Ford Project EVolve

MVP Presentation

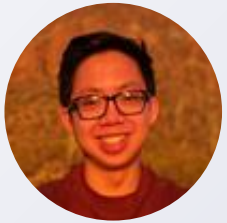
Team: Aniket, Claire, Erika, Philip, Pranjal, & Zac

Meet our team:

Zac Ettensohn
MS MS&E

Aniket Bhátia
MS EE

Pranjal Agarwal
MS MATSCI



Philip Phan
MS AeroAstro

Erika Francks
MS Product Design

Claire Rosenfeld
BS CS + MS MS&E

Presentation Roadmap

1. Product Opportunity Assessment Summary
2. Tests, Surveys, and Takeaways
3. Our Minimum Viable Product
4. Technical Feasibility
5. Product Development Plan
6. Business Model
7. Moving Forward

Section 1: **Product Opportunity Assessment Summary**

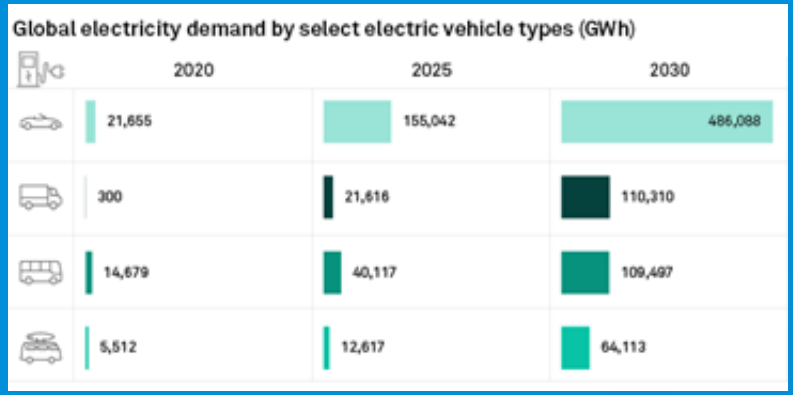
[Ford] plans to lead the electrification revolution, because it is a *smart business decision* and accelerating adoption of electrified products is the right thing to do."

– Ford Integrated Sustainability and Financial Report 2021

EV Adoption Will Strain the Grid

Ford and other OEMs are committed to electrifying their vehicles.

As EV becoming more popular, solutions need to be put in place to help sustain the grid.



"Electrifying everything is hip to say, better than the alternative, but the grid is fragile as-is."

-Alex, demand response analyst

Demand Response

I will increase supply by 50 KW for $100!

Power Plants

Demand is currently outstripping supply by 50 KW

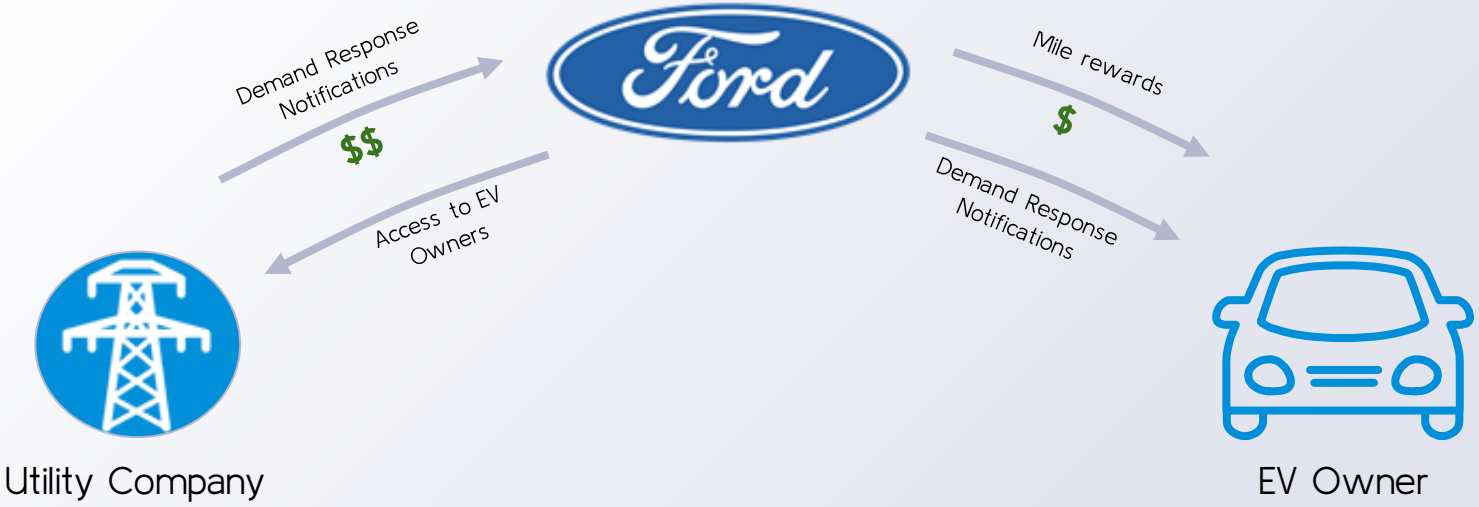
Open Market Bids

Utilities

I will decrease demand by 50 KW for $90!

