



Worm Capital

We are value investors focused on the future.

The Tesla Decade



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Cameron Tierney | Research Analyst, Worm Capital

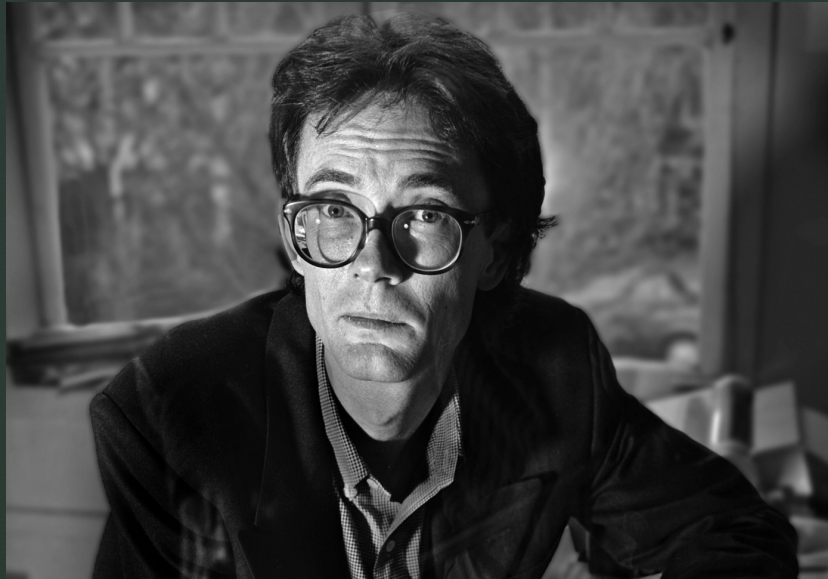
April 18, 2022

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“The future is already here – it's just not very evenly distributed.”

William Gibson



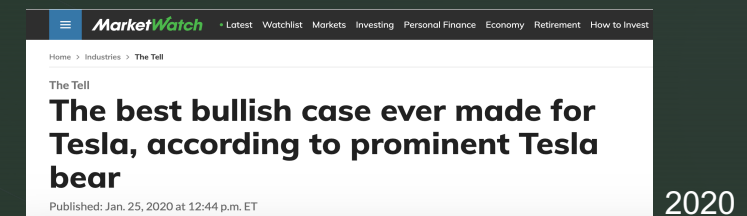
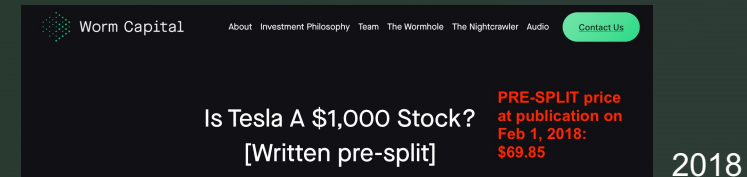
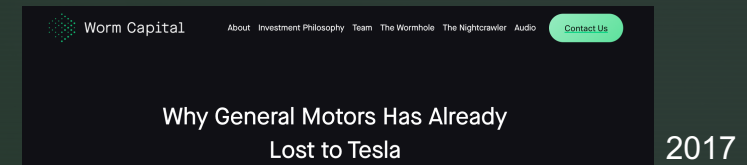
This presentation outlines our views on...

- The scope of Tesla's opportunity within a changing industrial landscape.
- Tesla's competitive advantages and consistent execution as a market vanguard.
- A set of probable future outcomes for Tesla's financial growth.

Some background on us

- Tesla has been our largest position for 4+ years.
- We have long believed that Tesla was destined to be one of the largest companies in the world—based on free cash flow and net income.

Our research/commentary:



It's still early days...

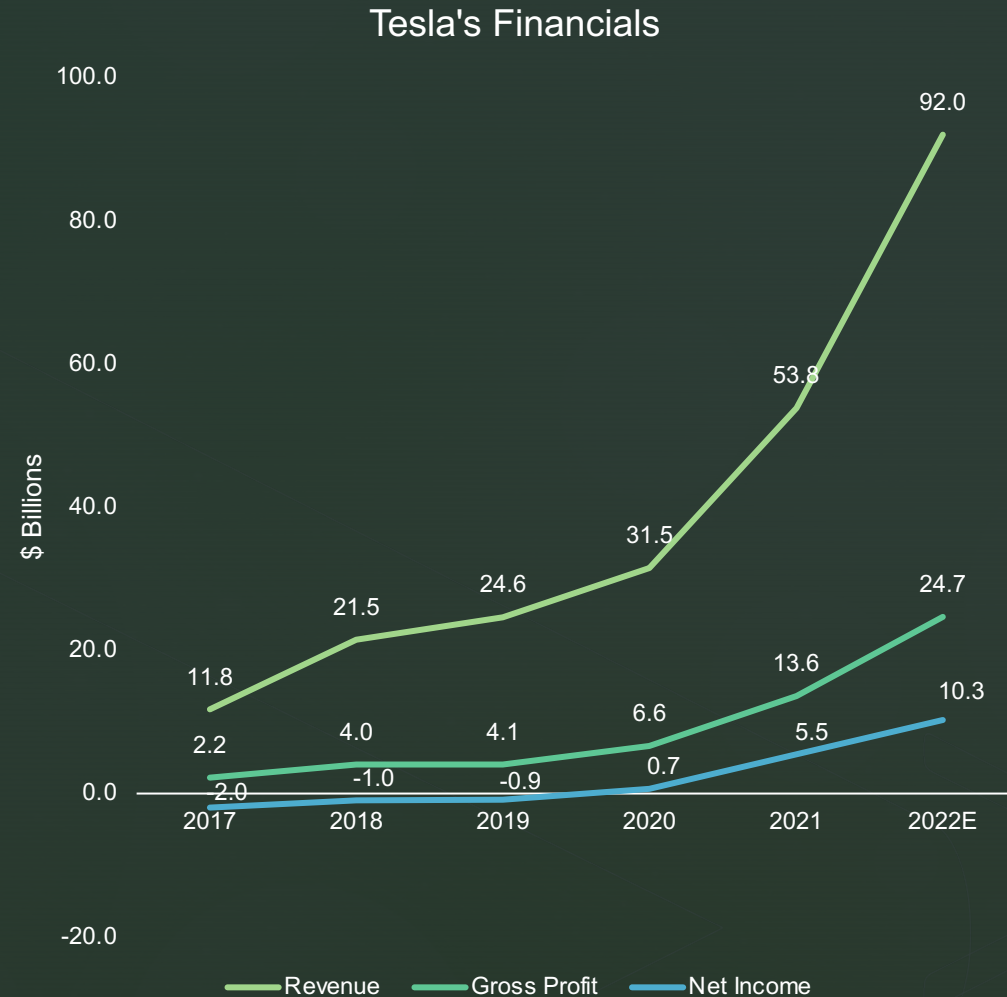
- Our multi-year research effort into Tesla's manufacturing capabilities and supply chain integrations suggest that Tesla is more than 6 years ahead of any competitor. This lead is expanding.
- The company has massive scale today, which in our view will likely compound at significant rates going forward—and outpace current consensus expectations by a wide margin.
- We believe that many market participants do not yet grasp the extensive data, software, manufacturing, and AI advantage that Tesla enjoys.
- Overall sell-side estimates of Tesla's growth are, in our view, are extremely low.

A recipe for an **epic** redistribution of wealth.



Hitting the inflection point

- Tesla is in expansion mode.
- Infrastructure is being built out to sustain ~50% YoY growth through 2030.
- Operating, gross, and net margins should expand at a healthy rate over time.





Our forecast of Tesla in the 2020s

Ludicrous growth mode. We anticipate:

- 50%+ revenue CAGR – more than any company of its size and scale in history.
- The potential to achieve a 20 million vehicle production run-rate by year-end 2030.
- 40%+ gross margins at scale.
- We believe Tesla shares could offer a 10x return by 2030 – and potentially much more.*
- *Note: Our 10x by 2030 valuation assumptions include Tesla's current business lines. This figure does not include Tesla's planned Robotaxi network or real-world AI product revenue, each of which have profound upside implications to our financial models.



The view from Mars





What *is* Tesla?

Tesla is best described as a holding company composed of four distinct businesses.



