



CLIMATE CHANGE MAKE IT PERSONAL

PERSONAL ACTIONS TO REDUCE IMPACTS OF CLIMATE CHANGE

Led by

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POUGHKEEPSIE, NY



GASOLINE TO CO₂



U.S. Energy Information
Administration

Frequently Asked Questions

How much carbon dioxide is produced by burning gasoline and diesel fuel?

About 19.64 pounds of carbon dioxide (CO₂) are produced from burning a gallon of gasoline that does not contain ethanol. About 22.38 pounds of CO₂ are produced by burning a gallon of diesel fuel.



SURVEY TALLY

TOTAL DATA COLLECTED

Times selected		
Consumable Products, Purchases		
10	1	Be mindful of a purchase's carbon footprint
13	2	Buy goods in reusable bottle and containers
5	3	Buy in bulk
4	4	Shop vintage/second-hand
4	5	Buy low impact environmental fabrics
8	6	Swap out paper towels for washable cloths
Education/Outreach		
0	1	Participate in citizen science projects
2	2	Get educated on climate change and its impacts
6	3	Discuss the changes you're making with friends and family
3	4	Educate and support children with the solutions they need for a cleaner, better future
Electricity Source		
11	1	Install solar power
11	2	Ask your utility company about buying clean electricity
7	3	Participate in community solar, source aggregation/"buying club"
Energy Usage		
15	1	Audit your home's energy
0	2	Turn off lights when space is unoccupied
4	3	Lower the central heating 3 degrees in winter; raise AC temperature 3 degrees in summer
3	4	Wash clothes at a lower temperature
5	5	Turn down your water heater to 120 degrees
5	6	Set fridge temperatures 35 – 38 degrees for the fridge and 0 degrees for freezers
6	7	Calculate your household's carbon footprint
Equipment		
8	1	Check your appliances' energy-efficiency
6	2	Use a programmable thermostat
4	3	Install geothermal or heat pump system
2	4	Purchase dishwashers and cloth efficient certification label
Food		
2	1	Don't cook more than you can eat and adapt recipes to your needs
0	2	Freeze your food if you are not using it soon
5	3	Swap out a few meat-heavy meals for vegetarian or vegan recipes
6	4	Purchase locally sourced

Garden outdoors		
6	1	Have a water-smart landscape
6	2	Shrink your lawn
2	3	Plant bushes and trees along waterways
Investment		
3	1	Invest wisely seeking funds that do not in any way support the fossil fuel industry
3	2	Invest in climate change solution innovations
Living space		
6	1	Downsize your home living space; close off unused space safely
9	2	Move to a smaller dwelling
3	3	Move to a centralized dwelling walkable distance to daily needs
4	4	Insulate water heater and pipes
3	5	Install just in time water heaters
1	6	Cool house naturally: night air circulation, ceiling fan, shade
3	7	Seal air leaks
3	8	Re-insulate older home with non-degradable insulation
Political		
2	1	Vote for candidates supporting sustainability
2	2	Speak to your elected official
4	3	Write letters, sign petitions
5	4	Attend, Promote lectures
4	5	Verify recycling and other laws are in place and followed
1	6	Verify public entity is acting climate smart
Recycling		
1	1	Repair, reuse, upcycle and repurpose before throwing something away
Transport		
3	1	Consolidate/combine trips
17	2	Drive an electric car
7	3	Choose a fuel-efficient vehicle
2	4	Rent a vehicle when needed
1	5	Walk
0	6	Cycle
4	7	Use public transport
2	8.	Go easy on the gas and brakes
2	9.	Use cruise control
0	10.	Regularly service so perform efficiently
Workplace		
0	1	Procure ENERGY STAR certified products and equipment for your workplace
2	2	Apply pertinent parts of this list to your workplace

LIKELY BEHAVIOR TO BE ADOPTED, BY FREQUENCY

Order	Frequency	Topic
1	17	Drive an electric car
2	15	Audit your home's energy
3	13	Buy goods in reusable bottle and containers
4	11	Install solar power
5	11	Ask your utility company about buying clean electricity
6	10	Be mindful of a purchase's carbon footprint
7	9	Move to a smaller dwelling
8	8	Swap out paper towels for washable cloths
9	8	Check your appliances' energy-efficiency
10	7	Participate in community solar, source aggregation/"buying club"
11	7	Choose a fuel-efficient vehicle
	116	
Count	60	266
of Total	18%	44%

