**

**In what industries?**

Your mission is to “automate the routine”, and “humanize the exceptional.”

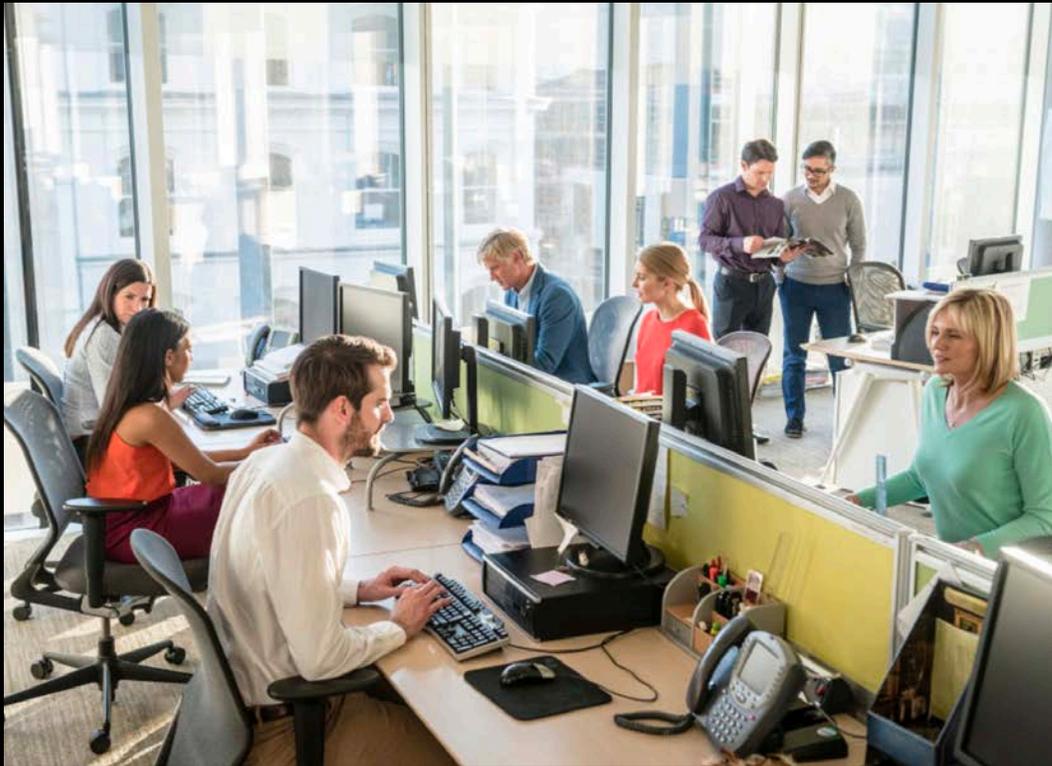
**NEVER LET A CRISIS GO TO WASTE...**

**BE ASPIRIN, NOT VITAMINS**



*NEED to have, not Nice to have*

# RE-INVENT YOUR BUSINESS MODEL



**THEN...**



**NOW...**

# RE-INVENTING/Virtualizing HOSPITALS (APOLLO India): Taking (empty) hotel rooms in India, and turning them into hospital rooms...

 THE NEW  
**INDIAN EXPRESS**

☰

🏠 NATION WORLD STATES CITIES BUSINESS SPORT GOOD NEWS MOVIES GALLERIES

STOCK MARKET      BSE      38426.24      ▲ 385.67(1.01%)      NSE      11334.95

Home > Business

## COVID-19: Apollo Hospitals launches 'Project Stay I' with 500 isolation rooms in hotels across country

*This effort is aimed at creating isolation and quarantine facilities and reducing the burden on hospitals providing acute care.*



(Sangita Reddy) Turning empty hotel rooms into hospital rooms with remote monitoring and a doctor/nurse living on the first hotel.

# RE-INVENTING, DISPLACING, DIGITIZING

## Market Cap of ZOOM vs. Top Airlines



**"The day before something  
is a breakthrough, it's a  
crazy idea..."**

# BRINGING THE SCREEN TO YOU... AR/VR



**Oculus Quest 2:**  
September 2020



**HTC Project Proton:**  
Spring 2021



**Apple AR Glasses:**  
Spring 2021? / 2022

# ANA AVATAR XPRIZE®



- **\$10 Million** Prize Purse
- Transmit your Senses & action to a Robotic Avatar.
- Disaster relief, health assistance
- 100+ Teams from 15 countries