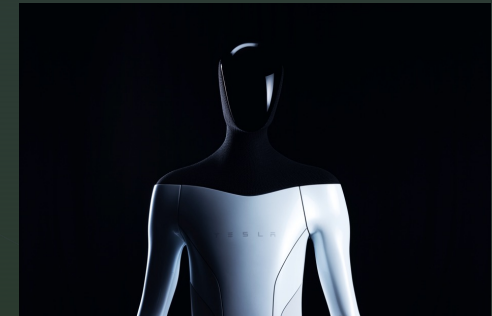
Consumer
Transport



Commercial
Transport

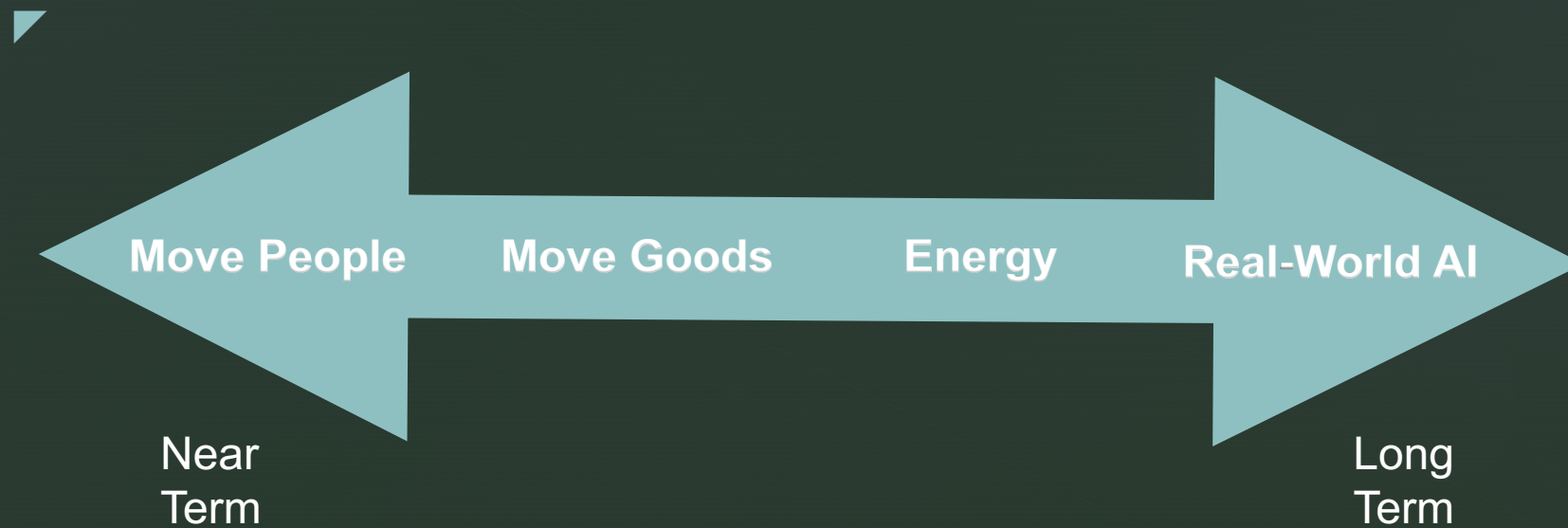


Energy

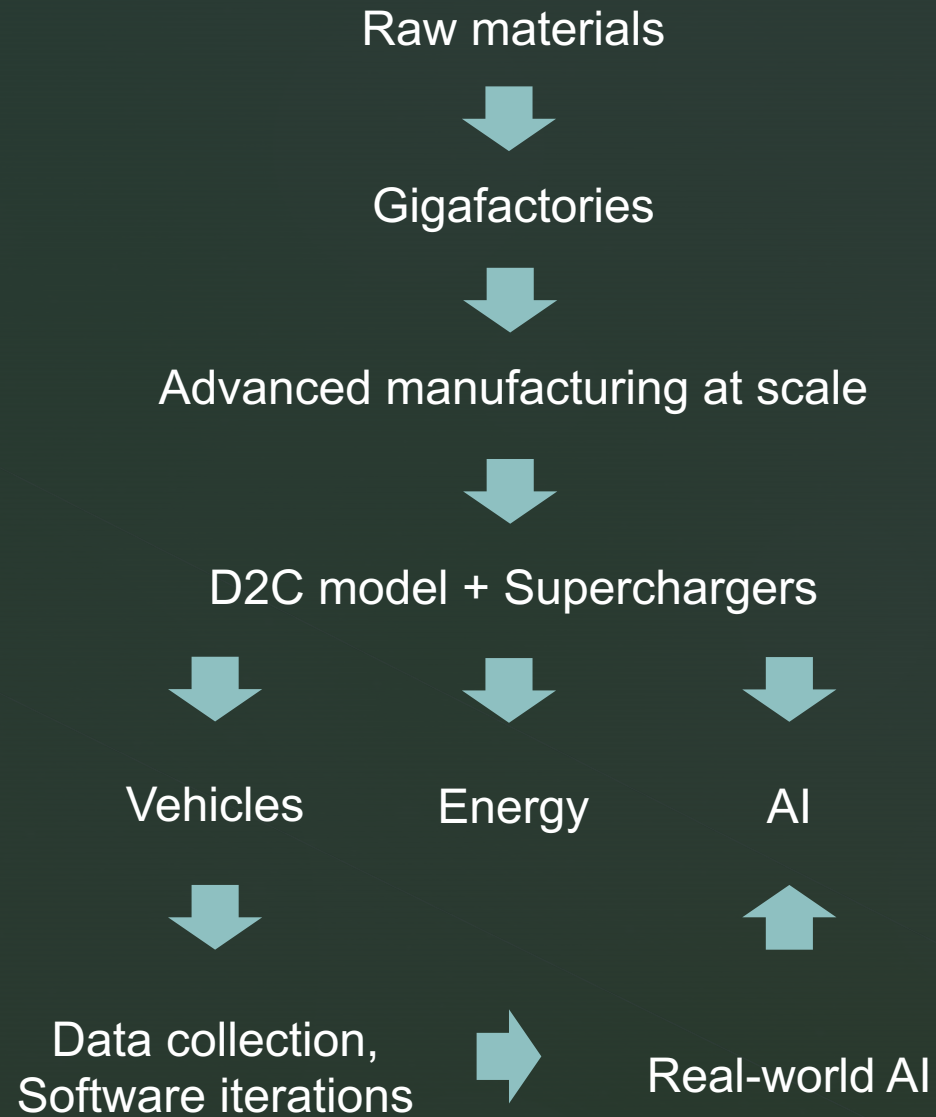


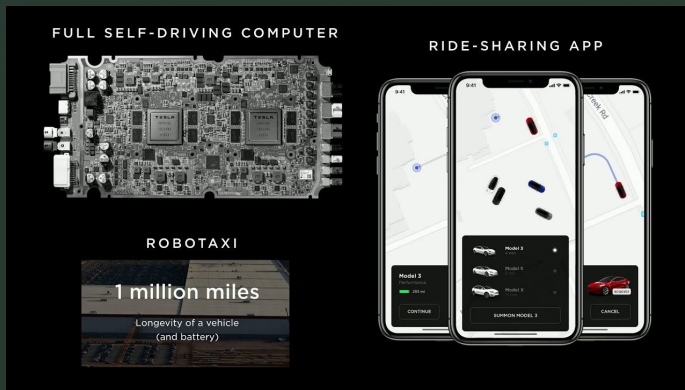
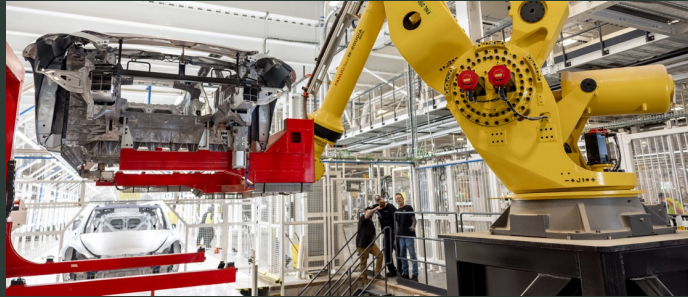
Real-world AI
/ Autonomy

Each of these businesses exists on a continuum, operating at various stages of cash flow and maturity.



Vertical integration is key to Tesla's long-term success.





2 Big Ideas...

- **Vast end markets**
 - These four verticals, cumulatively, represent over \$15 trillion in addressable markets.
- **Cars are just the start...**
 - Tesla's consumer vehicles are the entry-point to develop necessary cash flows to build out new and bigger business lines in the coming years (i.e. energy storage, Robotaxi software, bots, more...)

From ICE to EVs:
How to imagine a
disruption of this
magnitude



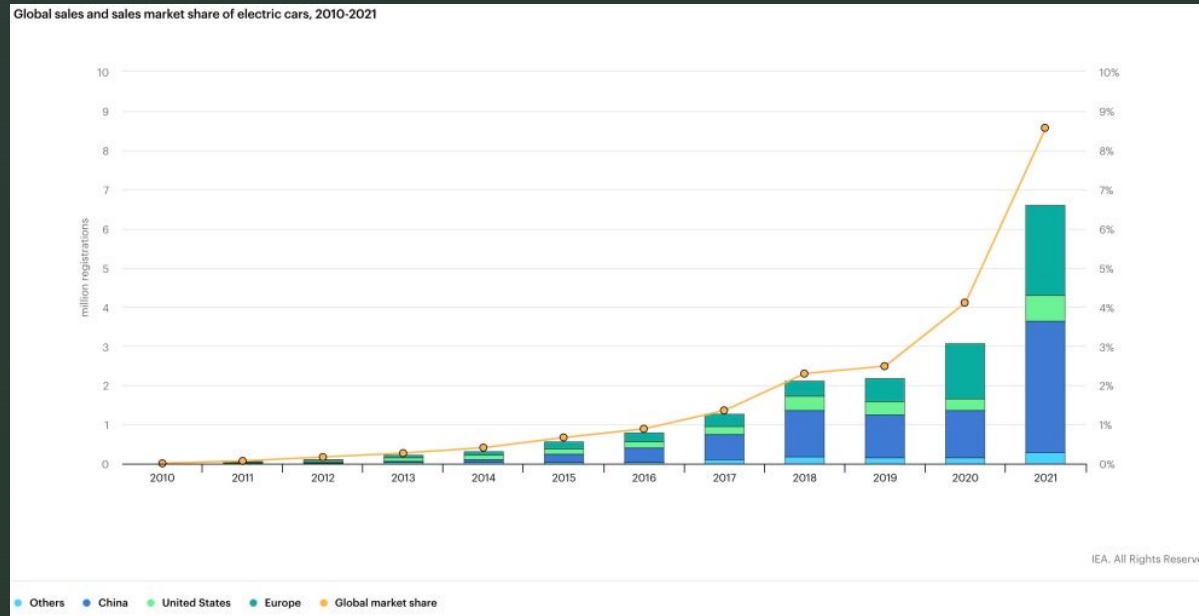
There are currently
~2 billion combustion
engine cars in the
world.¹



Source: <https://www.ucsusa.org/resources/vehicles-air-pollution-human-health>


- Annual sales: ~67M ICE vehicles²
- Annual revenue: ~\$2.7 trillion³
- Auto represents ~3% of overall GDP in USA⁴

EV adoption represents the largest industrial paradigm shift of the 21st century.




“In 2021, electric car sales more than doubled to 6.6 million, representing close to 9% of the global car market and more than tripling their market share from two years earlier. **All the net growth in global car sales in 2021 came from electric cars.**”

International Energy Agency



Multiple factors
are driving all
transport towards
100% EVs—
quickly

- Lower total costs of ownership.
 - Lower depreciation (and potentially appreciating) characteristics via software upgrades.
 - Simplified manufacturing and maintenance processes (fewer moving parts).
 - iPhone-like product enhancement.
 - Range anxiety no longer a concern (fast charging, energy-dense low-cost batteries, etc.).
- 



What comes next?

- How quickly will the shift happen?
- Which companies will emerge triumphant?
- Will it be one company? Or many?
- Can the existing OEM incumbents make this transition from ICE to EV?
- Will they survive? Will a new crop of companies emerge?

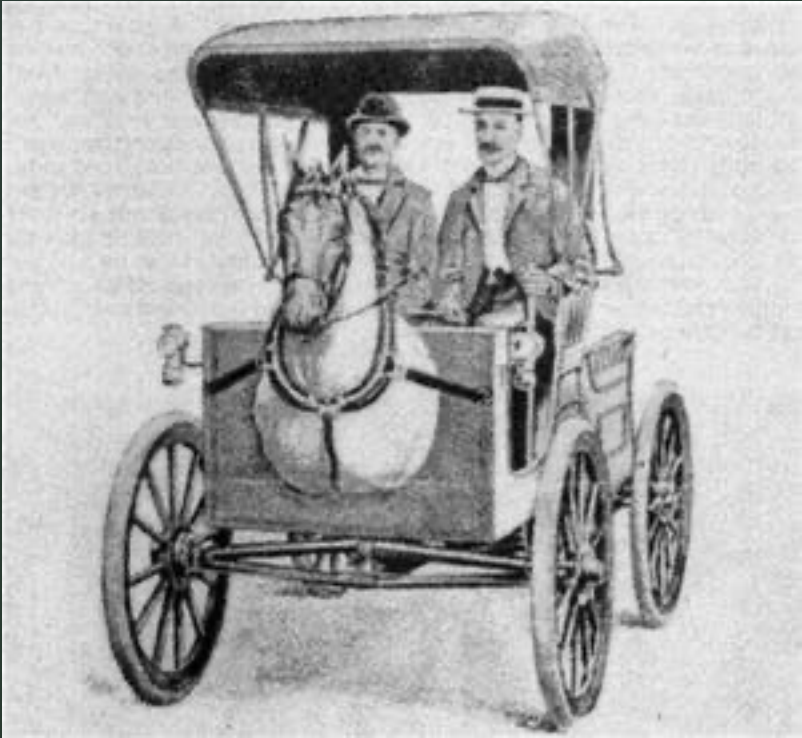
Our perspective on the Cambrian environment (Worm Theory)

We believe:

- “The One-Room Hypothesis”
 - Post-Internet, customers can quickly identify the best product/service
- It’s a land-grab environment.
 - Companies should optimize for scale and value proposition.
- Winner-take-most
 - Big winners, big losers



History suggests these transitions are unkind to incumbents—and underfunded upstarts



Many OEMs transitioning to EVs will fail:

- Immense switching costs
- Legacy cash flow models
- Auto dealer networks
- Lack of battery supply
- Heavy debt load
- Brain drain of talent

For years, the incumbent auto OEMs have made public claims that they are pivoting to EVs and deploying significant capital to achieve those goals.

Competition?

GM Is Going All Electric, Will Ditch Gas- and Diesel-Powered Cars

NBC: Oct. 2, 2017

PICTURES | THU SEP 7, 2017 | 10:27AM EDT

BMW gears up to mass produce electric cars by 2020

Reuters: SEP 7, 2017

BUSINESS

Nissan aims for pole position in electric cars with new Leaf

Automaker's answer to Tesla also targeted at rapidly growing Chinese market

Nikkei: September 6, 2017

NEWS

Volvo's Electric Future

The automaker says starting in 2019 it will make only electric or hybrid cars.

KRISHNADEV CALAMUR JULY 5, 2017

The Atlantic: July 5, 2017

OEMs increasingly look like carriage manufacturers of the early 20th century

- Incumbents have not vertically integrated battery supply, software, etc.
- Their existing manufacturing lines could become stranded assets by 2025.

BUSINESS | AUTOS & TRANSPORTATION | AUTOS INDUSTRY
GM's Electric Dream in China Suddenly Looks Underpowered
The launch of a new Buick electric vehicle has been put on hold until a new battery supplier can be identified

WSJ: Aug. 29, 2018

Jaguar delays some I-Pace all-electric SUV deliveries, automaker says it is 'prioritizing'

Fred Lambert - Jul. 26th 2018 9:59 am ET @FredLambert

Electrek: Jul. 26th 2018

BMW Exec Bemoans Company's Failure To Keep Pace With Tesla's Battery Cell Production

CleanTechnica: January 25th, 2019

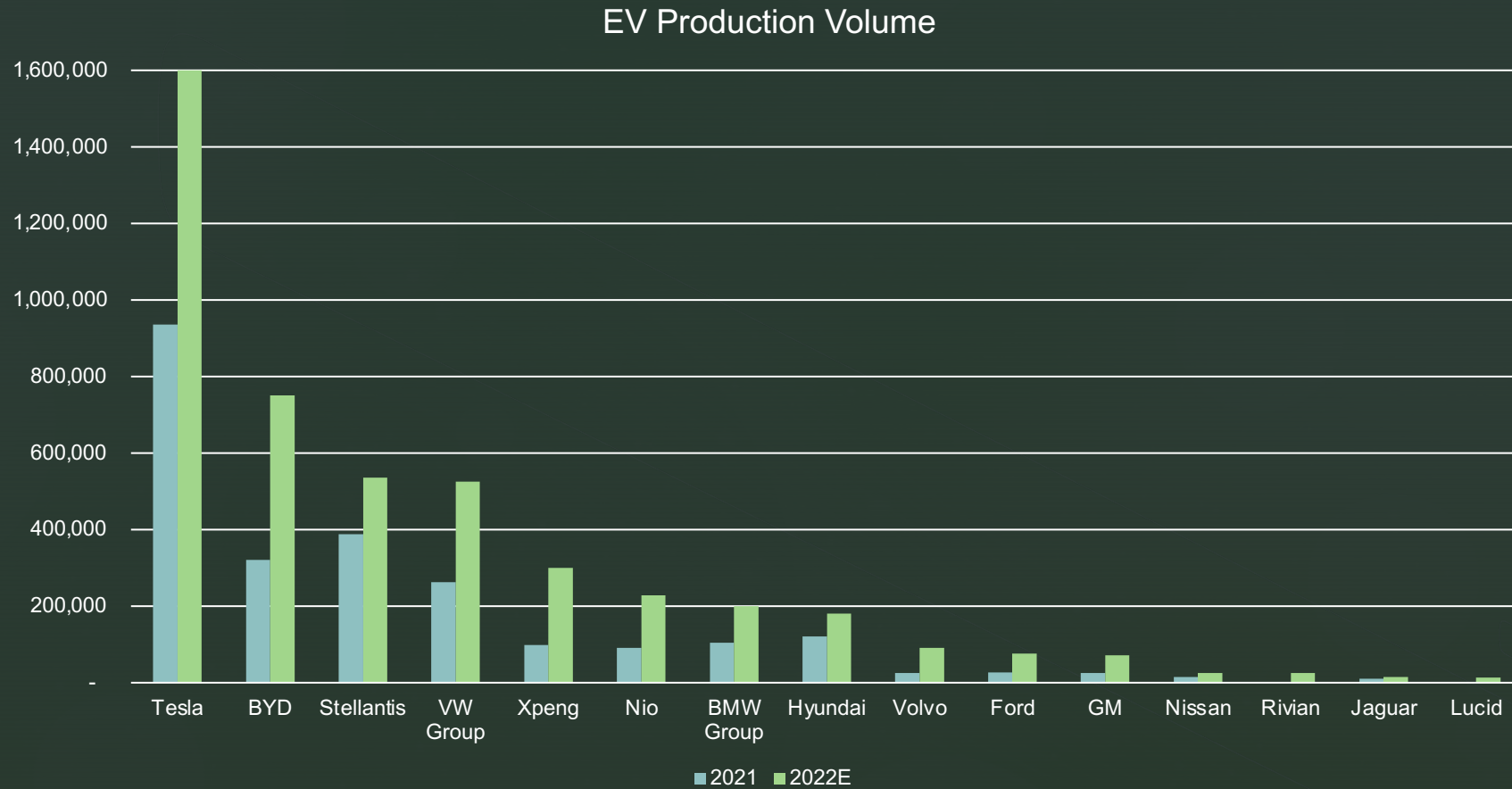
Audi's first electric car reportedly delayed again because of a battery shortage

