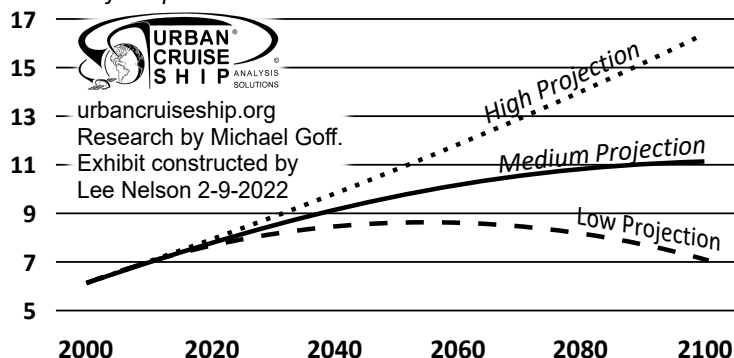


World Population Forecast

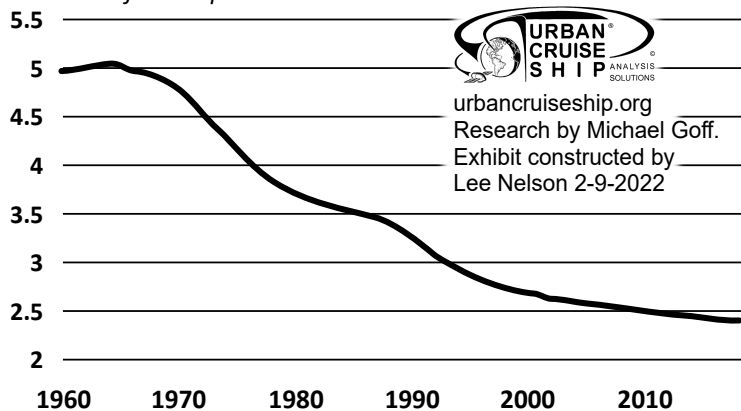
Billions of People



Source: United Nations

Total Fertility Trend - World

Number of Births per Woman



The World Bank. "Fertility rate, total (births per woman)". Accessed June 27, 2020

Total Fertility Rate (2018)

Number of Births per Woman

By Country



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Niger (highest TFR)	6.91
Nigeria	5.39
Pakistan	3.51
Indonesia	2.31
India	2.22
Mexico	2.13
Bangladesh	2.04
Brazil	1.73
United States	1.73
China	1.69
Russia	1.57
South Korea (lowest TFR)	0.98

By Region

Sub-Saharan Africa	4.69
Middle East and North Africa	2.81
South Asia	2.39
Latin America and Caribbean	2.03
East Asia and Pacific	1.82
Europe and Central Asia	1.71
North America	1.71

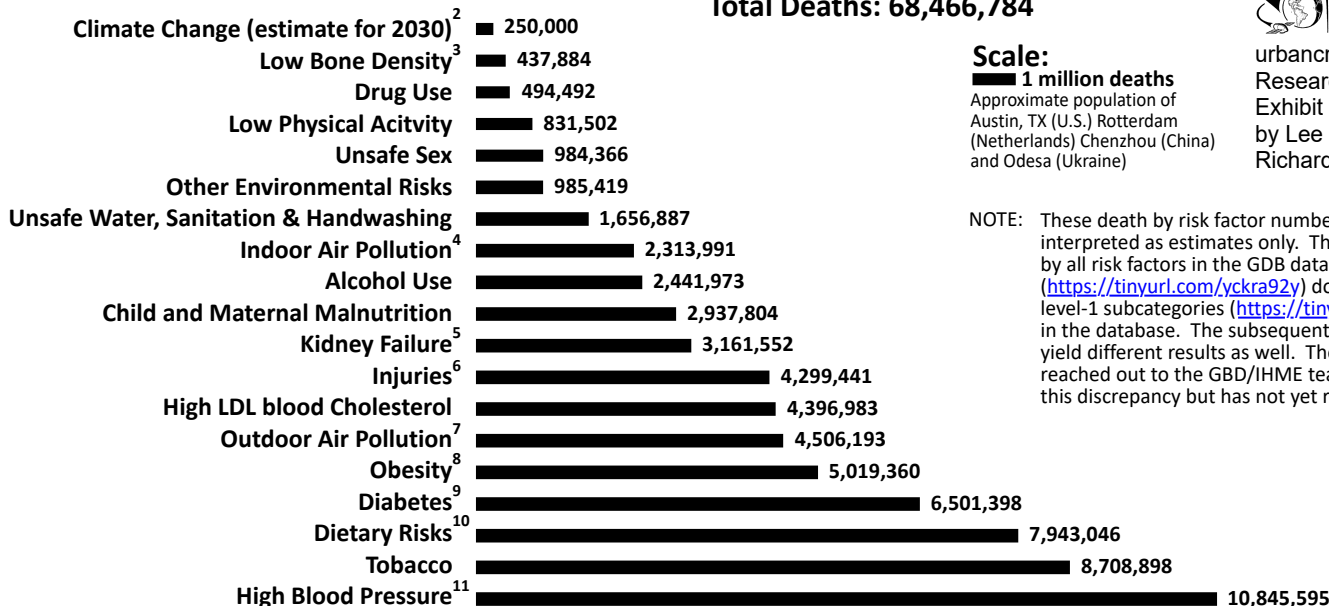
By Income Bracket

Low Income	4.51
Lower Middle Income	2.71
Middle Income	2.32
Upper Middle Income	1.87
High Income	1.60

The World Bank. "Fertility rate, total (births per woman)". Accessed June 27 2020.

Deaths by Risk Factor - 2019¹

Total Deaths: 68,466,784



Scale:

1 million deaths
Approximate population of
Austin, TX (U.S.) Rotterdam
(Netherlands) Chenzhou (China)
and Odesa (Ukraine)



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Exhibit constructed
by Lee Nelson &
Richard Burd 2-9-2022

NOTE: These death by risk factor numbers should be interpreted as estimates only. The total death count by all risk factors in the GDB database (<https://tinyurl.com/yckra92y>) does not match the level-1 subcategories (<https://tinyurl.com/2p9ccnf4>) in the database. The subsequent levels (2, 3, & 4) yield different results as well. The UCS team has reached out to the GBD/IHME team for clarification on this discrepancy but has not yet received an answer.