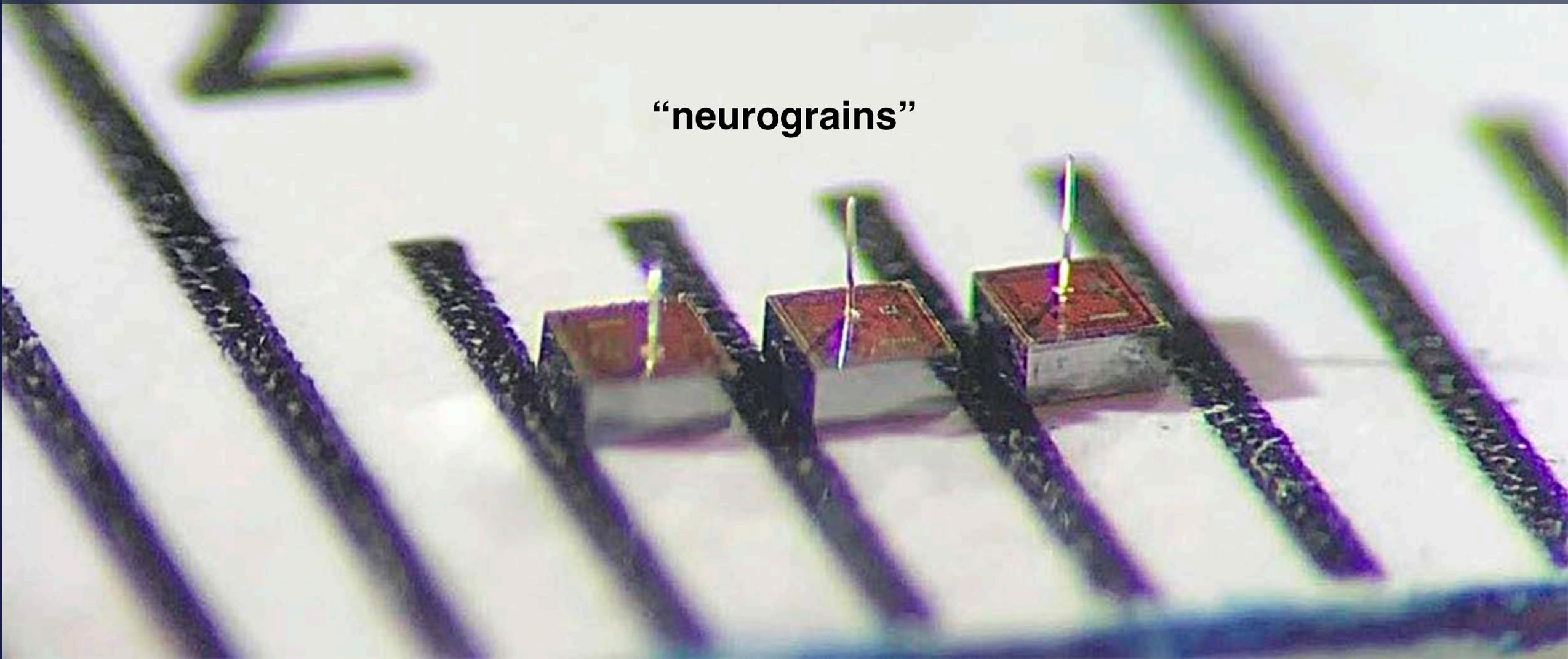
**Sponsor: ALL NIPPON AIRWAYS (ANA)**

# BRAIN-COMPUTER INTERFACE

*(increasing human intelligence)*

# RESEARCHERS DESIGNED **'RICE-SIZED'** BRAIN IMPLANTS THAT CAN COMMUNICATE WITH EACH OTHER AT 10 MBPS

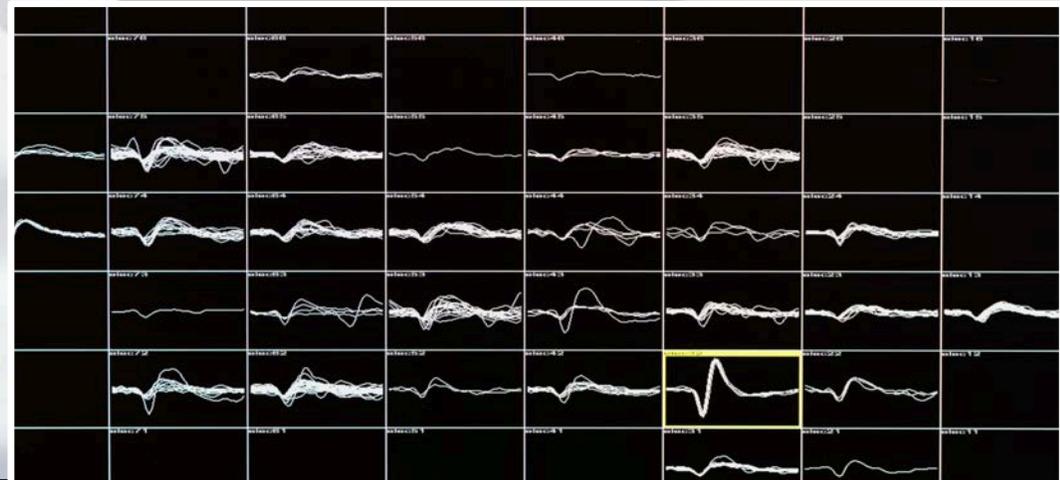
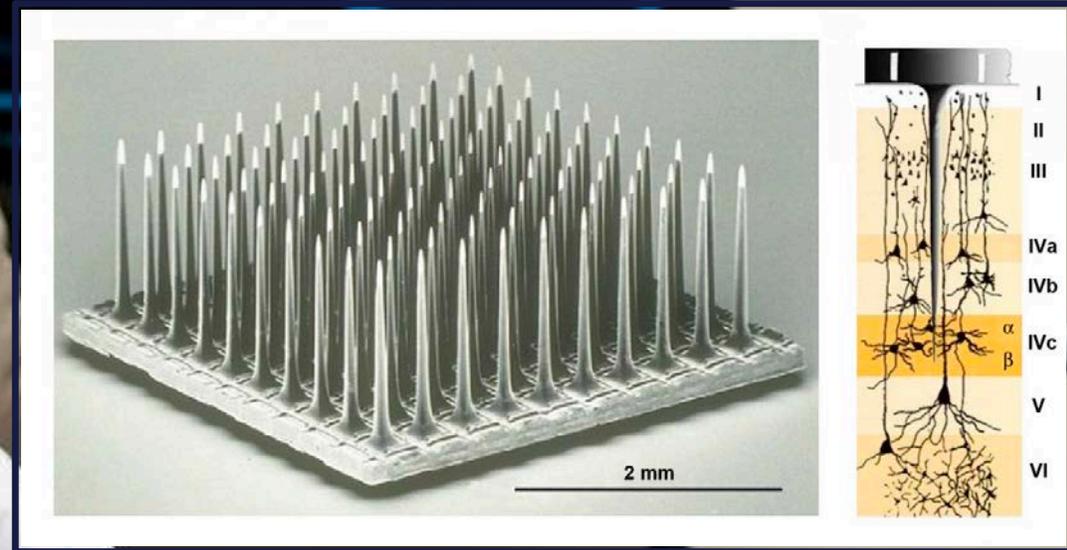
“neurograins”