The Verge: Apr 19, 2019

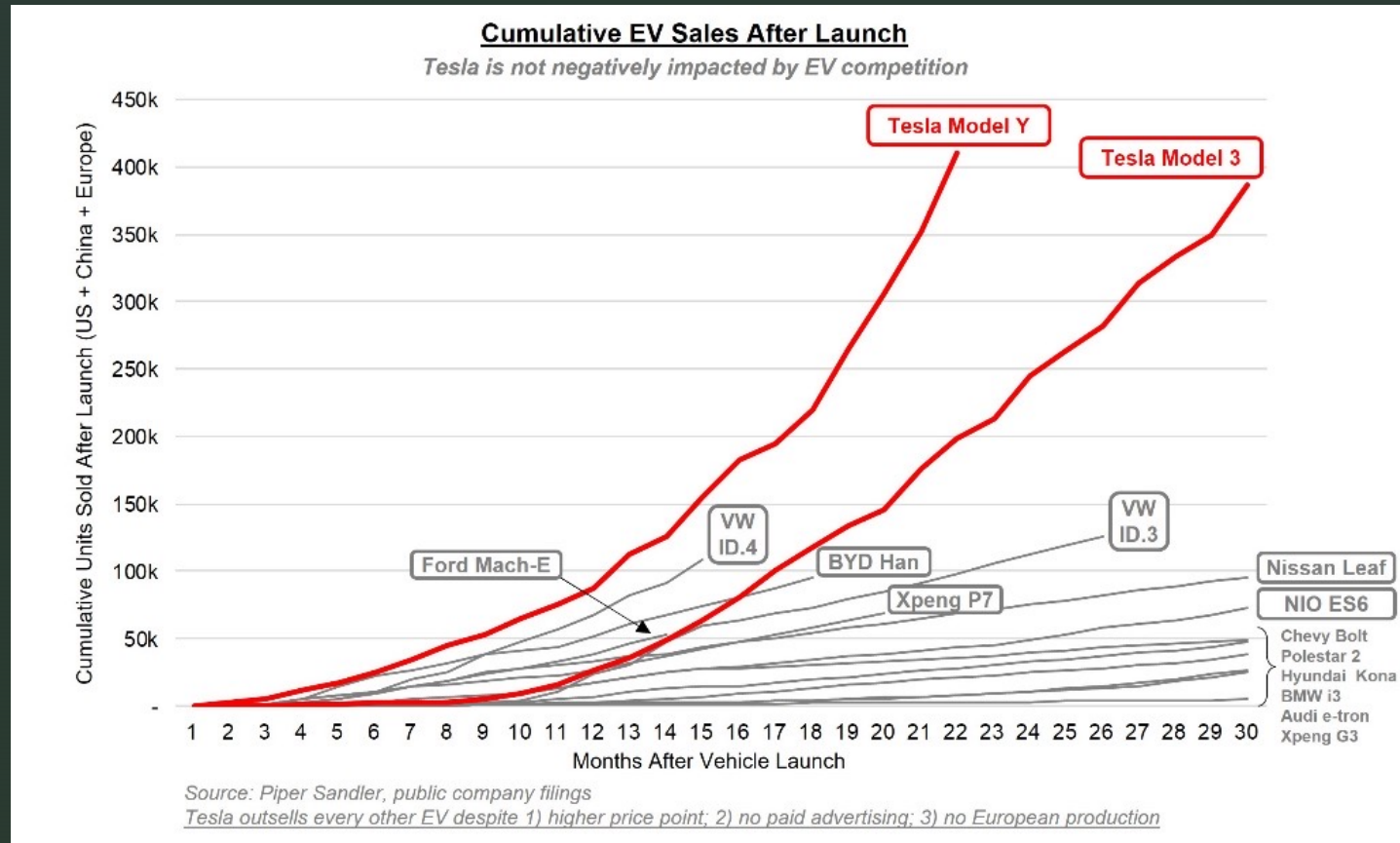
Slow transition to electric fells BMW's CEO after just one term

Bloomberg: July 06, 2019

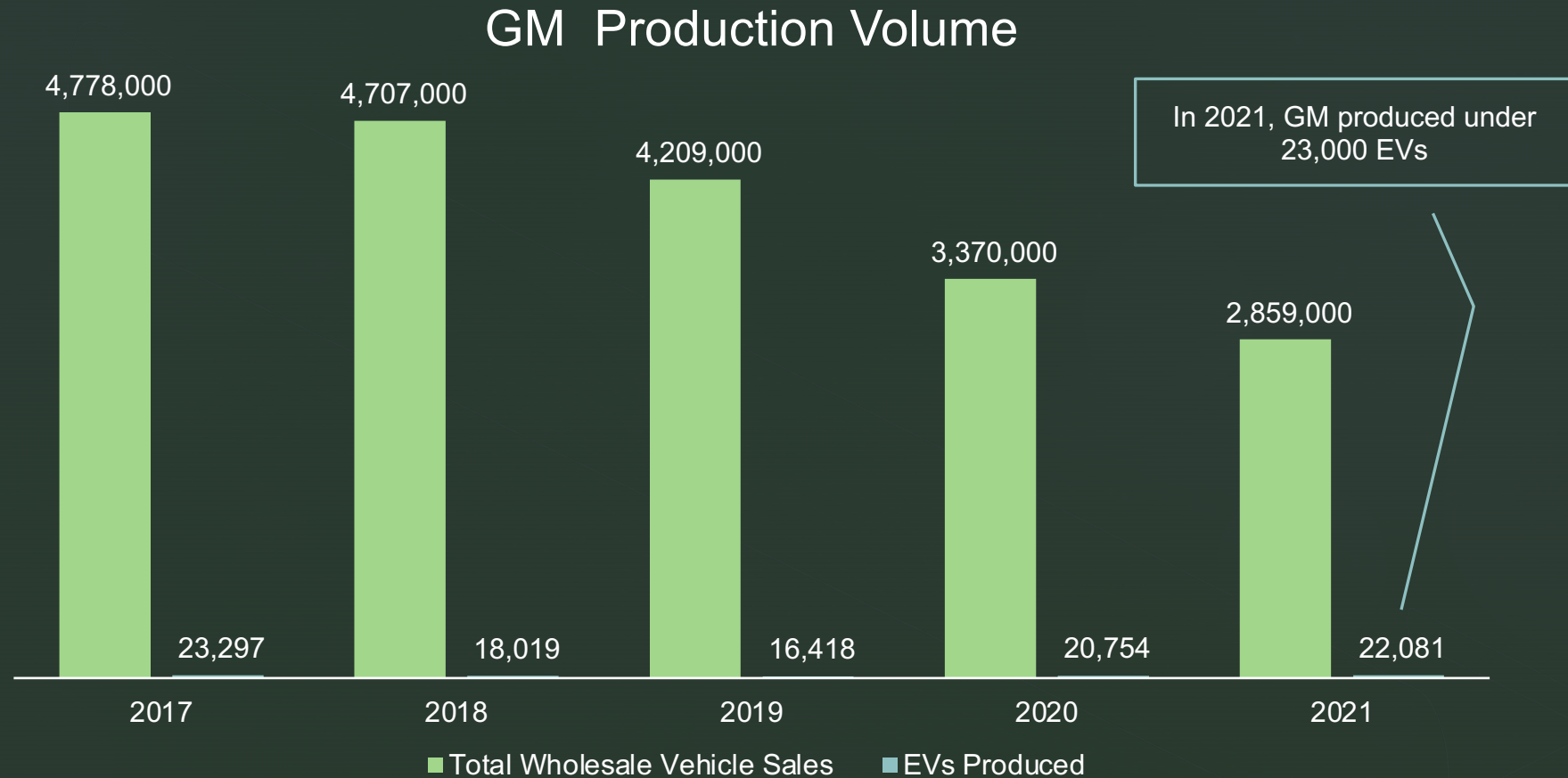
There is *no* competition (yet)



Best product wins

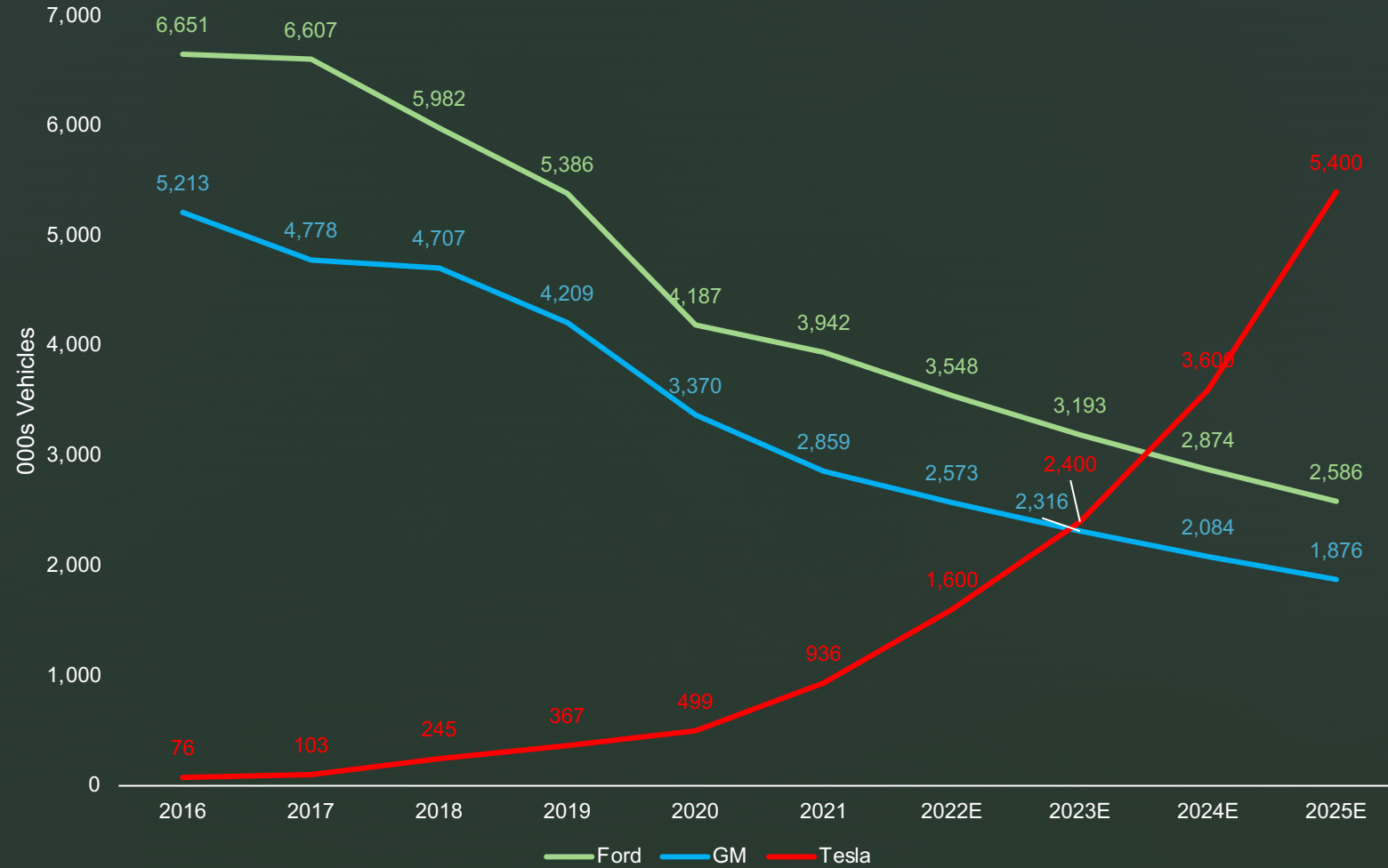


GM's failed push into EVs is a sign of what's yet to come...





The Tipping Point: ICE Production in Decline



Source: Worm Capital estimates



Our view: winner-take-most

Tesla is likely to dominate over time with sustaining advantages: power laws, returns to scale, and compounding network effects...