1.) Data is based on the Global Burden of Disease (GBD) 2019 Study with rearrangements in the classifications & naming. Permalink to GBD 2019 dataset: <https://tinyurl.com/wnx2hvf6>

2.) World Health Organization. (2014). Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. <https://apps.who.int/iris/handle/10665/134014> These 250,000 deaths are for comparison and not included in the 68,466,784 death total.

3.) This is what the GBD calls: Low bone mineral density

4.) GBD labels this as Household air pollution from solid fuels

5.) This is what the GBD calls: Kidney dysfunction

6.) GBD Cause of Death (2019) dataset: <https://tinyurl.com/fucde3nk> - includes the Accidents, Transport injuries, Suicide, & Homicide categories at the bottom of the opposite page

7.) This is a combination of what the GBD calls: Ambient particulate matter pollution + Ambient Ozone Pollution

8.) This is what the GBD calls: High body-mass index

9.) This is what the GBD calls: High fasting plasma glucose

10.) Includes both malnutrition and overeating in diets

11.) This is what the GBD calls: High systolic blood pressure

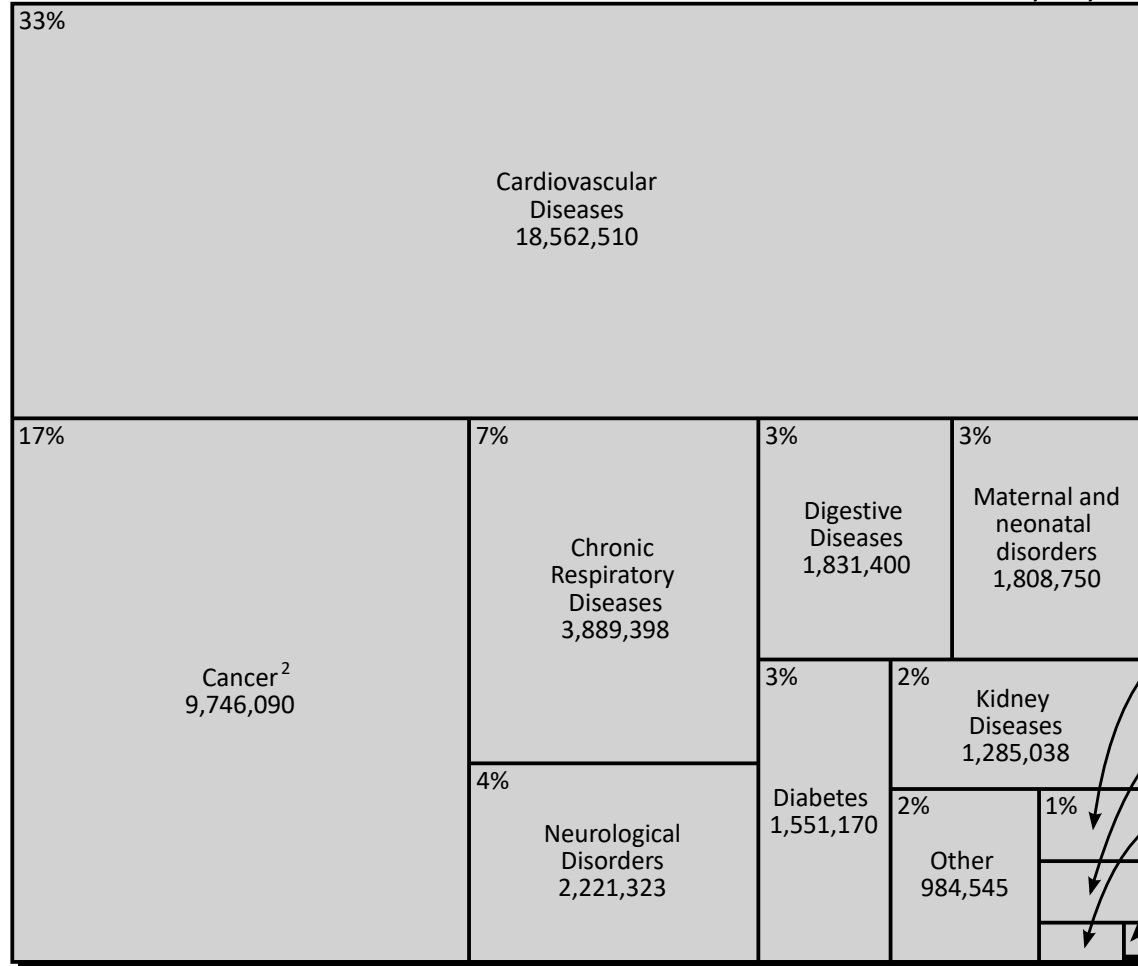
2019 Worldwide Cause of Death Comparison¹ p. 2 of 2

Total Deaths: 56,526,960

Non Infectious Causes

76% of Total Deaths

Number of Deaths: 42,571,951



Scale:

100,000 deaths

(Capacity of the football stadium at the University of Texas, Austin, U.S. or the Melbourne Cricket Ground in Victoria, Australia)