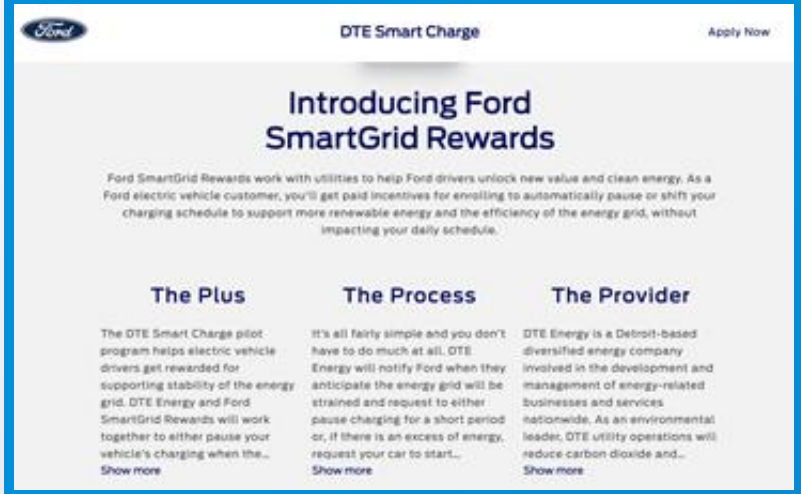
Ford

Business Model



Ford's Current Work

- Pilot program with DTE Energy in Detroit
- SMS based program to alert users
- Testing key systems features like sign up and physical user participation process



How Project EVolve Fits In

DTE Smart Charge

Systems Level Testing

- SMS Alerts
- Sign up
- Physical UX

Project EVolve

UX Testing

- Opt-in incentives
- Key app features
- App UX

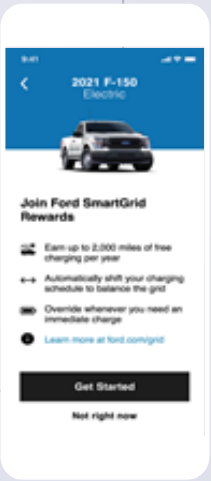
Project EVolve

Improving the SmartGrid User Experience

Our Vision

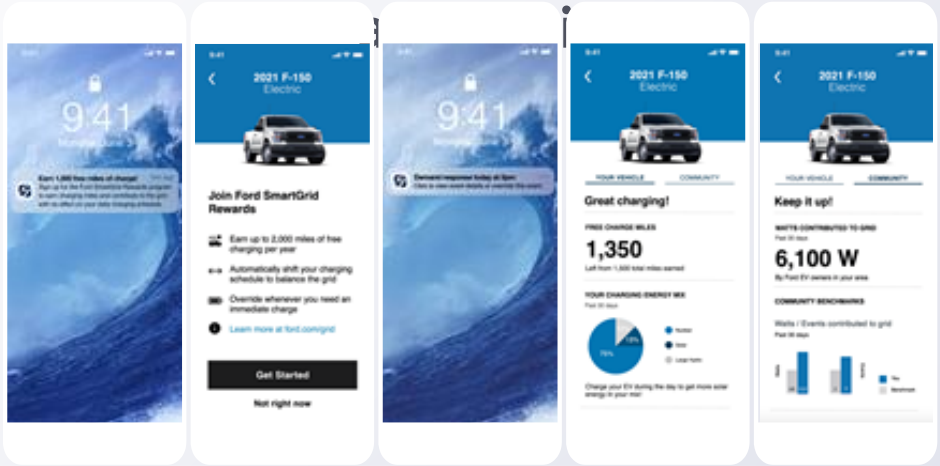
A hands-off, easy-to-understand, user-centric SmartGrid mobile app experience that

1. increases SmartGrid participation
2. maintains SmartGrid participation
3. brings users into the Ford digital ecosystem



Our Minimum Viable Product

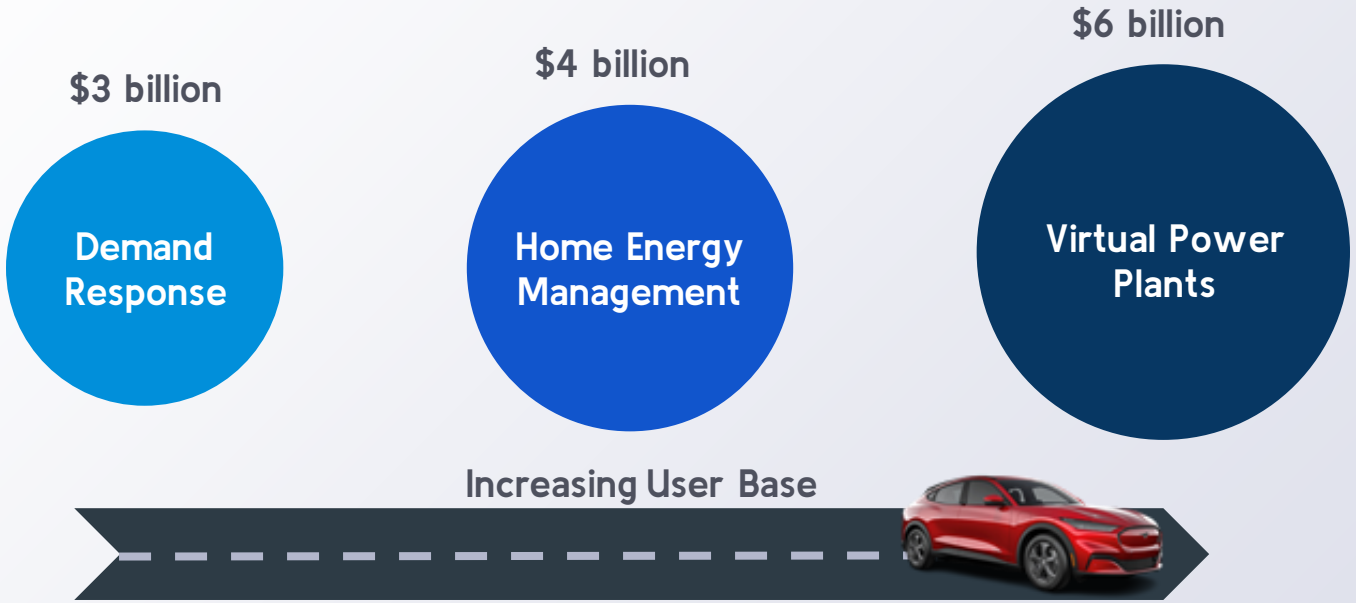
New SmartGrid UX for the FordPass mobile