Historical analogies:

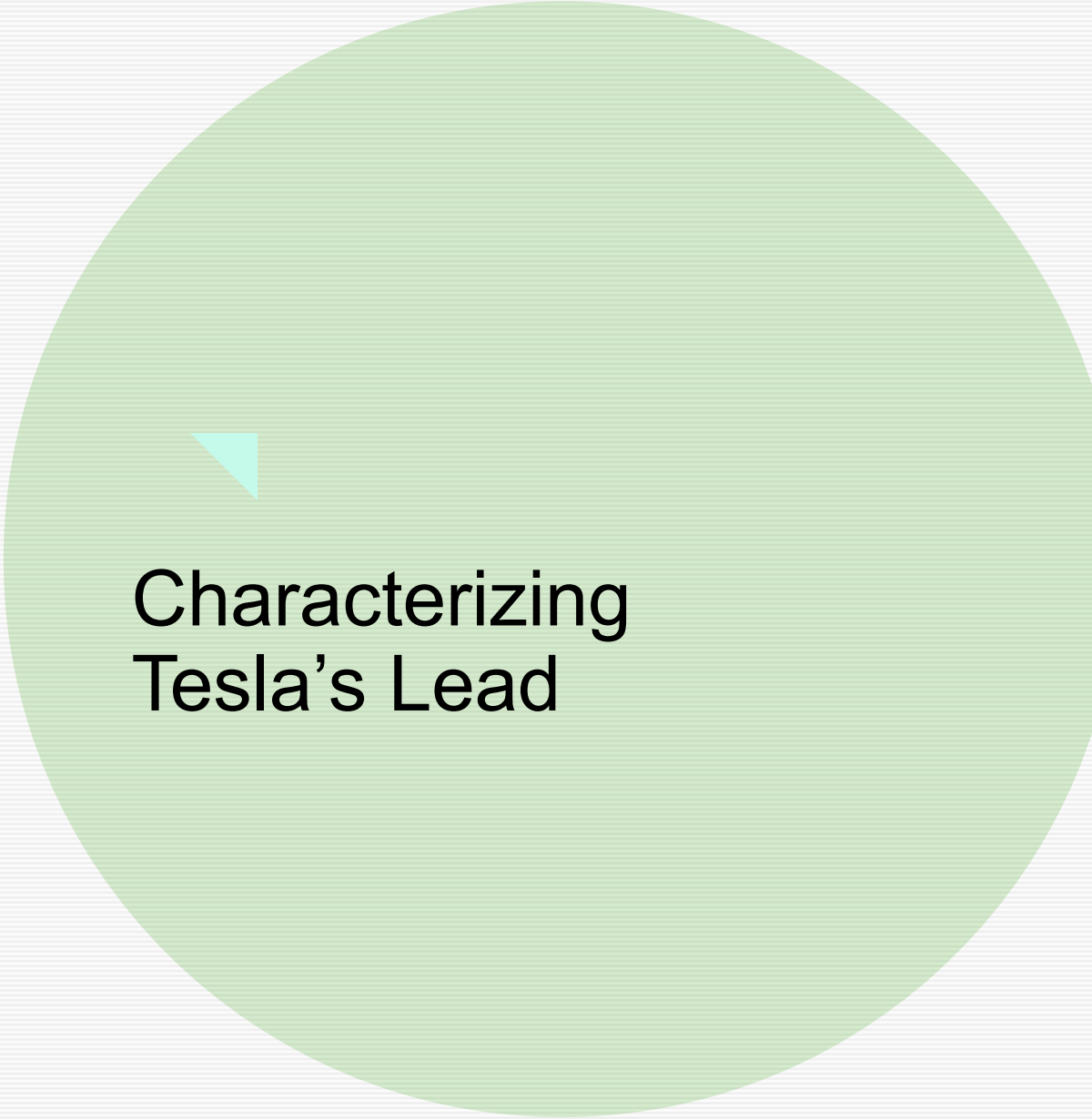
- Google search (data advantage leads to better value proposition)
- Apple iPhone (consumer obsession, app store ecosystem)

▶

**“Tesla is 10 years ahead,
especially when it comes to
the manufacturing”**

Sandy Munro, Manufacturing Consultant
2021





Characterizing Tesla's Lead





“Tesla is growing at the fastest pace of any large manufactured object in history.”

Elon Musk, April 2022

Tesla Cyber Rodeo



A qualitative review of Tesla's moat

- Advanced manufacturing at scale
- Battery strategy
- Autonomy and Real-world AI
- AI Training
- Fast charging infrastructure
- Global, localized production
- Top intellect recruiting
- D2C business model
- Integrated software
- Brand Value

Advanced Manufacturing at Scale

“To make the best cars in the world, we designed vehicles and factories from the ground up.”

Drew Baglino, Tesla Engineering

Rewriting mass production

Ford Model T (1913-1927)

- Rewrote manufacturing by utilizing assembly line.
- Production costs made the automobile a staple in American society.
- Reinvented transport for next 100 years.

Tesla (2017-2030)

- Reinvention of consumer vehicles and manufacturing processes.
- First desirable mass market electric vehicle.
- Totally vertically integrated and automated building process.

The factory is the product

Tesla is Tesla's biggest customer

- Factory construction from a first principles perspective.
- Materials engineering and supply chain integration.
- Factory robotics / machinery - constant improvement.



Source: InsideEvs

Tesla doesn't contract out factory construction

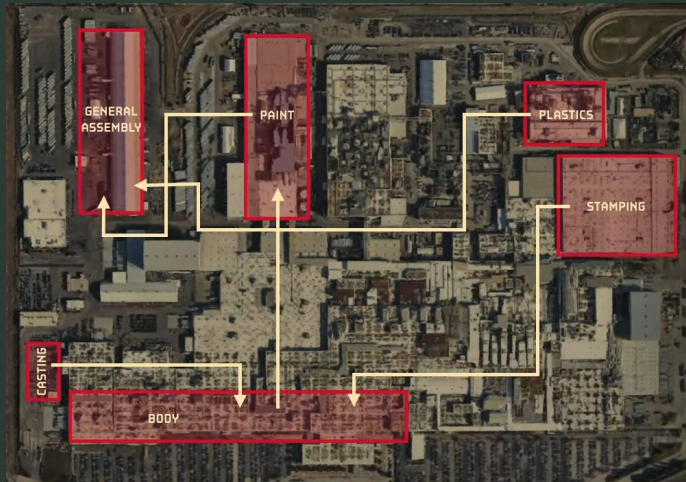
- Tesla has an in-house construction unit building out its factories.
- This enables a radically new and optimized manufacturing process.
- Historical analogy: Amazon built its own distribution centers to reinvent e-commerce logistics.



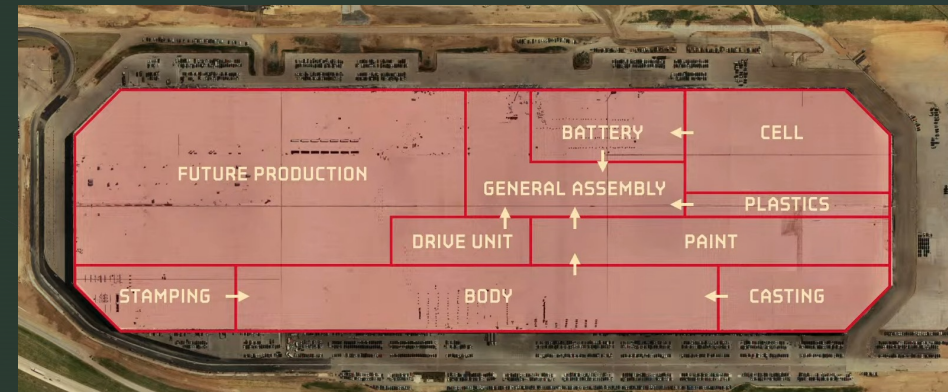
Source: CleanTechnica

Tesla designs factories like semiconductors

Fremont, CA (factory V1)



Austin, TX (latest version)



“It makes sense to think of the factory like a chip – like an integrated circuit. Combine everything together in one package.”

Elon Musk, April 2022

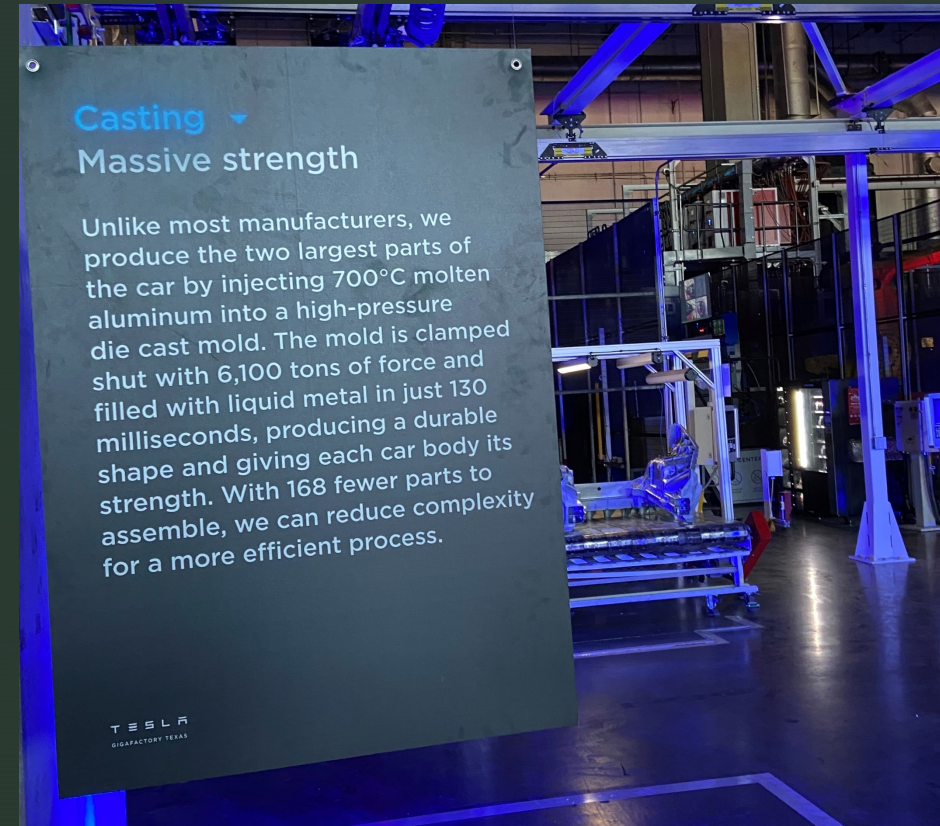
Stamping out cars like Hot Wheels

- Die casting is a revolution in auto manufacturing, enabling lightweight and cost-efficient production.
- Tesla works with IDRA, which builds customized 6,000+ ton “stamping” machines to produce cars at scale.
- This new process could lower labor costs by 20%¹



Proprietary alloys reduce parts

- Tesla has developed single die casts made of a custom aluminum alloy—a first in autos manufacturing and inspired by engineering at SpaceX.
- Accretive to margins and to production efficiency (e.g. 168 fewer parts than Tesla's previous process).



Source: Eric Markowitz at Giga Austin

In-house machine software speeds up response times

- Tesla developed its own OS to manage nearly all its manufacturing robots with custom software.
- Changes can be made to its OS much faster than other OEMs can draft a proposal to send to a 3rd party vendor.



Net result = improving margin profile

“Tesla will be absolutely head and shoulders above anyone else in manufacturing, that is our goal”

Elon Musk

Tesla's Auto Gross Margins:
~30%

GM's EV Gross Margins:
(-64%)*

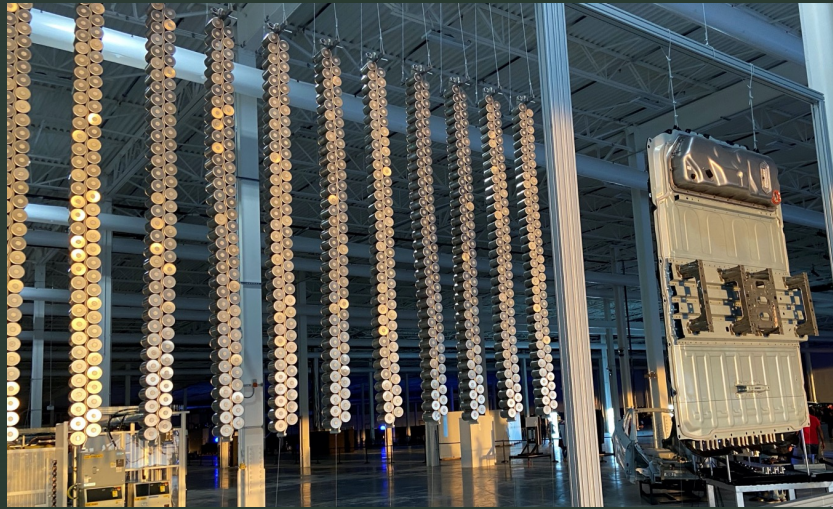
*Estimated, see Worm Capital Q3 2021 letter

And consistently improving

“We're getting way better at making cars.

You can see that in Giga Shanghai. You'll see that even more with Berlin. And we're really changing the design of the car in order to make it more manufacturable.”