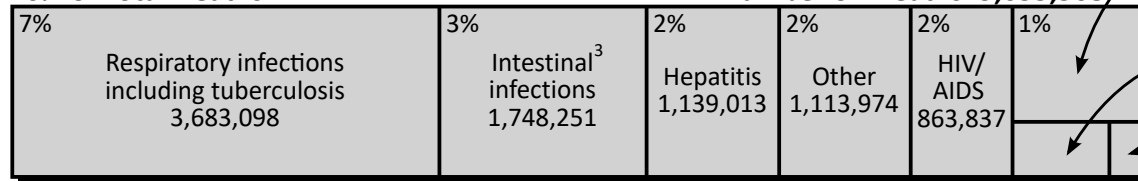


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Richard Burd 10-31-2021

Infections

16% of Total Deaths

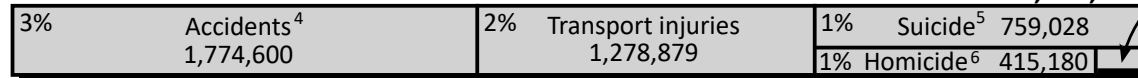
Number of Deaths: 9,655,568



Injuries

8% of Total Deaths

Number of Deaths: 4,299,441



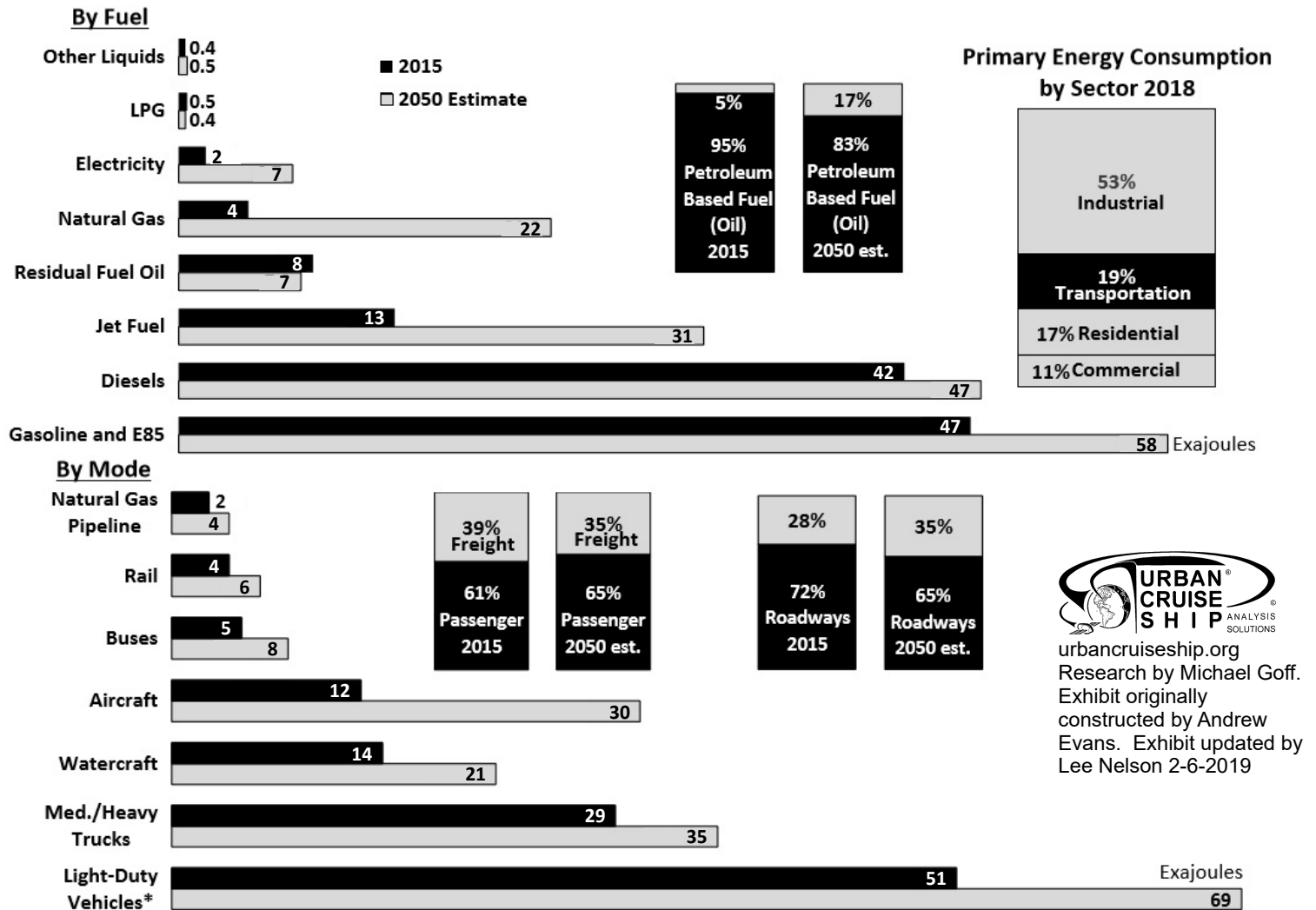
Conflict and terrorism
62,985

Executions and police
conflict 8,769

NOTE: There is a 1% (474,417) difference between this death count and the Death by Risk Factor - 2019 on the opposite page; this is due to statistical rounding estimates in the data collected by the Global Burden of Disease

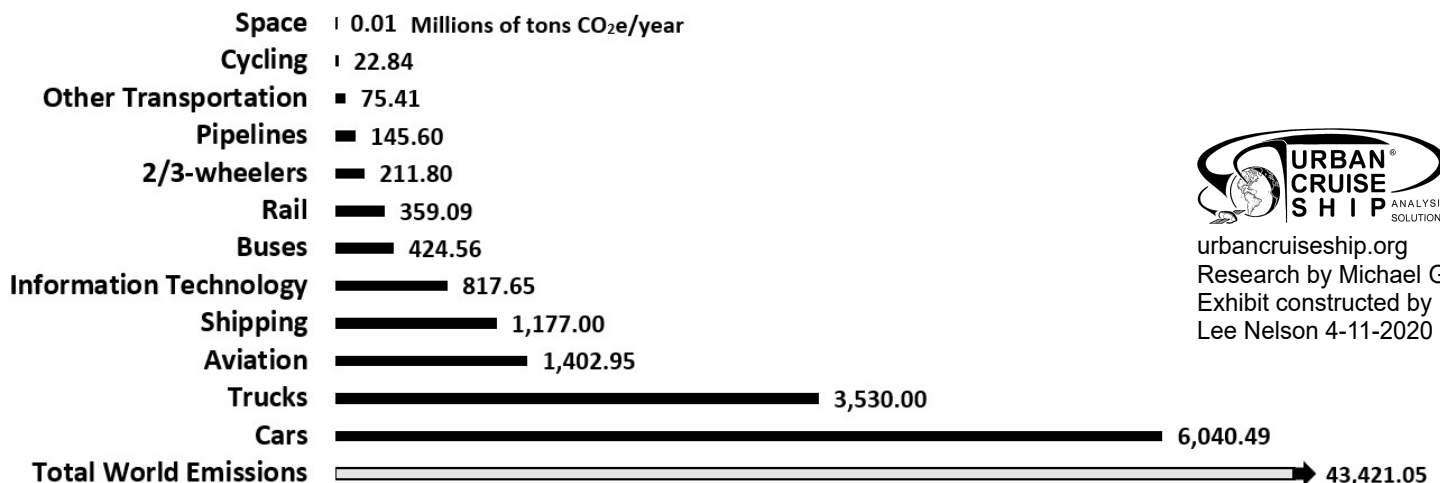
- 1.) Data is based on the Global Burden of Disease (GBD) 2019 Study with rearrangements in the classifications & naming of diseases; whereas the GBD classification hierarchy is tailored to medical logistics and identifying biological systems effected by disease, the breakdown above is arranged to specifically separate infections from non-infections. In example, the GBD groups together infections and non-infectious conditions into a single Maternal and neonatal disorders category whereas above those same (maternal and neonatal) conditions are broken down into infections and disorders.
Permalink to Global Burden of Disease (GBD) 2019 Dataset: <https://tinyurl.com/ud232svf>
- 2.) GBD labels this as Neoplasms and those which result in death are almost always cancerous (malignant) in nature.
- 3.) GBD labels this as Enteric infections
- 4.) GBD labels this as Unintentional Injuries which are not related to transportation infrastructure or modes; car accidents are included in Transport injuries
- 5.) GBD labels this as Self-harm because it is also used in disability-adjusted life year (DALY) calculations in addition to death calculations.
- 6.) GBD labels this as Interpersonal violence - since these are causes of death and not DALY's, these are effectively homicides.