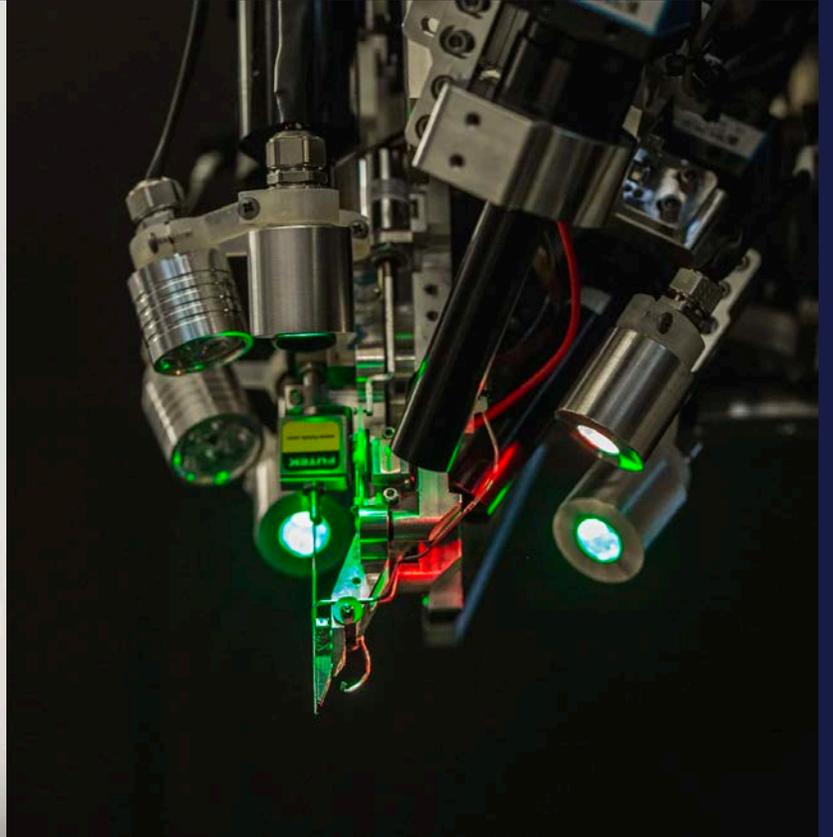
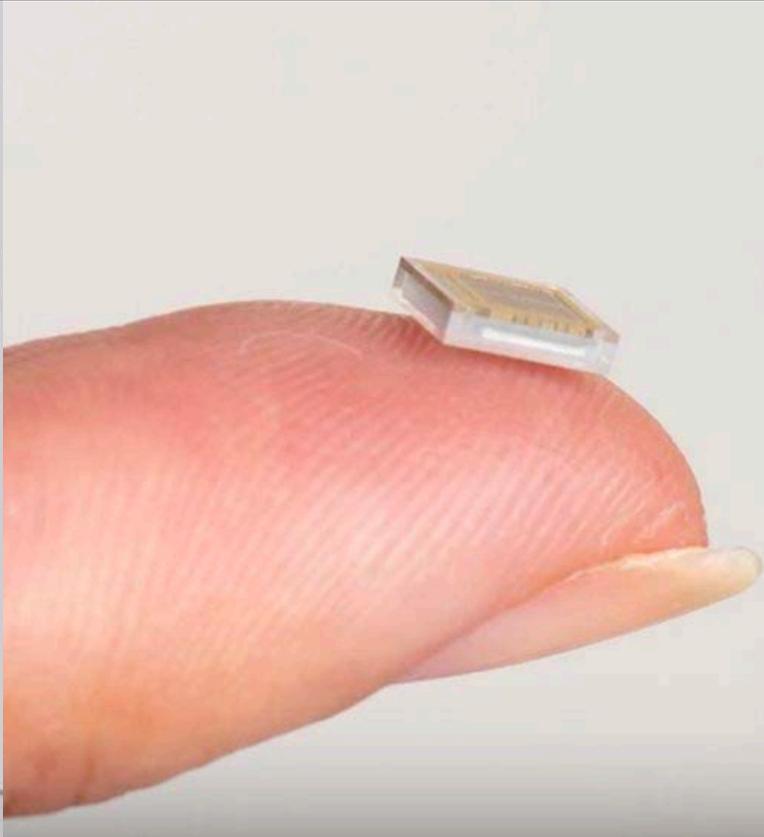
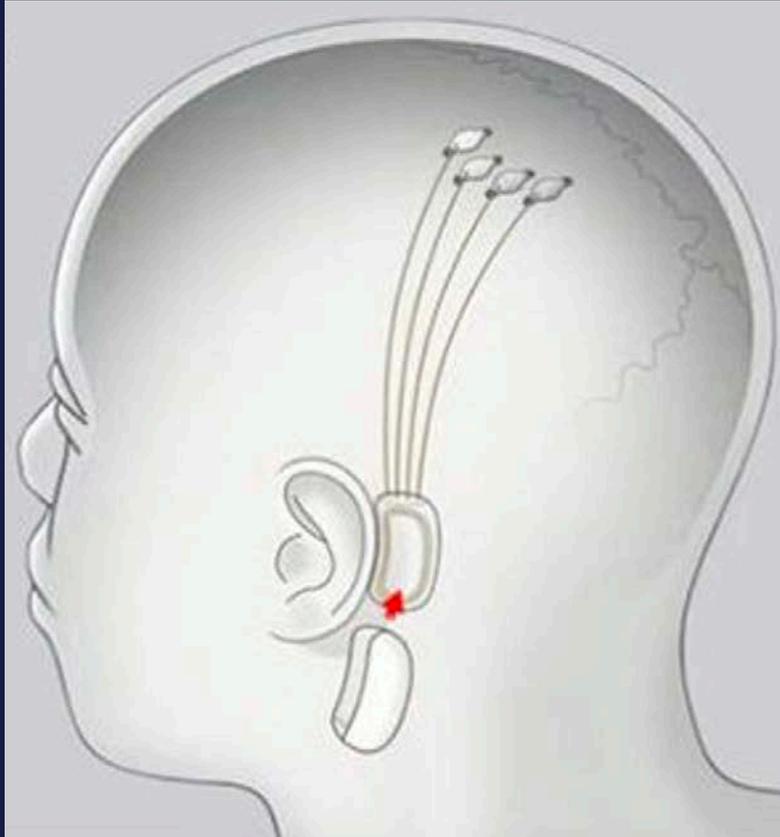
# A 100 ELECTRODE ARRAY PLUGGED DIRECTLY INTO A BLIND WOMAN'S VISUAL CORTEX... **RESTORED VISION**



