Stanford Cleantech Challenge 2022

Accelerating the Electrification Revolution

Motivation

A better world for all requires a future that's inclusive, equitable, and sustainable. As we continue our journey to electrification and carbon neutrality, we are committed to a strategy that addresses our people, our planet, and our customers. It is at the heart of our purpose, and it is driving our path forward. That's why Ford is acting now to produce no-compromise electric vehicles like the Mustang Mach-E, F-150 Lightning and E-Transit. And it's why we're aiming to reach carbon neutrality no later than 2050, by reducing emissions from our operations and throughout our entire supply chain, while pushing the boundaries of innovation and technology.

We're reimagining how EVs – and the batteries that power them – are designed, manufactured, and recycled, creating an all-new electric vehicle manufacturing ecosystem. We're also working closely with our suppliers, from factories to mines for raw materials, to both reduce carbon emissions and help the people and communities around them thrive. We are building a more equitable and inclusive business through our focus on making a positive impact. Through our community engagements we are making lives better. And we are building a culture where everyone feels they belong. We are committed to leadership in human rights and the environment in every single part of our business, because fulfilling our purpose depends on it.

Electrification

Ford is investing $50 billion in electric vehicles from 2022 through 2026 to electrify our icons, build out EV charging infrastructure, create a digital ecosystem with trusted customer service, and to take our suppliers on this journey with us. We expect fully electric vehicles to account for 50% of our global sales volume by 2030. The demand for our first wave of EVs – Mustang Mach-E, E-Transit and F-150 Lightning – has exceeded our expectations. By the end of 2023, we will have the global capacity to produce 600,000 EVs annually to meet the demand.

Further Reading

- Ford Integrated Sustainability and Financial Report 2022, Ford Motor Company: https://corporate.ford.com/social-impact/sustainability.html
- Ford F-150 Lightning: https://media.ford.com/content/fordmedia/fna/us/en/products/evs/all-electric-f-150-lightning/all-electric-f-150-lightning.html
- Ford Mach-E: https://media.ford.com/content/fordmedia/fna/us/en/products/evs/mustang-mach-e/mustang-mach-e.html

Challenge Option 1: Expanding EV Adoption - An EV for Everyone

With the current geopolitical climate and gas prices on the rise, it has never been more lucrative to avoid the gas pump and go electric. There are a few unique challenges that drivers face when switching from a gasoline internal combustion engine to an electric vehicle (EV). Depending on one's housing type and accommodations, overnight charging may not be available. This can present a problem for people who rely on overnight charging to charge their vehicle for the next morning's commute to work.

Think about where people live, charging affordability, charging convenience, and equity in charging. Charging should be available to everyone regardless of their income. How can we ensure everyone has equal access to charging? What technological solutions, especially in charging infrastructure, access, and mobility might address these barriers?

Scenarios to consider:

- Urban / metropolitan areas
- Rural / remote areas
- High-density living (e.g., apartment complexes, multi-family dwellings)
- Low-income communities
- Charger-less workplaces

This challenge is about expanding charging access/use and removing barriers – the focus of this challenge is not range extension or "range-anxiety".

Deliverables

Propose a new opportunity for Ford Motor Company:

- Pick 1-2 scenarios from the list above.
- Pitch a novel startup company (ex: vehicle hardware, charging hardware, software, connected services, policy, user behavior, etc.) that drives the adoption of EVs for everyone and addresses the scenario(s) selected. Provide the technical requirements, business case, customers, and solutions. Be sure to address how your company differs from other competitors and current offerings at Ford. Also, consider how this company might partner with Ford Motor Company in the future.
- Provide a 5-minute recorded video presentation and slide deck outlining the above and any additional motivation, customers, customer pain points, proposed solution, demonstration of solution, and data supporting expected impacts.
- Be sure to address how your solutions differ from existing vehicle solutions and the current features available in the FordPass App.