The Business Case

- Estimate Ford can make **$13 million in revenue by 2025** in demand response
- Main objective is to establish a user base
  - Assuming 20% adoption rate, **550,000 users by 2030**

Ford's Step into a New Energy Market



How this aligns with Ford's Vision

- Allows for the sustainable adoption of EV's while minimizing the growing strain on the grid
- Establishing a new users base that will allow for the expansion into new energy markets
- Create more value for the end user for being a part of the Ford ecosystem

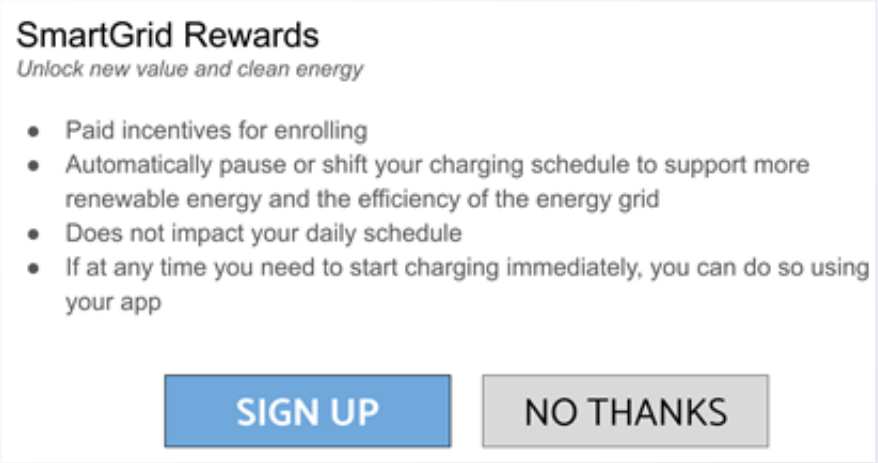
"Focusing on the ownership experience unlocks a different way to create value for our commercial and retail customers, and it will drive recurring revenues for Ford"

-Jim Farley, President and CEO

Section 2: **Tests, Surveys, and Takeaways**

SmartGrid Flyer Test

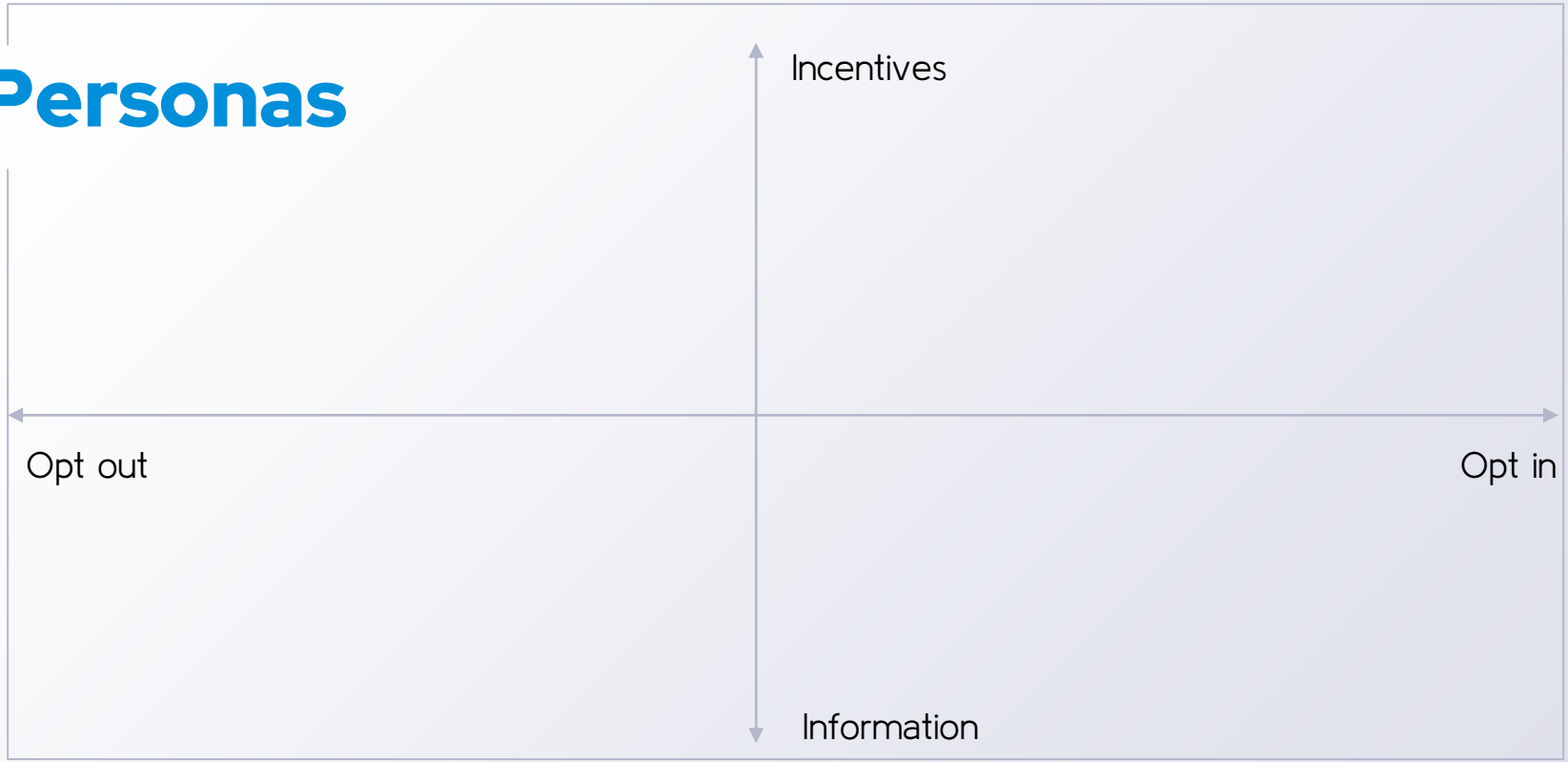
Would people opt into the SmartGrid program as-is?



