

# *Future Perfect*

*Looking Forward – Out the “Rear” Window*



Prediction is very difficult,  
especially if it's about the  
future.

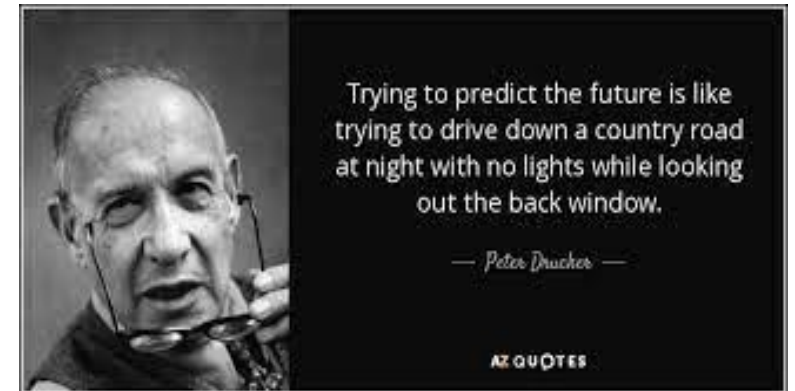
Niels Bohr

BrainyQuote



STUDY THE  
PAST IF YOU  
WOULD DEFINE  
THE FUTURE

Confucius



# Doug Stowell

Doug Stowell has been an OLLI instructor at Furman University in Greenville, SC since 2015 and a national ZOOM instructor for over 50 OLLI's since 2019. His career includes: Director of Market Research for the Xerox Corp., U.S. Director for the U.K. firm National Opinion Polling and Senior Consultant with Wirthlin Worldwide Polling in Washington, DC He opened his own firm, Market Resource Associates, in 2008 and continues today conducting global surveys and political polls.



Douglas "Doug" Stowell  
Chief Research Consultant

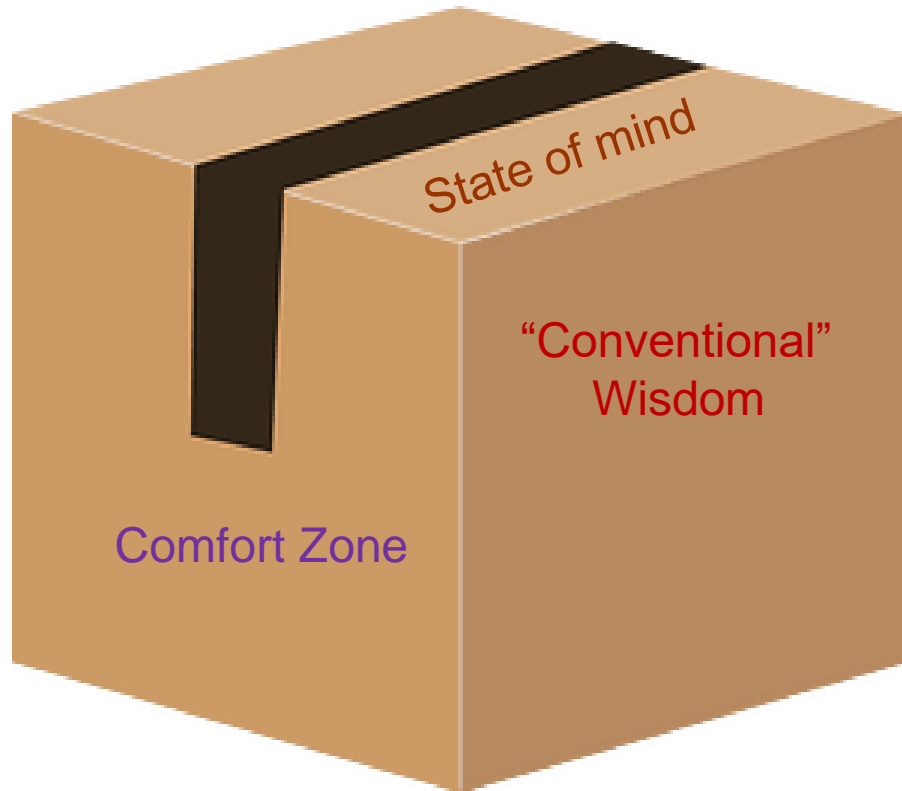
Market Resource Associates  
608 Pawleys Drive  
Greenville, SC 29681

[dwstowell10@gmail.com](mailto:dwstowell10@gmail.com)

571 275-4299



# Venturing outside the “box”!



# The *Future Perfect* Tense

[Remember your 7<sup>th</sup> Grade Grammar? The 12 tenses?]

<ul style="list-style-type: none"><li>•<u>Present Simple</u> <i>I do</i></li><li>•<u>Present Continuous</u> <i>I am doing</i></li><li>•<u>Present Perfect</u> <i>I have done</i></li><li>•<u>Present Perfect Continuous</u> <i>I have been doing</i></li></ul>	<ul style="list-style-type: none"><li>•<u>Past Simple</u> <i>I did, I did do</i></li><li>•<u>Past Continuous</u> <i>I was doing</i></li><li>•<u>Past Perfect</u> <i>I had done</i></li><li>•<u>Past Perfect Continuous</u> <i>I had been doing</i></li></ul>	<ul style="list-style-type: none"><li>•<u>Future Simple</u> <i>I will do</i></li><li>•<u>Future Continuous</u> <i>I will be doing</i></li><li>•<u>Future Perfect</u> <i>I will have done</i></li><li>•<u>Future Perfect Continuous</u> <i>I will have been doing</i></li></ul>
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If we plan ahead we **will have done** the best we can to make the future *perfect*!



# Setting the *course* ...

- ▶ There are 100's of topics on the “future” we *could* explore!



- ▶ Today, we'll consider just eight in brief detail.

Automobiles ... Aviation  
Energy ... Environment  
Education ... Healthcare  
A / I ... Social Media

- ▶ We'll only look out seven years to 2030!

# Toyota Motor Car, Ltd. U.S. Import Position and Strategy – 1968

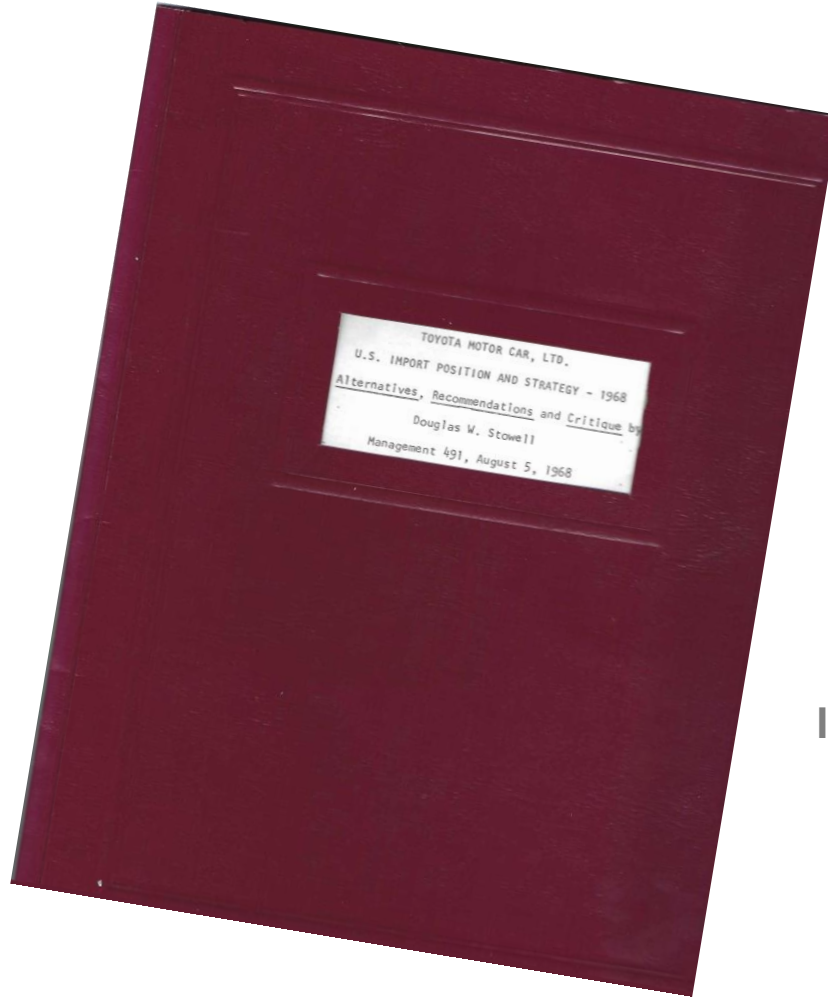
Douglas W. Stowell

Management 491 – August 5, 1968

Case Western Reserve University

Prepared for: Professor A. B. Cummins

I didn't give Toyota much of chance ... in 1968!



# Just so we're on the same "page" ...



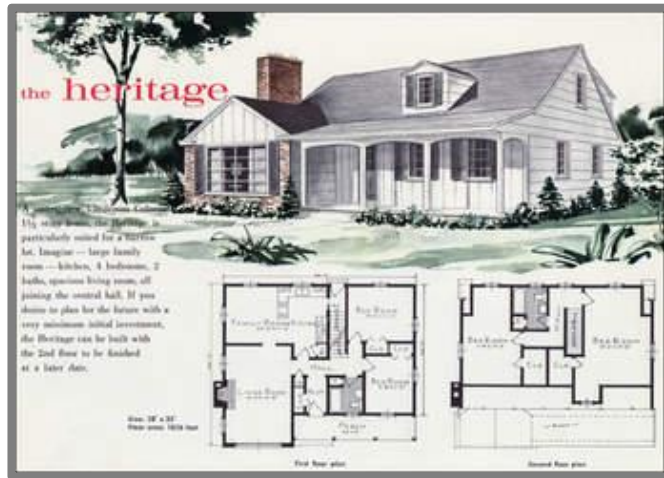
1960 = \$0.05



2023 = \$1.00



1960 Ford Station Wagon \$2,900 (52%)



1960 — new ranch — 1500 sq. ft.  
\$16,900



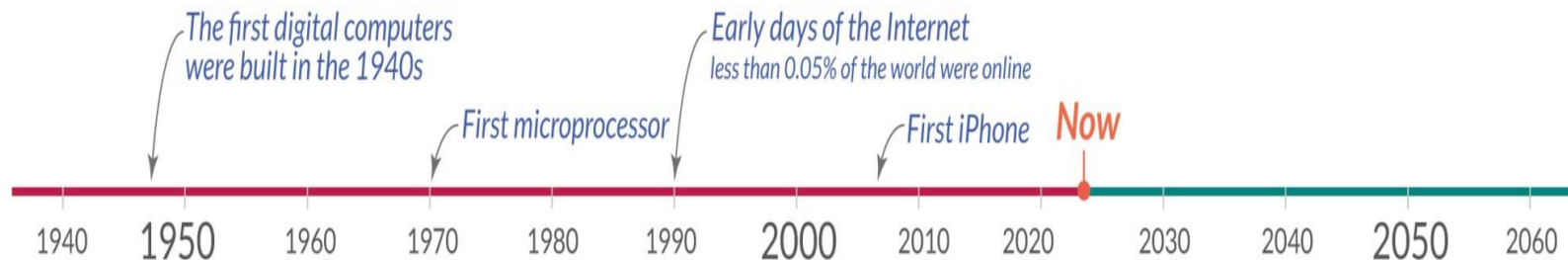
2023 — new 2-story — 2900 sq. ft.  
\$405,000



2023 Ford Explorer SUV %48,870 (62%)  
(% of Median Family Income)



# A QUICK LOOK “BACK”!



## Remember the technology of the '50's?



Microwave Oven



Hard Drive



Birth Control Pills



Jet Aircraft

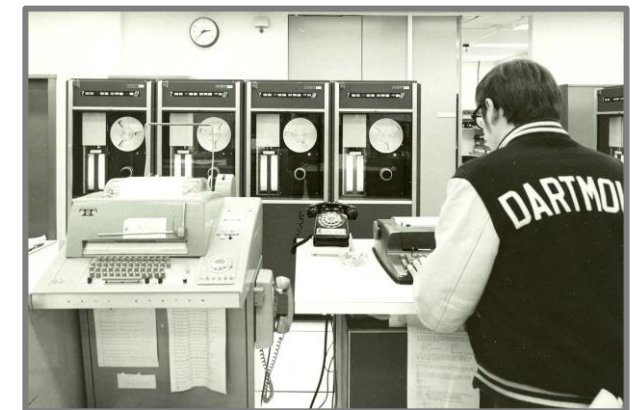
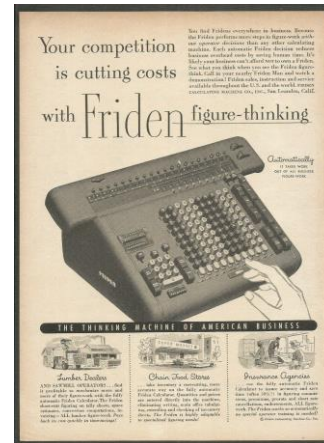


Integrated Circuits

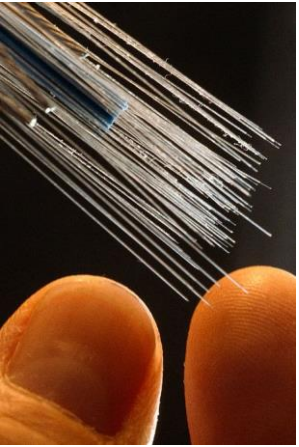


Polio Vaccine

## How did we “compute” in the '60's?



# How about the technology of the '70's?



Fiber Optics



Super Computer



The P/C



GPS



Walkman



MRI

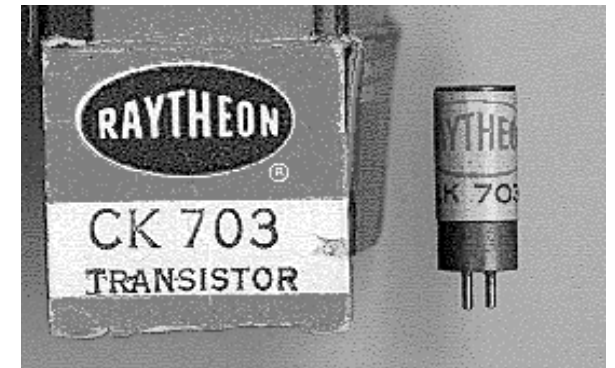
SOURCE: <https://www.popularmechanics.com/technology/best-inventions/>



# Time Magazine's 10 Most Influential Inventions of the 20th Century



- 1 Automobile
- 2 Radio.
- 3 Television.
- 4 Transistor.
- 5 Laser.
- 6 Electric refrigeration.
- 7 Personal computer.
- 8 Wireless technology.
- 9 Manned spaceflight.
- 10 Airplane



SOURCE: <https://content.time.com/time/subscriber/article>



# The two greatest **influential** developments of the 20<sup>th</sup> century?



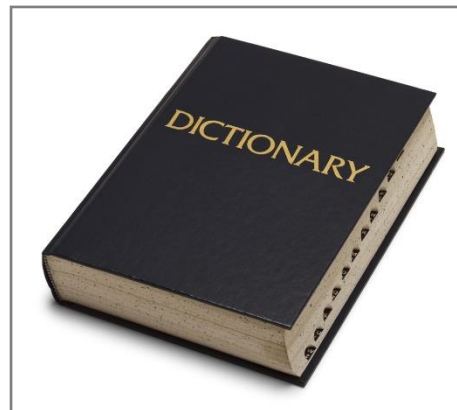
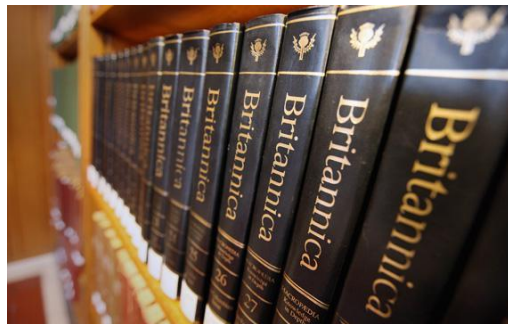
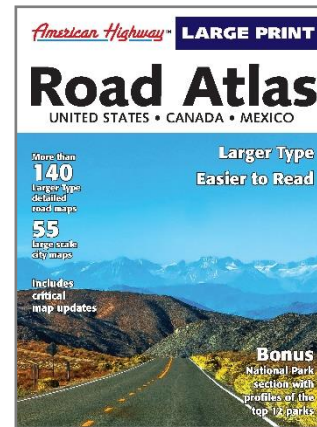
THE WEB GOES PUBLIC  
JANUARY, 1991



GOOGLE LAUNCHED  
SEPTEMBER, 1998

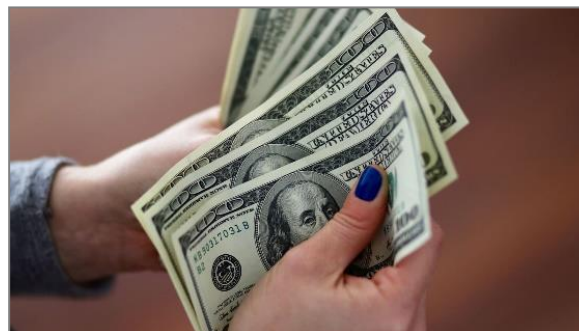
The classic multi-colored Google logo, with the word 'Google' in its signature font and a trademark symbol.

# Didn't we use All of these things ... in the '60's?





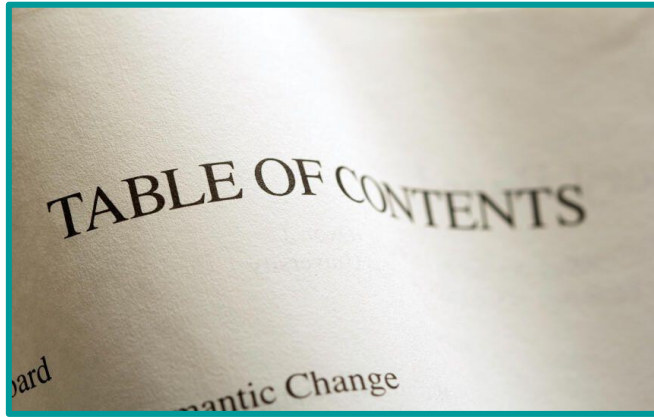
# And ALL of these too ...



Today,  
all we *need* is  
this **ONE** tool:



# What we'll *try* to cover!

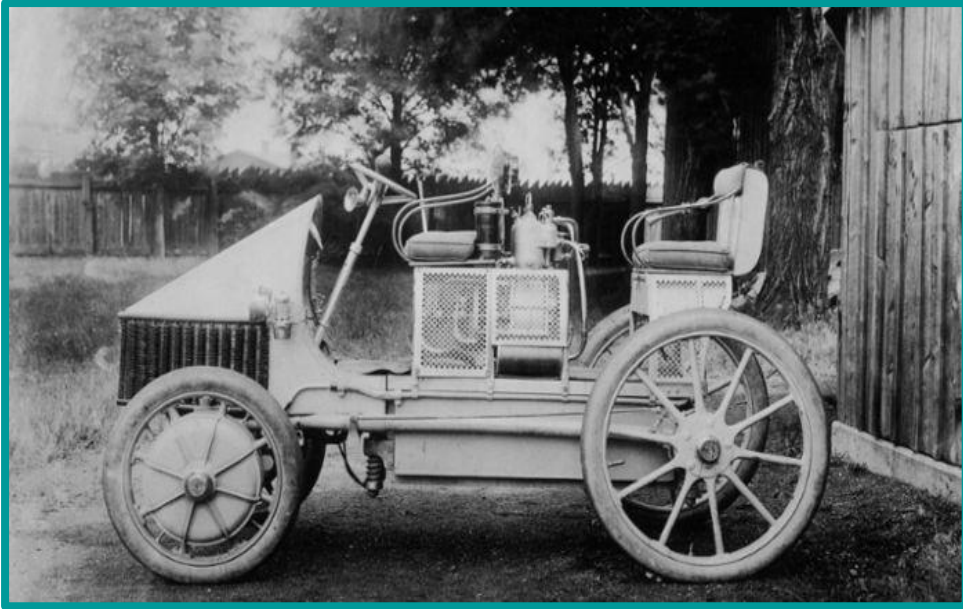


Topic
Automobiles
Aviation
Energy
Environment
Education
Healthcare
A / I
Social Media

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	Main Idea <b>3.</b>
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→	



# Automobiles



[In 1900, Ferdinand Porsche joined the carriage maker Ludwig, Lohner & Co. in Vienna. He created the electric wheel hub motor for the first Lohner-Porsche Electromobile.]



2023 Porsche Taycan – All Electric  
670 HP ... 0-60 mph in 2.40 seconds!  
Taycan Model 4S @ \$105,150

# How long have we driven a gas-powered auto?



In 1885, Karl Benz invented a conveyance that is credited as the first car in the world to be powered by fuel.