Elon Musk

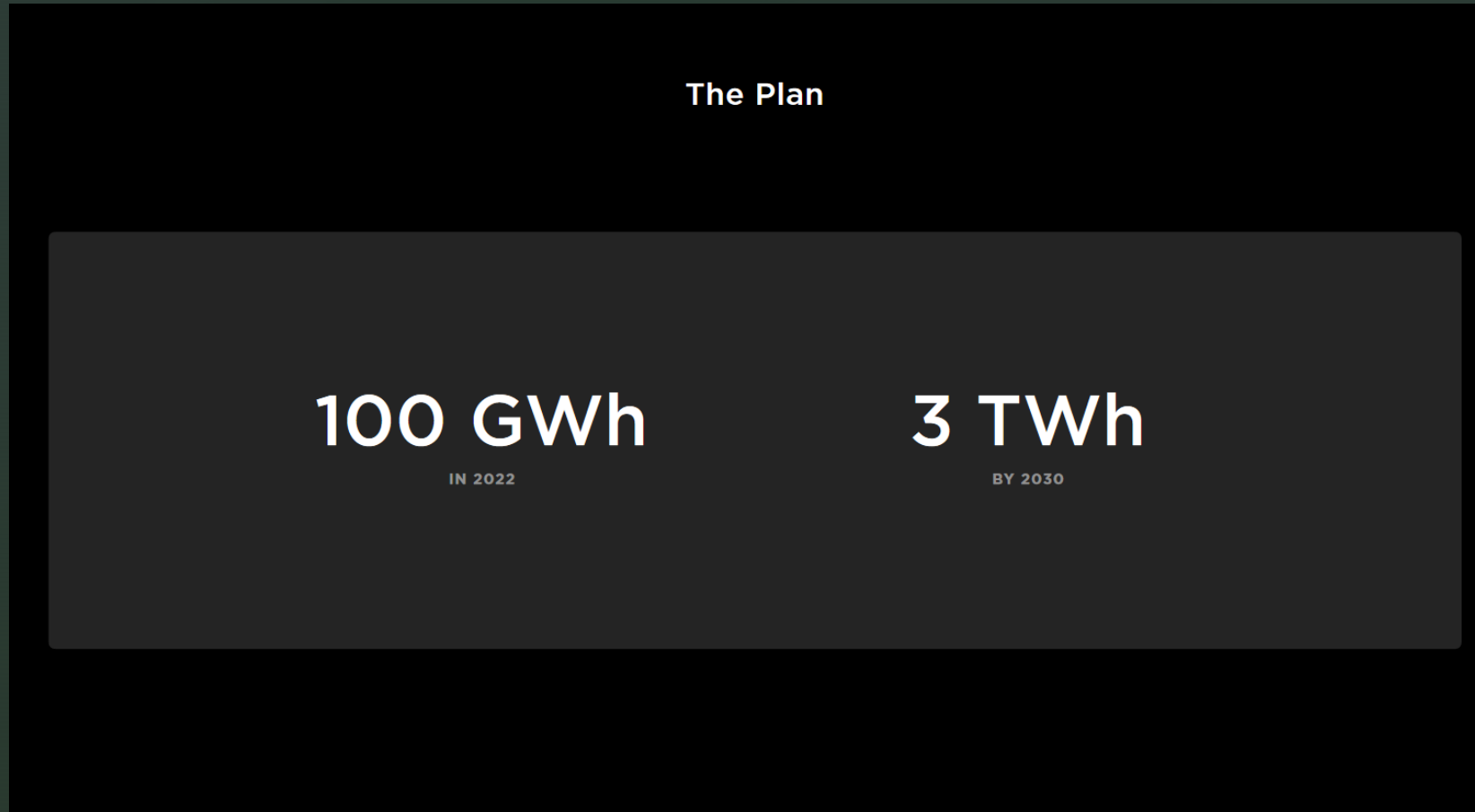


Source: Eric Markowitz at Giga Austin

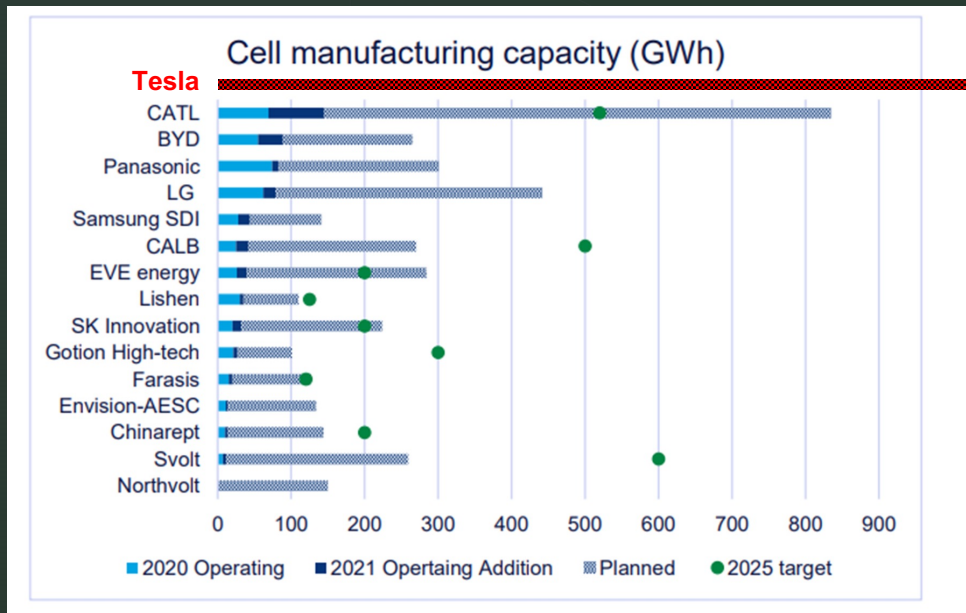
Battery Strategy



Tesla's 2030 cell production targets



Tesla's planned production is literally off the charts



3,000 GWh
= 3 TWh

Tesla's battery targets in context

To put it in context, 3 TWh =

- Production capacity for 60 million Tesla Model 3s.
- In context: the global vehicle market supports ~67 million new vehicles p.a.

“Over time we think [Austin] will be the biggest cell factory in the world”

Elon Musk
April 2022

Cathode material sourcing

- Tesla has secured multi-year materials contracts— at a discount—given their scale.
- Other OEMs will continue to struggle with cost, given low initial volume purchases and low profitability, which creates a negative feedback loop.

Tesla Dodges Nickel Crisis With Secret Deal to Get Supplies

“People don’t realize how far ahead Tesla is when it comes to securing the supply chain for raw materials and an integrated approach to battery materials.”

Todd Malan
Talon Metals spokesman
via Bloomberg

Innovative lithium sourcing



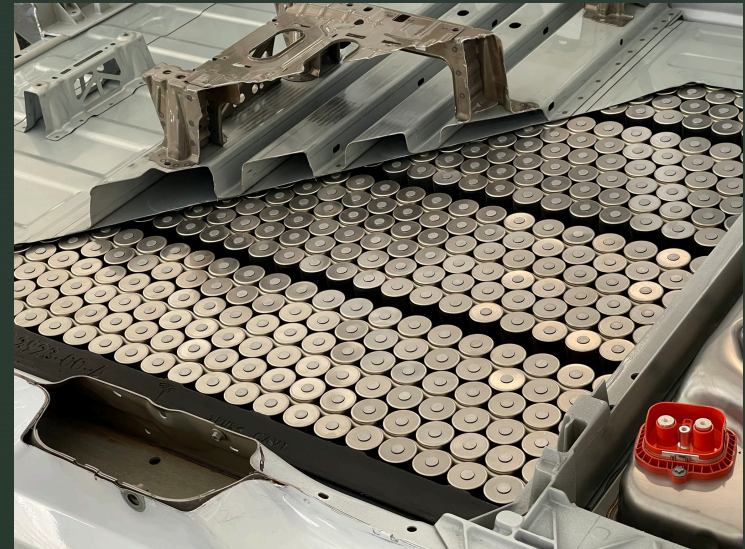
- Commodity prices are prone to volatility. The best hedge is to go directly to the source.
- Tesla patented a novel low-cost lithium extraction technique involving sodium chloride.
- Tesla has secured rights to 10,000 acres of lithium clay in Nevada.

Mini-case study: 4680 Cells

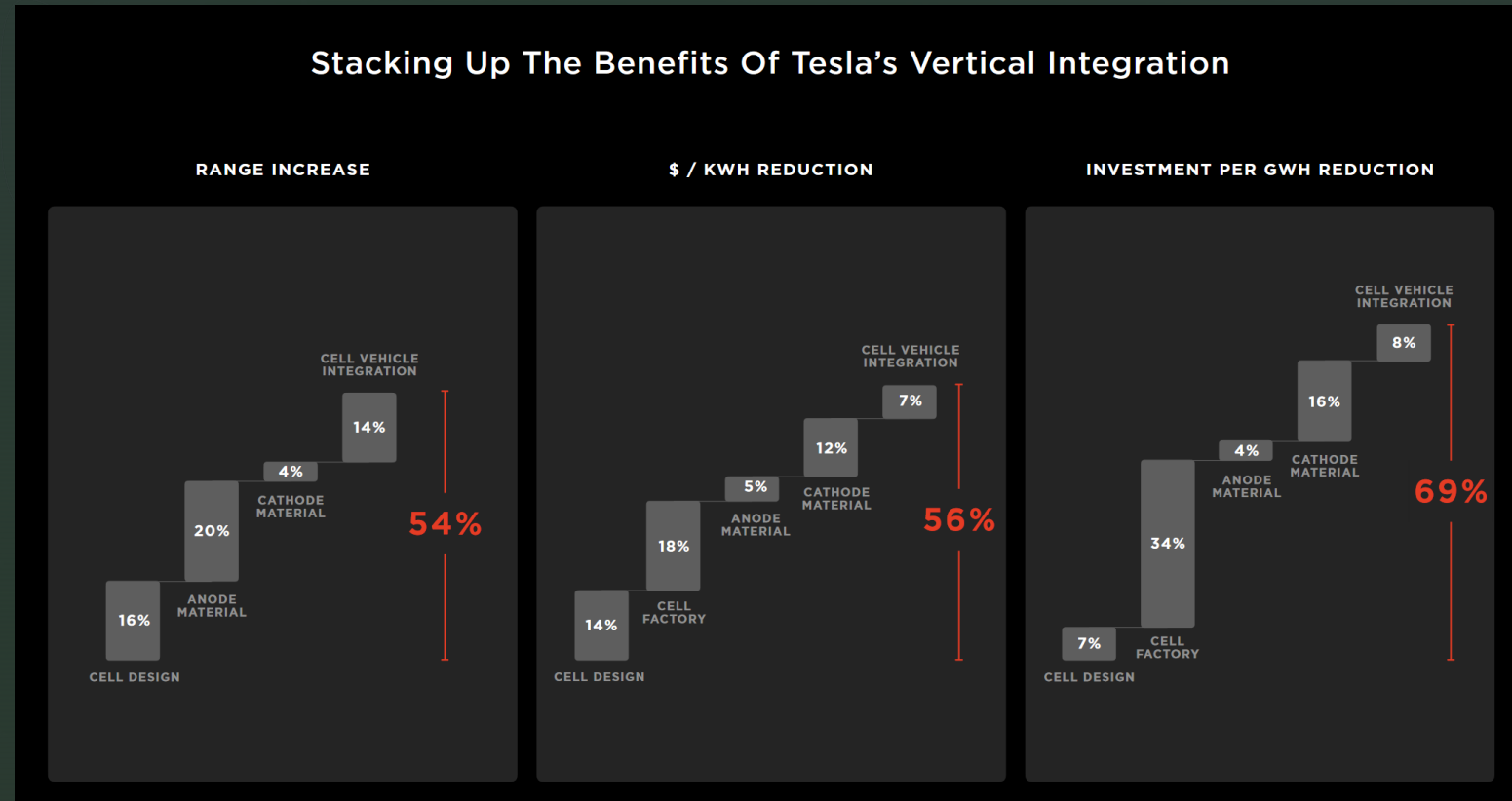
“You can’t do continuous motion production if you have tabs”

Elon Musk, Battery Day 2020

- Tesla has developed a new form factor, which introduces tabless cells.
- Combined with a structural battery pack that strengthens the car itself, it’s a revolution in battery engineering.
- 4680s will speed production by 7x, enabling massive scale.