**Univ. of Miguel Hernandez,  
in Elche, Spain**



**NEURALINK** BUILDING BROADBAND BRAIN TO COMPUTER  
INTERFACE – IN PIGS NOW... HUMANS NEXT YEAR.  
*10 Chips to provide about 2 Gbps connection*





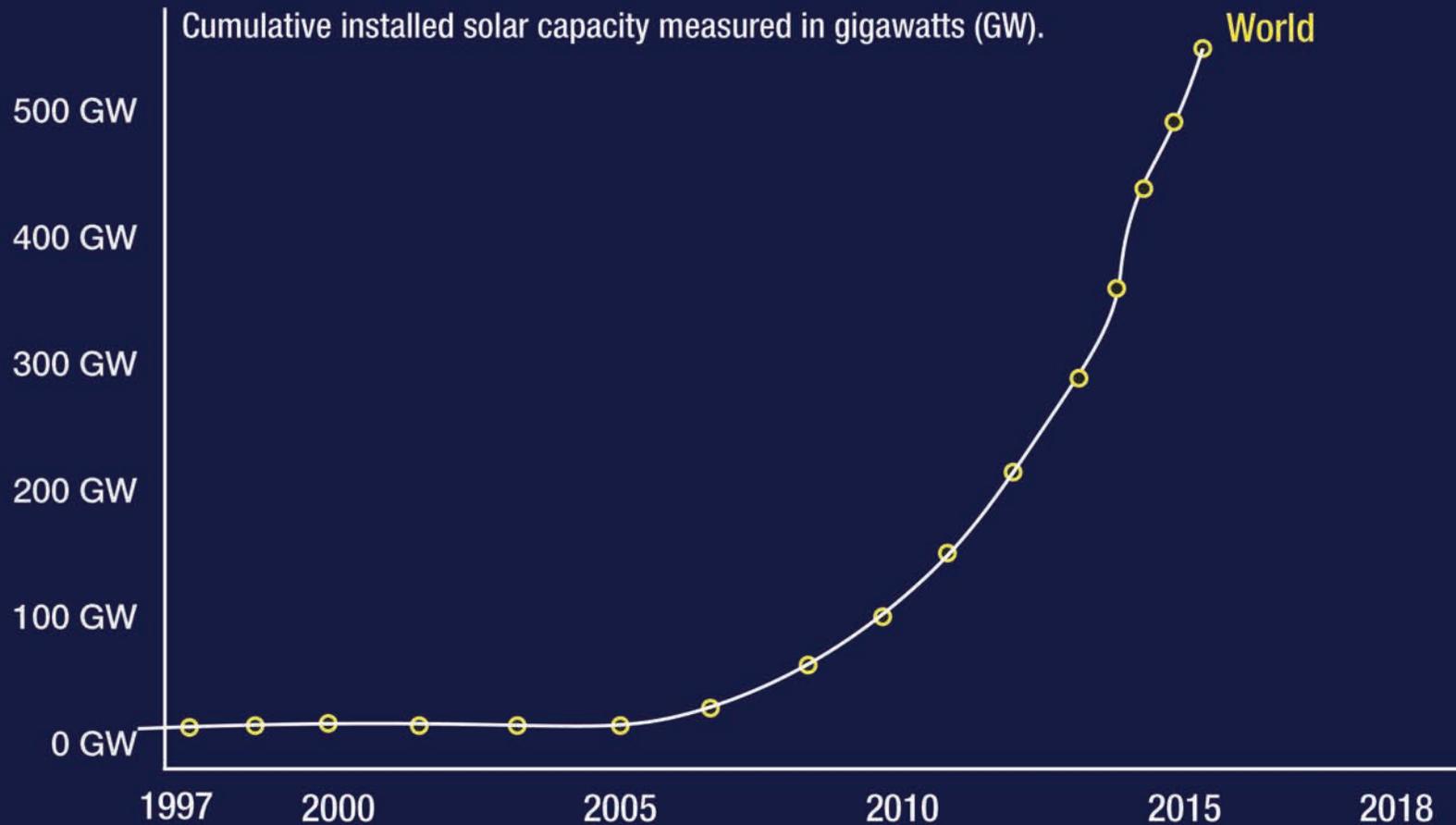
**"ABUNDANCE MINDSET"**

**A DECADE OF ABUNDANCE**

**2010 - 2020**

# RENEWABLE ENERGY

## 10X SOLAR ENERGY CAPACITY

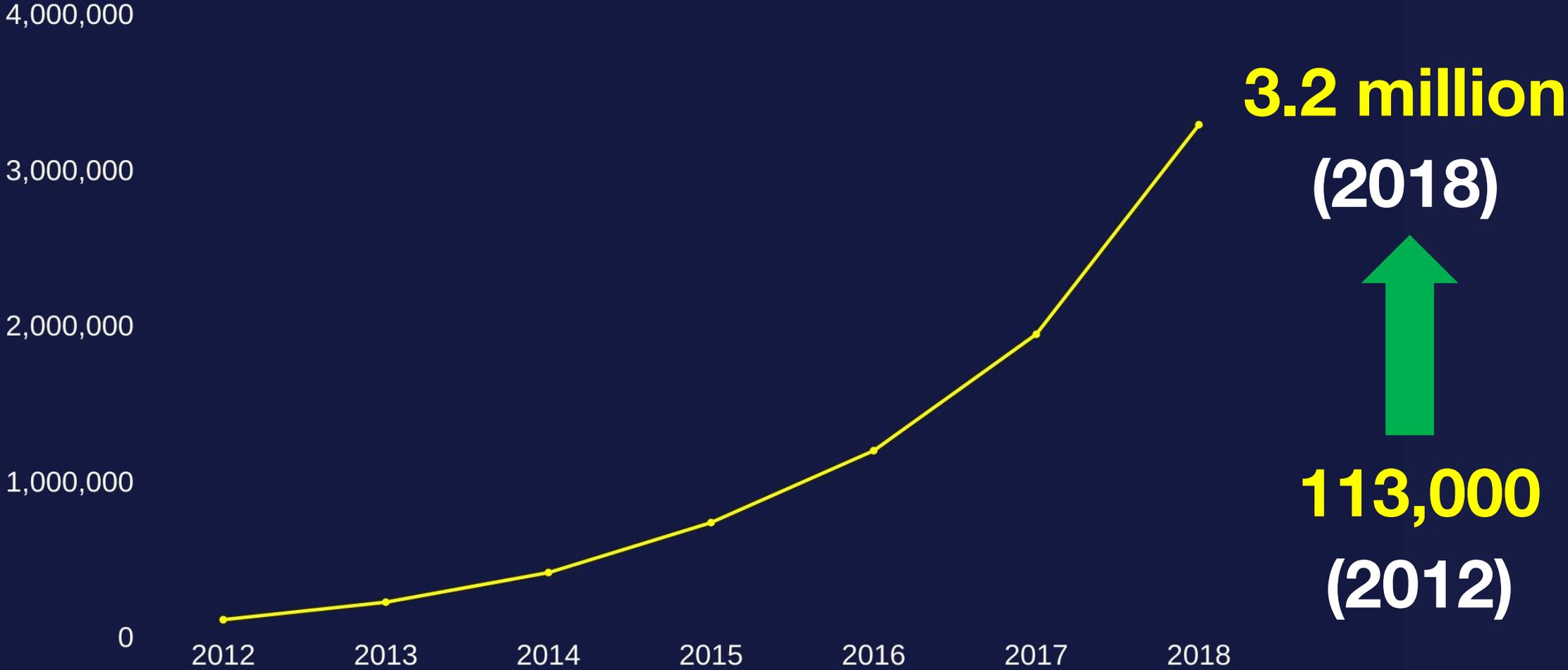


**565 Gigawatts**  
**(2018)**



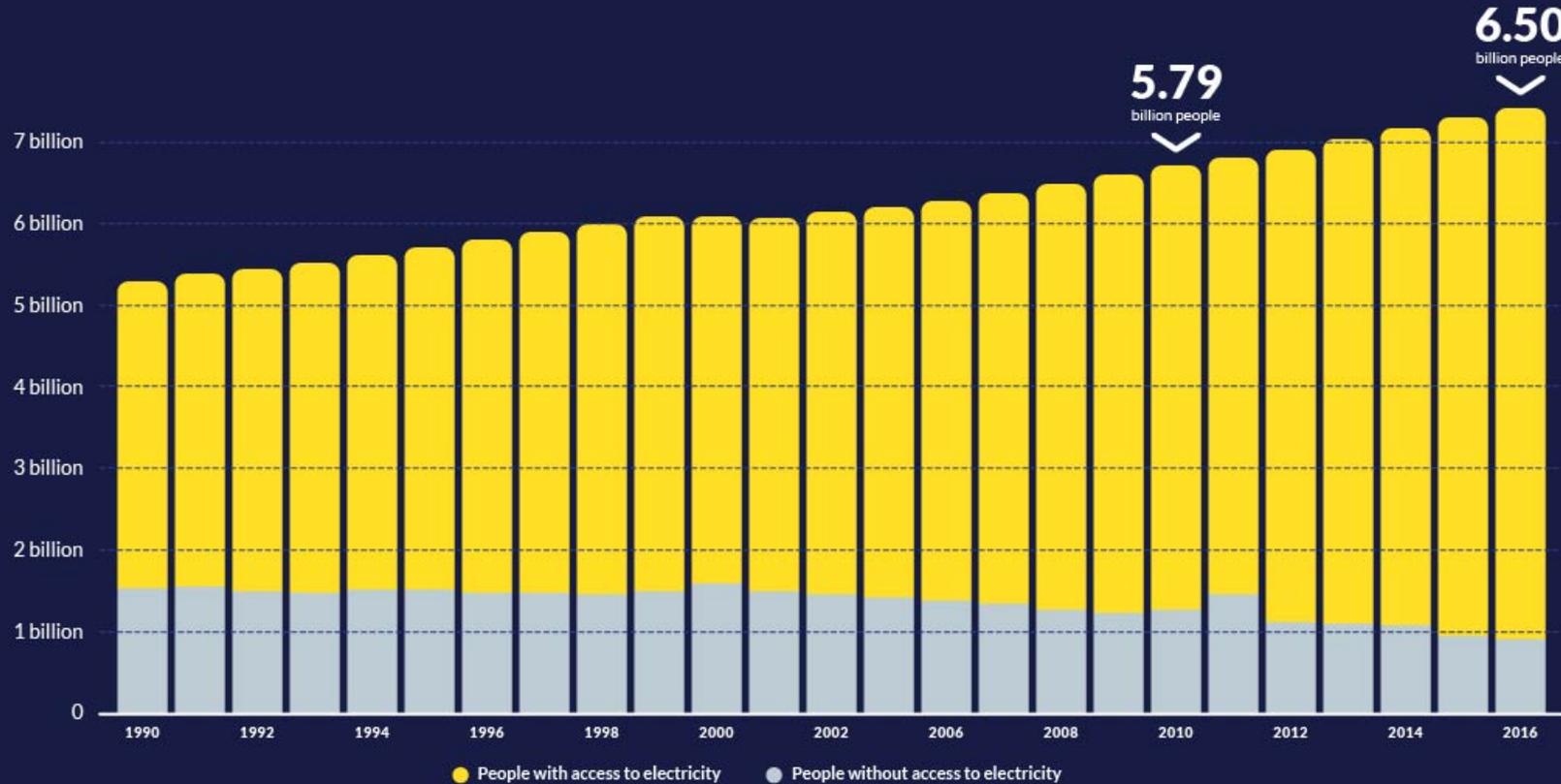
**40 Gigawatts**  
**(2010)**

# 30X MORE BATTERY ELECTRIC VEHICLES ON THE ROAD



Source: Statista, IEA.org