## So, what's changed?



1965 Mustang H/T - \$2,427 Base



2023 Mustang Coupe - \$28,500 Base

**\$2,427** in 1965, when adjusted for inflation, would be **\$21,415** in 2023

$$\$28,500 - \$21,415 = \$7,085 / \$28,500 = 24.9\%$$

The **real** cost of the 2023 Mustang is 25% greater than a 1965 Mustang!

\$7,000 + in Technology: Airbags, cruise control, front/side cameras, HVAC Systems, Emission controls, touch screen nav systems, tire pressure monitoring, etc., etc..

# A global *push* for electric vehicles (EV's) has been in progress for over 20 years!

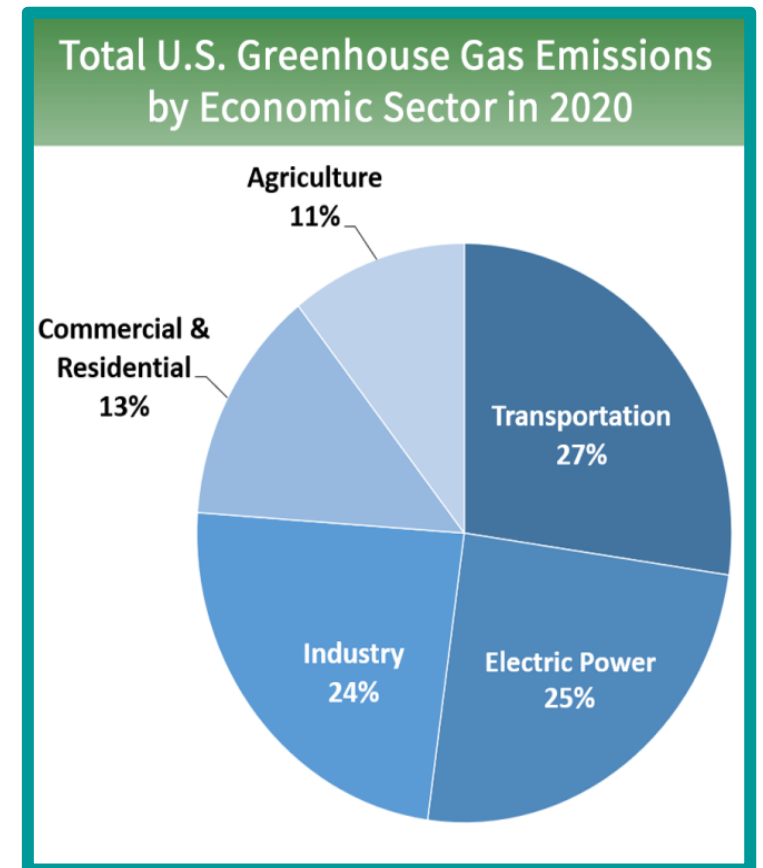
U.S. Price/Gal. August 15, 2023

Country	Price/Litre	U.S. / Gal.
U.K.	£1.496	\$7.19
Germany	€1.864	\$7.69
France	€1.903	\$7.85
Sweden	Kr21.003	\$7.32
South Korea	Krw1,694.9	\$4.81
Japan	Jpy180.3	\$4.69
Hong Kong	Hkd24.04	\$11.63
South Africa	Zar22.5	\$4.44
Mexico	Mxn24.4	\$5.38
U. S. A.	-----	\$3.88

1. Where will the price of unleaded gas be in 5 years?
2. How can individuals make a significant impact on air quality?

An emerging reality

Lower Maintenance Costs!

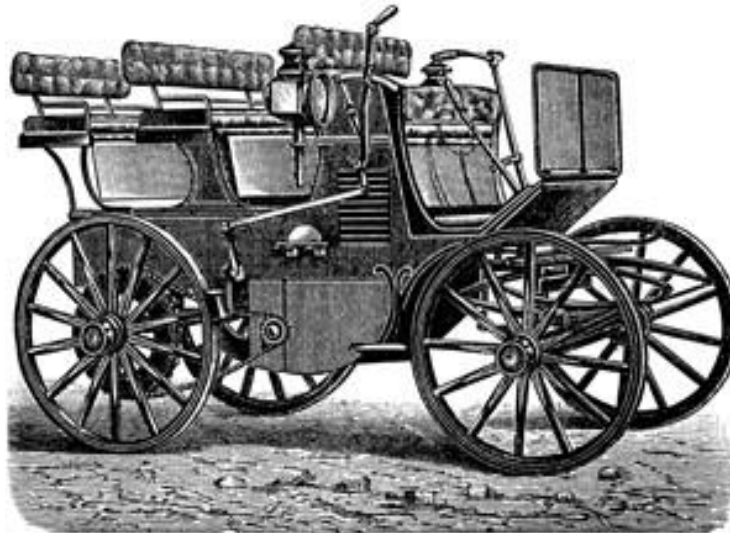


# All Electric Cars!

In the 1830s, Scotland's Robert Anderson built a battery powered, motorized carriage. Batteries (galvanic cells) were not yet rechargeable, so it was viewed more parlor trick ("Look! No horse nor ox, yet it moves!") than a transportation device.

By 1890, a Scotland-born chemist living in Des Moines, Iowa, William Morrison, applied for a patent on the electric carriage he'd built perhaps as early as 1887.

It appeared in a city parade in 1888, according to the *Des Moines Register*. With front-wheel drive, 4 horsepower, and a reported top speed of 20 mph, it had 24 battery cells that needed recharging every 50 miles.



# Some corporate/government EV goals by 2030.

BMW to invest \$1.75 B. in SC Plant to build electric vehicles and batteries.

Ford converting to all electric car production by 2030.

GM will convert to all electric car production by 2030!

The EU plans to require ALL new car sales to be electric by 2030.

The United States has announced a goal of new car sales to be 50% electric by 2030!

There more than 20 EV companies in China!  
60% of new car sales to be EV's by 2030!

Toyota will build a \$3.8 B. battery plant In North Carolina with a 2025 opening!

China's *BYD* company ("Build your dream") to build electric vehicle plant in the U.S..

# 23.4 million Toyota electrified vehicles sold!\*

Toyota has put more hybrid EVs, plug-in hybrid EVs, fuel cell EVs and battery EVs on the road globally than all other automakers combined.

## *The Power of Choice*



### HYBRID

Hybrid Electric Vehicles (HEV) use a combination of gas engine and electric motor(s) to maximize power and efficiency.

### PLUG-IN HYBRID

Plug-in Hybrid Electric Vehicles (PHEV) run just like hybrids but thanks to their larger battery pack, they can run farther on electric power alone.

### FUEL CELL ELECTRIC

Stored hydrogen travels to the Fuel Cell Stack, where it combines with oxygen from the outside air to create electricity and power the motor.

### ALL ELECTRIC

These pure-electric vehicles replace combustion engines with electric motors, providing smooth and almost instantaneous torque.

\* SOURCE: Toyota National Digital Ad – July, 2023



# Electric Vehicle Production



BYD – Qin Plus (China)

Rank	Company	Country	2022 Production	2021 Production	% Change
1	BYD	China	1,858,364	589,019	211%
2	Tesla	U.S.A.	1,314,319	936,247	40%
3	VW Group	Germany	839,207	763,581	10%
4	GM (+ Wuling)	U.S.A. / China	584,602	516,631	13%
5	Stellantis	Italy	512,276	381,843	34%
6	Hyundai (+ Kia)	South Korea	497,816	348,660	43%
7	BMW Group	Germany	433,164	329,182	32%
8	Geely Group	China	351,356	99,980	251%
9	Mercedes Benz	Germany	337,364	281,929	20%
10	Renault-Nissan-Mitsubishi	France/Japan	333,964	289,473	16%
11	GAC Group	China	287,977	125,384	130%
12	SAIC Motors	China	256,341	237,043	8%
	Other 44 Companies		2,679,173	1,759,392	52%
	Total EV Production		10,285,923	6,658,364	55%

	2022	2021
Total Production	85,016,728	80,145,988
EV Production	10,285,923	6,658,364
EV % Of Total	12.1%	8.3%

Includes BEVs and PHEVs

Source: <https://elements.visualcapitalist.com/visualizing-global-ev-production-in-2022-by-brand/>

# Top 10 EV Global Sales / Model - 2022



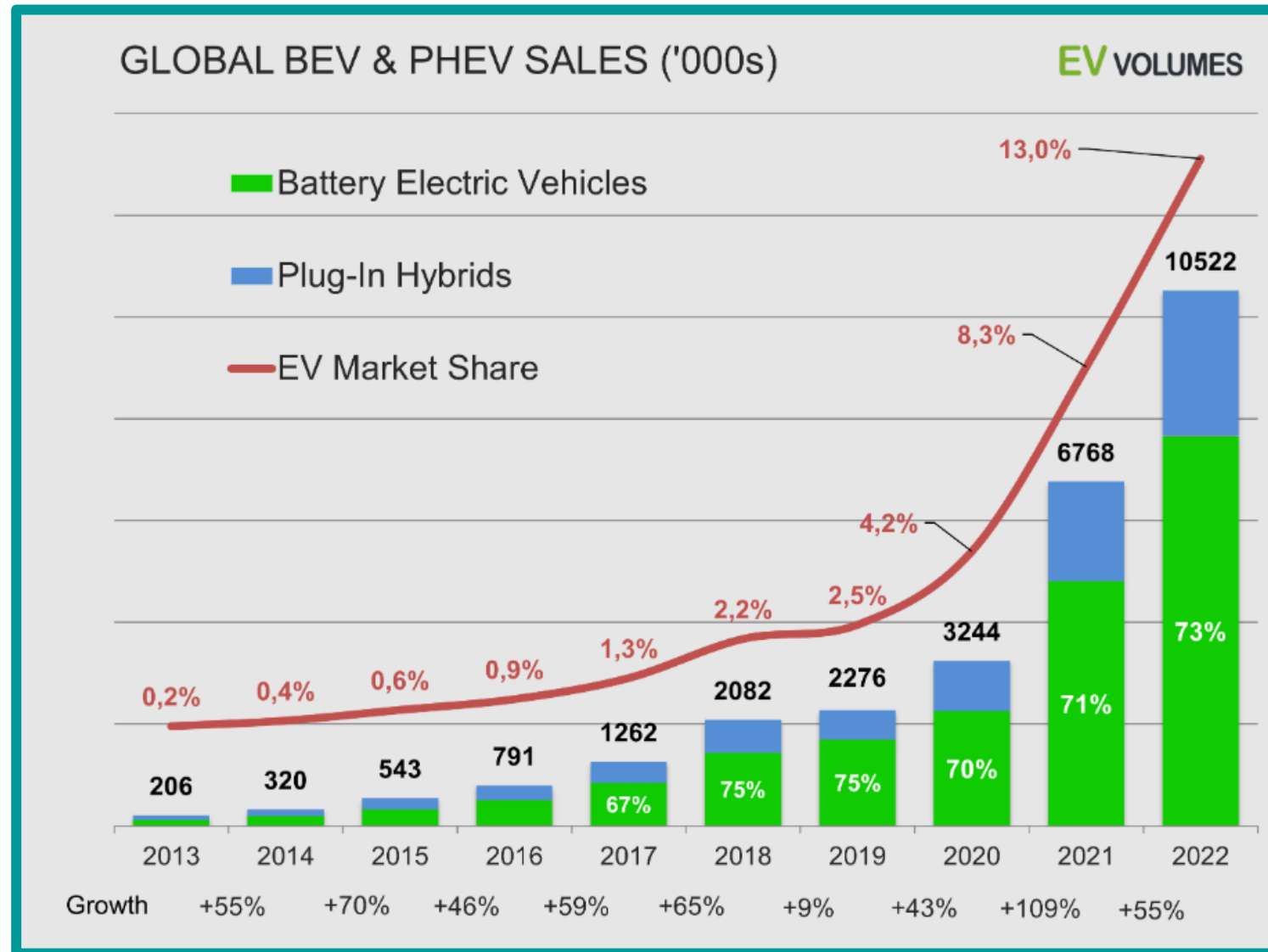
Top 10 Best-Selling Electric Cars in The World  
(Global Sales by 2022)

Rank	Model	Units Sold
#1	<b>Tesla Model Y</b> Compact SUV	786,000 BEV
#2	<b>BYD Song</b> Compact SUV	477,094 BEV+PHEV
#3	<b>Tesla Model 3</b> Compact car	596,000 BEV
#4	<b>Wuling Hongguang Mini EV</b> Small/city car	424,031 BEV
#5	<b>BYD Qin Plus</b> Compact sedan	315,216 BEV+PHEV
#6	<b>BYD Han</b> Mid-size sedan	237,323 BEV+PHEV
#7	<b>BYD Dolphin</b> Subcompact hatchback	205,238 BEV
#8	<b>BYD Yuan Plus/Atto 3</b> Compact SUV	201,744 BEV
#9	<b>Volkswagen ID.4</b> Compact SUV	174,092 BEV
#10	<b>BYD Tang</b> Compact SUV	151,141 BEV+PHEV





# Global EV Sales Growth



SOURCE: <https://www.weforum.org/agenda/2023/05/electric-vehicles-ev-sales-growth-2022/>

# Some EV's in U.S. Showrooms- Fall '23





# Fisker Inc. – Manhattan Beach, CA



Will the 3<sup>rd</sup> time be the “charm”?



'23 Fisker Ocean – \$39,995



'25 Fisker Alaska Truck- \$45,500



'26 Fisker Pear - \$30,000



'26 Fisker Rōnin - \$285,000

Up to 1,000 HP ... 600 miles/charge!

**Fisker Inc.** is an American automotive company founded by Henrik Fisker and his wife Geeta in 2016.

Previously Henrik Fisker founded Fisker Automotive in 2007 to design, build and sell the Fisker *Karma*. beginning in 2011. The *Karma* was a fully electric vehicle widely hailed in California.

Production was suspended in 2012 due in part to the bankruptcy of its battery supplier A123 Systems, after about 2,000 of the vehicles had been sold.

A second effort was short-lived

In 2014, Fisker Automotive's assets were purchased by Wanxiang Group in China which renamed its new company Karma Automotive. Henrik Fisker retained the Fisker trademarks and brand.

Part of Fisker's early difficulties centered around scaling up production to maintain a consistent level of quality.

**THAT WAS 10 YEARS AGO!**

# Chery Shuxiangjia (eQ7) all-electric SUV!

Price starts at \$19,700 USD



The Chery eQ7 measures 4675/1910/1660mm, and the wheelbase is 2830mm. The car is built on China's first aluminum-based lightweight platform. The new car is available in five exterior colors, namely, green, blue, black, white, and gray.

Today, September 12, 2023 [Chery New Energy](#) officially launched its [eQ7](#) pure electric SUV in China, consumers can choose from six models with a price range of \$19,700 – \$22,400.



The motor outputs 155 kW and 285 Nm, with a 67.12 kWh battery pack, providing a 512 km CLTC pure electric cruising range. The top speed is 180 km/h and the 0 – 100 km/h acceleration time is 8 seconds.

SOURCE: <https://carnewschina.com/2023/09/13/chery-shuxiangjia-eq7-all-electric-suv-launched-price-starts-at-19700-usd/>



# What about recharging the battery?

(A “fluid and rapidly changing environment!”)



► The National Electric Vehicle Infrastructure program (NEVI), is a \$5 billion initiative to create a coast-to-coast network of 500,000 EV chargers by 2030. They are focused on major highways that support the majority of long-distance trips .

► BMW, GM, Honda, Hyundai, Kia, Mercedes-Benz, and Stellantis are creating a joint venture to launch a public charging network in North America. The full network is planned for completion by 2030.

► As of spring 2023, Tesla had more than 17,000 individual Superchargers in the United States. There are Supercharger stations in all 50 states and Puerto Rico, as well as in Canada, Mexico, and across the world, with more planned.

► In June 2023, Ford, General Motors and Tesla announced agreements allowing Ford and GM electric cars to use Tesla Superchargers starting in 2024.



80% of the miles driven by the average U.S. car  
are < 50 miles per day!

**Alternative Fuels Data Center – Location, Costs, Tax Credits, etc.**

<https://afdc.energy.gov/laws/inflation-reduction-act-summary>

# MPGe ?

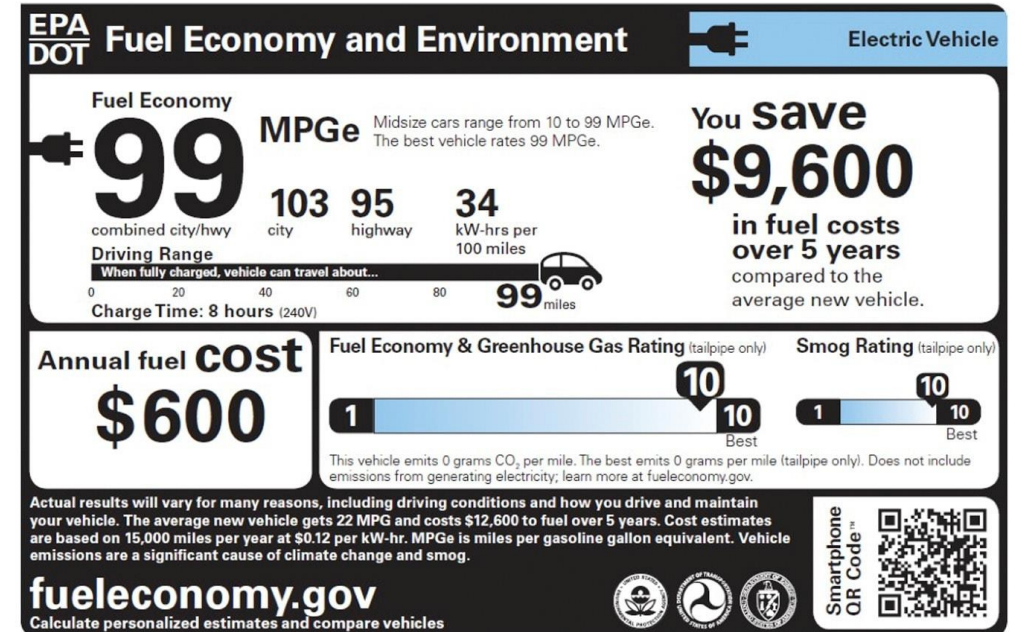
MPGe is an abbreviation for “**miles per gallon-equivalent.**” In other words, it's the electric vehicle version of mpg. MPGe was introduced by the Environmental Protection Agency (EPA) in 2010 as a means to compare the amount of energy consumed by vehicles using alternative fuels to those of gas-powered engine

## Calculating MPGe

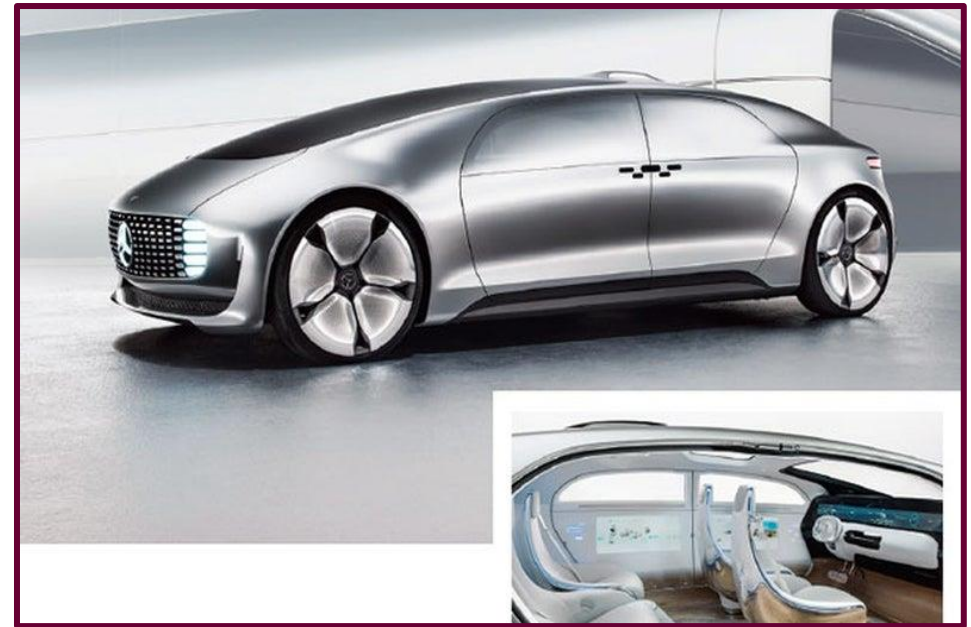
Burning gasoline generates heat. Using electricity also generates heat. So MPGe is essentially the heat equivalent of mpg.

One gallon of burned gas produces 115,000 [British thermal units](#) (BTUs). Generating the same amount of heat through electricity would require 33.7kWh, the standard unit used to measure electricity.

MPGe is the distance a car can travel on 33.7kWh of electricity. So, if a vehicle can cover 60 miles for every 33.7kWh of electricity, its MPGe would be 60. That would be the equivalent of a gas-powered car getting 60 mpg.



# Driverless vehicles?





# By 2030 25% of Miles Driven will be Driverless! \*



## Radical Shift Will Be Concentrated in Large Cities

Currently facing long commutes, crowded highways, higher insurance costs, etc.