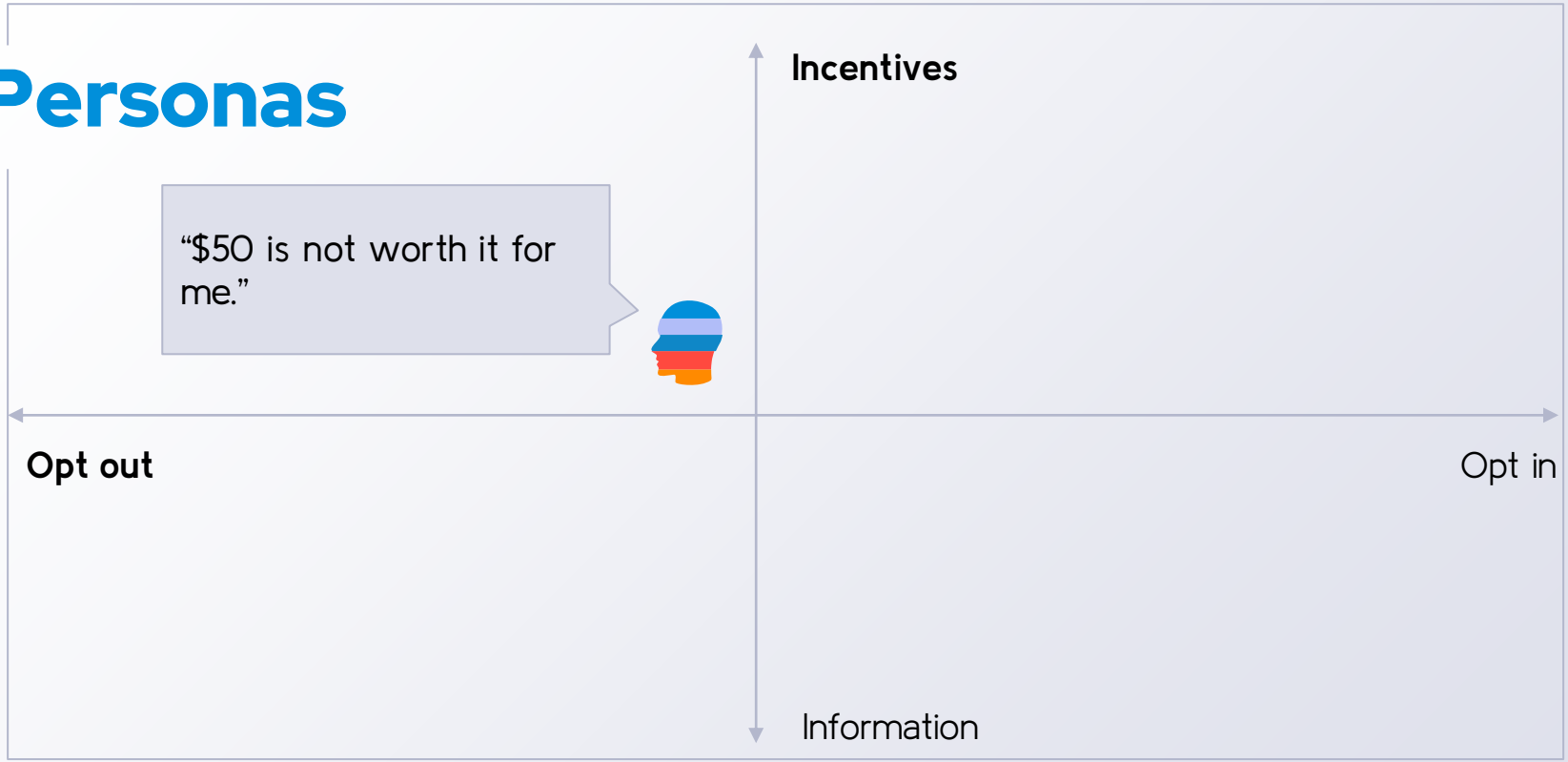
Takeaways

1. SmartGrid is a confusing program.
2. Within EV users, different users have