Worldwide Transportation Sector Energy Consumption



Source: Energy Information Administration (EIA), Annual, Energy, Outlook 2017 (https://www.eia.gov/outlooks/ieo/excel/appl_tables.xlsx)
Global Greenhouse Gas Emissions Data (<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>)
*Includes cars, SUVs, motorcycles, vans, pickup-trucks, and most other vehicles dedicated to personal transit.

Transportation Sector Emissions - World



U.S. Environmental Protection Agency. "Lifecycle Greenhouse Gas Results". Accessed June 11, 2019.
Hanova, J., Dowlatabadi, H. "Strategic GHG reduction through the use of ground source heat pump technology". Environmental Research Letters 2(4). November 2007.
Staffell, I. "Guest post: Ten charts show how the world is progressing on clean energy". CarbonBrief. November 2018.
Fridleifsson, I., Bertani, R., Huenges, E., Lund, J. "The possible role and contribution of geothermal energy to the mitigation of climate change". IPCC Scoping Meeting on Renewable Energy Sources, Proceedings, pp. 59-80. January 2008.
Chester M. "Passenger Transportation LCA Database". Accessed December 6, 2019.

Vehicle and Cargo In Various Vehicles Compared

p. 2 of 2

Wasteful transport

■ Vehicle Weight ■ Fuel Weight

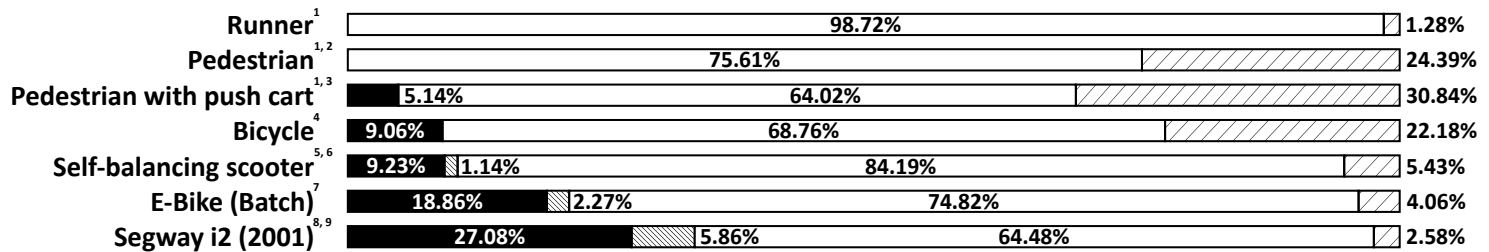
Efficient transport

□ Passenger Weight □ Cargo Weight

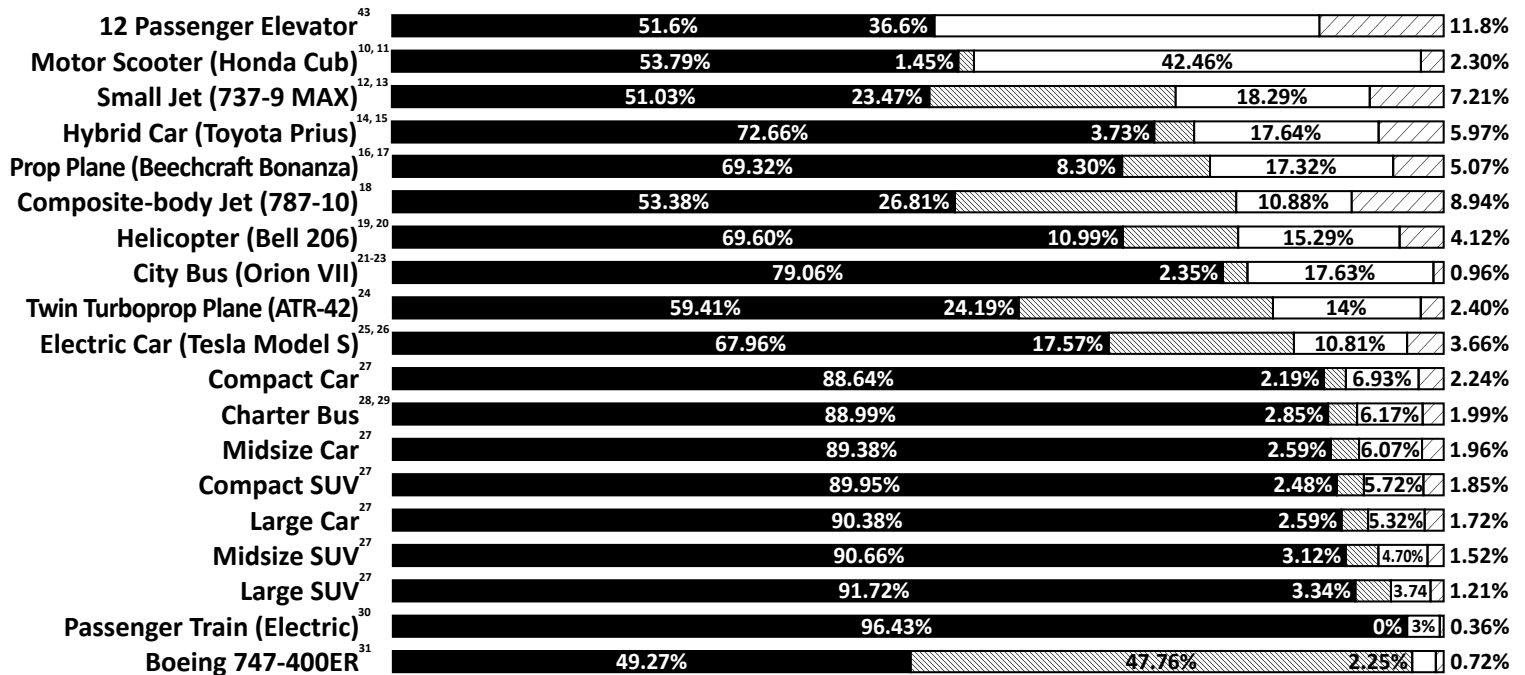


Exhibit concept & editing by
John van der Harst. Research
by Michael Goff. Research &
graphics by Richard Burd
2/9/2022