A convergence of three trends – Ride Sharing, Autonomous Driving, and Vehicle Electrification—will offer big-city dwellers cheap, convenient transportation, transforming the automotive industry, says a report by the [Boston Consulting Group](#) \*.

Due to their ability to cut travel costs by 60%, shared autonomous electric vehicles ([SAEVs](#)) could shift about 25% of miles traveled from private automobiles—creating enormous benefits for consumers

BCG estimates that in 2030, a total of 4.7 million autonomous electric vehicles will replace 5.1 million conventional autos sold in the US.

SOURCE: \* <https://www.bcg.com/press/8july2020-self-driving-cars-are-set-to-revolutionize-urban-mobility>



# Automation could send long-haul truckers driving into the sunset

**How it would work:** Many automated trucking developers envision the use of transfer hubs, where cargo trailers would be handed off between humans and robots.

- Autonomous trucks would carry freight on the highway, between the hubs.
- Human drivers in conventional trucks would then take over on local streets to the final destination.



<https://www.youtube.com/watch?v=o6XRGEPC7wk&t=116s>

# China's EV metals crackdown!

October 24, 2023



- ▶ **China is now limiting** how much battery metal it exports, casting a cloud over the future of the electric vehicle transition
- ▶ China's Ministry of Commerce announced last week that it would require foreign companies to apply for permits to receive shipments of raw and synthetic graphite starting Dec. 1, 2023.
- ▶ Chinese officials also recently restricted the export of two minerals — gallium and germanium — used for military technologies, virtually cutting off all access.
- ▶ China's announcement came after the U.S. blocked Beijing from obtaining certain computer chips and Europe declared it would examine potential tariffs on Chinese steel and aluminum.

SOURCE: <https://www.axios.com/2023/10/23/china-graphite-metals-evs>

# Still not convinced *electric* cars are coming?

Consider the Gen “Z+” babies, learning to drive!





# Aviation



Early U.S. transport aircraft. Production began in 1925 by a Henry Ford company and ended in 1933, after 199 had been built. Cruised at 90 mph and had a range of 575 miles.



First e-VTOL (All electric aircraft) by Joby Aviation. Designed for ride-sharing / short distance commuting. Developed in conjunction with Toyota. Full certification in late '23!

## News Release: October 12, 2022 ... London (UK) Times



Delta Airlines has placed a \$60M deposit with **Joby Aviation** to use their Flying taxis to cut long-winded journeys to airports. DL will have a mutually exclusive partnership across Britain and the U.S. for five years after Joby's commercial launch



American Airlines has invested in **Vertical Airspace**, a Bristol, UK based firm and reserved 50 delivery slots of it's aircraft, now under testing.



United Airlines is backing **Eve Air Mobility**, another U.S. start-up, and has struck a preliminary purchase agreement by depositing \$10M.

# Electric Aerial Ride Sharing – E-VTOL

Joby Aviation   340 Woodpecker Ridge   Santa Cruz, CA 95060

NYSE - *JOBY*



Joby Aviation is a California-headquartered transportation company developing and manufacturing an all-electric, vertical take-off and landing aircraft which we intend to operate as a commercial passenger aircraft **beginning in 2024**. We have spent more than a decade developing and testing our zero-emissions aircraft that will travel 150+ miles on a single charge, enabling a pilot and four passengers to leapfrog over the congestion below at speeds of up to 200 mph.

Website: <https://www.jobyaviation.com/about/>

# Joby Aviation Marks Production Launch

## June 15, 2023



Additionally, we announced that Toyota North America President & CEO Tetsuo “Ted” Ogawa joined Joby’s Board of Directors.

We're grateful to all the Toyota employees working side-by-side with us in California and from Japan, playing a key role in Joby's success.

**Along with the rollout of our first production prototype,** Joby’s executive team shared some of the incredible technology behind its best-in-class performance.

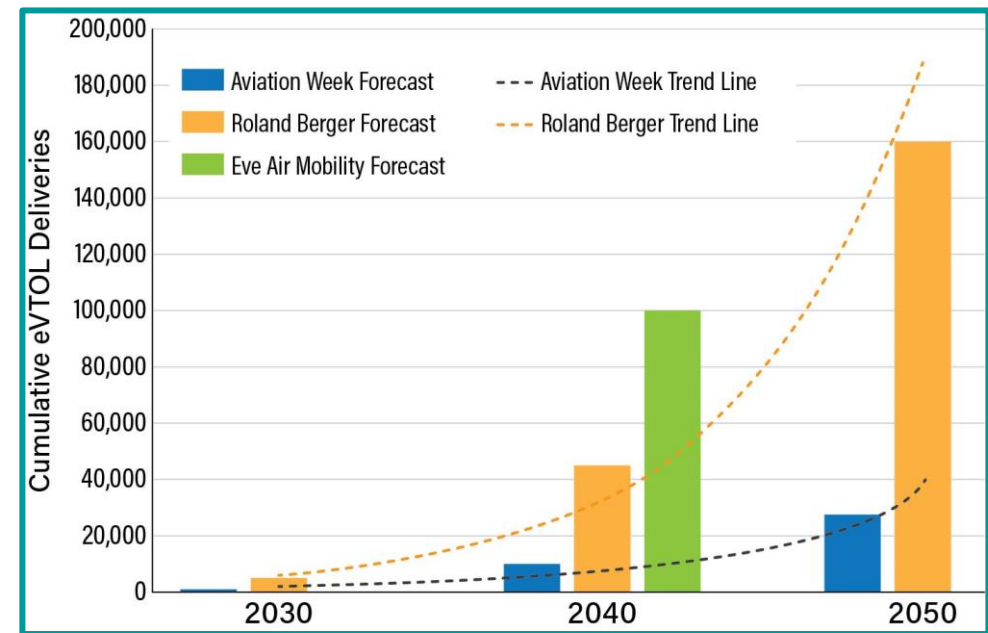
- The aircraft’s six dual-wound motors offer almost twice as much power as the Tesla Model S Plaid, despite the aircraft weighing less than the car.
- Our Joby Direct Drive motor architecture delivers high torque to spin the propellers slowly – minimizing noise – with just a single bearing as the only moving part.
- We selected a well-understood pouch cell out of the automotive supply chain that offers the specific power, specific energy, and cell life necessary for our commercial service. Our Joby-designed batteries offer 235 Watt-hours per kilogram at the pack level.
- For more than 95% of the trips made today in target markets like NYC and LA, we expect to be able to recharge our aircraft faster than it takes to deplane and board new passengers, allowing for back-to-back trips throughout the day.

SOURCE: <https://twitter.com/jobyaviation/status/1674926879319416833>



# Aviation Week Forecasts 1,000 eVTOL Deliveries By 2030

June 23, 2023



SOURCE: <https://aviationweek.com/shownews/paris-air-show/aviation-week-forecasts-1000-evtol-deliveries-2030>



## "Jetsons" era gets closer



The \$98,000 Jetson ONE can fly up to 1,500 feet in the air.

SOURCE: <https://www.jetsonaero.com/>

<https://www.axios.com/2023/10/06/personal-flying-machines-jetsons>

**Personal flying machines** are almost here: Anyone with the money and a few hours of training will be able to fly one.

A pilot license takes time, studying and dedication. But new technologies — some borrowed from electric cars and video games — are providing another route.

- Headquartered in Italy with plans to move to the U.S., Jetson has raised \$15 million from investors, including [will.i.am](https://www.will.i.am).
- The company has 300 orders - **deliveries in 2024**.

How it works: The Jetson ONE takes off vertically and then tilts forward, flying at a top speed of 63 mph and at an altitude of up to 1,500 feet. At less than 200 pounds, it qualifies as an "ultralight" aircraft, with relatively few FAA restrictions.

The pilot uses intuitive joystick controls. Redundant motors and propellers mean the plane can keep flying in the event of failure. Nevertheless, a parachute deploys.

# Sustainable Aviation Fuels – SAF's!



The aviation sector has long been considered one of the most difficult to decarbonize. Aviation accounts for 3% of global carbon emissions today, expected to triple by 2050.

SAF's are produced from ingredients including food scraps, forestry and municipal waste, packaging, textiles, i.e, *biomass*, a catch-all term for organic material.

Compared to traditional jet fuel, it provides up to a 70% reduction in carbon emissions over its lifecycle.

In 2021, some 33 million SAF gallons were added to commercial, transport and military flights, an initial part of the nearly 90 billion (B.) gallons used.

The *Clean Skies for Tomorrow Coalition*, a World Economic Forum initiative comprising 60 global companies, set a goal for the aviation industry to use 10% of SAF in its operations by 2030.



# Pilotless Commercial Passenger Planes?

Like it or not, the idea of pilotless airline travel is moving forward.

In December of 2019, Airbus performed its first fully automatic vision-based takeoff using an Airbus A350-1000 test aircraft at Toulouse-Blagnac Airport. They called it a “milestone in Airbus’ Autonomous Taxi, Take-Off & Landing (ATTOL) project,” launched in June 2018.



SOURCE: <https://www.travelpulse.com/news/airlines/airbus-makes-successful-test-run-of-pilotless-plane.html>

# Autonomous (Pilotless) Air Taxi

**WISK Aero**    2700 Broderick Way    Mountain View, CA 94043

Currently trades under a SPAC (special purpose acquisition company)  
Reinvent Technology Partners, on the NYSE under "RTP"



Wisk was established in 2019 as a joint venture between The Boeing Company and Kitty Hawk Corporation, two leaders in aviation who are shaping the future of mobility.

Web site: <https://wisk.aero/about/>

# Will pilotless aircraft be cleared for takeoff?\*

Airlines are keen to start using autonomous commercial aircraft to reduce flight crew costs and address pilot shortages

- ▶ "A pilotless airliner is going to come; it's just a question of when," said James Albaugh – in 2011 when he was president and CEO of Boeing Commercial Airlines.
  - ▶ Xwing, Reliable Robotics and Merlin Labs **have converted** *existing aircraft* (Cessna Caravan & Beechcraft King Air) the workhorses of light aviation.
    - » FedEx, UPS, DHL and Amazon are observing or becoming directly involved.
  - ▶ "A future pilot will still be needed, but he or she will sit in an office flying and managing the aircraft from the ground like the drone pilots already do."  
Capt. Tilmann Gabriel Chairman, International Pilot Training Association
  - ▶ Google is testing a two-person, electric powered air taxi in New Zealand known as *Cora*, with three onboard computers to calculate its flight path – no pilot necessary
  - ▶ At first, autonomous aircraft will be used for industrial jobs that AIA calls "dull, dirty and dangerous": fighting forest fires, inspecting infrastructure, surveying crops, et al.

Sources: [irishtimes.com/business/innovation/autonomous-flight](http://irishtimes.com/business/innovation/autonomous-flight)  
[unitingaviation.com/news/safety/future-flight-pilotless-aircraft/](http://unitingaviation.com/news/safety/future-flight-pilotless-aircraft/)



# Aircraft by 2030 - Substantially Reduce Emissions



The hybrid electric aircraft that GE Aerospace and MagniX are developing as part of NASA's Electrified Powertrain Flight Demonstration (EPFD) project.

# G-BOAB - British Airways Concorde - SST



- ▶ Built by British Aircraft Corporation
- ▶ Entered service May 18, 1976
- ▶ September 1984: Sets an SST record:  
4,565 miles from Washington to Nice.
- ▶ Final flight - August 15th 2000  
BA002P JFK-LHR
- ▶ Hours Flown - 22,296 Hrs 55min  
Landings - 7,810  
Supersonic Flights - 6,688

SOURCE: <https://www.heritageconcorde.com/g-boab>

# Supersonic Transport Aircraft



Air France Concorde – January 26, 1976  
[November 26, 2003]



TU – 144 – November 1, 1977  
[June 1, 1978]



Overture – I – 2029 / 30 ?

\* \* \* \* \*

## Challenges to be met:

1. Reduce/eliminate sonic boom
2. Drastically improve fuel consumption
3. Reduce passenger cost/seat



# American places deposit on 20 Overture aircraft!

The world's largest airline, poised to have the world's largest supersonic fleet.

## The return of super-sonic air travel!

2022 Overture Super-factory announced  
Overture design revealed  
2024 Production launch  
2025 Rollout  
2026 First flight

(Founded 2014)

### Boom Supersonic

- 12876 East Adam Aircraft Circle
- Englewood, CO 80112
- United States

NASDAQ: *BOOM* @ \$26.66 / Share



SOURCE: <https://boomsupersonic.com/overture>

# “United plans supersonic passenger flights by 2029”(?)

BBC News – June 5, 2021



US airline United has announced plans to buy 15 new supersonic airliners and "return supersonic speeds to aviation" in the year 2029.

The new Overture aircraft will be produced by a Denver-based company called Boom, which has yet to flight-test a supersonic jet.

United's deal is conditional on the new aircraft meeting safety standards.

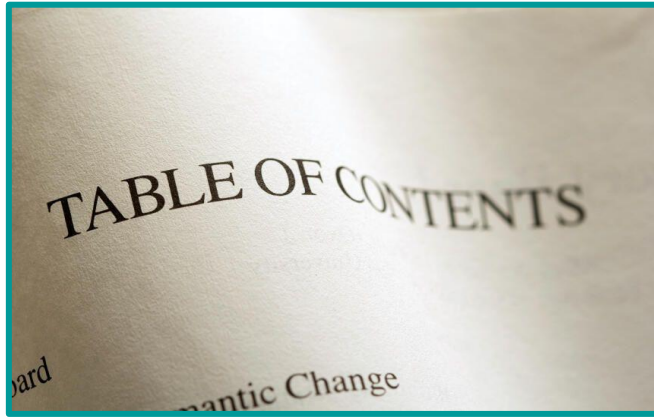
SOURCE: <https://www.bbc.com/news/technology-57361193>

# Time for a Break!





# What we'll *try* to cover!



Topic
Automobiles
Aviation
Energy
Environment
Education
Healthcare
A / I
Social Media

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# Energy



Oil Field – Texas – 1909

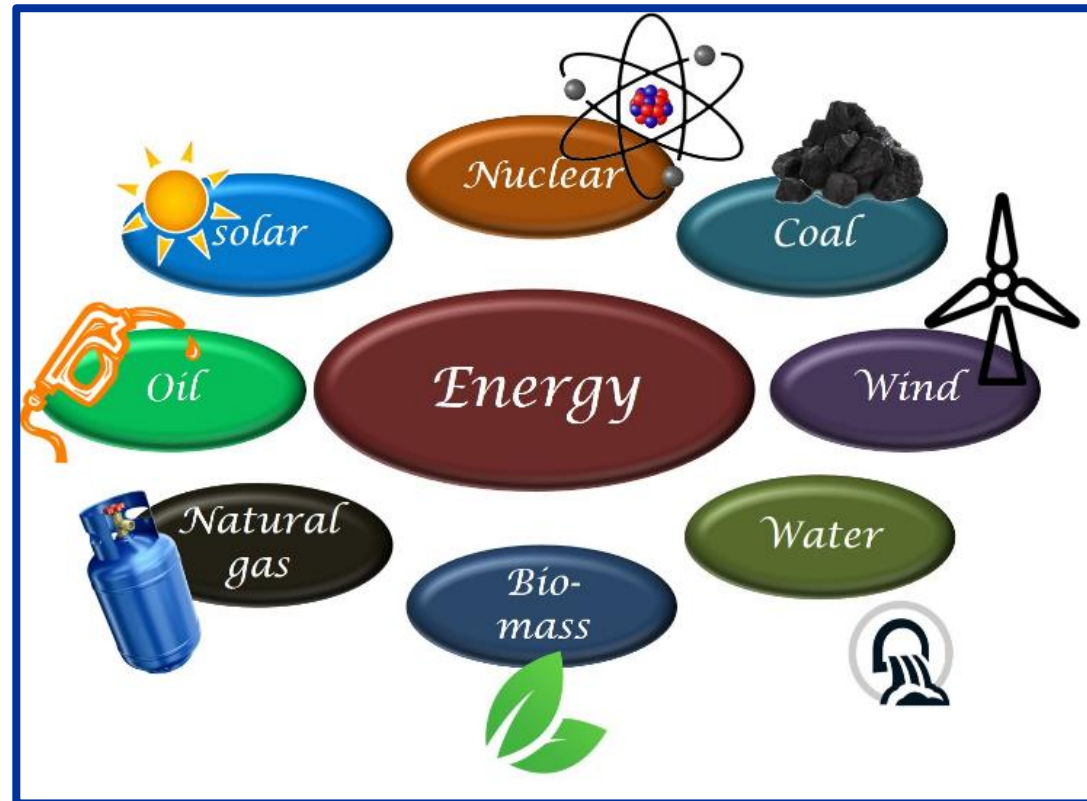


Solar Farm – Arizona - 2023

# En·er·gy

/ˈenərjē/

*Noun* power derived from the utilization of physical or chemical resources, especially to provide light and heat or to work machines

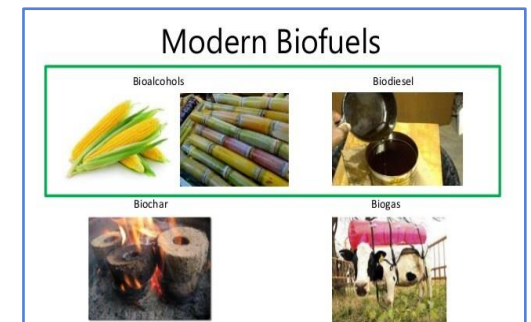




# Ranking of Global Energy Sources - 2022



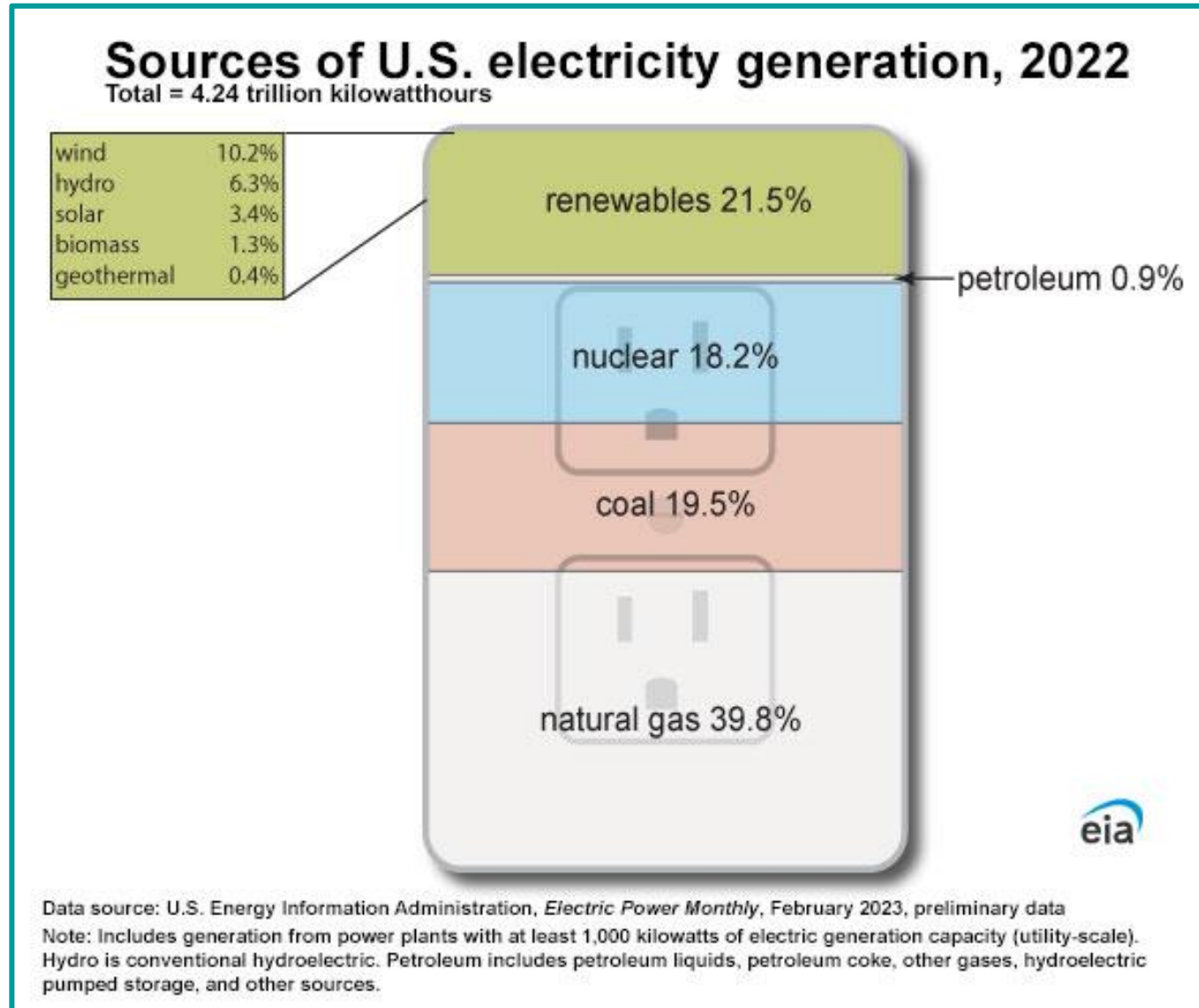
Rank	Source	Terawatt Hours *	% of Total
1	Oil	52,970	29.6%
2	Coal	44,854	25.0%
3	Natural Gas	39,413	22.0%
4	Hydro	11,300	6.3%
5	Bio-Mass	11,111	6.2%
6	Nuclear	6,702	3.7%
7	Wind	5,488	3.1%
8	Solar	3,448	1.9%
9	Other Renewables	2,414	1.3%
10	Modern Bio Fuels	1,199	0.6%
	<b>TOTAL:</b>	<b>178,899</b>	<b>100.0%</b>