different motivations.

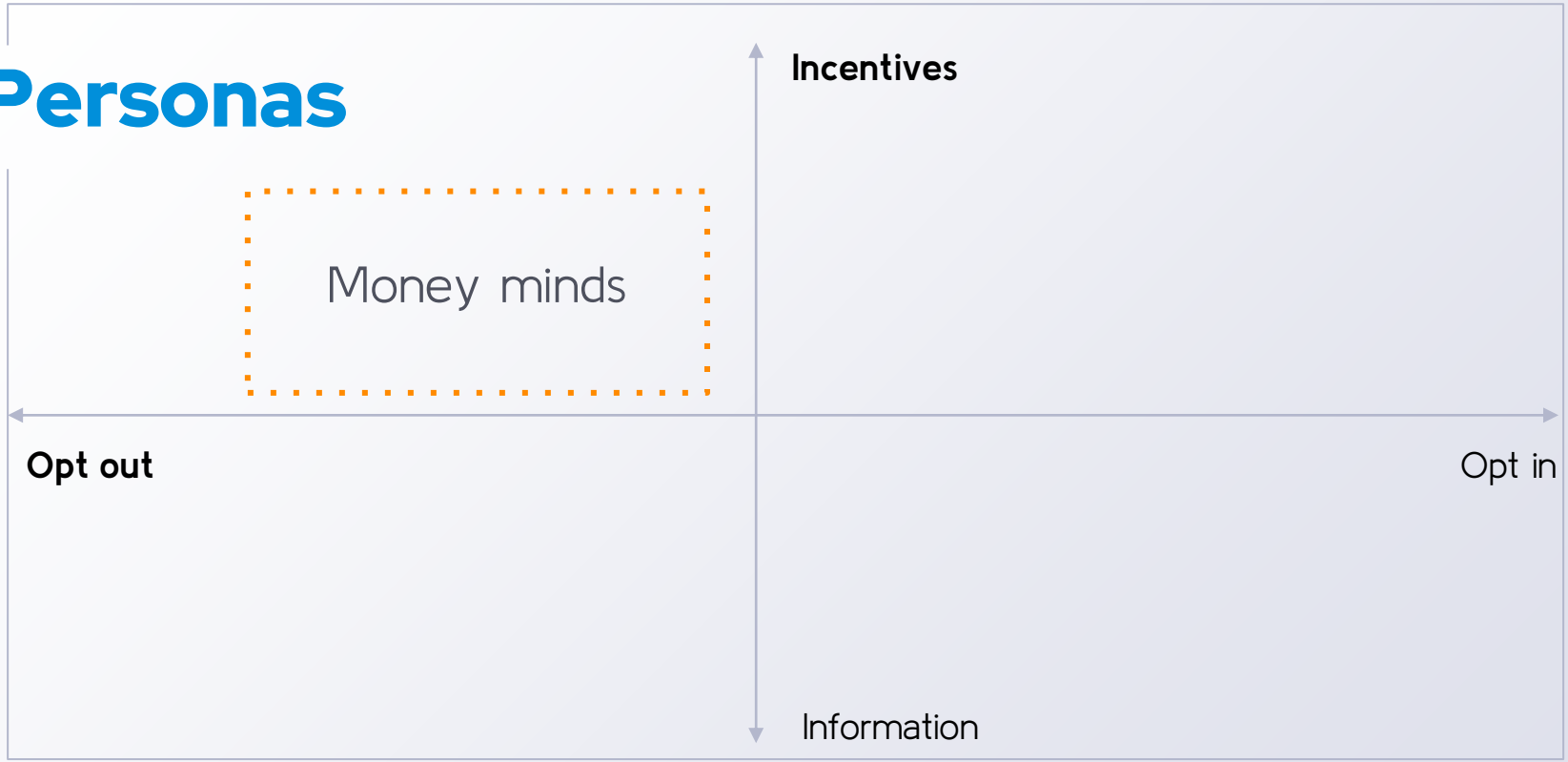
Personas



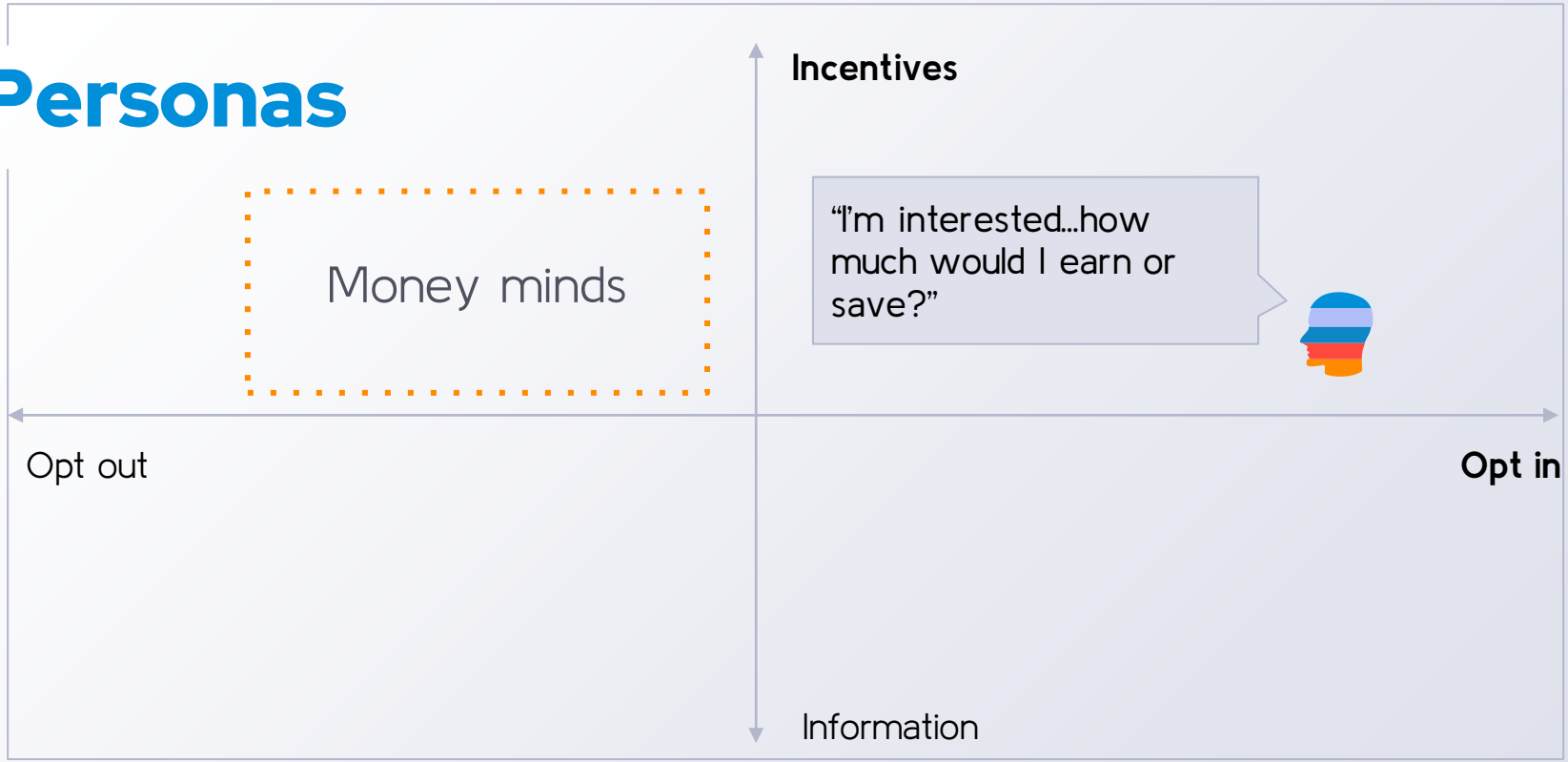
Personas


Incentives