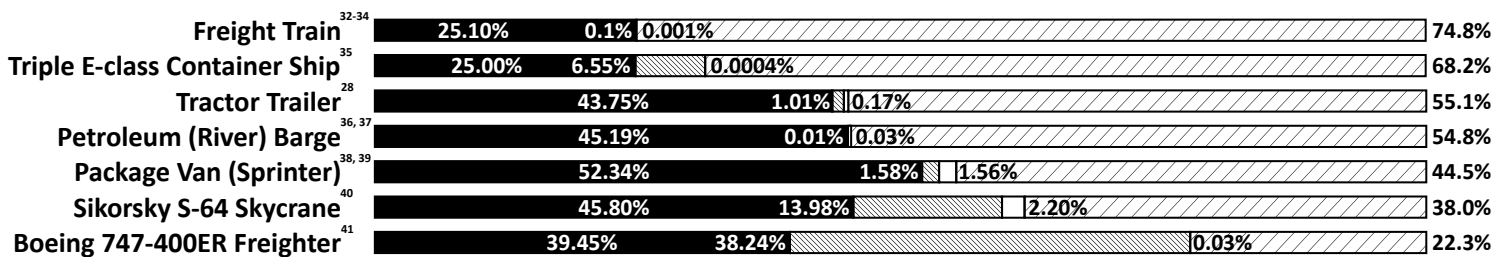
Pedestrian Vehicles



Passenger Vehicles



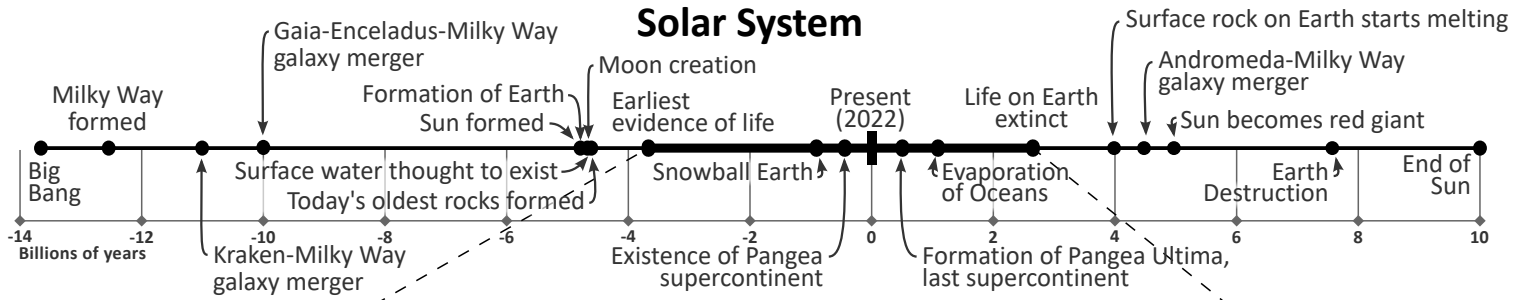
Freight Vehicles



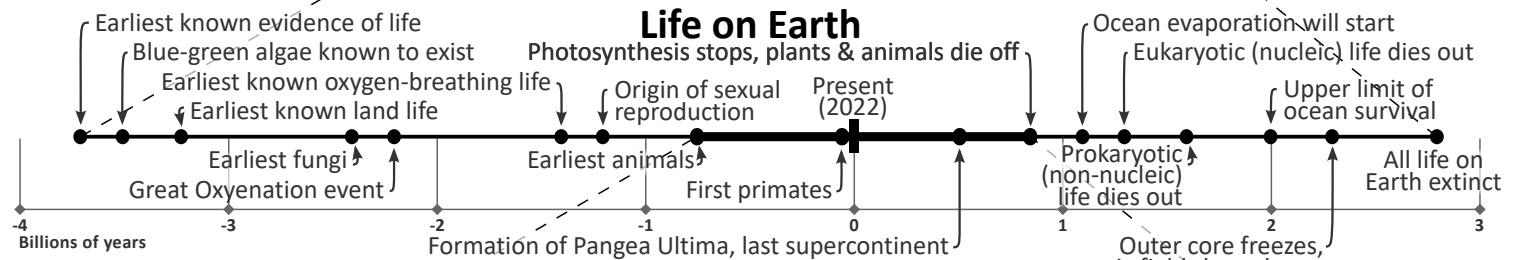
- 1.) We assume a person weighs 62 kilograms per Rettnet, R. "The Weight of the World: Researchers Weigh Human Population". Live Science. 2013.
- 2.) Wagner, N. "Carry That Load". The Doctor Will See You Now. October 2014.
- 3.) Wellmax Grocery Utility Shopping Cart Product Specifications
- 4.) White, M. "How Much Does A Bike Weigh?". Bicycle Universe. Accessed May 28, 2021.
- 5.) Acc. to XPIRT SBW666 Product Specification total weight is 19 lbs
- 6.) Battery is a XIXIML 36V 4.4Ah 4400mah & weighs 2.1 lbs per consumer review
- 7.) Wired Magazine: The 13 Best Electric Bikes for Every Kind of Ride 2021.
- 8.) i2 Segway Product Specifications
- 9.) Segway i2 battery is 22.7 lbs per this reseller's specifications
- 10.) Honda Cub is the most manufactured motor scooter acc. to: Joe D'Allegro "Honda Builds 100 Millionth Super Cub Scooter". The Drive 2017
- 11.) The Honda cub carries one gallon of gas weighing 6.3 lbs acc. to these specifications at bikez.com
- 12.) Empty Weight is 99,360 lbs acc. to Boeing: 737 MAX Airplane Characteristics for Airport Planning 2019
- 13.) Boeing 737 MAX Airplane Characteristics for Airport Planning 2019; p.51 of 196 (PDF)
- 14.) The top selling hybrid car in the U.S. acc. to Wikipedia
- 15.) Curb weight is 3,040.2 lbs acc. to Wikipedia
- 16.) Anders Clark (June 25, 2015). "The Beechcraft A36 Bonanza". Disciples of Flight; this model has the: "...longest production run of any aircraft in history."
- 17.) Assuming 4 passengers with fuel & cargo at max allowable takeoff weight per Airmart's Beechcraft G36 Bonanza Specifications
- 18.) Assuming 330 passengers with fuel & cargo at max takeoff weight per Modern Airlines Dreamliner Boeing 787 Specs Table
- 19.) Acc. to FlightGlobal, the Bell 206 is the most widely used helicopter in service w/ 15% of the market
- 20.) Assuming a load of 4 passengers, an empty weight of 2,331 lbs, & max takeoff weight of 3,350 lbs per Wikipedia
- 21.) Assuming a curb weight of 29,780 & fuel capacity of 125 US Gallons (Diesel) per Wikipedia & C.P.T.D.B. Specs respectively
- 22.) Assuming fuel tank capacity of 125 U.S. gallons (deisel) per Canadian Public Transportation Discussion Board Specifications