\* A terawatt-hour is a unit of energy equal to outputting one trillion watts for one hour. It is equal to  $3.6 \times 10^{15}$  Joules

SOURCE: <https://ourworldindata.org/energy-mix>

# U.S. utilities electricity generation by source - 2022



SOURCE: <https://www.eia.gov/>

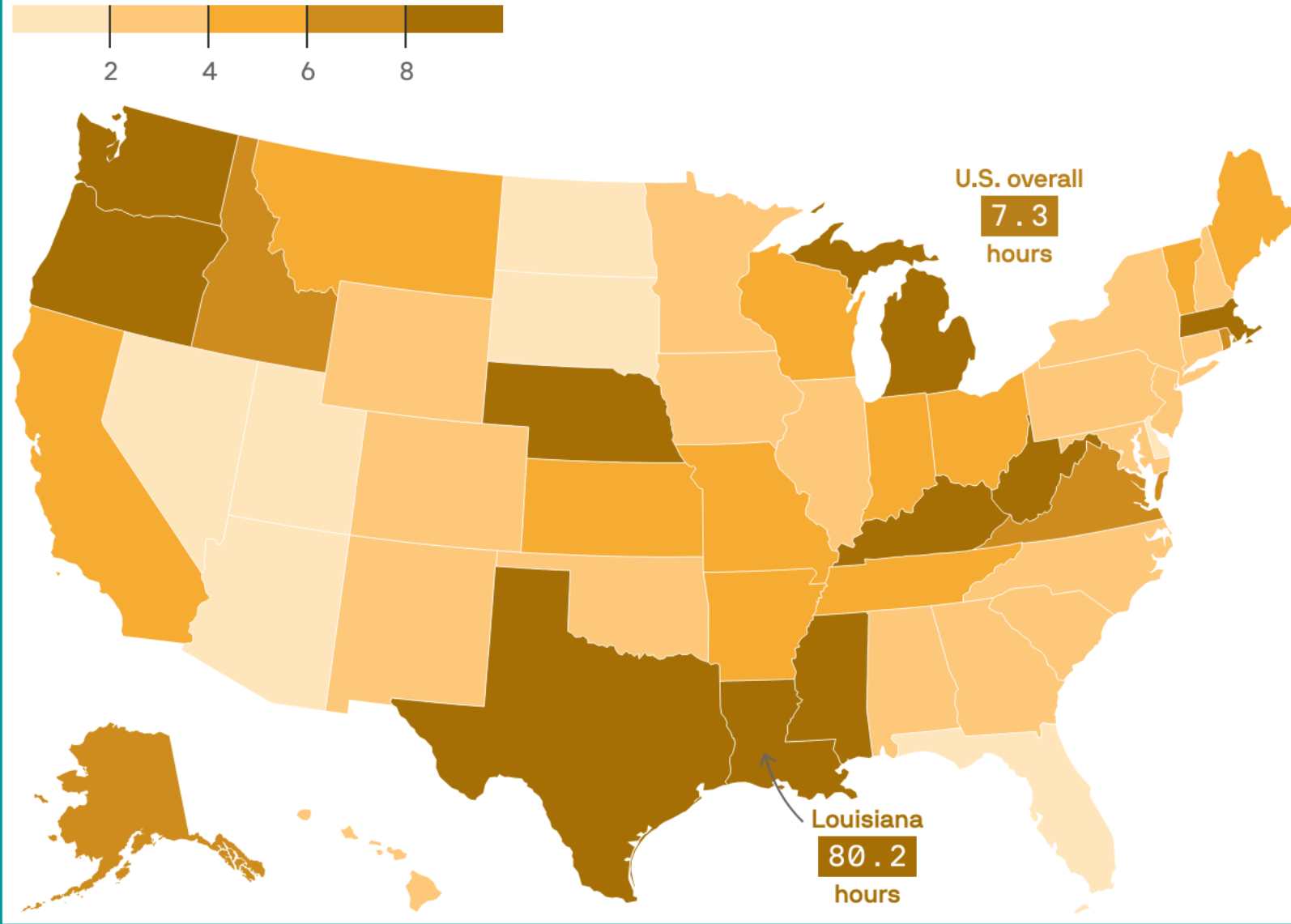
# The “Ageing” U.S. Electricity Infrastructure! \*



- ▶ “The U.S. has an outdated and fragmented power grid is increasingly threatened by the effects of climate change and global warming, but estimates show that upgrading it may cost billions, even trillions!”
- ▶ “The American Society of Civil Engineers, which gave the U.S. energy system a “C-” grade on its 2021 infrastructure report card, said then that grid investment trends will eventually lead to a funding gap of almost \$200 billion by 2029.”
- ▶ “The Department of Energy currently estimates that power outages cost the U.S. economy \$150 billion annually, not including the human toll.”
- ▶ “A large swath of the U.S. power grid is decades old, and powered by fossil fuel plants. The grid wasn’t designed with today’s extreme weather events in mind, said Dr. Payman Dehghanian, GWU’s School of Engineering.”

\* SOURCE: <https://www.axios.com/2023/07/11/us-power-grid-modernize-climate-change>  
BY: Jacob Knutson July 11, 2023

# Hours of electrical outage experienced by the average customer in 2021



SOURCE  
U.S. Department of Energy



# What about *electric* cars?

*Better fuel economy!*



*Eliminates gas-engine pollution!*



*Lowers maintenance costs!*

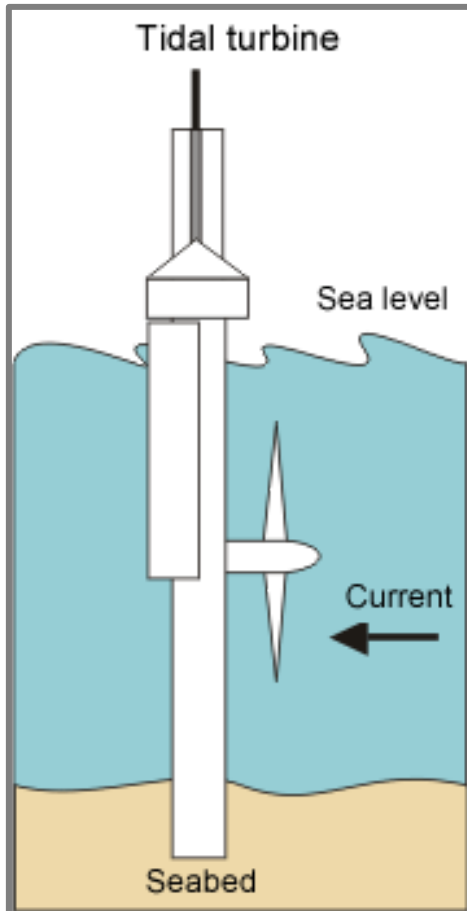


*Raises demand for electricity!*



# One example of a new “idea”!

## Tidal flow turbines!



There are several demonstration tidal energy projects in various stages of development in the United states including:

- [Roosevelt Island Tidal Energy \(RITE\) Project Pilot](#)  
In the East River of New York
- [Western Passage Tidal Energy Project](#) in Maine
- [Cobscook Bay Tidal Energy Project](#) in Maine

# Plans For New Nuclear Reactors Worldwide

Today there are about 440 nuclear power reactors operating in 32 countries with a combined capacity of about 390 GWe. In 2022 these provided 2653 TWh, about 10% of the world's electricity.



- Nuclear power capacity worldwide is increasing steadily, with about 60 reactors under construction.
- Most reactors on order or planned are in the Asian region, though there are major plans for new units in Russia.
- Significant further capacity is being created by plant *uprating*.
- Plant lifetime extension programs are maintaining capacity, particularly in the USA.



In the [USA](#), the Nuclear Regulatory Commission has approved about 165 uprates totalling over 7500 MWe since 1977, a few of them 'extended uprates' of up to 20%.

SOURCE: <https://world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx>

## # of Active Nuclear Power Reactors Worldwide as of May 2023

Rank	Country	#
1	U. S. A.	93
2	France	56
3	China	55
4	Russia	37
5	Japan	33
6	South Korea	25
7	India	22
8	Canada	19
9	Ukraine	15
10	U. K.	9

As of May 2023, there were 436 nuclear reactors in operation in 32 countries around the world

SOURCE: <https://www.statista.com/statistics/number-of-nuclear-reactors-in-operation-by-country/>

## % of Total Electrical Grid Supplied by Nuclear - 2021

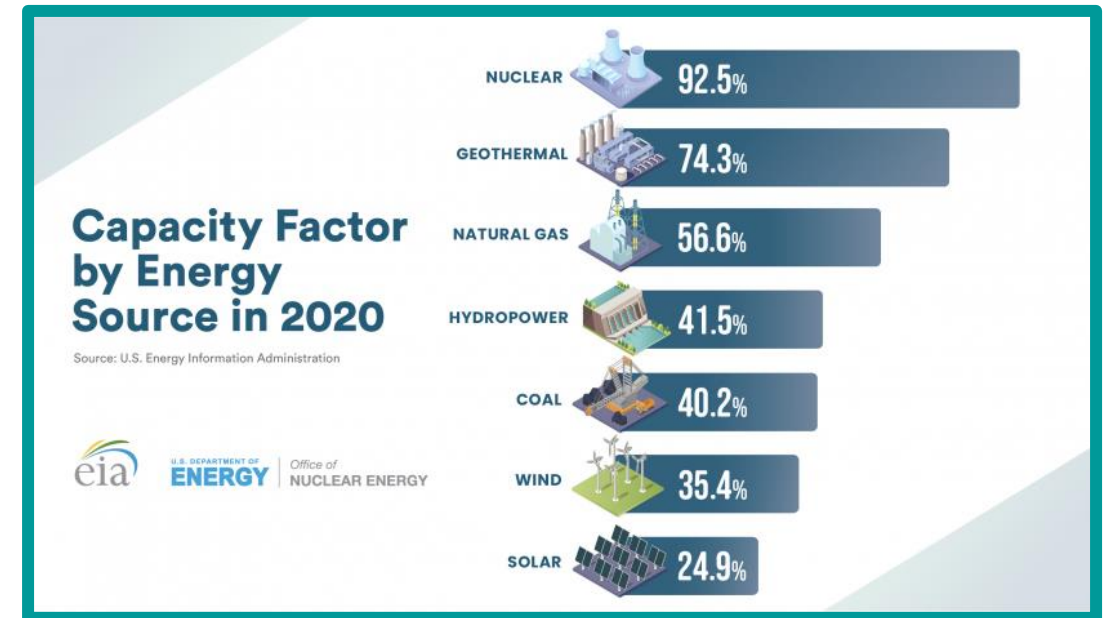
Rank	Country	GWh Supplied to grid	% Nuclear To TOTAL grid
1	France	282093.23	62.6 %
2	South Korea	167513.86	30.4 %
3	Spain	56150.36	20.3 %
4	Russia	209516.56	19.6 %
5	U. S. A.	772220.52	18.2 %
6	U. K.	43604.79	14.2 %
7	Canada	81717.65	12.9 %
8	Japan	51907.51	6.1 %
9	China	395353.82	5.0 %
10	India	41972.38	3.1 %

SOURCE: <https://worldpopulationreview.com/country-rankings/nuclear-power-by-country>



# Nuclear Power in the 21<sup>st</sup> Century

- ▶ All nuclear reactor designs must satisfy three fundamental safety functions in the event of a significant abnormal event: stop the fission chain reaction, ensure adequate cooling of the nuclear fuel, and prevent the release of radioactivity into the biosphere.
- ▶ America's nuclear power plants are among the safest and **most secure industrial facilities in the world**. Multiple safety systems, the industry's commitment to comprehensive safety procedures, robust training programs and stringent federal regulation keep nuclear plants and neighboring communities safe
- ▶ New nuclear plants are much safer today as they are smaller, can be run safely at higher temperatures and lower pressures with alternative coolants to water, such as molten salt, inert gas or liquid metals.



Nuclear energy has by far the highest capacity factor of any other energy source. This basically means nuclear power plants are producing maximum power more than 92% of the time during the year. That's about nearly 2 times more as natural gas and coal units, and almost 3 times or more reliable than wind and solar plants.

# Government estimates of renewable energy sourcing!

## Non-nuclear Renewables

### U.S.A. @ 33% - 2030

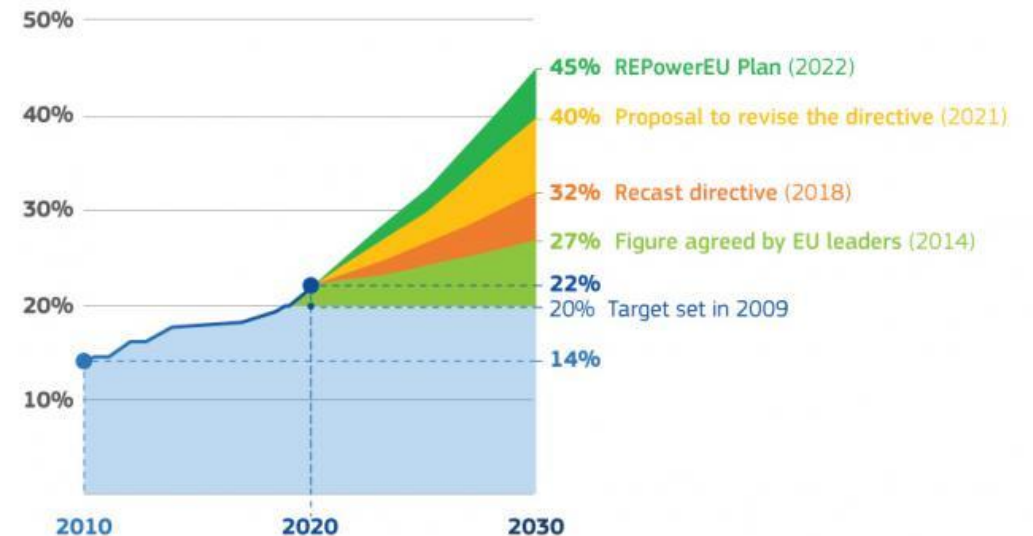
“US Energy Information Administration (EIA) and the Federal Energy Regulatory Commission (FERC) suggest continued strong growth by renewable energy sources. EIA's data from the past ten years indicate **renewables could be one-third of US electrical generation in 2030.**”

SOURCE: <https://renewablesnow.com/news/renewables-on-track-to-provide-33-50-of-us-2030-electricity>

SOURCE: <https://renewablesnow.com/news/renewables-on-track-to-provide-33-50-of-us-2030-electricity>

### E.U. @ 45% - 2030

#### Evolution of renewable energy targets



SOURCE: <https://energy.ec.europa.eu/topics/renewable-energy>

So, how much / how fast will the U.S. increase sources of electricity from renewables?

Energy Source	2022	2030 +/- ?	2030 ?
Fossil fuels	59.3%	▼	
<u>RENEWABLES</u>			
Nuclear	18.2%	▲	20.0% ?
Wind	10.9%	▲	15.0% ?
Hydro-power	7.3%	-	7.3% ?
Solar	3.9%	▲	10.7% ?
Sub-total Renewables:	40.4%		53.0% ?
New Renewable Sources	--	?	

	2022	2030 ?
Wind	10.9%	15.0% ?
Hydro-power	7.3%	7.3 %
Solar	3.9%	10.7 %
<b>Total:</b>	22.1 %	33.0 %

# “If you build it, they *will* come!”

“It” = Market **demand**, for more electricity at peak usage times is already **established** ... rechargeable battery powered devices, including cell phones, power tools, cars, safety monitoring devices, portable lighting, et al..



“They” = A transformed mix of generating sources for electricity (a mix of renewable and historical sources) AND a transformed distribution network coordinating the peaks/valleys of usage across time zones.



Given the “it”, “they” **will** come ... one step at a time!



# A “*field of dreams*” requires dreamers and doers!



- ▶ The MARKET is creating these new demands
- ▶ Entrepreneurism is incented by market demands
- ▶ Capitalism responds to market demands
- ▶ Corporations are engaged in new developments
- ▶ Federal, state and local agencies MUST coordinate
- ▶ Both Source & Distribution channels will change
- ▶ New methods, processes and products are evolving

☀ The above applies globally as the demand is global!

Many companies in many nations are working on these electricity issues!

# Environment



Industrial pollution – 1950's



Environmental protection – 2020's



# Will the weather be “different” in 2030?



2022  
Photos!



# By 2030, Earth Could Experience Once-Per-Century Heat Waves Every Other Year, Study Says \*

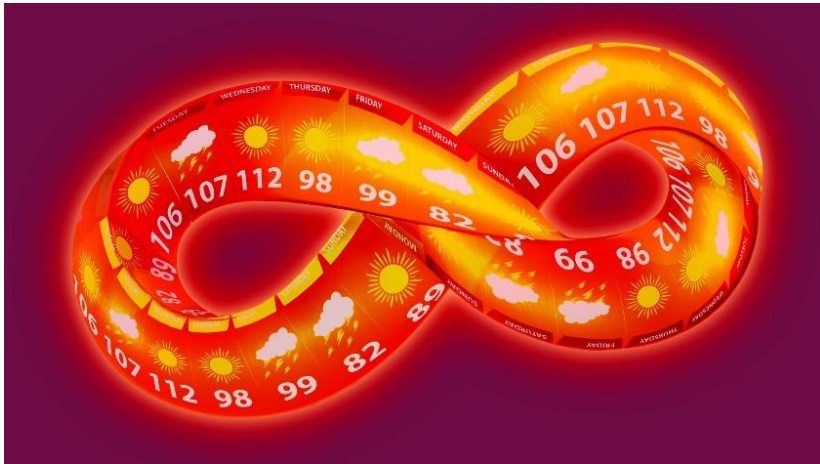
“By 2030, almost all countries will experience “extreme hot” weather every other year due mainly to greenhouse gas pollution by a handful of big emitters, according to a [paper](#) published Thursday by *Communications Earth & Environment*, reinforcing forecasts that the coming year will be one of the hottest on record.”



\* SOURCE: <https://www.forbes.com/sites/zacharysmith/2022/01/06/by-2030-earth-could-experience-once-per-century-heat-waves-every-other-year-study-say>\*\*



# What summer '23's weather reveals about climate change.\*



THE JUNE GLOBAL SURFACE  
TEMPERATURE WAS 1.05°C (1.89°F)  
ABOVE THE 20TH-CENTURY AVERAGE  
OF 15.5°C (59.9°F);  
JUNE, 2023 IS NOW THE WARMEST JUNE  
ON RECORD!

- The sea ice that usually wraps around the icebound Antarctic continent is at its [lowest level on record](#).
- There are [unprecedented wildfires burning in Canada](#) and multiple [extreme heat events worldwide](#).
- Italy issued hot weather [red alerts for 16 cities on July 16](#) with meteorologists warning that temperatures will hit record highs across southern Europe in the coming days.
- The National Weather Service issued an [excessive heat warning for Miami-Dade County](#), first time the region has been under such an alert.
- Record temperature of an incredible 51.7C which destroys the previous [Chinese national record](#) by a full 1C!
- [Insane heat event ongoing in Siberia](#) with dozens records obliterated every day and will get worse.

\* SOURCE: Andrew Freedman, [Axios](#), July 17, 2023

# Climate Change! Global Warming!

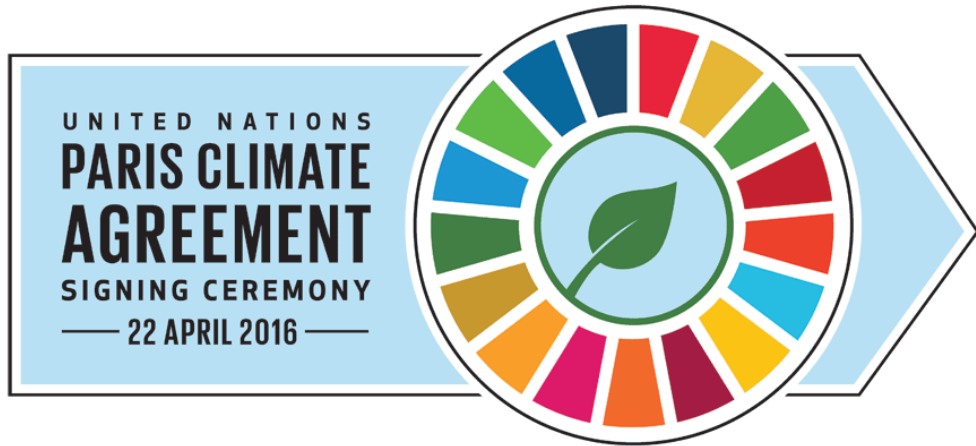
## The Paris Agreement

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on December 12, 2015 and entered into force on November 4, 2016.