GROUPED BY SIMILAR FOCUS

	Category	Frequency	Topic
1	EV		
		17	Drive an electric car
		7	Choose a fuel-efficient vehicle
		24	
2	Energy Sourcing		
		11	Install solar power
		11	Ask your utility company about buying clean electricity
		7	Participate in community solar, source aggregation/"buying club"
		29	
3	Home efficiency		
		15	Audit your home's energy
		6	Use a programmable thermostat
		8	Check your appliances' energy-efficiency
		4	Install geothermal or heat pump system
		6	Home Carbon Footprint
		39	
4	Purchases		
		13	Buy goods in reusable bottle and containers
		10	Be mindful of a purchase's carbon footprint
		8	Swap out paper towels for washable cloths
		6	Purchase locally sourced food
		5	Swap out a few meat-heavy meals for vegetarian or vegan recipes
		31	
5	Dwelling		
		9	Move to a smaller dwelling
		6	Downsize living space
		6	Have a water-smart landscape
		6	Shrink your lawn
		27	
	Total selected	161	
		61% of all selections made	

THE SCHEDULE FOR THE REMAINDER OF THE SERIES

WEEK

- 2 ALTERNATIVE VEHICLES
- 3 THE CLIMATE ACT
- 4 DROP IN COST OF RENEWABLES
- 5 RENEWABLE ENERGY SOURCES
- 6 HOME EFFICIENCY
- 7 CONSUMER GOODS
- 8 DWELLING ISSUES