- 23.) Assuming 36 passengers (4,921 lbs) on a standard 40' bus per New York City MTA Service Guidelines p.14 of 21 in the PDF
- 24.) Specifications per ATR Family Booklet as well as ATR's 42-600 homepage carries 2 pilots, a steward(ess) and 30-48 passengers
- 25.) Curb weight: Sabatini, Jeff (November 2014). "2014 Tesla Model S 60 Full Test - Review". Car and Driver. Retrieved May 7, 2015.
- 26.) Battery Weight: "How Much Does a Tesla Weigh?" Weight of Stuff
- 27.) Miller-Wilson, K. "List of Car Weights". LoveToKnow. Accessed May 28, 2021. NOTE: we assume average passenger count for loads
- 28.) Weight: Pennsylvania Department of Transportation. "Approximate Vehicle Weights". Accessed May 28, 2021.
- 29.) The charter bus fuel tank size is estimated as the median of five values: GOGO Charters. "Charter Bus Comparison Chart". Accessed May 28, 2021.
- 30.) Acela Express (trainset) Wikipedia
- 31.) Boeing. "The right choice for the large airplane market". Accessed May 28, 2021.
- 32.) Typical (U.S.) freight train weights & configurations: Barkan, C. "Introduction to Rail Transportation". University of Illinois at Urbana-Champaign. 2012.
- 33.) GE Dash 8 Series (locomotive) Wikipedia
- 34.) Personnel on freight trains: Sperandeo, Andy. "The people who work on trains". trains.com. 2006.
- 35.) Wang, Brian. Next Big Future. "Largest container ship will be 16% larger and 20% less CO2and 35% more fuel efficient". Accessed December 1, 2021.
- 36.) Weight estimates based on data provided by: Crowley. "LPT-16552 Deck Cargo/Petroleum Barge". Accessed December 1, 2021.
- 37.) Physical weight calculated using Archimedes' principle on this 3D model in the Trimble Sketchup 3D warehouse
- 38.) Vega Gabriel. "These Are the Vans That Deliver All of Your Amazon Packages". Motor Biscuit 2020. Accessed December 1, 2021.
- 39.) Specifications provided by the manufacturer: Sprinter Cargo Van by Mercedes-Benz. Accessed November 30, 2021.
- 40.) Specifications per Wikipedia Fuel capacity per Heli-Archive "Sikorsky S-64A Sky Crane". Accessed November 24, 2021.
- 41.) Boeing. "Introducing the 747ER and 747ER Freighter". January 2003. Accessed November 23, 2021.
- 42.) U.S. Air Force Fact Sheet "Global Hawk". Accessed December 1, 2021.
- 43.) Vehicle weight is the cabin weight minus the counterweight; we assume 6 passengers (as an average load) each carrying 20kg cabin-weight, passenger-weight, and counterweight are average approximations of Doug Guderian; accessed on January 17, 2022.