Its goal is to **limit global warming** to well below 2, preferably to **1.5 degrees Celsius**, compared to pre-industrial levels.

To achieve this long-term temperature goal, countries aim to **reach global peaking of greenhouse gas emissions as soon as possible** to achieve **a climate neutral world by mid-century ... 2050**.

The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.



RANK	COUNTRY	TOTAL CO2 EMISSIONS
1	China	10.06GT
2	United States	5.41GT
3	India	2.65GT
4	Russian Federation	1.71GT
5	Japan	1.16GT
6	Germany	0.75GT
7	Republic of Iran	0.72GT
8	South Korea	0.65GT
9	Saudi Arabia	0.62GT
10	Indonesia	0.61GT
11	Canada	0.56GT
12	Mexico	0.47GT
13	South Africa	0.46GT
14	Brazil	0.45GT
15	Turkey	0.42GT
16	Australia	0.42GT
17	United Kingdom	0.37GT
18	Poland	0.34GT
19	France	0.33GT
20	Italy	0.33GT

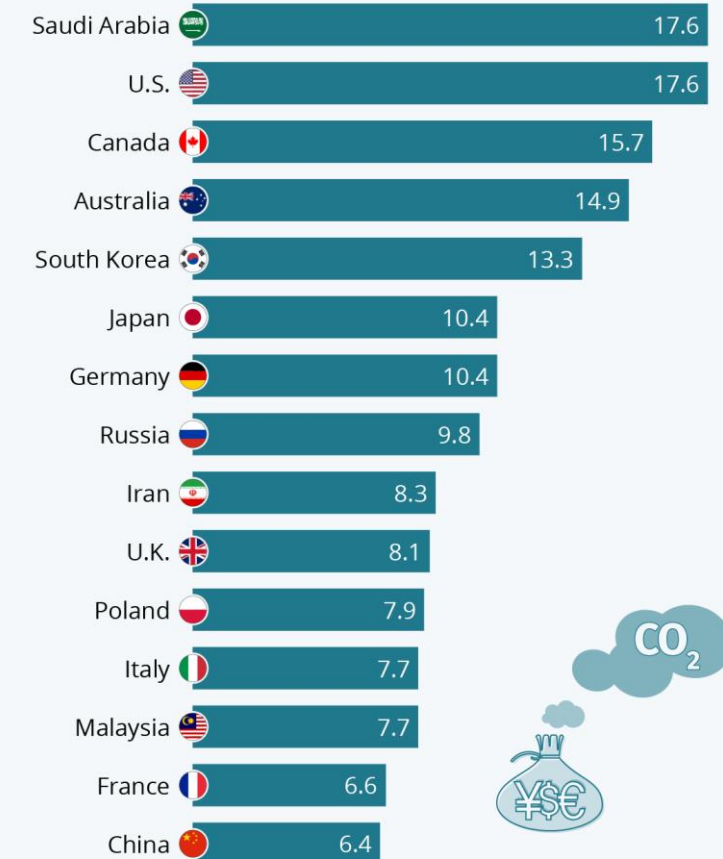
SOURCE: <https://www.ucsusa.org/resources/each-countrys-share-co2-emission>

The 20 countries that  
emitted the most  
◀ CO2 in 2022

Per Capita CO2  
Emissions by  
Country ▶

## Wealthy Nations Lead Per-Capita Emissions

Countries with highest per-capita emissions, in metric tons CO<sub>2</sub>



Source: World Bank



statista

SOURCE: <https://www.statista.com/chart/24306/9/carbon-emissions-per-capita-by-country/>

# What *might* / *should* / *must* / *will* happen by 2030?

To achieve the 1.5 degrees Celsius target, **the world must reduce annual carbon dioxide emissions by 48 per cent by 2030**, and reach net zero by 2050, while reducing methane emissions by a third by 2030 and almost halving them by 2050. Apr 5, 2022



To prevent the worst outcomes from climate change, **the U.S. will need to reduce greenhouse gas emissions by 50% in the next eight years**. Scientists from around the nation have developed a blueprint for success. The United States has set an ambitious goal to reduce greenhouse gas (GHG) emissions by at least 50% by 2030. Jun 2, 2022

SOURCE: <https://www.firstpost.com/world/explained-the-crucial-1-5-degrees-celsius-climate-target>



# Energy Department announces largest-ever investment in ‘carbon removal’!



The Energy Department announced Friday it is awarding up to **\$1.2 billion** to two projects to directly remove carbon dioxide from the air in what officials are calling the largest investment in “engineered carbon removal” in history.

The process, known as **direct air capture**, does not yet exist on a meaningful scale and *could be a game changer* if it did and were economical.

**Project Cypress** will be built in Calcasieu Parish, Louisiana. South Texas DAC is planned for Kleberg County, Texas. Each expects to capture up to one million metric tons of carbon dioxide per year initially. The goal is to scale up to remove **30 million metric tons per year** once fully operational.

# Cargo moving on "WindWings"



- ▶ A cargo ship outfitted with two giant, high-tech sails called "WindWings" is now being tested on ocean routes
- ▶ The goal is to achieve average fuel savings of up to 30% or more on new vessels, which could be combined with other emissions cuts from using alternative fuels like [methanol](#) instead of greenhouse gas-intensive heavy fuel oil.
- ▶ "Zero carbon fuel ships are coming into the market earlier than expected, we may consider putting WindWings on new builds rather than retrofitting," indicates Jan Dieleman, president of Cargill's Ocean transportation business,

SOURCE: Axios by Andrew Freedman - August 21, 2023



# 2030 Goals



## CARBON EMISSIONS

Reduce or store 3 gigatons of CO2 emissions yearly

## HELPING PEOPLE

Benefit 100 million people at climate risk

### Conserve

10 billion acres of ocean

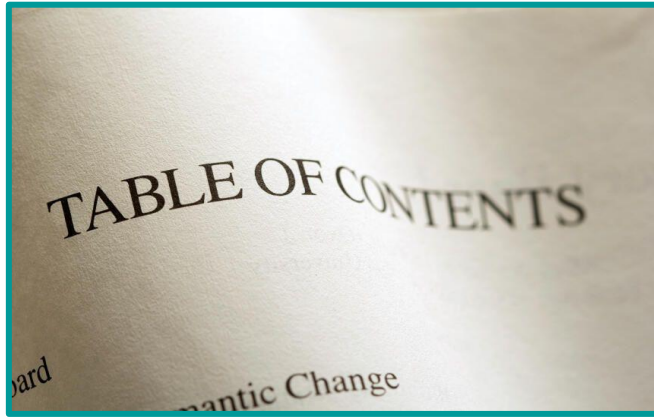
1.6 billion acres of land

More than 620,000 miles of rivers

### Support

45 million local stewards

# What we'll *try* to cover!



Topic
Automobiles
Aviation
Energy
Environment
Education
Healthcare
A / I
Social Media

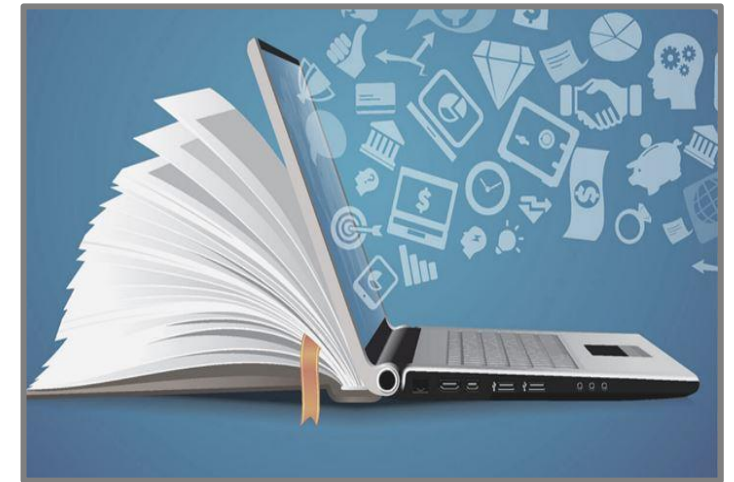
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# Education



# Education by 2030!



# What will the student experience look like in 2030? \*

1. Mobile will replace traditional learning!
2. Gaming will go up a gear!
3. Video learning will be the norm!

- ▶ Learning Management Systems will allow students to have instant access to lessons, back-ground material and tests on a range of mobile devices ... customizing and expediting the learning process.
- ▶ Students prefer a virtual/interactive learning process that complements their digital skills and offers instant feedback (students and teachers!) via check tests at anytime, adding an element of competitiveness.
- ▶ Video-sharing technologies will provide greater opportunities both in-class and on-line for expanded content presentation and discussion thereafter. Students will learn more *visually* than via lectures.

# Top Technology Trends for Education \*

1. e-Learning
2. Video-assisted Learning
3. Blockchain Technology
4. Increased “Big” Data
5. Artificial Intelligence
6. Learning Analytics
7. Gamification
8. Augmented & Virtual Reality
9. STEAM
10. Cloud Technology
11. Asynchronous Learning

Technology CHANGING Learning!

Accommodates Different Learning Styles

Provides teachers more time to “teach”!

Increased Student Engagement

Addresses plagiarism & fraud

More data to evaluate performance

Better measures of student’s needs.

Students can set their own schedule

Classroom is more immersive & Interactive!

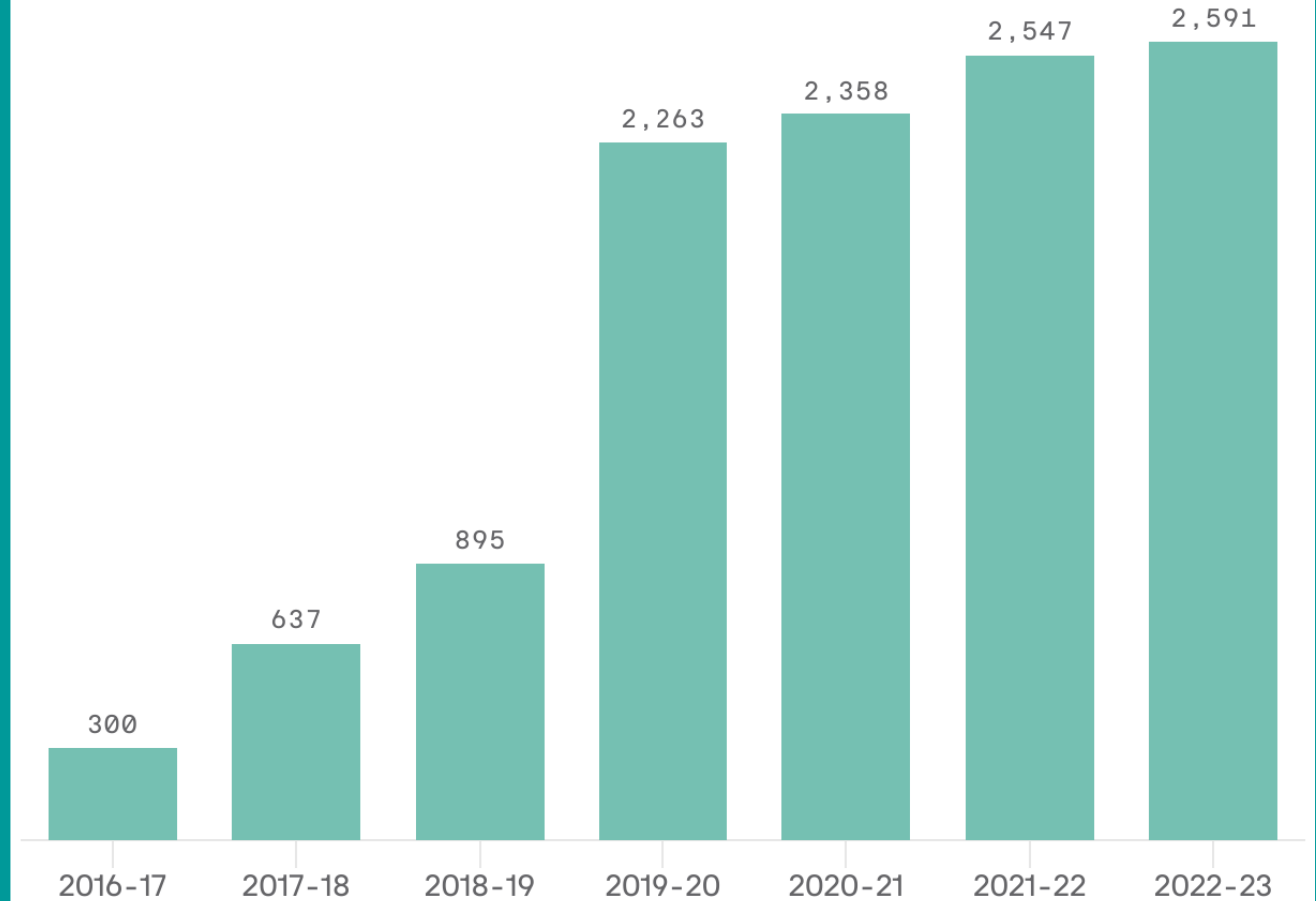
\* SOURCE: <http://www.powergistics.com/education>



# K-12 Education Technology Tools



Average number of edtech tools used by U.S. school districts



SOURCE: <https://app.learnplatform.com/>

# Education – 2030 – Not just technology!

“A paradigm shift for the class of 2030 By the time today’s kindergartners enter the workforce, **activities will substantially change across most occupations** and will increasingly require the application of expertise and **creative problem solving**, as well as collaboration, management, and the development of people.”

“Sharpening the focus on **social-emotional skills**. The strongest signal from our study was the need for teachers, schools, and school leaders to help students develop stronger social-emotional skills. While not new in education, **these skills are newly important** and are taking center stage alongside cognitive skills and content knowledge in the classroom and in the workforce.”

**Personalizing learning to accelerate progress.** “Modern learning experience design should center attention on the needs of students; approaching learning as a fluid, holistic, seamless set of experiences. Modern learning experience designs include inquiry-based learning, project-based learning, challenge-based learning, phenomenon-based learning, etc.”

Rank of 85	Country 2022 – Prelim.	Combined Score
1	China	1,736
2	Singapore	1,669
3	Estonia	1,579
4	Japan	1,560
5	South Korea	1,559
6	Canada	1,550
7	Finland	1,549
8	Poland	1,539
9	Ireland	1,514
10	United Kingdom	1,511
15	Germany	1,501
17	Australia	1,497
19	Norway	1,490
21 of 85	United States	1,485

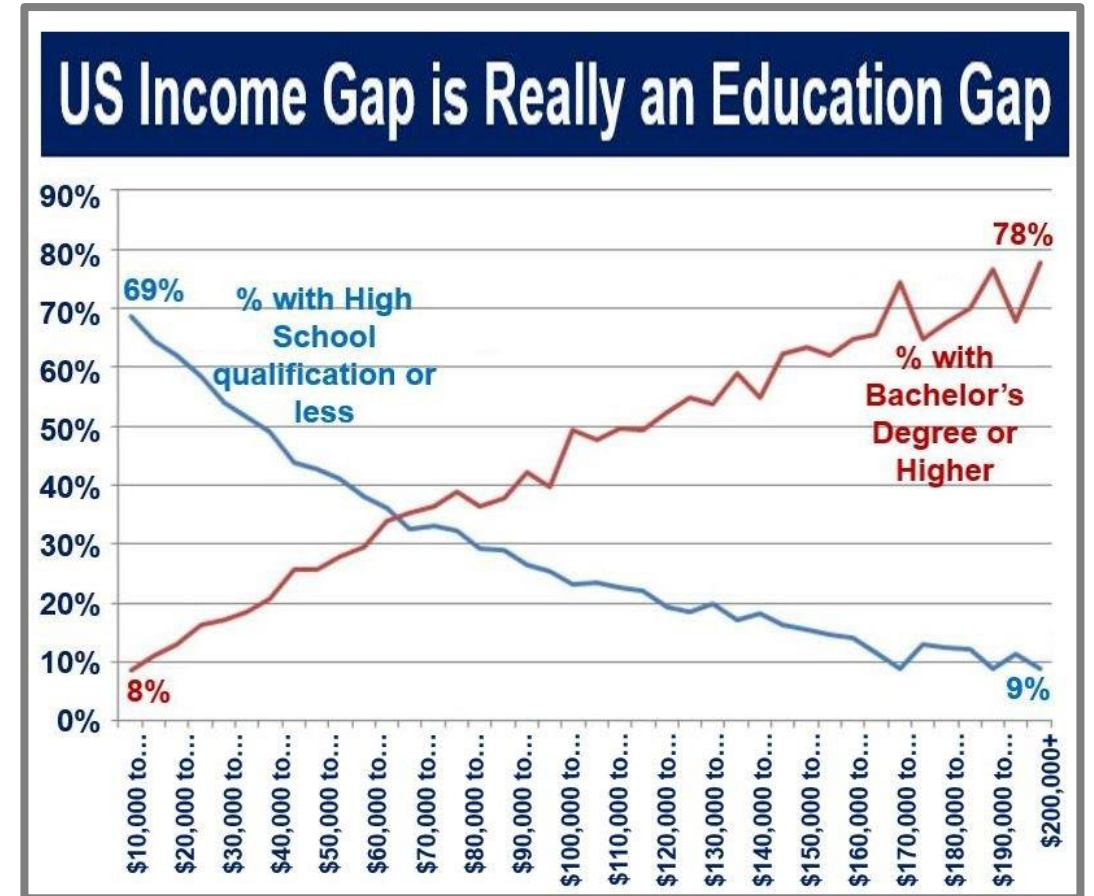
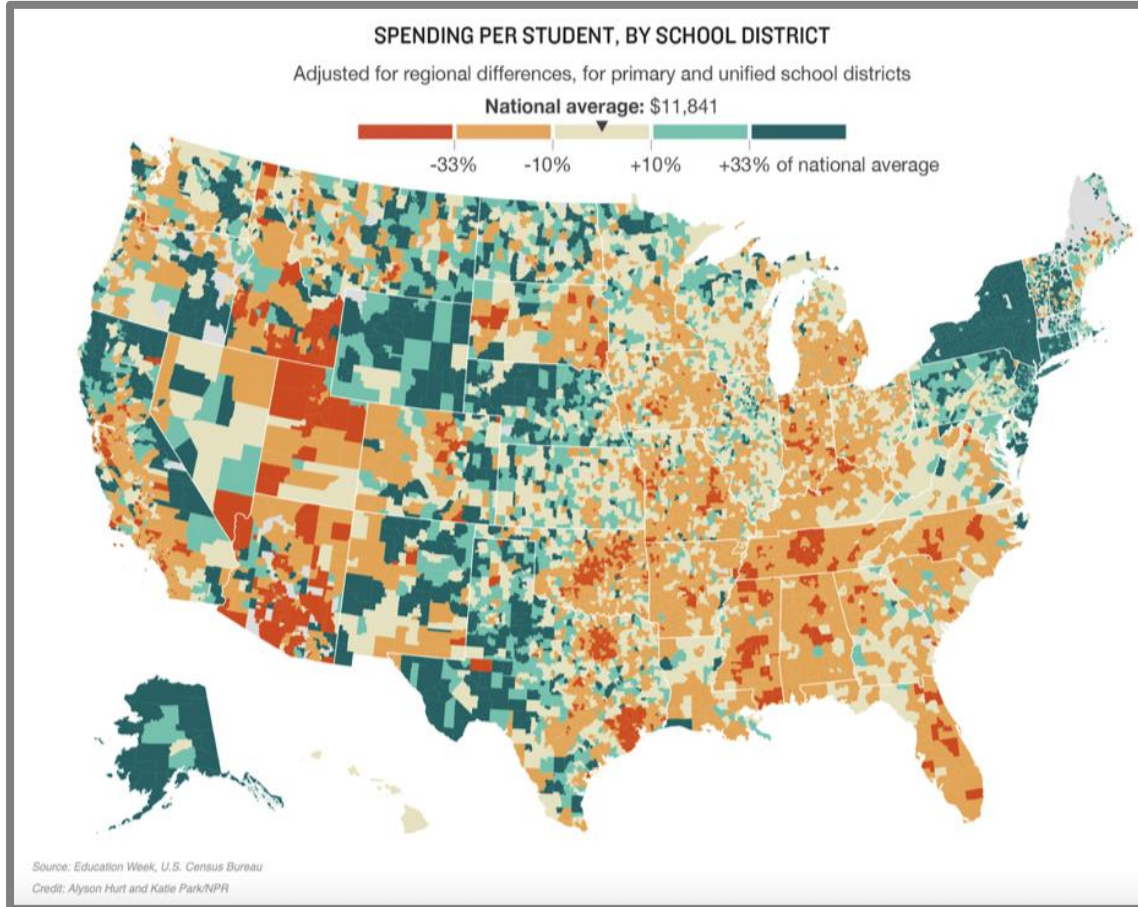
## Math, Science, Reading Scores

The Program for International Student Assessment (PISA) is a worldwide study by the [Organization for Economic Co-operation and Development](#) (OECD) in member and non-member nations. Educational systems are evaluated by measuring **15-year-old school pupils'** scholastic performance on **Mathematics**, **Science**, and **Reading**. It is repeated every three years. Its aim is to provide comparable data enabling countries to improve their education policies and outcomes.