Further Reading

- EV customer segmentation: The early EV driver EV adoption curve
- “Buttigieg: Biden administration must 'demystify' electric vehicles”: https://news.yahoo.com/buttigieg-biden-administration-must-demystify-electric-vehicles-192603010.html?guccounter=1
- “5 Steps to Effective EV Charging Infrastructure Incentives”: https://energycenter.org/thought-leadership/blog/5-steps-effective-ev-charging-infrastructure-incentives
- *What Ford features are already available for EVs?* FordPass App: https://www.ford.com/support/category/fordpass/fordpass-electric-vehicle-features-overview/
- *What connected services options do I have for Ford electric vehicle charging?* https://www.ford.com/support/how-tos/electric-vehicles/public-charging/what-connected-services-options-do-i-have-for-ford-electric-vehicle-charging/
- Think apartment-hunting is frustrating? Try doing it with an electric car. | Grist

Challenge Option 2: Unlocking potential in driving "sustainably"

Driving "sustainably" is much more than driving an electric vehicle. It also includes the energy ecosystem and opportunities beyond battery technologies and enablers. For example, solutions with emerging technology and connectivity can unlock new opportunities to extend range and determine route efficiencies. Likewise, advancements in charging technology and infrastructure can also unlock new opportunities to maximize potential and provide the most sustainable delivery of power.

Additionally, driving "sustainably" can encompass the vehicle lifecycle itself. This might include recycling and reuse of the vehicle and/or components – potentially considering business models where vehicles are designed with a "vehicle return/turn-in". Living more sustainably can also be a lifestyle choice – Ford's all-electric vehicles deliver new sustainability opportunities for its customers.

This challenge focuses on the future state of sustainability and Ford's new vehicles – *how can Ford design, create, and partner to prioritize sustainability across the vehicle ecosystem?*

How might Ford reduce its overall carbon footprint and enable "sustainable" driving?

Consider the scenarios:

- Life Cycle Analysis (LCA) of the vehicle and/or components
- Sustainable material selection for the future, as well as re-use
- How might EV batteries allow for sustainable driving - leveraging emerging technology (including software/AI/ML solutions) to enable EV range extension
- More efficient charging and energy use
- Communication and behavioral science for sustainable decision-making

Deliverables

Propose a new opportunity for Ford Motor Company – pick one of the two deliverable options below that best showcases your team's solution:

- (1) Pitch a novel startup company that creates a strategic partnership for Ford:
    - Pick a scenario from the list above.
    - Provide a 5-minute recorded video presentation and slide deck outlining the technical requirements, business case, customers, and solutions. Be sure to address how your company differs from other competitors. Also, consider how this company might partner with Ford Motor Company in the future.

  (2) Develop a Ford "Sustainable Driving" marketing campaign:
    - Pick a scenario from the list above.
    - Present the business case, customer needs, solutions, and messaging (supported with facts). Be sure to address how your solutions differ from existing efforts by Ford and competitors. Also, consider helpful partnerships and how these fit into Ford's long-term sustainability goals.
    - Provide a 5-minute recorded video presentation and slide deck outlining the above and any additional motivation, customers, customer pain points, proposed solution, demonstration of solution, and data supporting expected impacts.

Further reading

- What is Ford currently doing?
    - Ford Bronco Sport Vehicle Becomes First Vehicle to Feature Parts Made of 100% Recycled Ocean Plastic: https://www.at.ford.com/en/homepage/news-and-clipsheet/news/2021/12/ford-bronco-sport-becomes-first-vehicle-to-feature-parts-made-of.html
    - The Road to Zero Waste: https://www.at.ford.com/en/homepage/news-and-clipsheet/news/2021/4/zeo-waste.html
    - Ford Teams With Redwood Materials to Create First Pathways for Recycling End-of-Life Batteries from Electrified Ford and Lincoln Vehicles; Kicks Off in California: https://www.at.ford.com/en/homepage/news-and-clipsheet/news/2022/2/redwood-materials.html