HISTORICAL TIMELINES p. 1 of 2

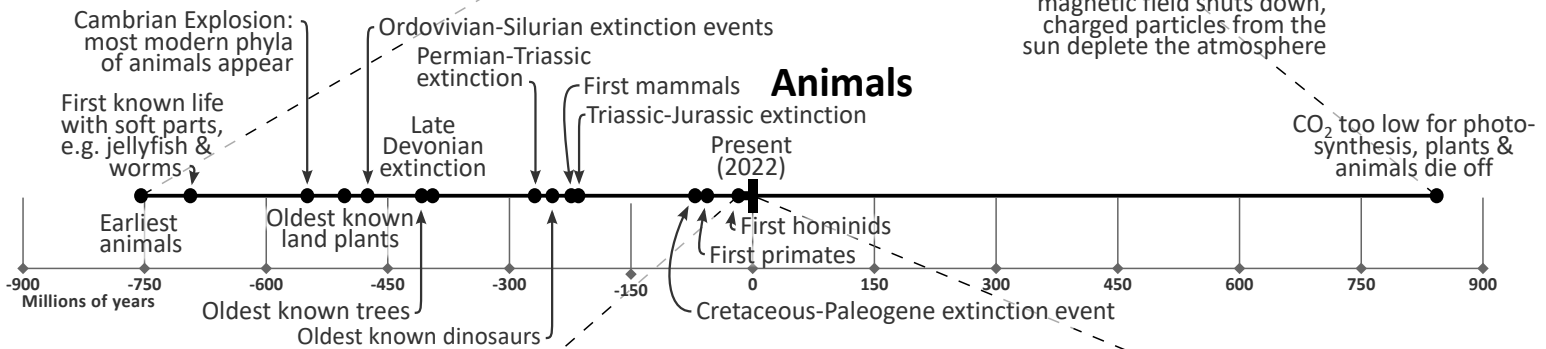
Solar System



Life on Earth



Animals



Hominids

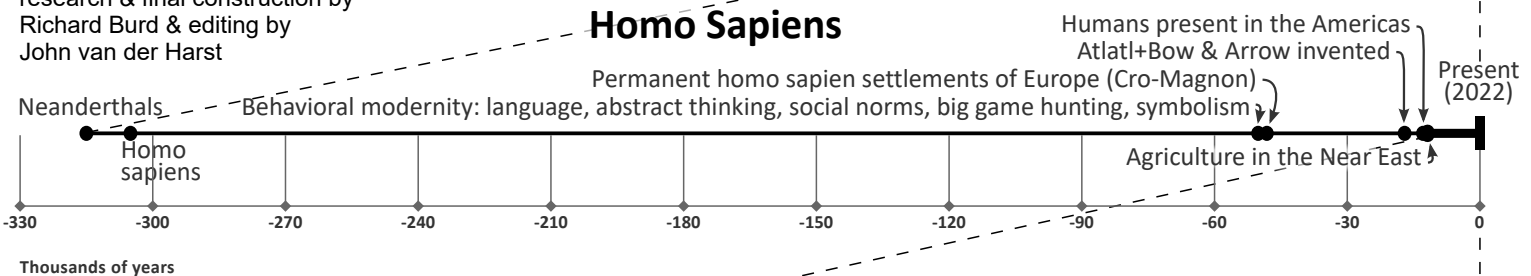


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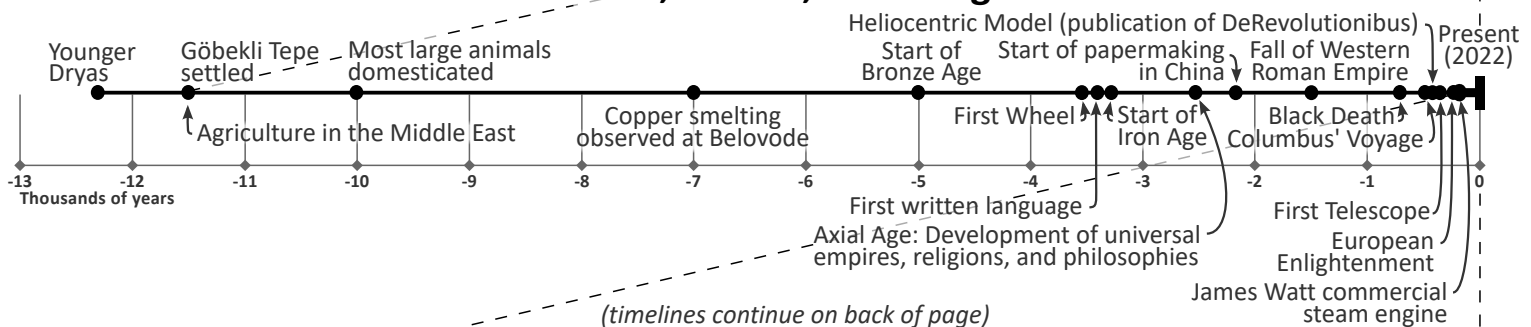
Exhibit Research by Michael Goff,
initial construction by Lee Nelson,
research & final construction by
Richard Burd & editing by
John van der Harst