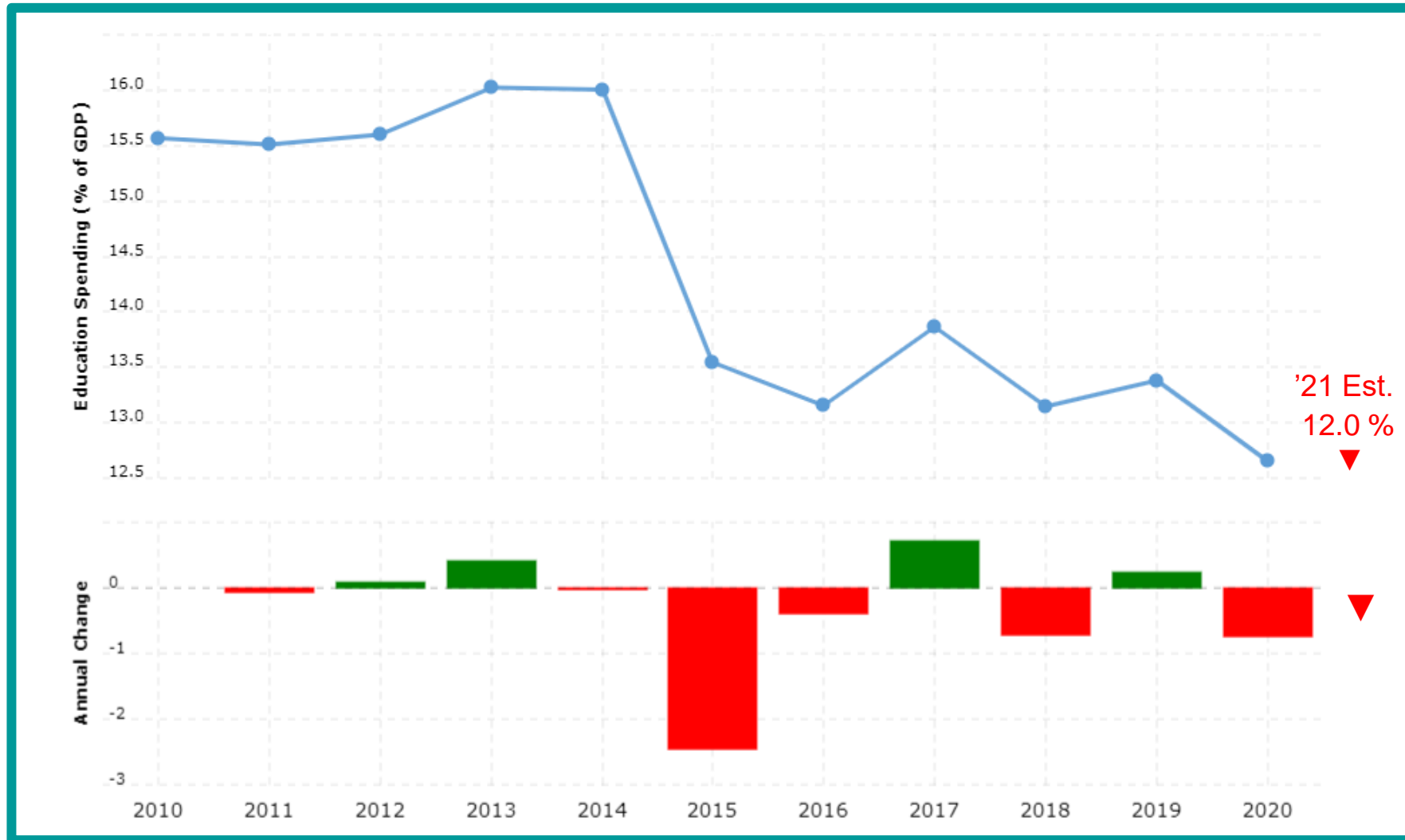
# U.S. Education Spending -2021



SOURCE:<https://blog.richmond.edu/livesofmaps/2022/02/27/spending-per-student-by-school-district-our-tax-dollars-eduction/>



# U.S. Government Spending on Education as % of GDP



SOURCE: <https://www.macrotrends.net/countries/USA/united-states/education-spending>

# Education Inequality in the U.S.!

1. U.S. inequality is **excessive**, whether in comparison to other countries at the present time, or in comparison to the past history of our own country.
2. Excessive inequality is **economically and socially harmful**: it is a drag on economic productivity and is socially divisive.
3. Inequality **responds to social policy** and is not inevitable.
4. We need research to **identify the policies** that will be effective in reducing inequality, and in reducing the effects of inequality in this generation on the outcomes of the next

QUOTES FROM:

*The Future of Educational Inequality in the United States: What Went Wrong, and How Can We Fix It?*

by Adam Gamoran President, William T. Grant Foundation

# School “Districts” ... 2030?



Category	1	2	3
Country	U.S.A	Finland	China
Population	336 M.	6 M.	1.4 B.
# School “Districts”	13,800 +	1	“1”
PISA* Scores / Rank:	U.S.A.	Finland	China
Reading: Rank / Score	13 <sup>th</sup> / 505	6 <sup>th</sup> / 520	1 <sup>st</sup> / 555
Math: Rank / Score	38 <sup>th</sup> / 478	16 <sup>th</sup> / 507	1 <sup>st</sup> / 591
Science: Rank / Score	19 <sup>th</sup> / 502	7 <sup>th</sup> / 522	1 <sup>st</sup> / 590

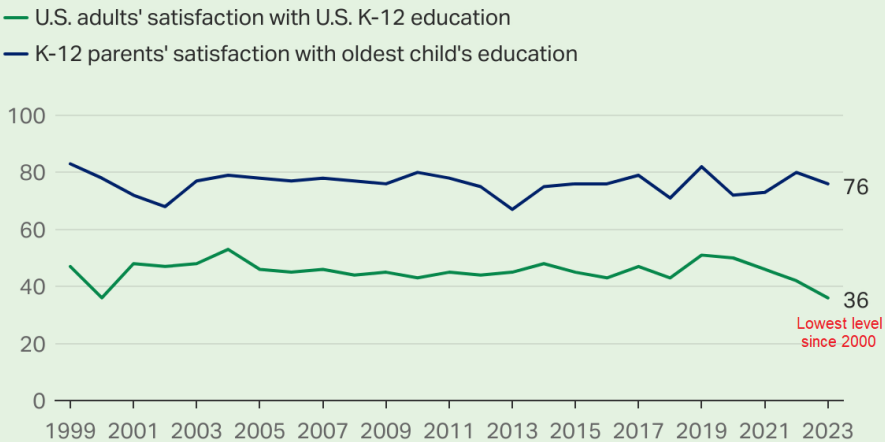
\* **Programme for International Student Assessment (PISA)** is a worldwide study by the [Organisation for Economic Co-operation and Development](#) (OECD) in member and non-member nations intended to evaluate educational systems by measuring 15-year-old school pupils' scholastic performance on reading, mathematics and science. It was started in 2000 and is repeated every three years. 78 nations are included in this report.

# K-12 Education Satisfaction in U.S. Ties Record Low

August 31, 2023

## Parents Remain More Satisfied With Oldest Child's K-12 Education Quality Than Americans Are With U.S. K-12 Education Quality

% Completely/Somewhat satisfied

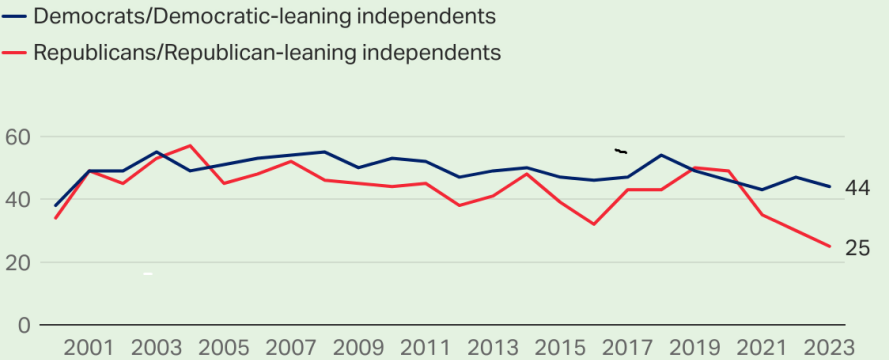


GALLUP



## Republicans' Satisfaction With K-12 Education Quality in U.S. at New Low

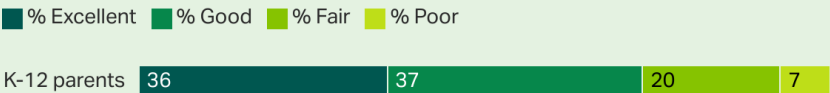
Overall, how satisfied are you with the quality of education students receive in kindergarten through grade 12 in the U.S. today -- would you say you are completely satisfied, somewhat satisfied, somewhat dissatisfied or completely dissatisfied? % **Completely/Somewhat satisfied**



GALLUP

## K-12 Parents Largely Rate Their Children's Teachers Positively

How would you rate the performance of your children's teachers -- as excellent, good, fair or poor?



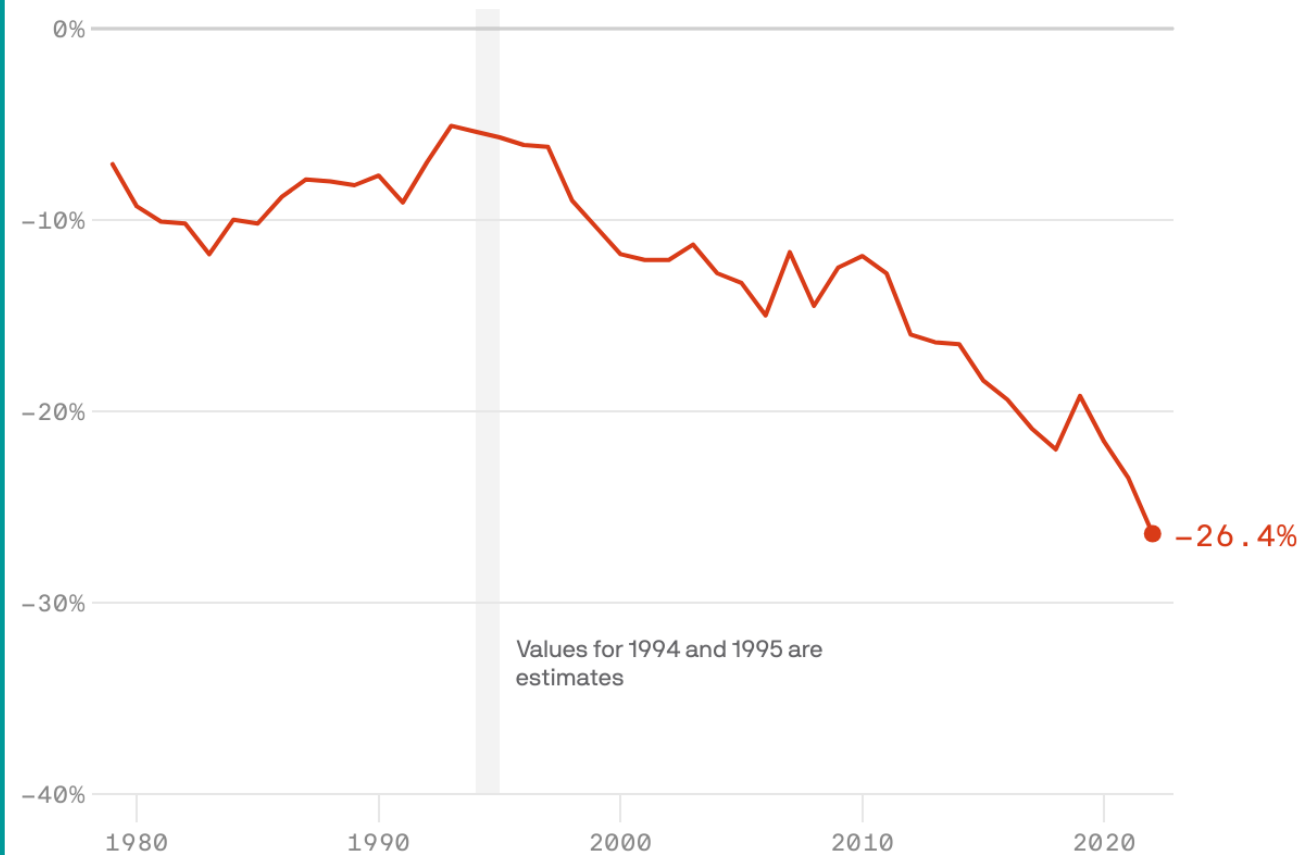
Aug. 1-23, 2023

GALLUP



## Wage gap between teachers and comparable college graduates

Annually; 1979–2022

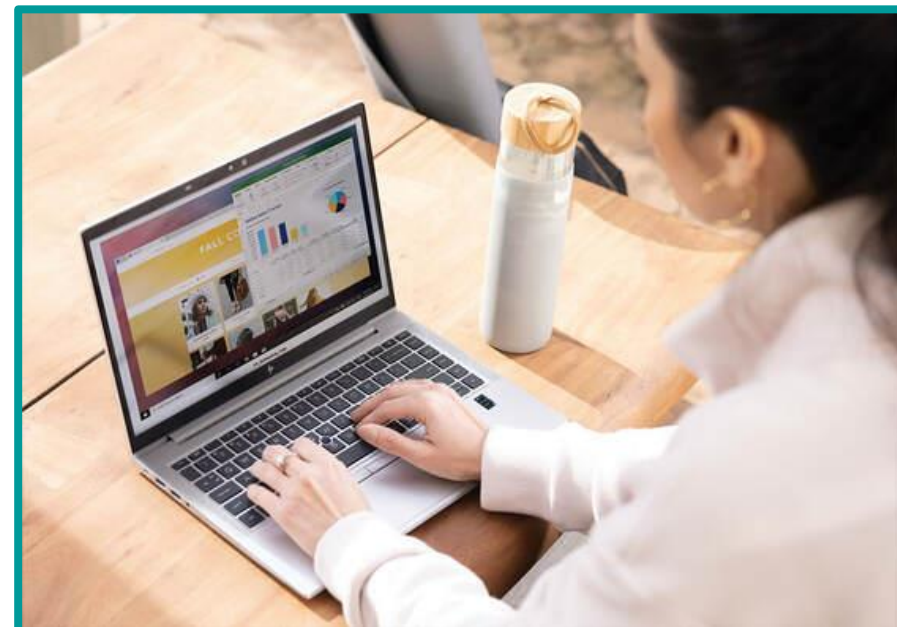
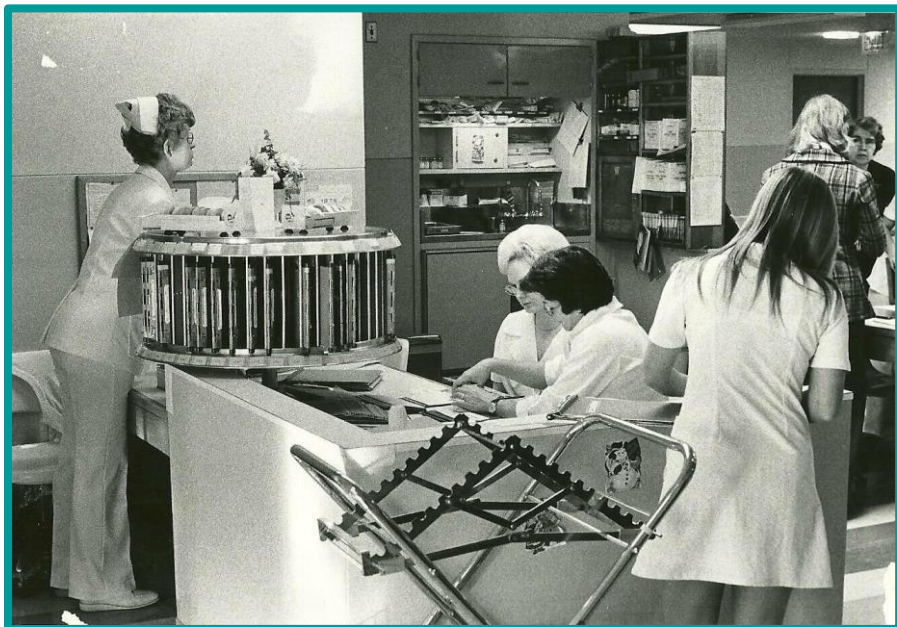


One Education Factor  
that impacts the  
Future!

How/When will we solve this?

SOURCE: <https://www.epi.org/publication/teacher-pay-in-2022/>

# Healthcare

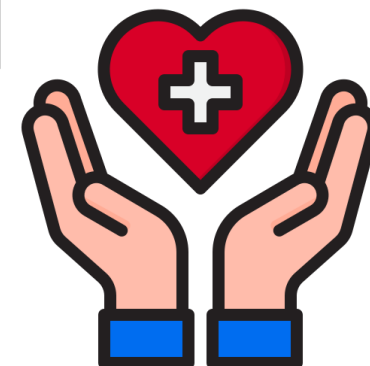




## Five Healthcare Predictions by 2030 \*

- 1 Wearable technology monitoring most patient's health
- 2 Genetic testing and genomic profiling widely used
- 3 Telehealth is used for initial primary care appointments
- 4 Increased access to health analytics (e.g., drug efficiency)
- 5 Vastly improved outcomes

\* SOURCE: <http://www.hcinnovations.com>



# 2030 Healthcare Predictions by *Provista* \*

## ESCALATING HEALTHCARE SPENDING

- \$6.8 T. : Expected national health spending by 2030
- 5.3% : Avg. growth in national health spending from 2025 to 2030
- \$135.6 B. : U.S. urgent care market size in 2030, up from \$56.7 B. 2022

## PROJECTED HEALTHCARE WORKER SHORTAGES

- 203,000 : Registered nurse openings each year until 2031
- 122,000 : Physician shortage in America by 2030
- 45,000 : Primary care physician shortage in 2030
- 25,940 : Addiction counselor shortage in 2035

\* SOURCE: <https://www.provista.com/blog/blog-listing/whats-the-future-of-healthcare-see-what-experts-predict-for-2030-and-beyond>





# *“Primary Care 2030: Innovative Models Transform the Landscape” \**

Bain expects nontraditional primary care providers to make up as much as a third of a market by 2030. Today, it is still dominated by traditional providers in fee-for-service arrangements.

The shift from fee-for-service to fee-for-value reimbursement models has been one of the most significant sources of innovation in primary care, a trend we expect will only accelerate.

## APC – Advanced Care Providers

Over the course of the next decade, rising costs, consumerism, labor shortages, demographic shifts, and digital disruption will continue to alter the primary care landscape.

Increased cost awareness, consumerism, digital adoption, and physician shortages are putting pressure on today’s care models. In response, we expect a heightened focus on specific populations, broader adoption of multidisciplinary care teams, and growth of alternative sites and channels of care to redefine this space.

## VBC – Value Based Care

\* SOURCE: <https://www.bain.com/insights/primary-care-2030/>

# Medical technology (device) continuing trends.

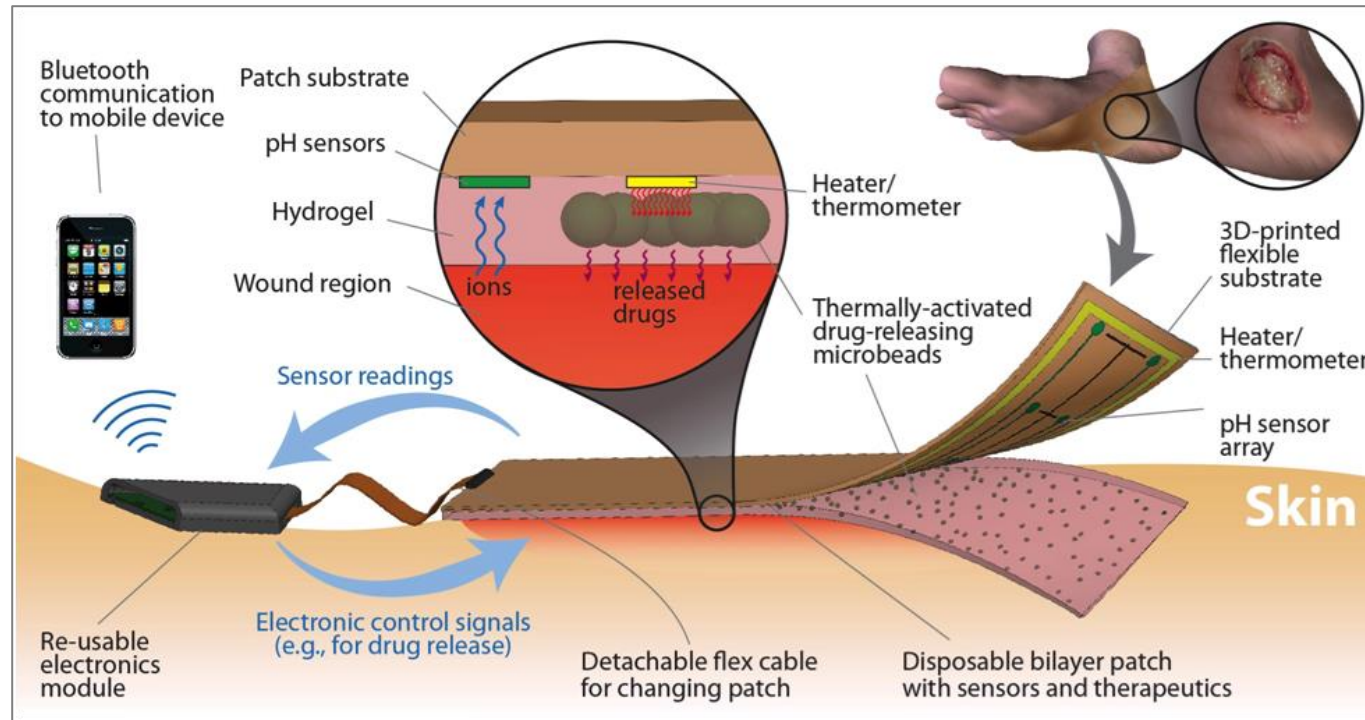
- mRNA (messenger ribonucleic acid) – genetic coded vaccines
- Virtual reality for medical training, surgical support and preventive measures
- Neurotechnology in brain image, stimulation and other brain disorders
- Artificial Intelligence in detecting disease, drug research, treatment programs, ++
- 3D Printing to create implants, joints, prosthetics, regenerate skin cells, blood vessels, ?
- Precision Medicine – matching an individual's genetics, environment and lifestyle to treatment
- CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) Gene editing and genetic defects
- Telemedicine – providing ease of contact, comfort and convenience for patients
- Health Wearables – tracking daily activity in prevention of chronic disease like diabetes/cardiovascular
- Mental Health Technology – Estimates for 2030 indicate depression will be the leading cause of disease globally. New phone apps can help detect voice, BP and other symptoms.