Hundreds of small tweaks = a few profound improvements to range and costs

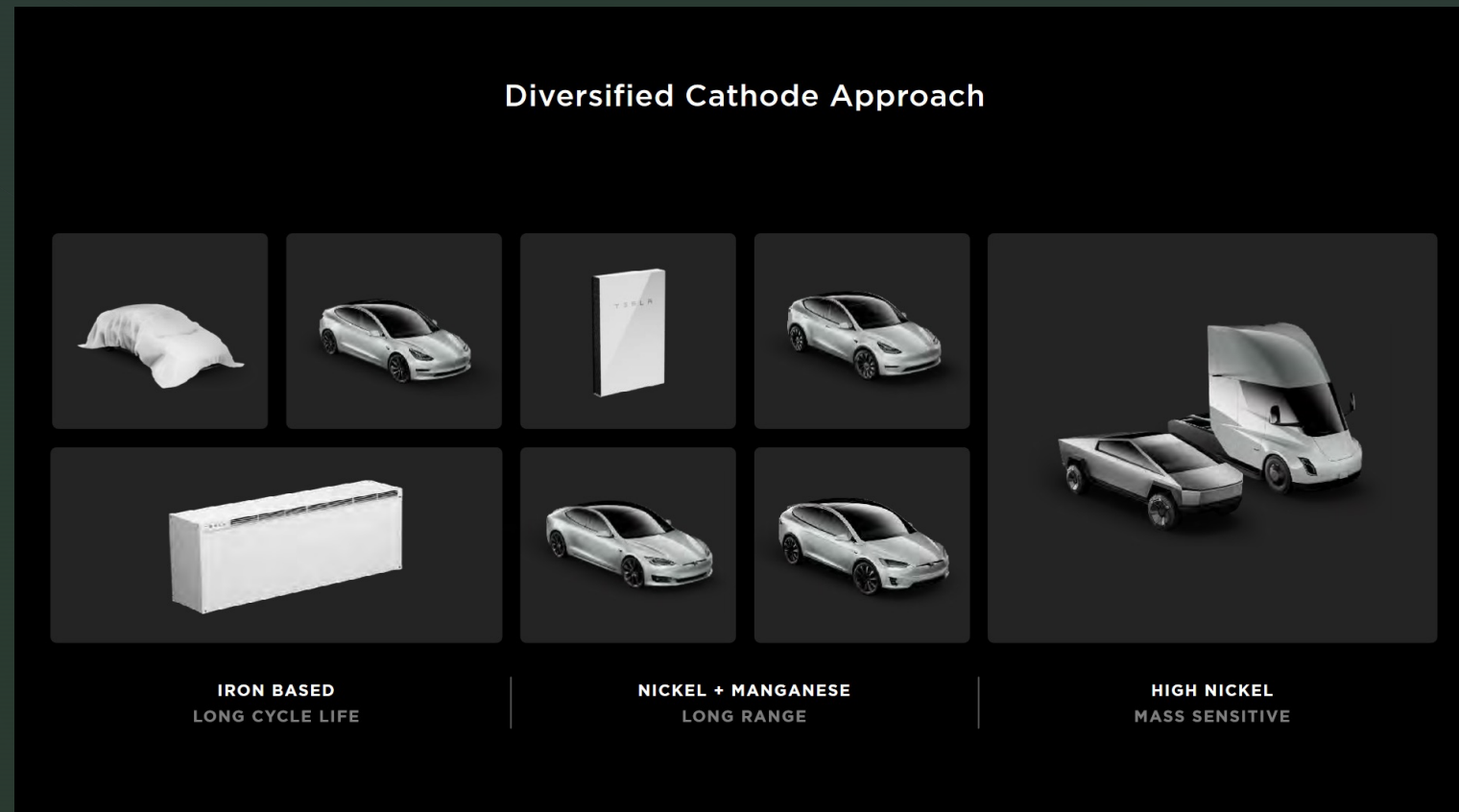




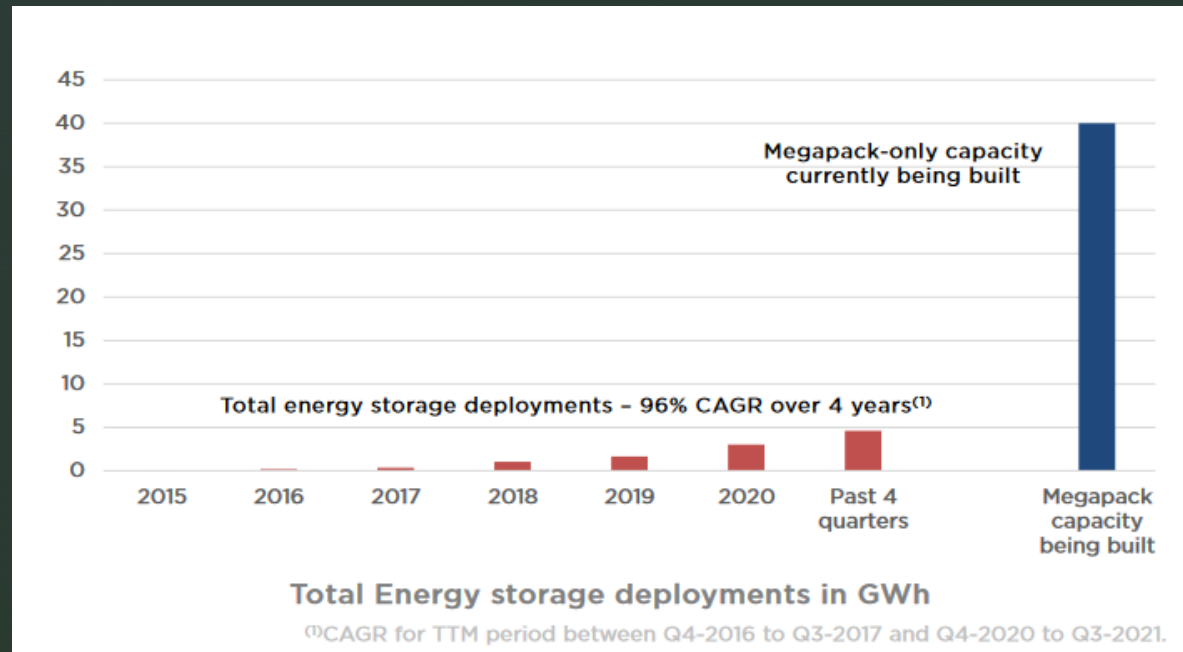
**“We’re building our own battery cell,
we think the most advanced battery cell in the world.”**

Elon Musk, April 2022

Tesla's battery strategy is flexible to multiple current and future chemistries



Tesla Energy – A sleeping giant



Source: Tesla Q3 2021 Shareholder Deck

“I think there's generally a lack of understanding or appreciation for the growth of Tesla Energy... In the long term, I expect Tesla Energy to be of the same - roughly the same size as Tesla's automotive sector.”

Elon Musk
Q3 2019 Earnings Call

The runway for energy is huge

2021 Segment Revenue

- Auto: ~\$51B
- Energy: ~\$2.8B

We think energy CAGR will accelerate through the decade and could be generating \$160 billion in net income by 2030.



Source: Electrek

Truckers are being squeezed

Truckers desperately needs autonomous EVs:

- Most truckers are independent contractors – responsible for operating costs themselves.
- 100%+ turnover in US truck drivers.
- Global freight trucking industry will reach \$2.7 trillion by 2026 (GIA).

RETAIL

Walmart says it is raising truckers' pay and starting a training program as it grapples with a driver shortage

PUBLISHED THU, APR 7 2022-9:00 AM EDT | UPDATED 2 HOURS AGO

Source: CNBC

Tesla's trucking opportunity



- Tesla Semi
 - Price: \$180k
 - Fuel savings: \$200k+
 - FSD improves safety
- Fundamental constraint to EV semis is cell capacity
 - Tesla is best positioned to make affordable and profitable electric semis at scale.

Autonomy and Real-world AI

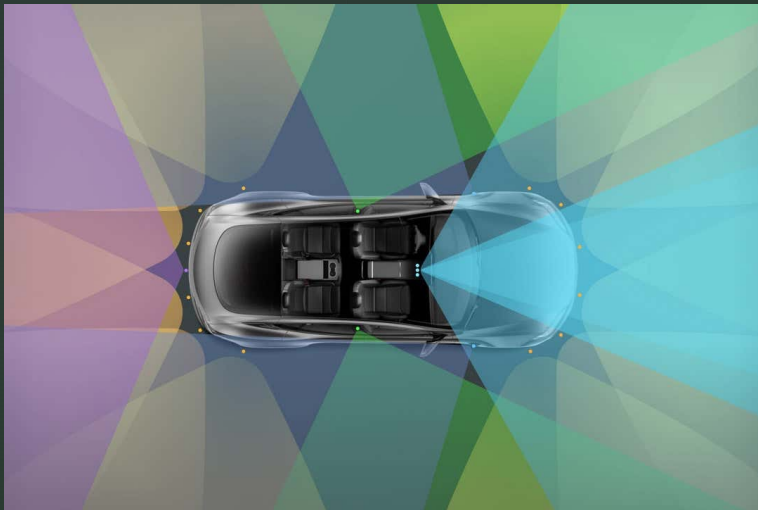
“I think a very powerful sustainable advantage for us is the fleet.
Nobody has the fleet...

It’s just a massive data advantage.”

Elon Musk, Autonomy day 2019



The race to autonomy



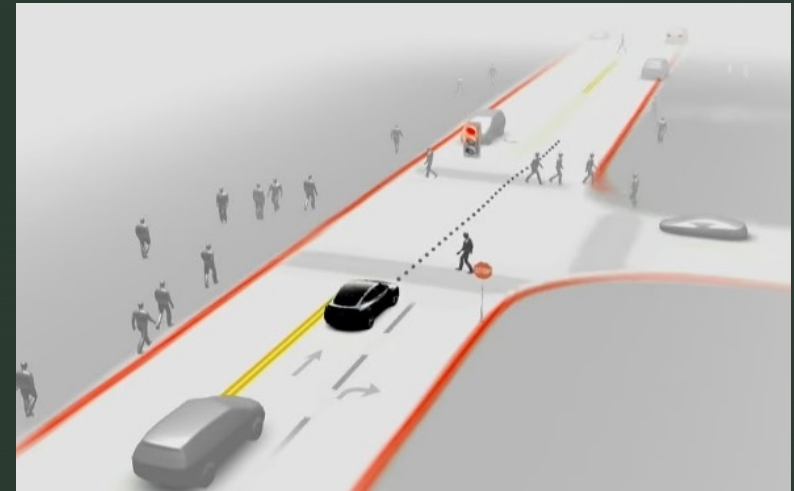
To be first...

- Scalable approach – computer vision
- Data collection at massive scale
- Robust neural network training infrastructure

Tesla's installed base = advantage

- We estimate now they have over 5 billion miles of data – up from 3 billion miles in April 2020.
- 1.5 million+ vehicles on the road today collecting data. By end of year 2022, we expect this to increase to 3 million.
- 60,000+ FSD Beta testers on road today

Competitors: Comma AI (50 million+ mi),
Waymo (20 million+), Cruise (2 million+)



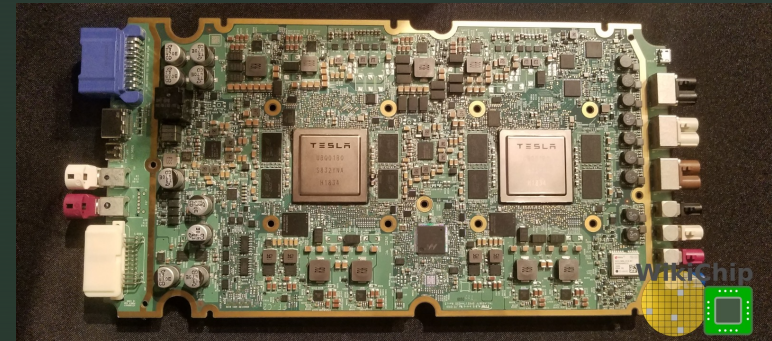


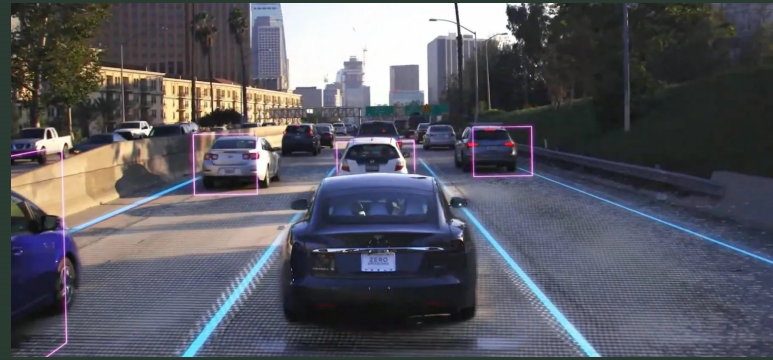
Data advantage is expanding...

- No other domestic OEMs equip vehicles with comparable data collection hardware.
- Tesla has a negative cost of capital to acquire marginal data.
- Tesla makes FSD-enabled cars faster than any other OEM.

Vertical integration enables AI side bets

- Tesla built ASIC to run computer vision neural nets at low power – FSD Chip
- FSD Chip used to develop Tesla Bot.
 - First use – Tesla factory floor
- TAM – global physical labor market





AI Training



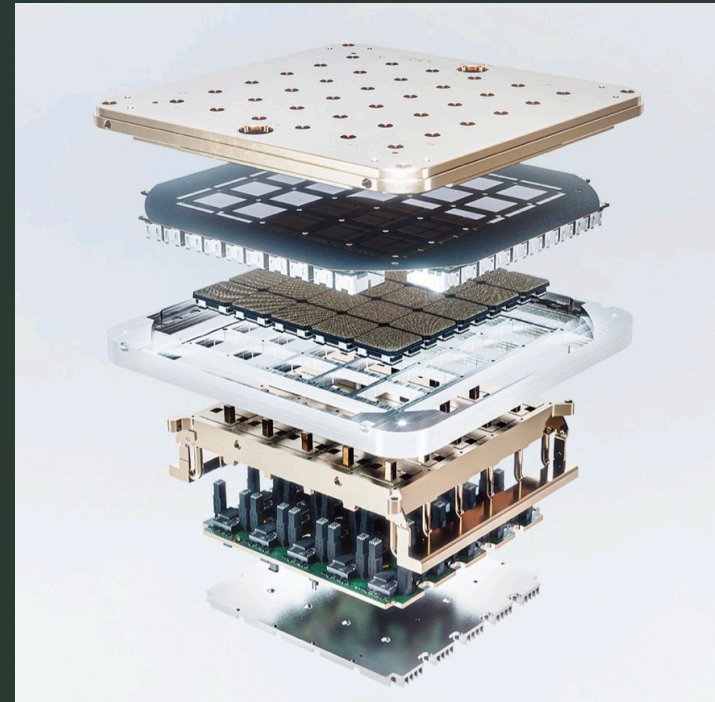
Tesla trains its AI via its in-house GPU cluster

- No. 5 supercomputer in world by FLOPs.
- This is a huge investment that requires free cash flow (funding), engineering expertise, and real-world datasets other OEMs do not have.
- The goal: develop world's best computer vision AI training supercomputer.

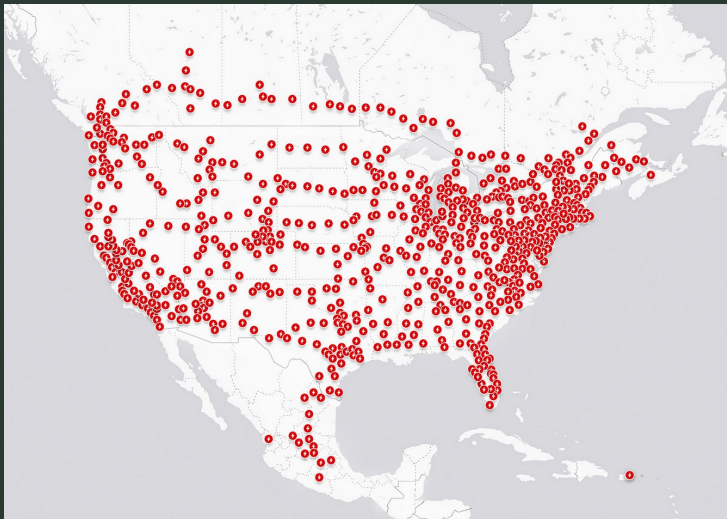


Is Tesla creating the next Nvidia?