# 700 MILLION MORE PEOPLE HAVE ACCESS TO ELECTRICITY



**6.5 B (2016)**

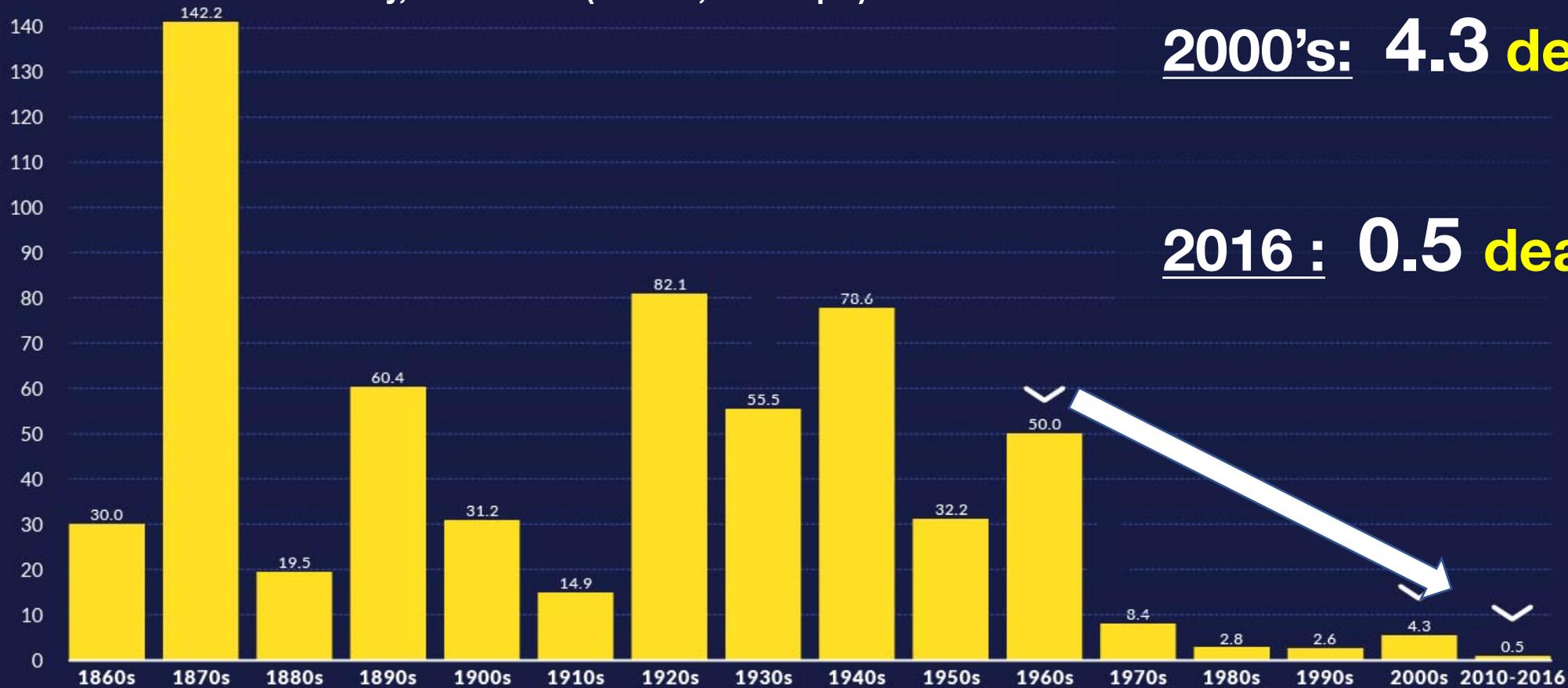
**5.79 B (2010)**

Source: The World Bank, Our World In Data

# FAMINE

## 9X LESS PEOPLE DIED FROM FAMINE

Annual Rate Of People Dying Due To A Famine  
Globally, Per Decade (Per 100,000 People)