**SOURCE: “Top 10 new medical technologies 2022” <http://www.preclinical.com>**

# Smart Bandages

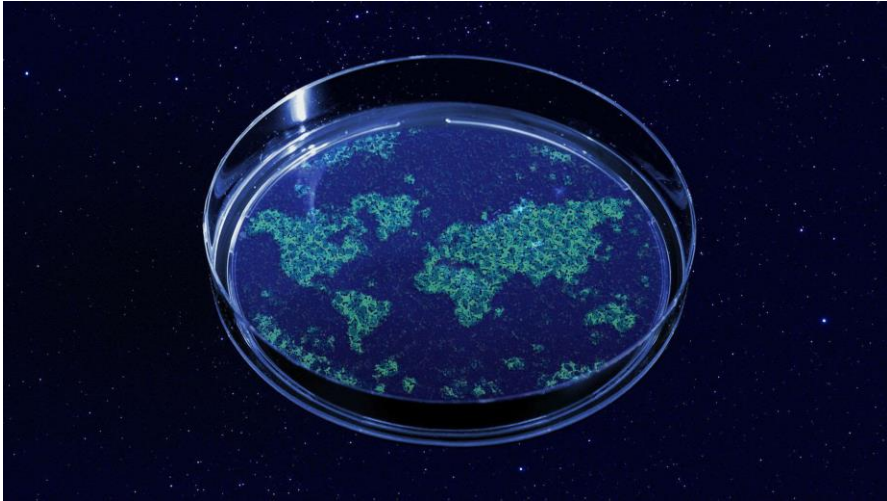
## The Future of Wound Care

Smart systems, devices with sensing, responding, or reporting functions, or a combination of these, can address many of the challenges associated with wound healing, particularly for chronic wounds.



SOURCE: <https://www.sciencedirect.com/science/article/abs/pii/S0167779918301987>

# Satellites could prevent the next pandemic!



**Better, cheaper, more accessible** satellite data is helping researchers see what's happening on Earth during disease outbreaks.

**The details:** Researchers are piecing together correlations between infectious disease and factors like loss of animal habitat and urbanization.

**Where it stands:** Satellites have been used to learn more about the source of the [Ebola virus](#), track an outbreak of [Rift Valley fever](#) and aid in the [Zika](#) response.

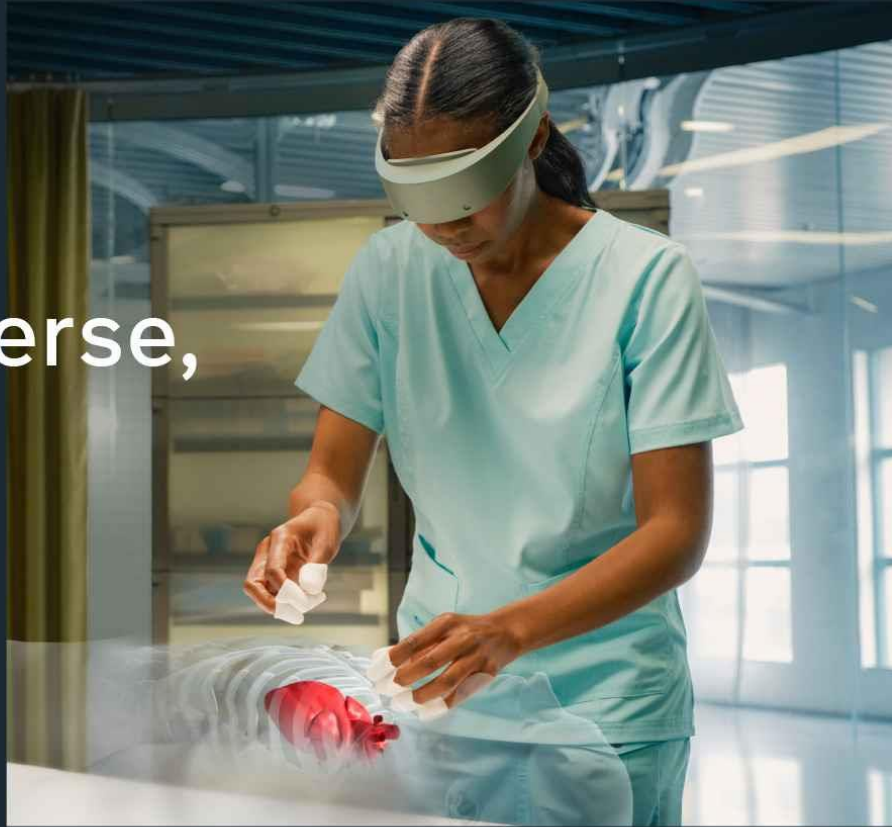
•**NASA** also joined other space agencies to create a COVID-19 dashboard, making relevant satellite data available to the public and epidemiologists.

SOURCE: <https://www.axios.com/2022/06/21/tracking-disease-outbreaks-space-satellite>





In the  
metaverse,

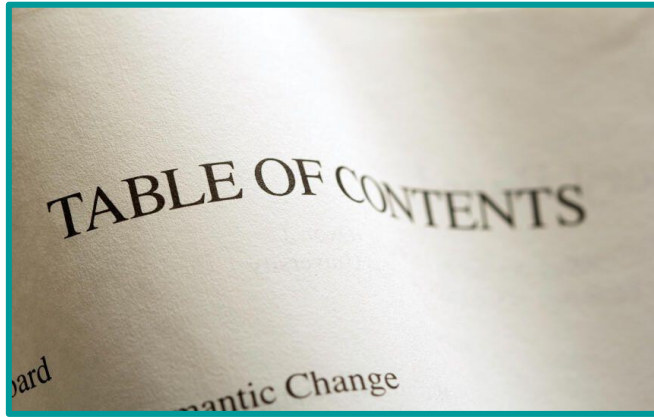


surgeons  
will practice  
**hundreds of  
times** before  
seeing  
patients.

# Time for another Break!



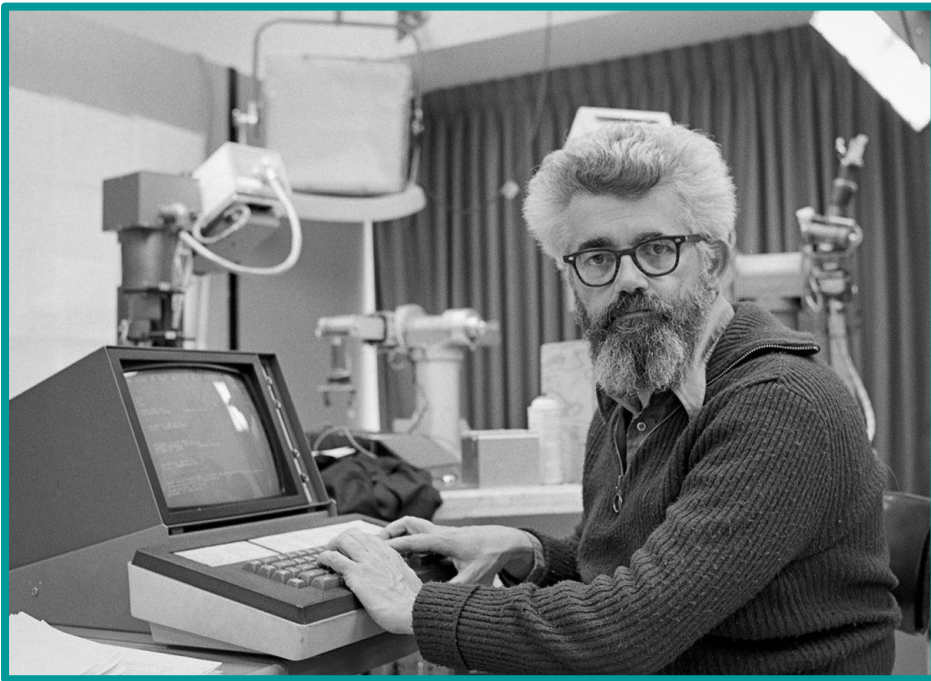
# What we'll *try* to cover!



Topic
Automobiles
Aviation
Energy
Environment
Education
Healthcare
A / I
Social Media

TABLE of CONTENTS	
	Main Idea <b>1.</b>
<b>2.</b>	Main Idea 
	Main Idea <b>3.</b>
<b>4.</b>	Main Idea 
→	

# Artificial Intelligence





# What is artificial intelligence?

« The capacity given by humans to machines to memorize and learn from experience, to think and create, to speak, to judge and make decisions »



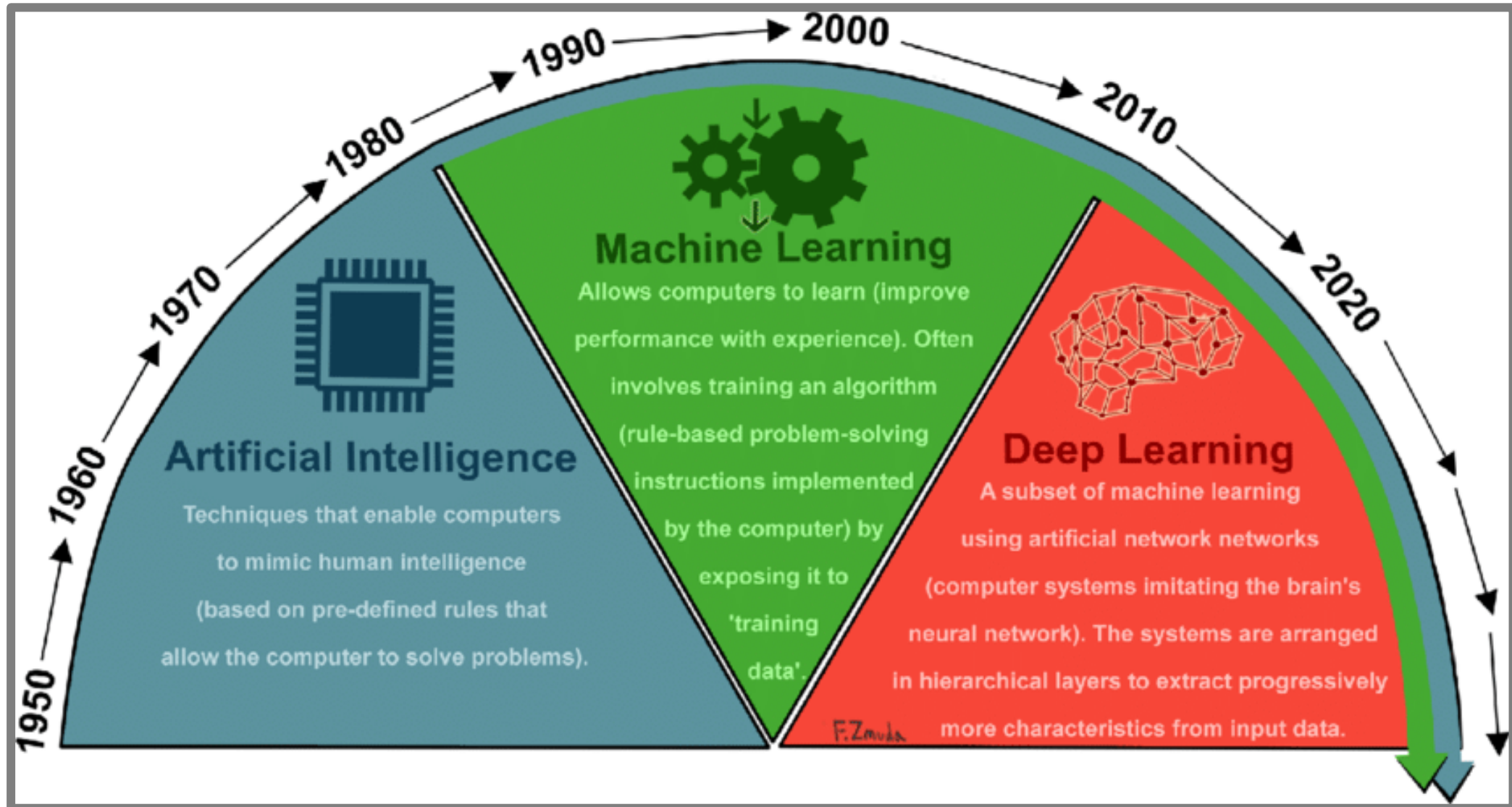
©IntoTheMinds  
www.IntoTheMinds.com

Artificial Intelligence is defined as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. AI is also defined as,

- An Intelligent Entity Created By humans
- Capable of Performing Tasks intelligently without being explicitly instructed.
- Capable of thinking and acting rationally and humanely
- An AI researcher would say that it's a set of algorithms that can produce results without having to be explicitly instructed to do so.

SOURCE: <https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/>

# Where are we on the A/I Development “curve”?



# 3 Types of Artificial Intelligence

## Artificial Narrow Intelligence (ANI)



Stage-1

### Machine Learning

- Specialises in one area and solves one problem



Siri



Alexa



Cortana

## Artificial General Intelligence (AGI)



Stage-2

### Machine Intelligence

- Refers to a computer that is as smart as a human across the board

## Artificial Super Intelligence (ASI)



Stage-3

### Machine Consciousness

- An intellect that is much smarter than the best human brains in practically every field

**Artificial Intelligence** “Intelligent machines” which can solve problems, make/suggest decisions and perform tasks that have traditionally required humans to solve

## Machine Learning

A subset of Artificial Intelligence Algorithms which learn without being explicitly programmed with rules. Use data to *learn and match patterns*

## Deep Learning/Neural Nets

A subset of machine learning Uses a *Deep Neural Network (DNN)* effective at a variety of tasks (e.g., image classification, speech recognition)

# Americans are not psyched about AI!

Nearly 40 percent of those polled in August, 2023 believe it does more harm than good, compared to 10 percent who think it does more good, according to a Gallup survey released this month.

A review of eight major polls shows people aren't just worried about their jobs, but also about the technology's effects on democracy, and they want the government to intervene.

Over half of Americans said misinformation spread with AI will definitely or probably affect the outcome of next year's presidential election.



The percentage of Americans who agree that “AI technology is advanced enough for use in mission-critical applications in defense and national security,” declined 8 points to 46 percent between this poll and November, 2022

Online course provider EdX released a survey of 800 C-suite executives that found the group is relatively jazzed about the technology. The survey's most arresting finding: 49 percent of CEOs *want* AI to take over most or all of the CEO job





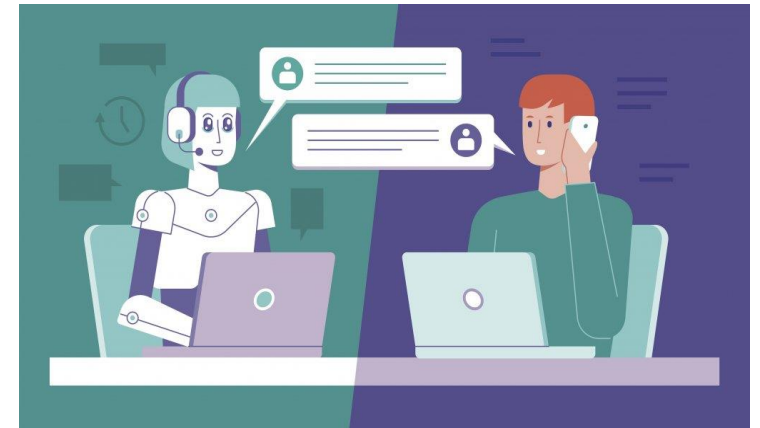
AI is the demonstration of human-like cognition or behavior by machines, including

- Perception
- Computer vision
- Natural language processing
- Generalization
- Memory
- Reasoning
- Problem solving
- Symbolic manipulation
- Learning from past experiences
- Motion/manipulation

## A few current AI examples:



- Manufacturing robots.
- Self-driving cars.
- Smart assistants.
- Healthcare management.
- Automated financial investing.
- Virtual travel booking agent.
- Social media monitoring.
- Marketing chatbots.
- Maps and Navigation
- Facial Detection and Recognition
- Text Editors or Autocorrect
- Search/Recommendation Algorithms
- E-Payments



# How can A/I make architecture more efficient.



A small pavilion at the Digital Futures exhibition in Shanghai.

This structure is made of cross-laminated timber (CLT), an increasingly popular building material that often substitutes for carbon-intensive concrete, especially in prefabricated buildings.

Conventional CLT is made by gluing layers of solid-sawn lumber boards perpendicular to each other, creating a material that's extremely strong.

Creating perfectly rectangular boards, however, creates a lot of wood waste.

Using AI to scan logs before they're sawn, startup Maestro Technologies has found a way to tessellate wobbly boards so they fit together perfectly in every layer of the CLT.

"The irregular geometry celebrates the original shape of the tree," says architect and Maestro founder Carlo Ratti. "We are using the artificial to bring out the brilliance of the natural."

# Introducing ChatGPT

“We’ve trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.”

DW

What is a blue moon 50 words

“A BLUE MOON IS A RARE ASTRONOMICAL EVENT IN WHICH TWO FULL MOONS OCCUR WITHIN A CALENDAR MONTH. THIS PHENOMENON TYPICALLY HAPPENS ONCE EVERY 2 TO 3 YEARS, MAKING THE SECOND FULL MOON IN A MONTH THE "BLUE MOON." DESPITE THE NAME, THE MOON DOESN'T ACTUALLY APPEAR BLUE; IT'S A COLLOQUIAL TERM FOR AN INFREQUENT OCCURRENCE.”

DW

Where is Brunei located 30 words

BRUNEI IS A SOUTHEAST ASIAN COUNTRY LOCATED ON THE ISLAND OF BORNEO. IT IS BORDERED BY MALAYSIA AND THE SOUTH CHINA SEA, KNOWN FOR ITS RICH OIL RESERVES.

Answers appear on-line in < 2 seconds!

Want to try it? SOURCE: <https://openai.com/blog/chatgpt>

# One more Chatgpt Example

DW

Is there a God 125 words

THE QUESTION OF THE EXISTENCE OF GOD IS A DEEPLY PHILOSOPHICAL AND THEOLOGICAL ONE, WITH DIVERSE PERSPECTIVES ACROSS CULTURES AND BELIEF SYSTEMS.

MANY RELIGIONS ASSERT THE EXISTENCE OF A GOD OR GODS WHO CREATED AND GOVERN THE UNIVERSE, OFFERING GUIDANCE, PURPOSE, AND MORAL PRINCIPLES TO THEIR FOLLOWERS. THESE BELIEFS OFTEN PROVIDE A SOURCE OF COMFORT, COMMUNITY, AND MEANING IN PEOPLE'S LIVES.

ON THE OTHER HAND, ATHEISM ASSERTS THAT THERE IS NO EVIDENCE OR NEED FOR A DEITY, RELYING ON SCIENTIFIC AND EMPIRICAL EXPLANATIONS FOR THE UNIVERSE'S ORIGIN AND FUNCTIONING. AGNOSTICISM TAKES A MORE NEUTRAL STANCE, CLAIMING THAT THE EXISTENCE OF GOD IS UNKNOWN OR UNKNOWABLE.