- D1 Chip – Tesla-designed ASIC to train computer vision AI.
- Dojo – Next-gen supercomputer targeting 1 exaflop of compute power.
- Business optionality – AWS, Intel



Fast Charging Infrastructure

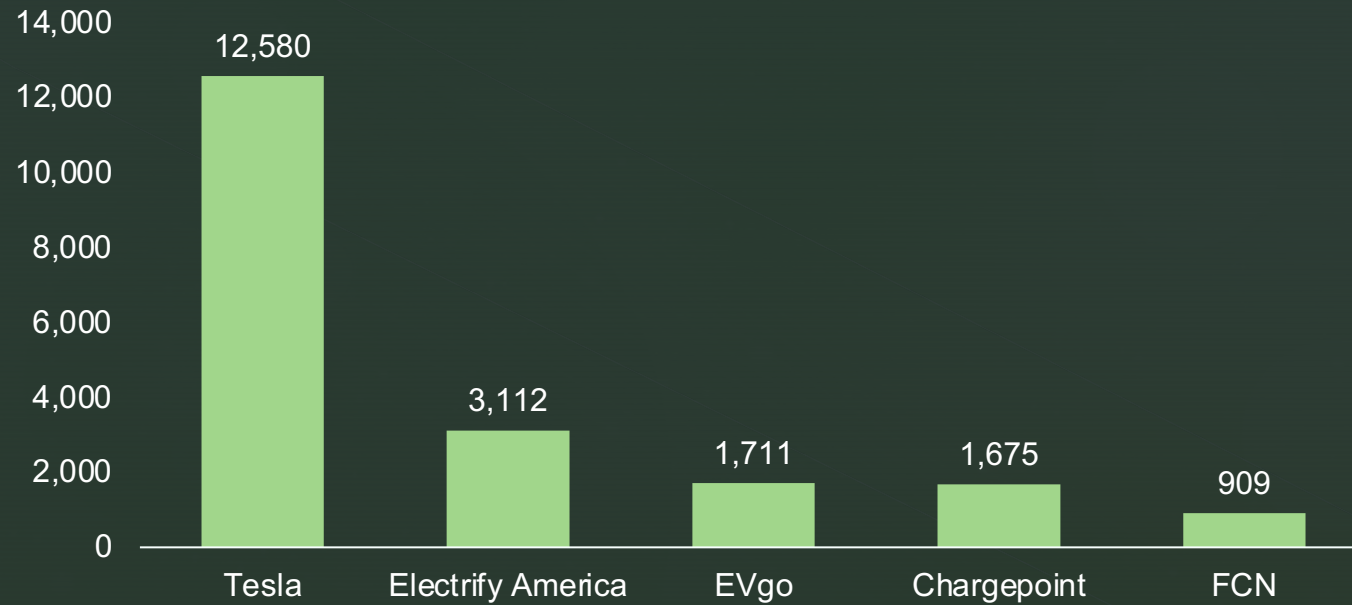


“If Tesla Supercharger networks open up to you—the biggest network—your car has a higher utility to you and to a future owner, so actually the car may actually appreciate in value for anybody that is holding one now.”

Scott Case, Recurrent CEO

Tesla's supercharger network is a massive moat

US Fast Charging Ports

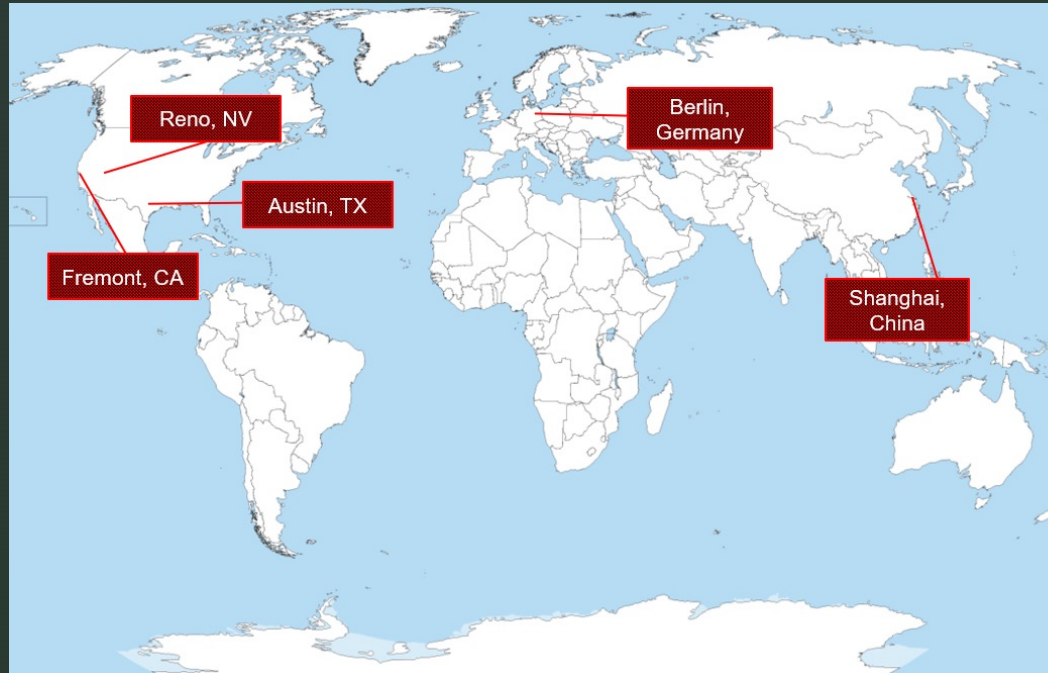


Source: Worm Capital data compilation from
<https://evadoption.com/ev-charging-stations-statistics/us-charging-network-rankings/>

The market underappreciates Supercharger value

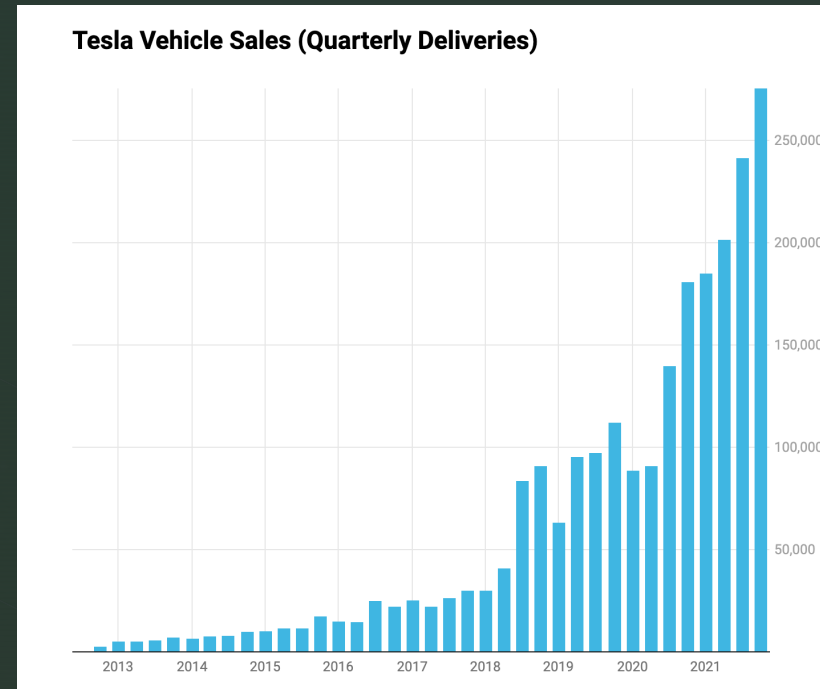
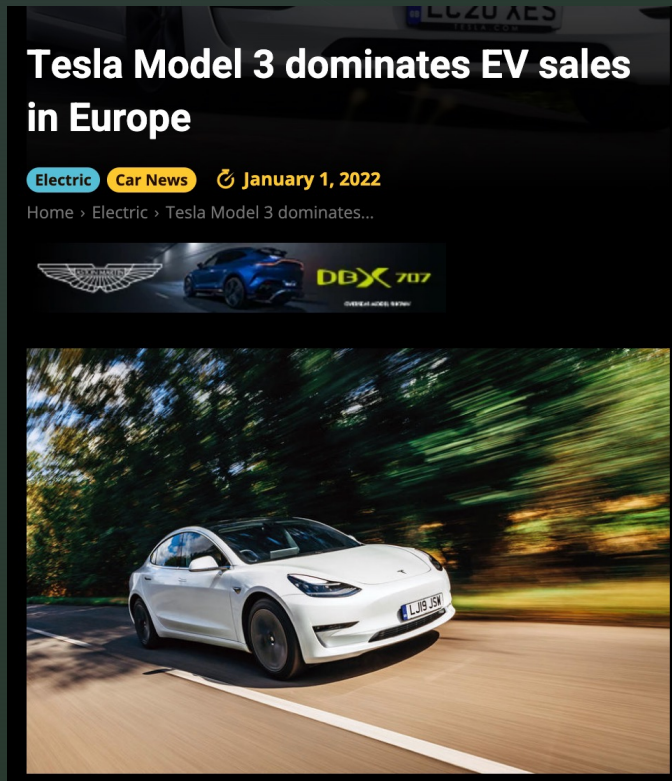
- 30k+ first-party chargers globally.
- No other OEMs come close.
- The Supercharger network enhances the Tesla value proposition.
- Revenue from 3rd parties can be accretive in the out-years.
- Tesla Supercharger = potentially a spin-out from Tesla by 2030.





Localized Production

Tesla is a dominant global brand



Source: CleanTechnica



The footprint is expanding at enormous scale

- Giga Texas: 4 million sq ft
- Fremont factory: 5.5 million sq ft
- Giga Berlin: 2.4 million sq ft
- Giga Nevada: 5.3 million sq ft
- Giga Shanghai: 9.3 million sq ft
- Giga New York: 1.2 million sq ft
- We expect 1-2 new factory locations to be announced by end of year.





**Top intellect
recruiting**



Engineering students rank Tesla as one of the most desirable US companies to work for

1. **Tesla**
2. SpaceX
3. Lockheed Martin
4. Google
5. Boeing
6. NASA
7. Apple
8. Microsoft

Source: Universum Global 2020



D2C Business Model

The dealership model is over

- Typical OEM distribution costs are \$3,000 to \$4,000 higher than Tesla's.¹
- 75% of Tesla Model 3 owners in a 2019 Bloomberg survey said they were “very satisfied” with Tesla’s D2C delivery, relative to a traditional dealership model.





Integrated Software

▶ The user experience is simply better—
like going from BlackBerry to iPhone



BMW Infotainment

Garmin-esque nav, 2012 music interface, reliance on iPhone for superior experience



Tesla Model S Infotainment

Powerful enough for console games, high def nav, video player, streaming

Supercharger network integrated into nav



Tesla's in-car console is like the early days of Apple's app store

- Tesla app store likely coming – with autonomy, Tesla will benefit from “attention economy” upside.
- Apple's App Store grossed more than \$85 billion in 2021, based on a 30% commission rate.



Business optionality – including gaming platform

Video Games Engineer, Infotainment Software

Job Category Engineering & Information Technology

Location Palo Alto, California

Req. ID 49019

Job Type

APPLY

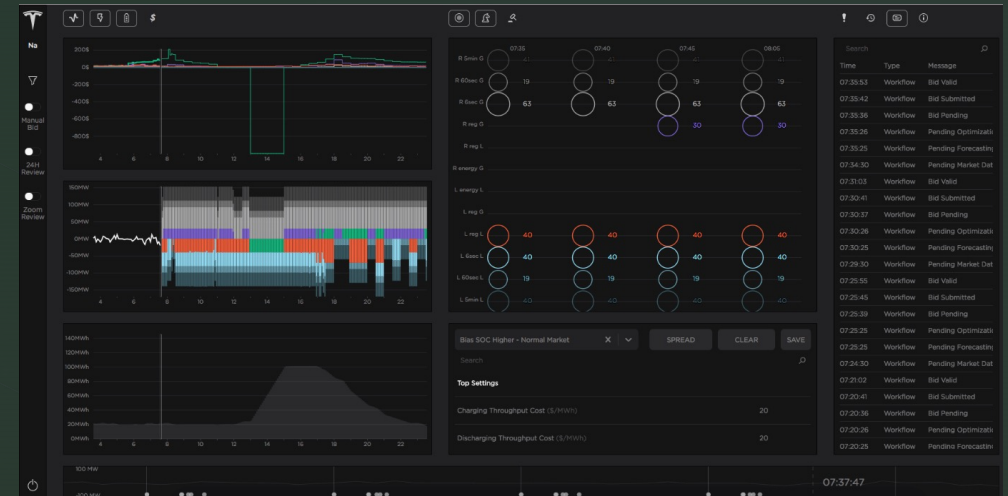
Tesla participates in the [E-Verify Program](#)

The Role

Tesla strives to make its cars the most fun possible; bringing video game experiences to the car helps increase that fun. In this incredibly rare opportunity to help build a video games platform, we are looking for a highly motivated software engineer to help enable the best video game content to be available in-car. Come put that industry experience to great use and help us build this platform.

Integrated software maximizes product utility – across Tesla's businesses

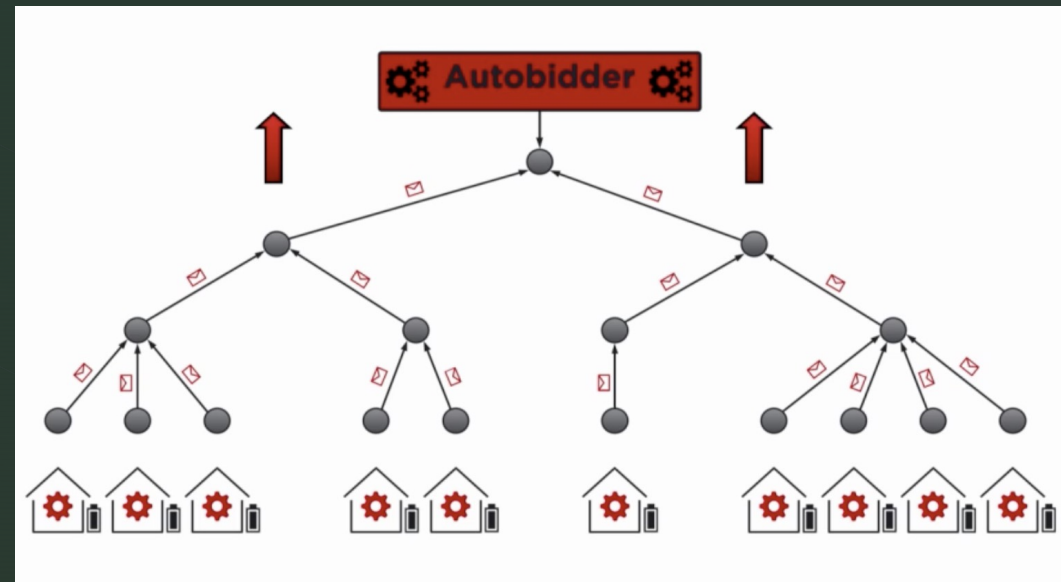
- Energy management software integrated with battery storage systems.
- Useful to maximize value of stored electricity.
- Distributed utility business optionality, i.e. virtual power plants.
- Competitors: Stem Energy (\$1.5 billion market cap), Fluence (\$1.8 billion)



Software could make Tesla a massive power utility

“Powerwalls can operate as a giant distributed utility. This is profound.”