"$50 is not worth it for me."
Opt out
Opt in
Information

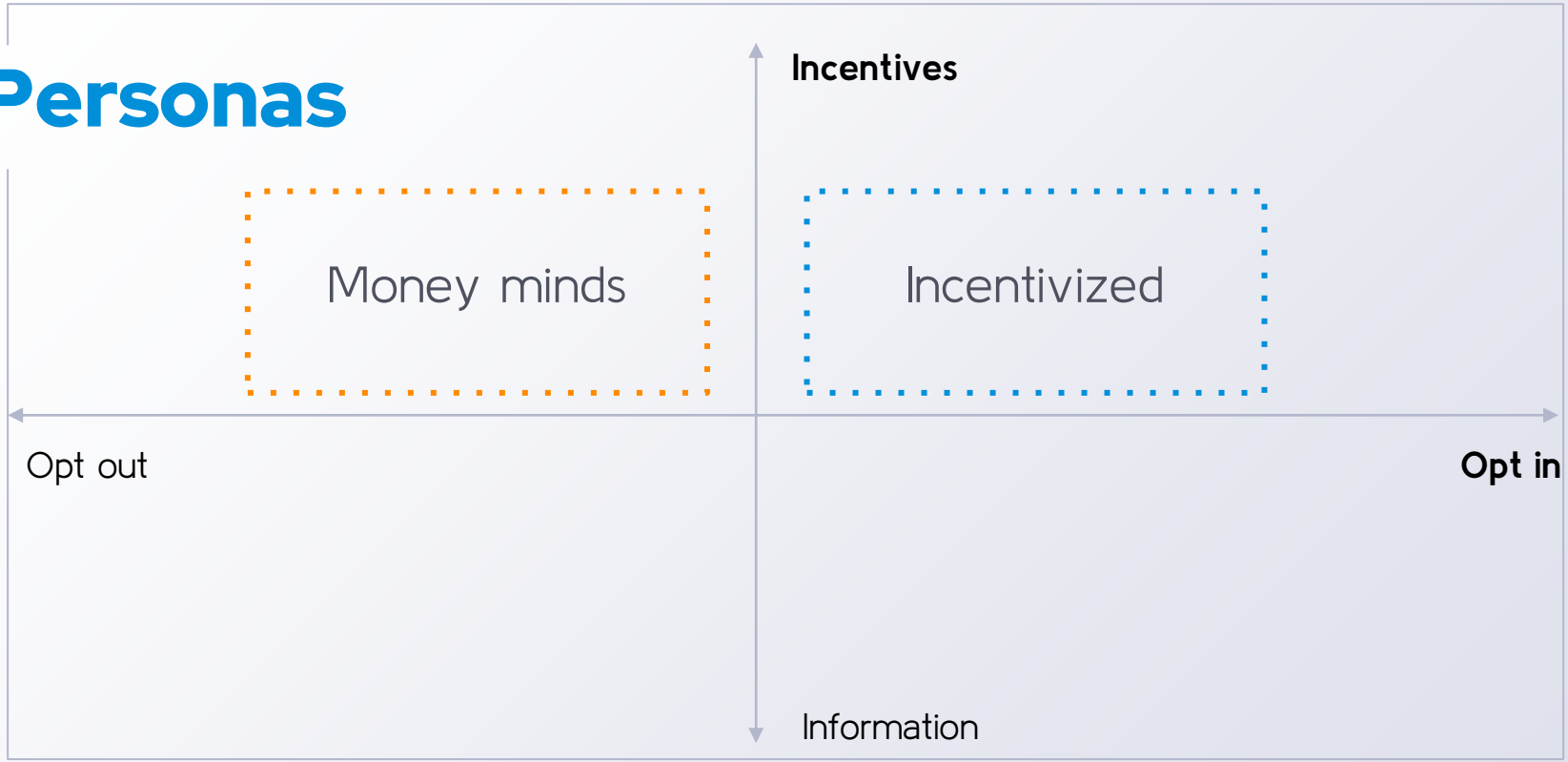
Personas