Homo Sapiens



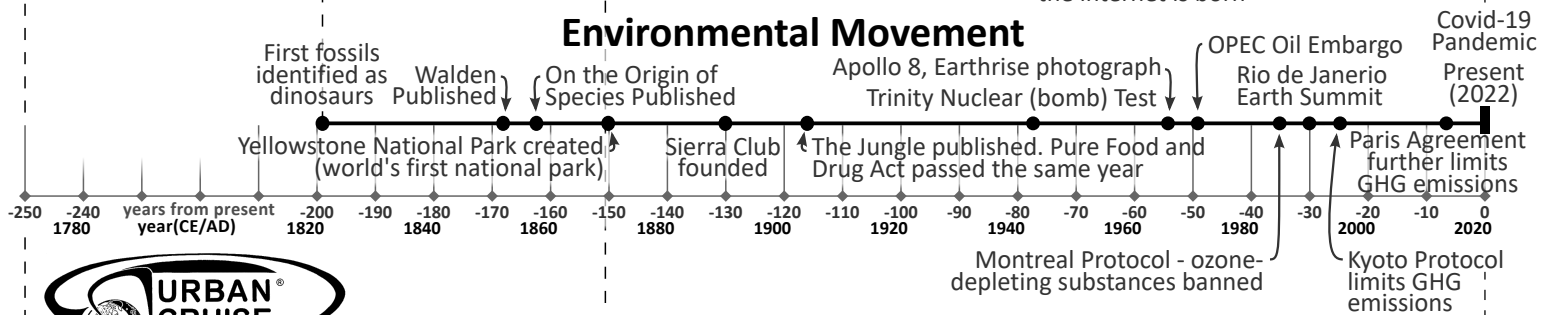
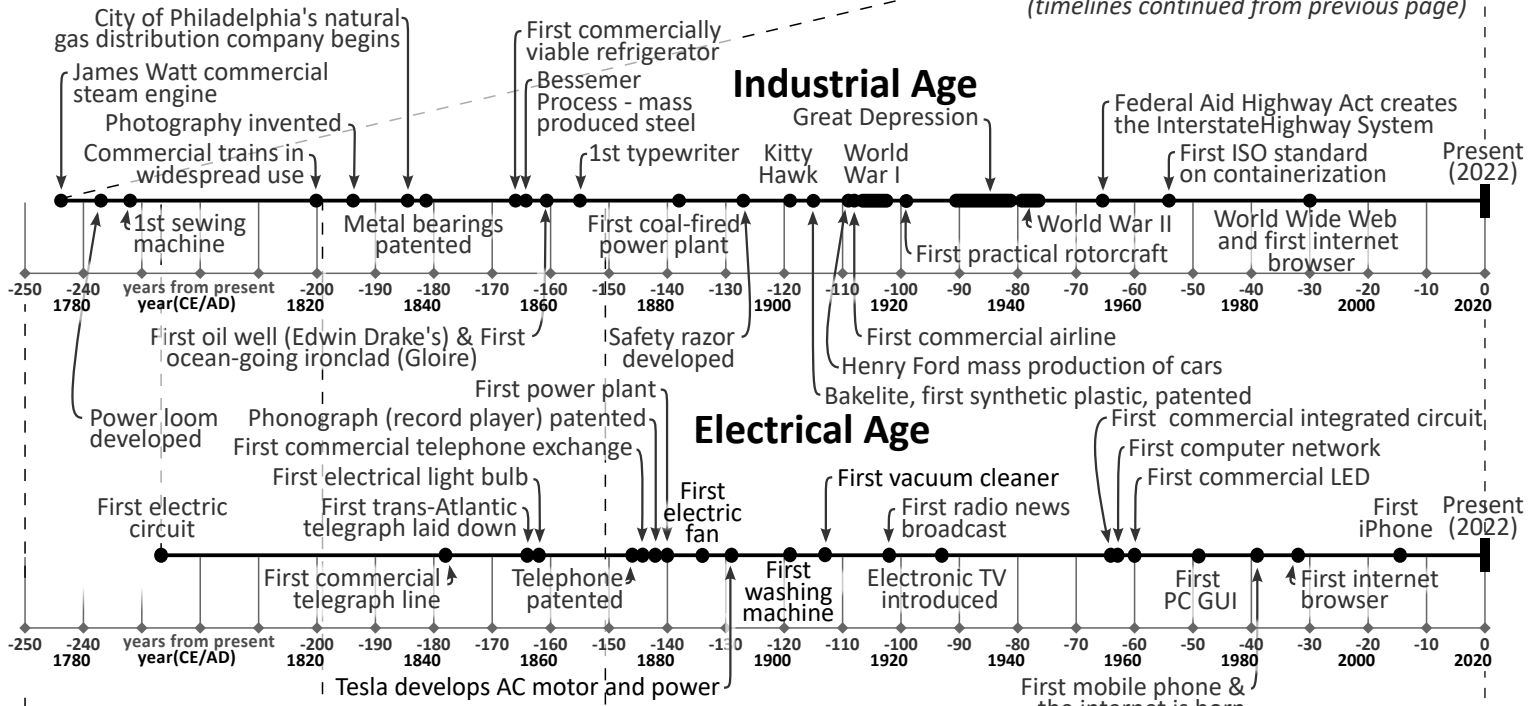
Neolithic, Bronze, & Iron Age



(timelines continue on back of page)

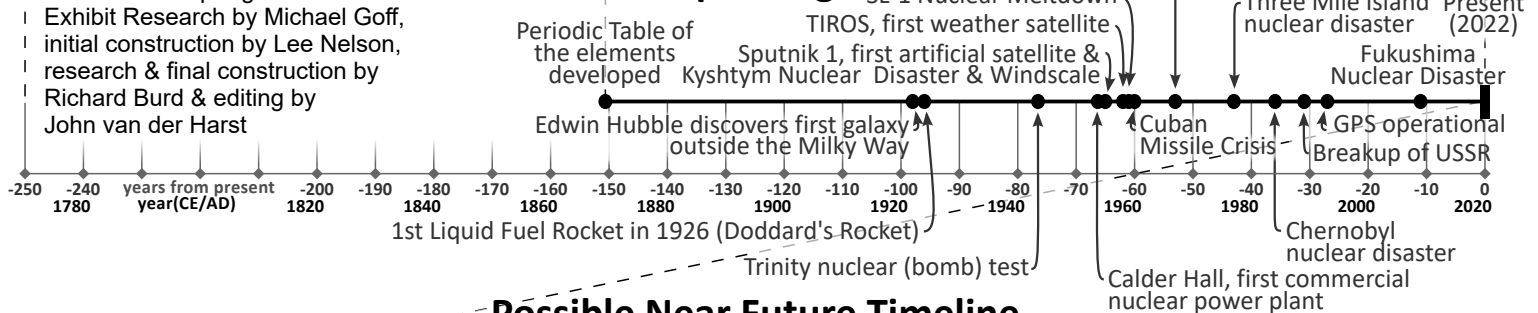
HISTORICAL TIMELINES p. 2 of 2

(timelines continued from previous page)

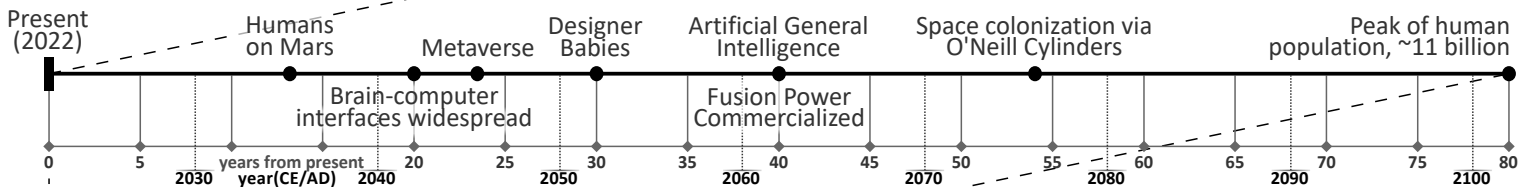


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Richard Burd & editing by
John van der Harst

Atomic & Space Age



Possible Near Future Timeline



Possible Far Future Timeline