Elon Musk
Q1 2021 Earnings Call





Brand Value

Tesla's most valuable intangible asset

(hint: it's not Bitcoin)

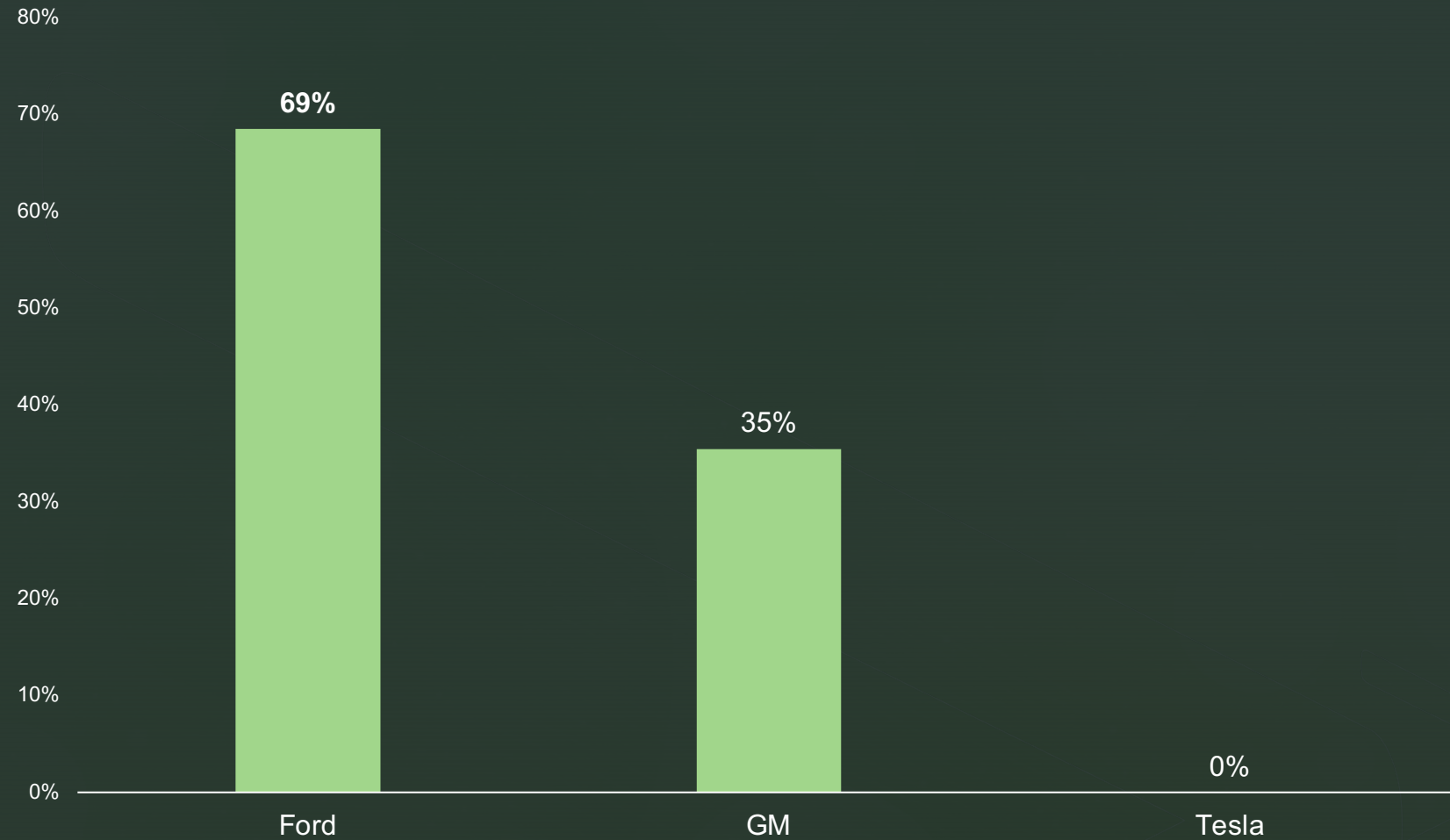
- Global brand with \$0 advertising spend.
- Tesla's NPS is an astounding **98**.
- Tesla generates massive publicity by word-of-mouth.



Source: <https://www.youtube.com/watch?v=nJzghgh3Vq4>



2021 Advertising Spend as % Operating Income



Source: Worm Capital calculations

Polarizing design leads to product virality

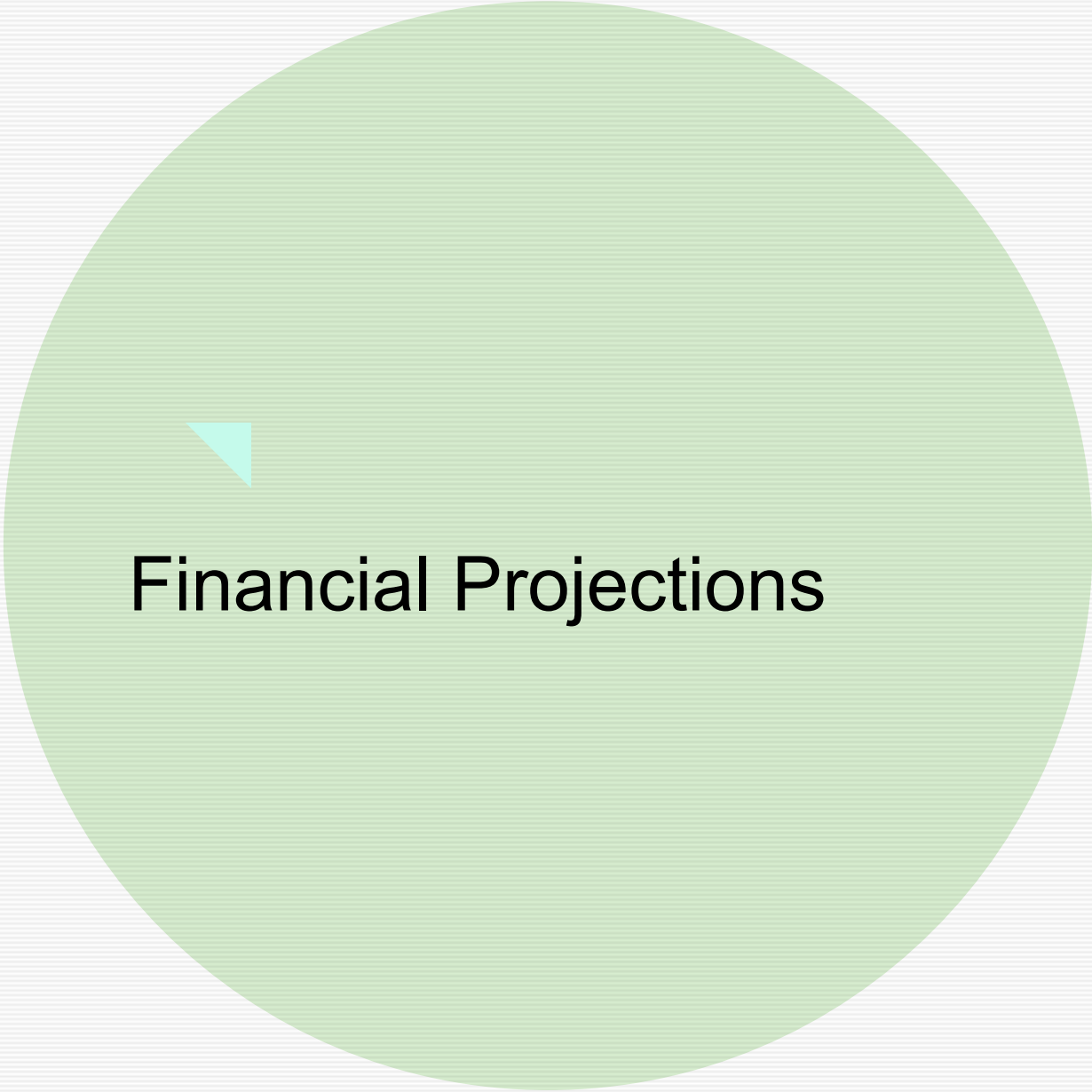


Data Shows Over 3 Million Tesla Cybertruck Orders, And It's Not Surprising



Tesla dominates pop culture





Financial Projections



▶ We think Tesla's growth could shock Wall Street for several years

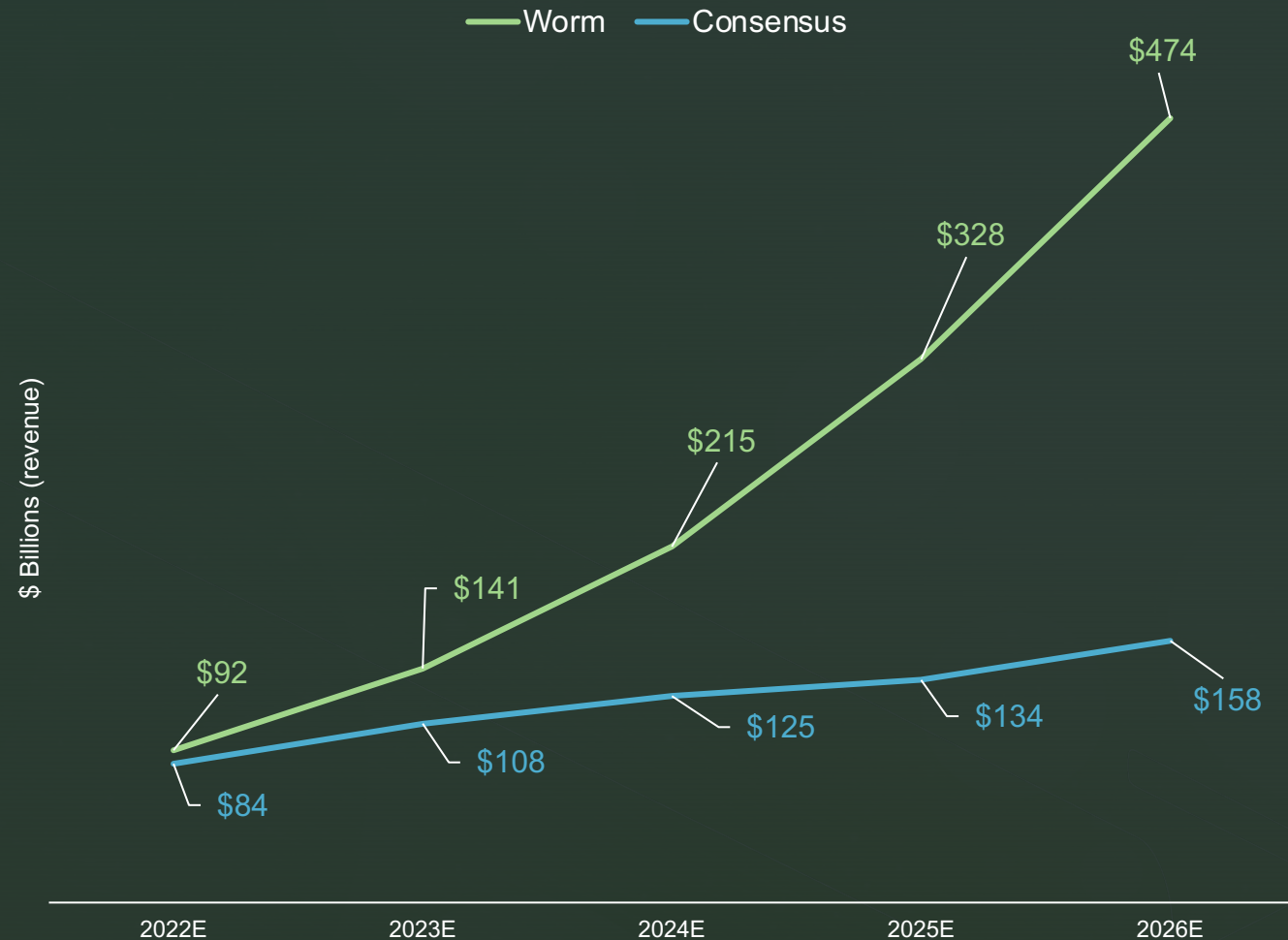
- We think Tesla will likely grow production at least 50% p.a. on average through 2030.
- Right now, Wall Street expects mean reversion: i.e. <20% annualized growth.
- We believe Tesla shares offer the best risk/reward investment opportunity in the market today.
- A convergence of accelerated growth, expanding margins, new products, and recurring software revenue could drive at least a 10x return in Tesla shares by 2030 – and potentially much higher.

Topline revenue estimates: Consensus vs. Worm

The best investments typically arise out of extreme forecasting arbitrage scenarios.

This is a huge one.

Note: This estimate does not include Robotaxi revenue.





Conclusion

- This presentation primarily outlined our qualitative review of Tesla's current businesses.
- It did not include a quantitative perspective on our valuation approach to Tesla's Robotaxi network and other expanded use cases of artificial intelligence integrated into new business lines.
- Note: factoring in these "call options," especially Robotaxi network, would result in some profound implications for Tesla's financials beyond what we have laid out here.
- Qualified prospective investors and current Worm Capital partners are welcome to get in touch for a more detailed quantitative perspective.



Thank you.

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