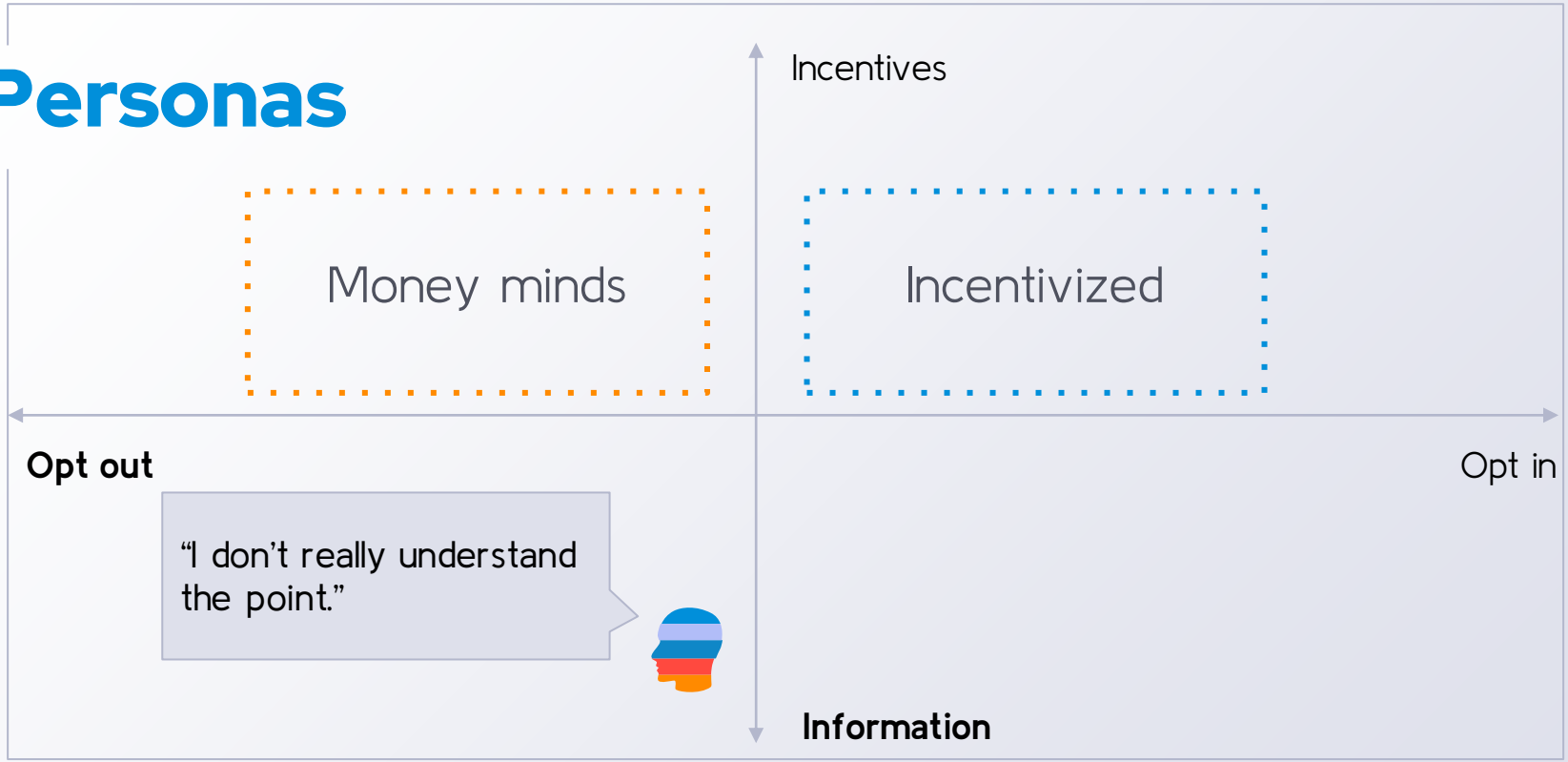
Personas


Incentives
Money minds
“I’m interested…how much would I earn or save?”
Opt out
Opt in
Information