ALTERNATIVE FUEL VEHICLES

...NOW A BRIEF INTERLUDE...
BEFORE THE MAIN SPEAKER

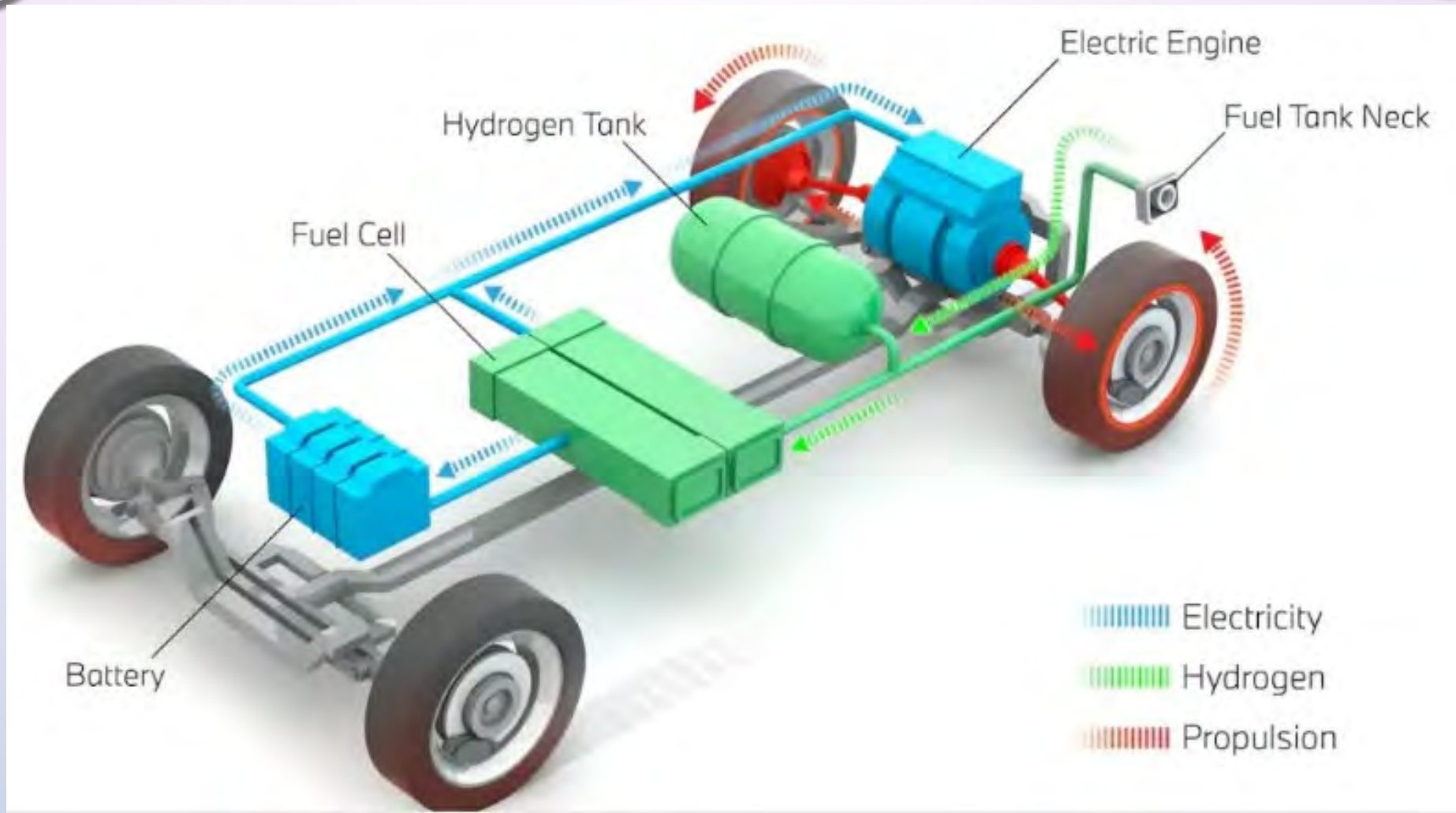
HYDROGEN VEHICLES

- **SIMILAR TO ELECTRIC VEHICLES,**
- **FUEL CELL ELECTRIC VEHICLES (FCEVS),**
- **USE AN ELECTRIC MOTOR TO POWER THE WHEELS,**
- **CREATING ZERO TAILPIPE EMISSIONS.**



The Toyota Mirai fuel cell vehicle has an estimates 402-mile range (Photo: Toyota)

[HTTPS://WWW.PCMAG.COM/HOW-TO/HYDROGEN-POWERED-CARS-FUEL-CELL-ELECTRIC-VEHICLES-EXPLAINED](https://www.pcmag.com/how-to/hydrogen-powered-cars-fuel-cell-electric-vehicles-explained)



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Hydrogen Fuel Cell Cars

Pros

- Greenest power source
- Use of renewable energy
- Efficient power source
- Quiet means of transportation
- Short fueling time
- Long range
- No harmful fumes
- No air pollution
- No greenhouse gas emissions
- Perfect for commuting
- Hedge against increasing gas prices

Cons

- High costs for new cars
- High depreciation in the first years
- Charging may be an issue
- Lack of infrastructure related to hydrogen cars
- Limited selection of vehicles
- Technology not mature yet
- Large investments in R&D necessary
- High fuel costs
- Safety concerns
- Hydrogen production may not be eco-friendly

environmental-conscience.com/hydrogen-fuel-cell-cars-pros-cons/

Hydrogen vehicle

From Wikipedia, the free encyclopedia

A **hydrogen vehicle** is a [vehicle](#) that uses [hydrogen fuel](#) for [motive power](#). Hydrogen vehicles include hydrogen-fueled [space rockets](#), as well as [ships](#) and [aircraft](#). Power is generated by converting the [chemical energy](#) of hydrogen to [mechanical energy](#), either by reacting hydrogen with oxygen in a [fuel cell](#) to power [electric motors](#) or, less commonly, by burning [hydrogen in an internal combustion engine](#).^[1]

As of 2021, there are two models of hydrogen cars publicly available in select markets: the [Toyota Mirai](#) (2014–), which is the world's first mass-produced dedicated [fuel cell electric vehicle](#) (FCEV), and the [Hyundai Nexo](#) (2018–). There are also [fuel cell buses](#). Hydrogen aircraft are not expected to carry many passengers long haul before the 2030s at the earliest.^{[2][3]}

As of 2019, 98% of hydrogen is produced by [steam methane reforming](#), which [emits carbon dioxide](#).^[4] It can be produced by [electrolysis of water](#), or by

en.wikipedia.org/wiki/Hydrogen_vehicle

Most Common Hydrogen Production Method With CO2 Released To Atmosphere

1.1 ton H2
\$590
(Elec \$217 +
power gas \$373
USEIA 2019)

Heat: 5.7 MWh

Methane: 2.2 ton

Water: 4.9 ton



Steam Methane Reforming
+ Water Gas Shift

Hydrogen: 1.1 ton

CO2: 6.0 ton
Typically Released
Greenhouse Gas
Pollution

Sometimes With Carbon Capture and Sequestration CCS

1.1 ton H2
\$1,091
(Elec \$217 +
CCS \$377 +
power gas \$497
USEIA 2019)

Heat: 5.7 MWh

Methane: 2.9 ton

Water: 3.3 ton



Steam Methane Reforming
+ Water Gas Shift

Hydrogen: 1.1 ton

CO2: 1.5 ton
Typically Released
Greenhouse Gas
Pollution

CO2: 3.6 ton
Typically CCS
Deep Underground
Injection Well Storage

Proposed Hydrogen Fueling Stations Along Major Interstates



EFRE » AFDC » [Fuels & Vehicles](#) » [Hydrogen](#)

[Printable Version](#)

Hydrogen Fueling Station Locations

Find hydrogen fueling stations in the United States and Canada. For Canadian stations in French, see [Natural Resources Canada](#).

Public Stations

Advanced Filters

Fuel Corridors

59 results in

U.S. and Canada

Enter location



Hydrogen



Include non-retail stations

These stations are only available to a certain subset of customers.