ULTIMATELY, THE QUESTION OF GOD'S EXISTENCE REMAINS A MATTER OF PERSONAL FAITH, EXPERIENCE, AND INTERPRETATION, AND DIFFERENT INDIVIDUALS AND CULTURES HOLD VARYING BELIEFS AND PERSPECTIVES ON THIS PROFOUND AND ENDURING QUESTION. IT IS A TOPIC THAT HAS INSPIRED MILLENNIA OF PHILOSOPHICAL AND THEOLOGICAL DEBATE.





# The Metaverse

The metaverse is a platform in which the virtual world and the physical world can be linked



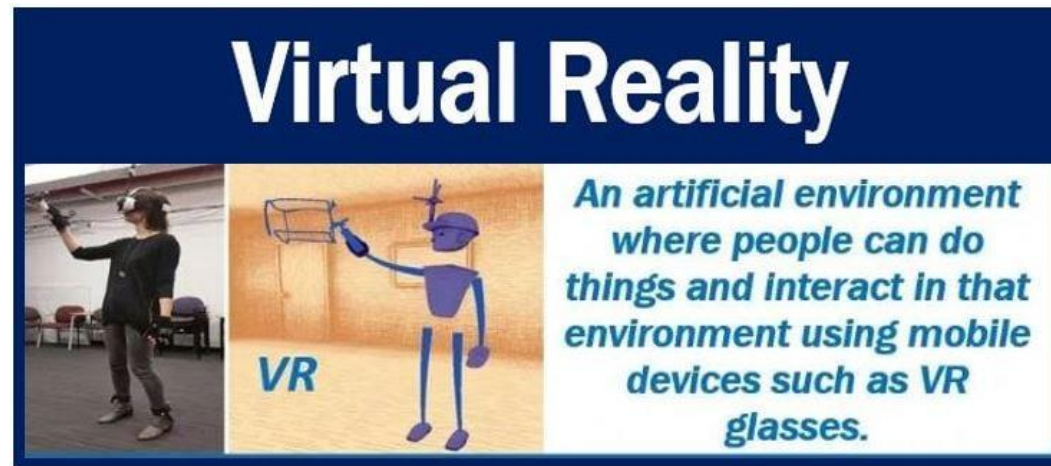
# Think of the metaverse as a virtual world that serves as an extension or an enhanced version of the real world.

James Howell – 101 BlockChains – April, 2022

Research firm Gartner predicts that **25% of people will spend at least one hour a day in the metaverse by 2026**. And with metaverse technology platforms predicted to become a lucrative market -- to the tune of \$800 billion by 2024, according to a December 2021 Bloomberg report -- fear of missing out on those potential dollars is a powerful motivator to ALL corporations!

- |   |                               |    |   |
|---|-------------------------------|----|---|
| 1 | Immersive Entertainment       | 6  | Advertising, branding and marketing opportunities |
| 2 | Business Operations           | 7  | Digital locations                                 |
| 3 | Education and training        | 8  | New revenue streams                               |
| 4 | Enhanced customer experiences | 9  | A more connected work experience                  |
| 5 | Work meetings                 | 10 | The yet-to-be imagined                            |

Virtual reality is the use of computer technology to create simulated environments. Virtual reality places the user inside a three-dimensional experience. Instead of viewing a screen in front of them, users are immersed in and interact with 3D worlds.



There are 3 primary categories of virtual reality simulations used today: non-immersive, semi-immersive, and fully-immersive simulations.

# Hmm! Give me some actual examples!

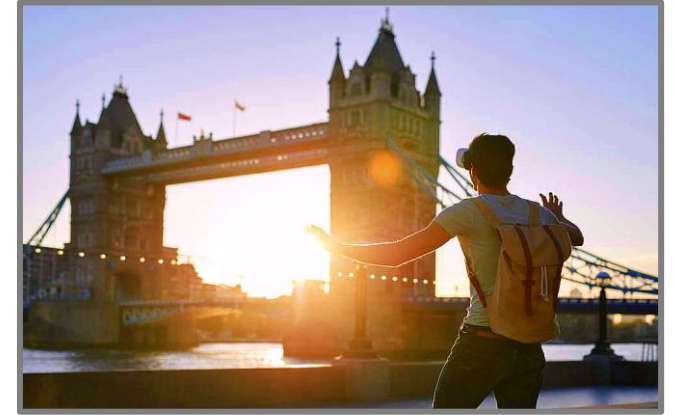
In use now!



Enhanced drone pilot training!



Immersive real estate tours!



Realistic travel experiences!

## SHOP ONLINE



**HIGH-QUALITY CARS**  
Multiple inspections. Free CARFAX history report. Schedule a virtual test drive.



**EASY ONLINE FINANCING**  
Apply online in minutes. Our financing partners will compete to get you the best rate.



**DELIVERED RIGHT TO YOU**  
Get your car or truck shipped to your home.

Virtual Used Car Lot Shopping



# Time (and Technology) March On!

*“The more things change ... they stay the same!”*



- ▶ **By the 1920's**, Tampa, FL was the center of cigar-making in the U.S..  
(Hav-a-Tampa, El Producto, et al.)
- ▶ At the peak, three cigar-making companies were in Greenville, SC.  
(Employing 400 and producing 15 million / year.)
- ▶ By 1929, new equipment was on the market to mechanically “roll” the cigar wrapper in Charlotte, NC.
- ▶ The “roller” increased production from 1,000/day to 4,000/day, making the Greenville locations obsolete.
- ▶ 200 young women lost their jobs + a \$2,500 weekly payroll was gone!



- ▶ **By the 2020's**, *Artificial Intelligence* progression had been under way for more than 50 years.  
(Manufacturing, administrative and other procedures have been easily modified, in many cases, reducing the manpower required )
- ▶ It is established that A/I can improve the processing of what otherwise were highly repetitive tasks  
(Not unlike a mechanical device to roll the cover on a cigar!)
- ▶ In 2021, “Chatbots” were made easily available to the general public, creating a massive awareness of new, potential uses (and consequences) of A/I.
- ▶ It is estimated that A/I will likely take away 85 million jobs globally by 2025! It could also generate 97 million new jobs in fields ranging from big data and machine learning to information security and digital marketing.

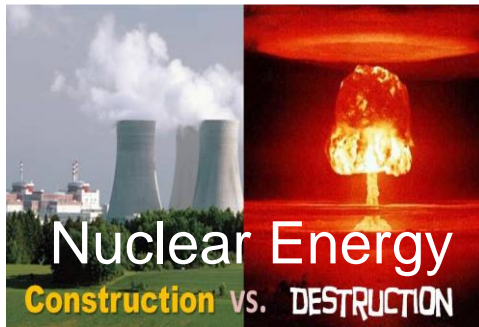
# Should we be afraid of AI?

Consider three other major discoveries/inventions from history:



◀ NOW, we can cook our food and heat our shelter!  
[But, we can also burn our house, habitat, etc.!]

NOW, we can communicate widely, e.g., the Bible! ▶  
[But, falsehoods, innuendos & blasphemy are rampant!]



◀ NOW, we have a new source for electricity, powering ships, etc.!  
[But, we could also destroy parts of or the entire planet!]

Each has positive benefits! Each have negative consequences!  
Left to “man” is the judgment to weigh the difference!

# What?



jonstokes.(eth|com) ✓

@jonst0kes



no



10:36 AM · Sep 12, 2023 · 9,629 Views



# Social Media







# • The Top 15 Social Media Sites & Apps by Active Users

## January, 2023

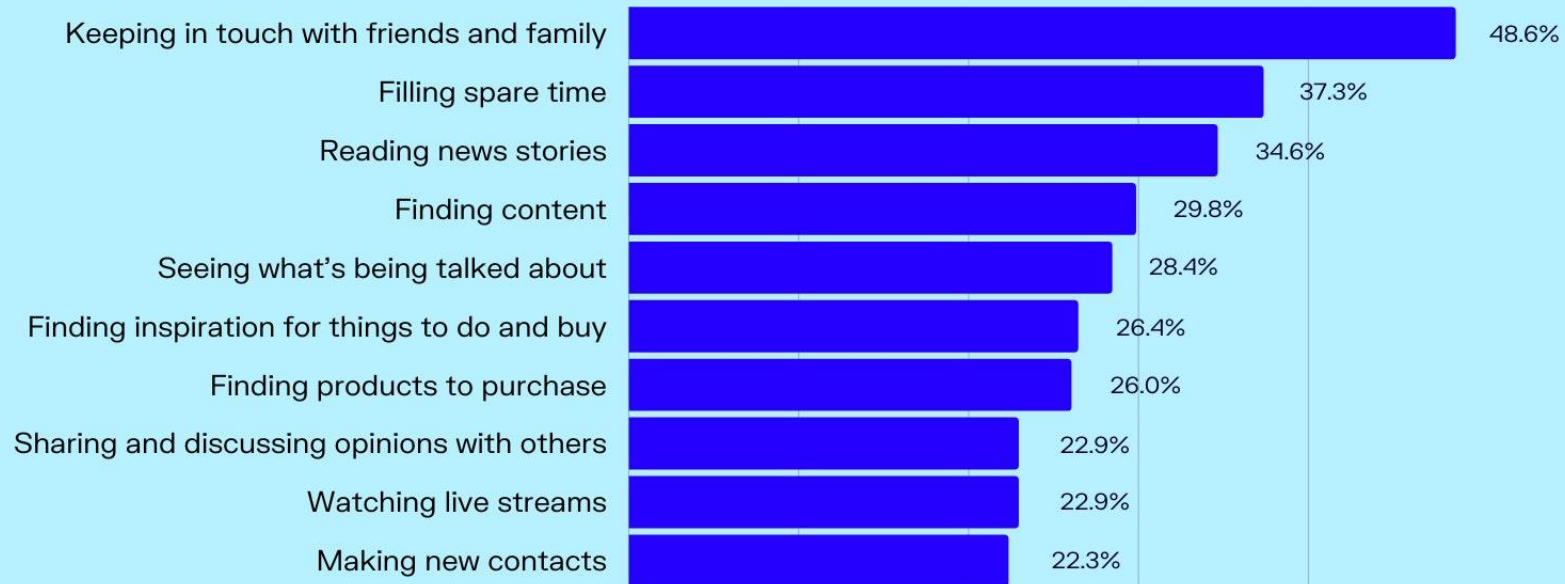
- 1. Facebook – 2.74 Billion Active Users
- 2. YouTube – 2.291 Billion Active Users
- 3. WhatsApp – 2.0 Billion Active Users
- 4. Facebook Messenger – 1.3 Billion Active Users
- 5. Instagram – 1.221 Billion Active Users
- 6. Weixin/WeChat – 1.213 Billion Active Users
- 7. TikTok – 689 Million Active Users
- 8. QQ – 617 Million Active Users
- 9. Douyin – 600 Million Active Users
- 10. Sina Weibo – 511 Million Active Users
- 11. Telegram – 500 Million Active Users
- 12. Snapchat – 498 Million Active Users
- 13. Kuaishou – 481 Million Active Users
- 14. Pinterest – 442 Million Active Users
- 15. Reddit – 430 Million Active Users



SOURCE: <https://www.dreamgrow.com/top-15-most-popular-social-networking-sites/>

# Top 10 Reasons for using Social Media

## Top Uses of Social Media (2023)

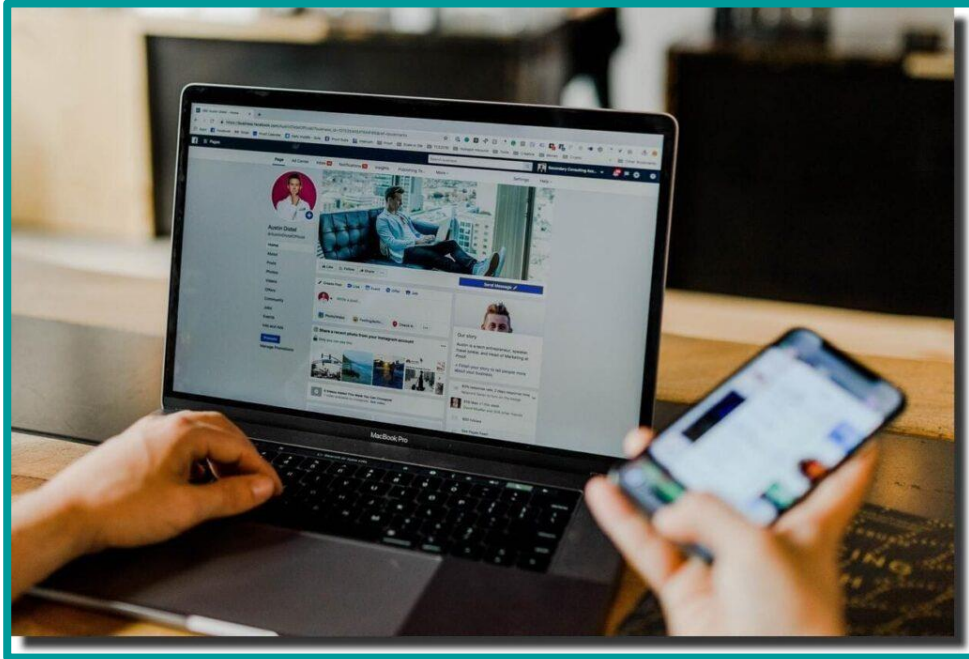


Source: DataReportal

**OBERLO**

SOURCE: <https://www.oberlo.com/statistics/why-do-people-use-social-media>

# Why do (small) companies sell on social media?

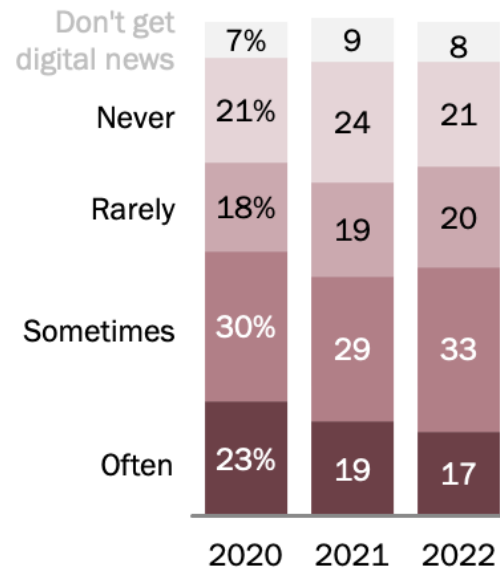


Rank	Reason
1	Large Audience Reach
2	Customer Interaction
3	Organic Content (For free)
4	Access to Advertising Tools
5	Redirecting traffic <i>from</i> S.M.
6	Performance Evaluation
7	Social Media is Free to Use
8	Can go Viral
9	Access to Customer Insights
10	Can be a <i>Testing Ground</i>

SOURCE: <https://upgode.com/social-media-benefits/>

## News consumption on social media

% of U.S. adults who get news from social media ...



Note: Figures may not add up to 100% due to rounding.

Source: Survey of U.S. adults conducted July 18-Aug. 21, 2022.

PEW RESEARCH CENTER

## % Getting news from social media.

### Media      % getting news

March 14, 2023

•Facebook:	44%
•Reddit:	37%
•YouTube:	30%
•Instagram:	29%
•TikTok:	30%
•Snapchat:	15%
•LinkedIn:	13%
•Twitch:	13%
•WhatsApp:	10%
•Twitter:	53%

SOURCE: <https://www.pewresearch.org/journalism/fact-sheet/social-media-and-news-fact-sheet>

SOURCE: <https://www.trueanthem.com/social-media-news-source/>



# What Comes After Social Media?

## 2030 and Beyond \*



- ▶ As of 2022, there were 3.8 billion active social media users, representing 47% of the world's population, who are online for an average of three hours a day.
- ▶ More and more sites will form around people with shared interests, values, and lifestyles. And yes, politics.
- ▶ The biggest developments in social media will be driven by changes in advertising in combination with artificial intelligence-powered virtual reality (VR).
- ▶ Social media will divide, isolate, and compartmentalize us as a society even more. Social media (*may*) become “anti-social” media.

\* By Thomas Frey SOURCE: <https://futuristspeaker.com/predictions/what-comes-after-social-media-2030>

# Technology 2025 + Prepare for the fourth industrial revolution

“Developments in previously disjointed fields such as **artificial intelligence and machine learning**, robotics, nanotechnology, 3D printing and genetics and biotechnology are all building on and amplifying one another . . . On average, by 2025, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the job today.” \*



\* SOURCE: <https://www.pluralsight.com/blog/career/tech-in-2025?>

A closing “thought” ... on the next seven years!



# What does Chatgpt say about technology by 2030?

Predicting specific technological changes by 2030 is challenging, but several trends and possibilities may shape the technological landscape:

- 1. Artificial Intelligence (AI) Advancements:** AI will likely continue to advance, impacting various industries, including healthcare, finance, and transportation. We may see AI-driven personal assistants, more autonomous vehicles, and AI-based drug discovery.
- 2. Quantum Computing:** Quantum computers could revolutionize computation, solving complex problems exponentially faster than classical computers, impacting cryptography, materials science, and more.
- 3. Renewable Energy:** Further developments in solar, wind, and energy storage technologies are expected, making clean energy more accessible and affordable.
- 4. 5G and Beyond:** 5G networks will become widespread, enabling faster communication and facilitating the growth of the Internet of Things (IoT). Beyond 5G, 6G and 7G technologies may emerge.
- 5. Space Exploration:** Continued advancements in space technology could lead to human missions to Mars and increased commercial space activity.
- 6. Biotechnology:** Innovations in gene editing, personalized medicine, and synthetic biology may transform healthcare, potentially curing diseases and extending lifespans.
- 7. Augmented and Virtual Reality:** AR and VR technologies will likely improve, impacting gaming, education, and workplace training.

**8. Sustainable Technologies:** Innovations in sustainable materials, agriculture, and transportation will play a vital role in addressing environmental challenges.

**9. Cybersecurity:** As technology evolves, so do cyber threats. More sophisticated cybersecurity measures will be necessary to protect data and infrastructure.

**10. Blockchain and Cryptocurrency:** : These technologies may continue to disrupt finance, supply chain management, and digital identity.

**11. Smart Cities:** Urban areas will become more connected and efficient, using data and technology to enhance infrastructure, transportation, and public services.

**12. Healthcare Tech:** Wearable health devices, telemedicine, and AI-driven diagnostics may transform healthcare delivery.

**13. Education Technology:** Online learning platforms and personalized education tools will evolve, potentially changing the way we access knowledge.

**14. Robotics:** Advanced robotics could impact industries from manufacturing to healthcare and home assistance.

**15. Environmental Tech:** Innovations in carbon capture, waste management, and water purification will be essential for addressing climate change.

Remember that these are speculative trends, and technological developments may unfold differently due to unforeseen challenges and opportunities. Technological progress is also influenced by societal, ethical, and regulatory considerations, which can shape the direction and pace of change.



# Two More Trends to Expand by 2030

## Low-Altitude Platform Stations (LAPS)

Expanding Internet Coverage Worldwide



LAPS float 300 metres high and use 3G and 4G frequencies to provide a signal range of about 70 kilometres (km) giving basic internet coverage.

SOURCE: <https://www.weforum.org/agenda/2022/01/airships-could-solve-digital-divide-internet/>

## 3d Printed Houses

Computer Driven Construction Process



SOURCE: <https://www.wired.com/story/new-story-3-d-printed-house/>

# “Back to the Future” ... *Perfect*



When considering the future ... consider how far and how fast we've come!

# The Two Biggest *Current* Evolving Technologies

[That will impact developments from 2023-2030!]



Quantum computing is a multidisciplinary field comprising aspects of computer science, physics, and mathematics that utilizes quantum mechanics to solve complex problems faster than on classical computers.

The bits in a conventional computer are replaced by quantum bits, or “qubits”. Whereas bits can only be either a 1 or 0 at any given time, qubits can carry twice the amount of information. This feature alone means that a quantum computer with 10 qubits has as much processing power as a standard computer with  $2^{10}$  bits



Generative AI refers to deep-learning models that can generate high-quality text, images, and other content based on the data they were trained on. Generative models can write high-quality software code faster, discover new molecules, and train trustworthy conversational chatbots grounded on enterprise data.

Generative AI can take raw data, say, all of Wikipedia or the collected works of Rembrandt, and “learn” to generate statistically probable outputs when prompted. Generative models encode a simplification their training data and draw from it to create a new work that’s similar, not identical, to the original data.



# A farmer on a tractor collides with a lawyer in his Lexus at a country road intersection.



They both get out on the road to talk!  
The farmer notices that the lawyer seems a bit agitated so goes back to his tractor and returns with a bottle in a brown paper bag and says:

*“Here, take a nip of this. It’ll help those nerves!”* The lawyer takes the bag and has a swallow. *“Mind if I have another?”* says the lawyer. *“Go right ahead! Have as many as you want!”* replies the farmer. So the lawyer takes a second, a third, and a fourth, maybe a fifth long sip.



Finally, the lawyer says *“Hey! Don’t you want to have some?”*

*“Oh no thanks!”* says the farmer. *“I’m waiting for the Sheriff!”*

*Always plan ahead for the future!*







And that's a  
*Wrap!*

Questions, comments, suggestions: Douglas “Doug” Stowell ... [dwstowell10@gmail.com](mailto:dwstowell10@gmail.com)