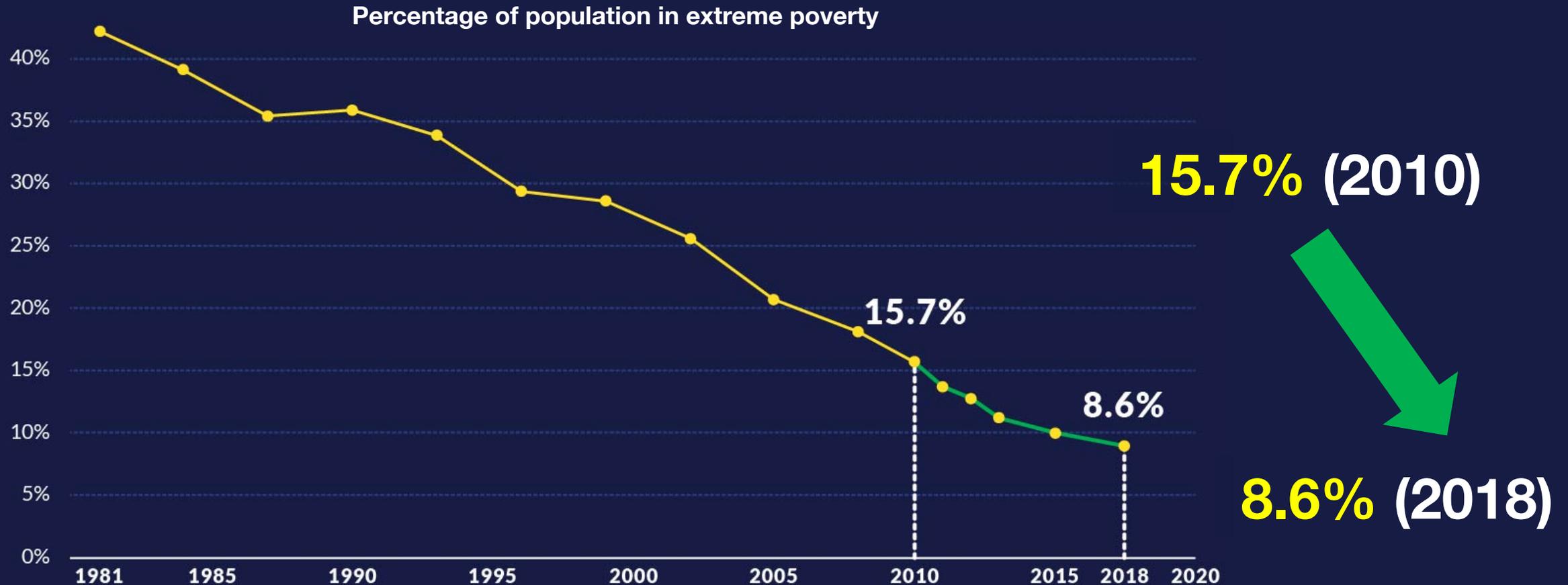
2000's: 4.3 deaths/100K

2016: 0.5 deaths/100K

Source: Our World In Data

# EXTREME POVERTY

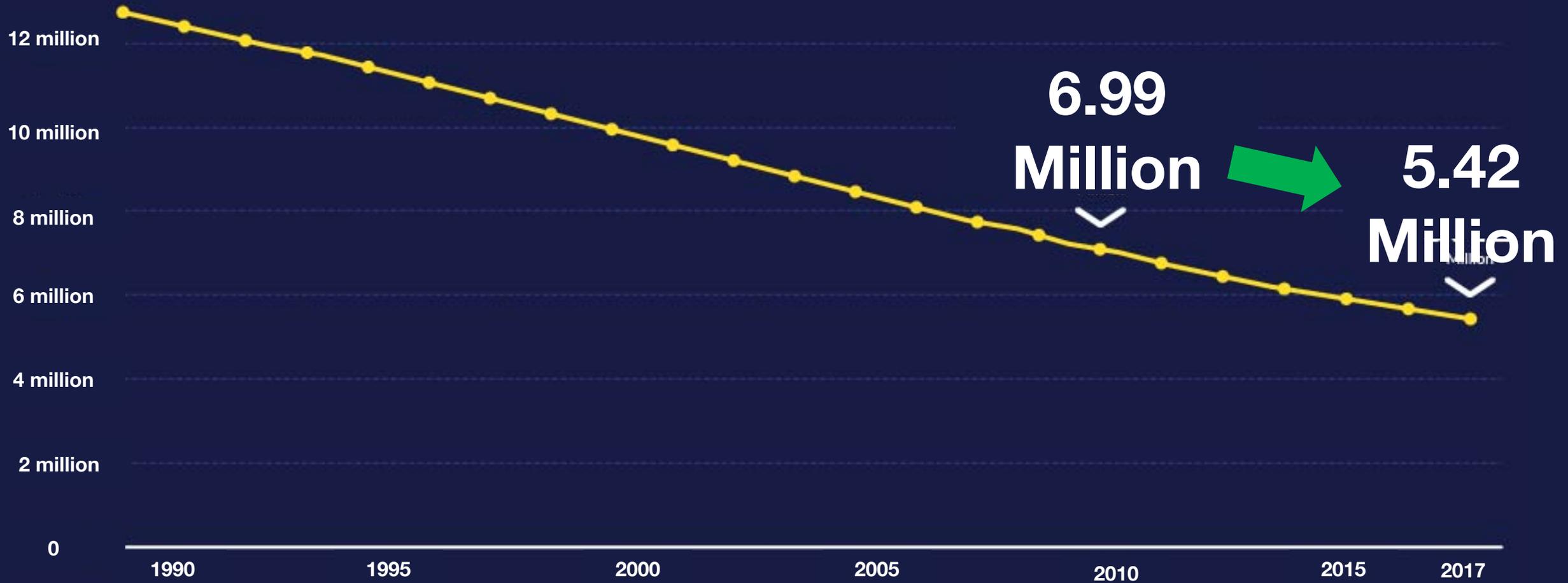
SINCE 2010, WE CUT GLOBAL EXTREME POVERTY IN HALF



Source: World Bank, Our World In Data

# CHILD MORTALITY

**22%** DECLINE IN CHILD MORTALITY (under age 5)



Source: United Nations, Our World In Data

# Final Abundance Thought...

**"A negative mind will never  
give you a positive life."**



**Final Abundance Thought...**

**“ The World’s Biggest Problems are the World’s Biggest Opportunities.”**

**FOR A COPY OF THESE SLIDES SEND  
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**[www.abundance360.com](http://www.abundance360.com)**

**[www.SingularityU.org](http://www.SingularityU.org)**

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