Map & Route



Enter location



Electric



Charger Types

DC Fast

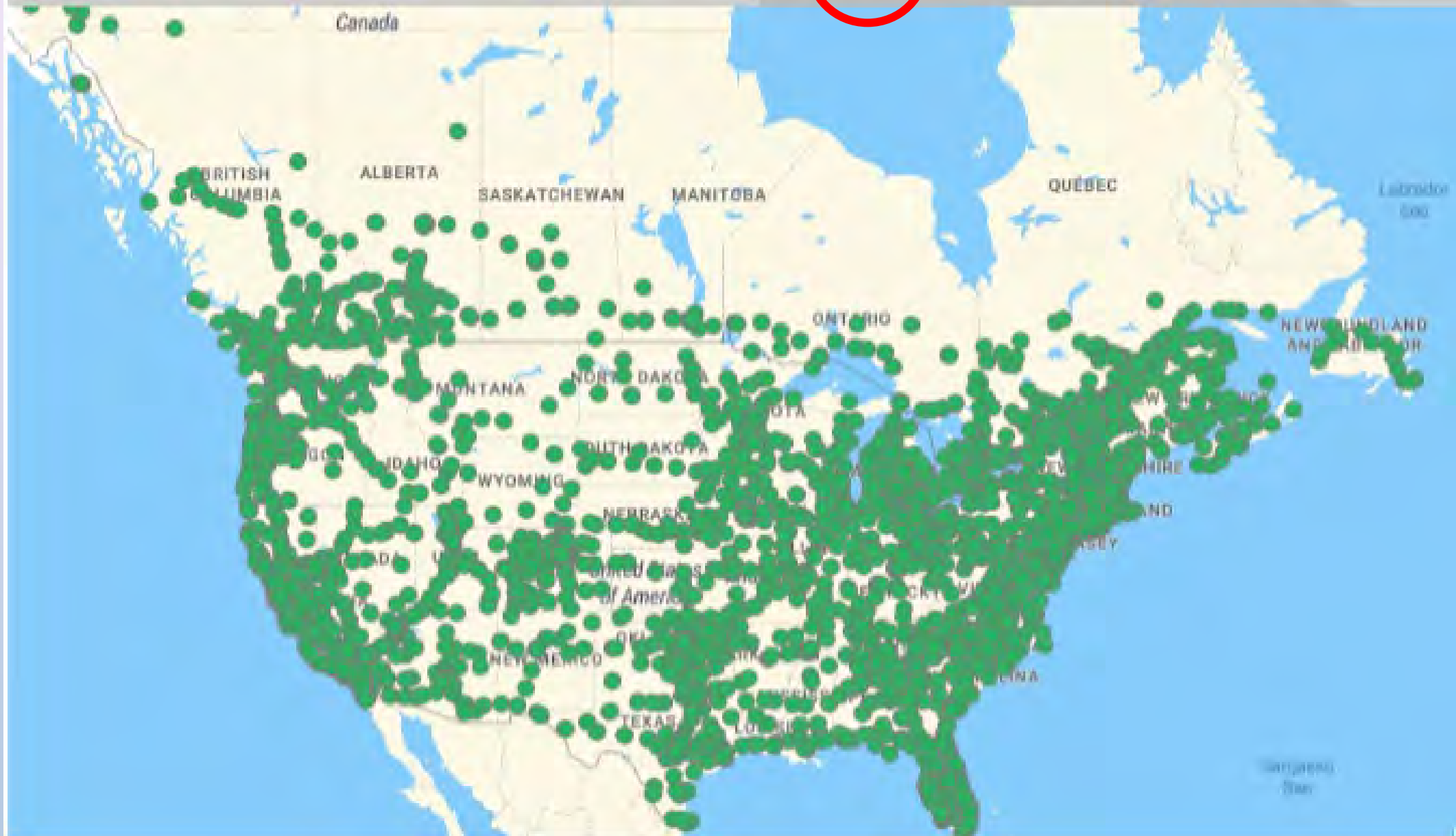


Connectors

All



Map
Route





[HTTPS://AFDC.ENERGY.GOV/](https://afdc.energy.gov/)

ALTERNATIVE FUELS DATA CENTER

...AND NOW: THE MAIN EVENT OF THE AFTERNOON

ELECTRIC VEHICLES

STEVE WEHR

CLIMATE IS CHANGING

- HAVE A POSITIVE INFLUENCE
- SEEK AND ACT ON WAYS TO:
 - REDUCE WHAT CONTRIBUTES TO CLIMATE CHANGE
 - PREPARE FOR IMPACTS OF CLIMATE CHANGE
- **BOUNCE FORWARD AND THRIVE UNDER THE CHANGE**

THANK YOU

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