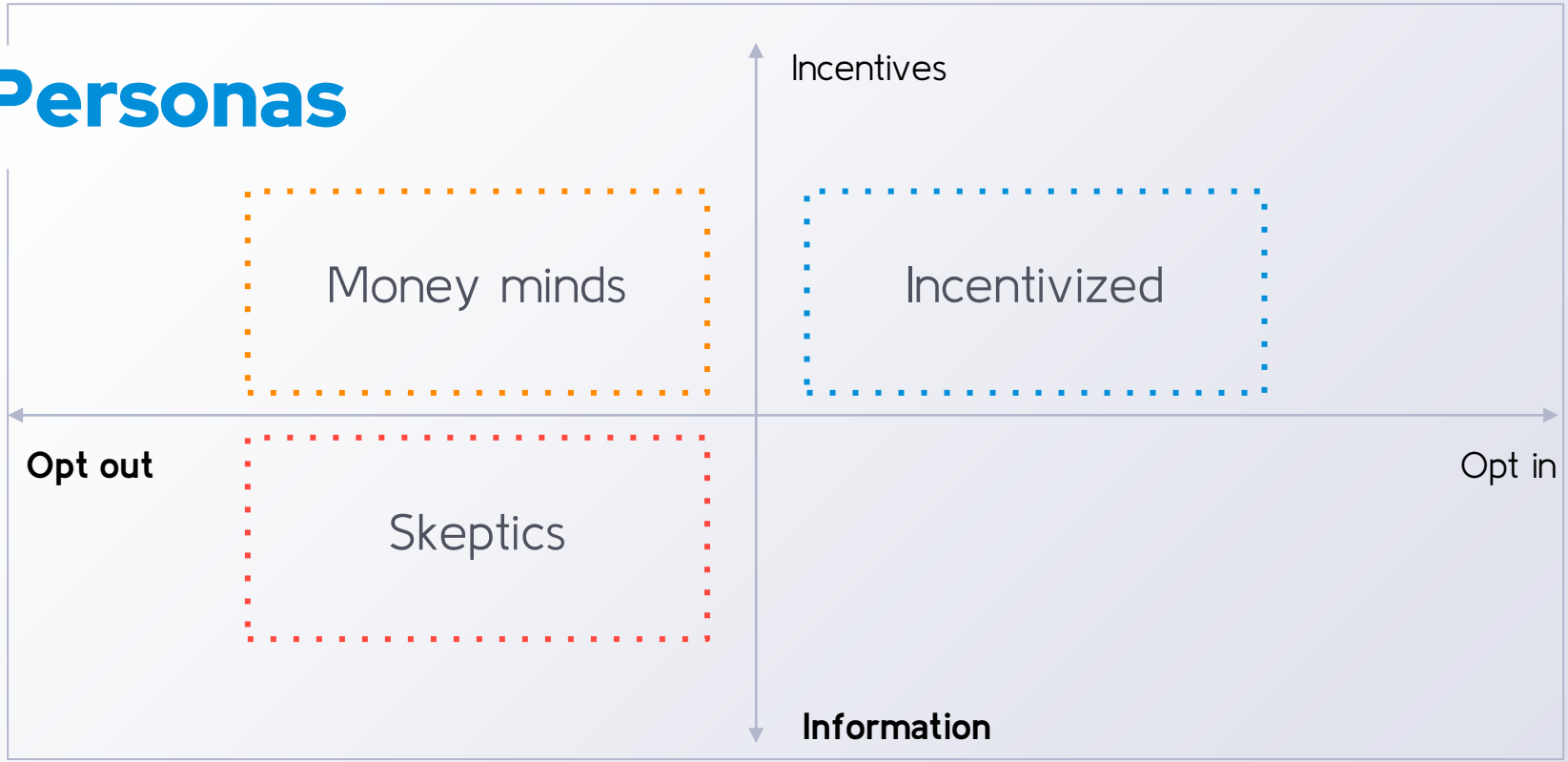
Personas


Incentives
Money minds
Incentivized
Opt out
Opt in
Information

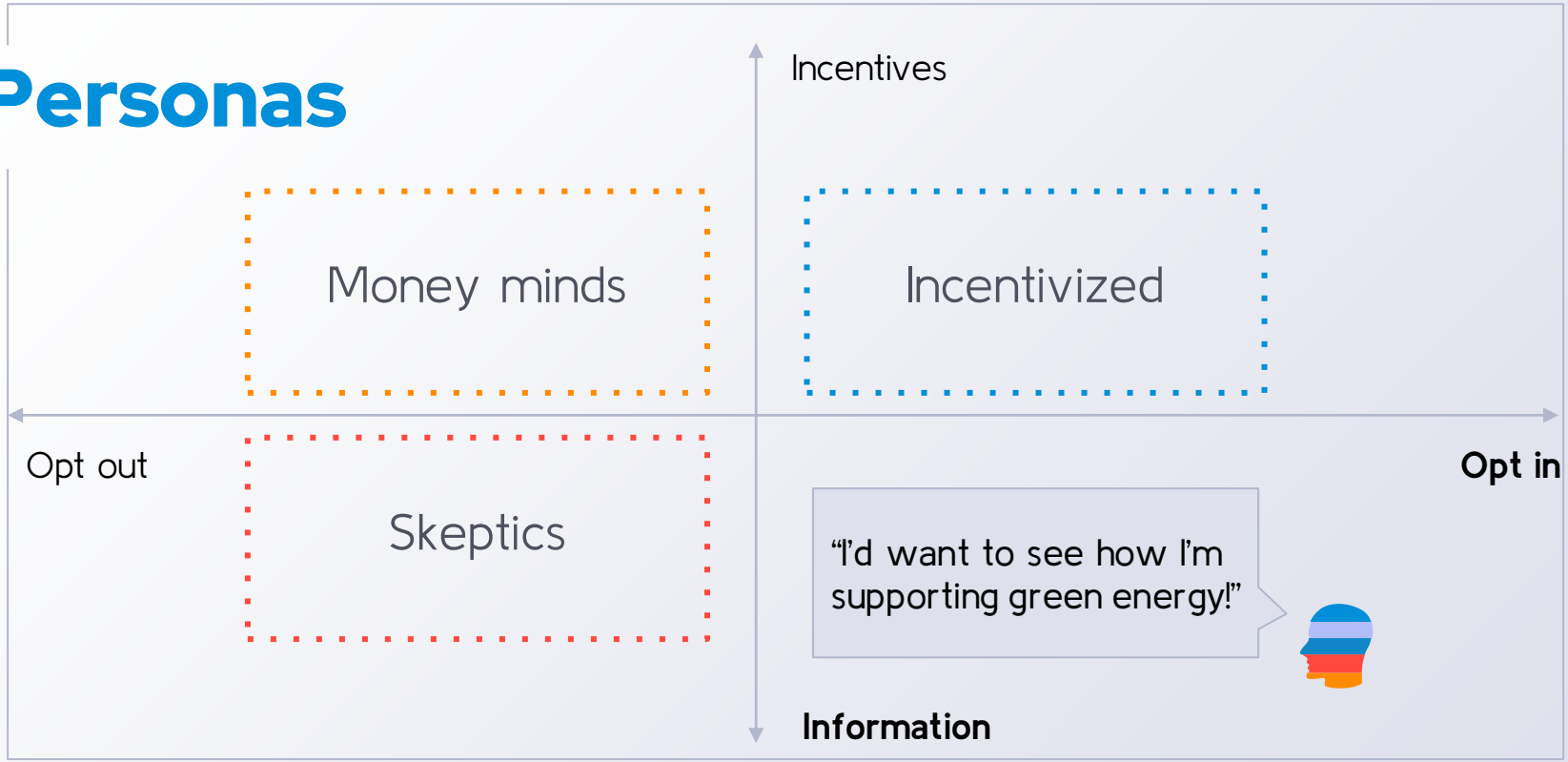
Personas


Incentives
Money minds
Incentivized
Opt out
Opt in
“I don’t really understand the point.”
Information

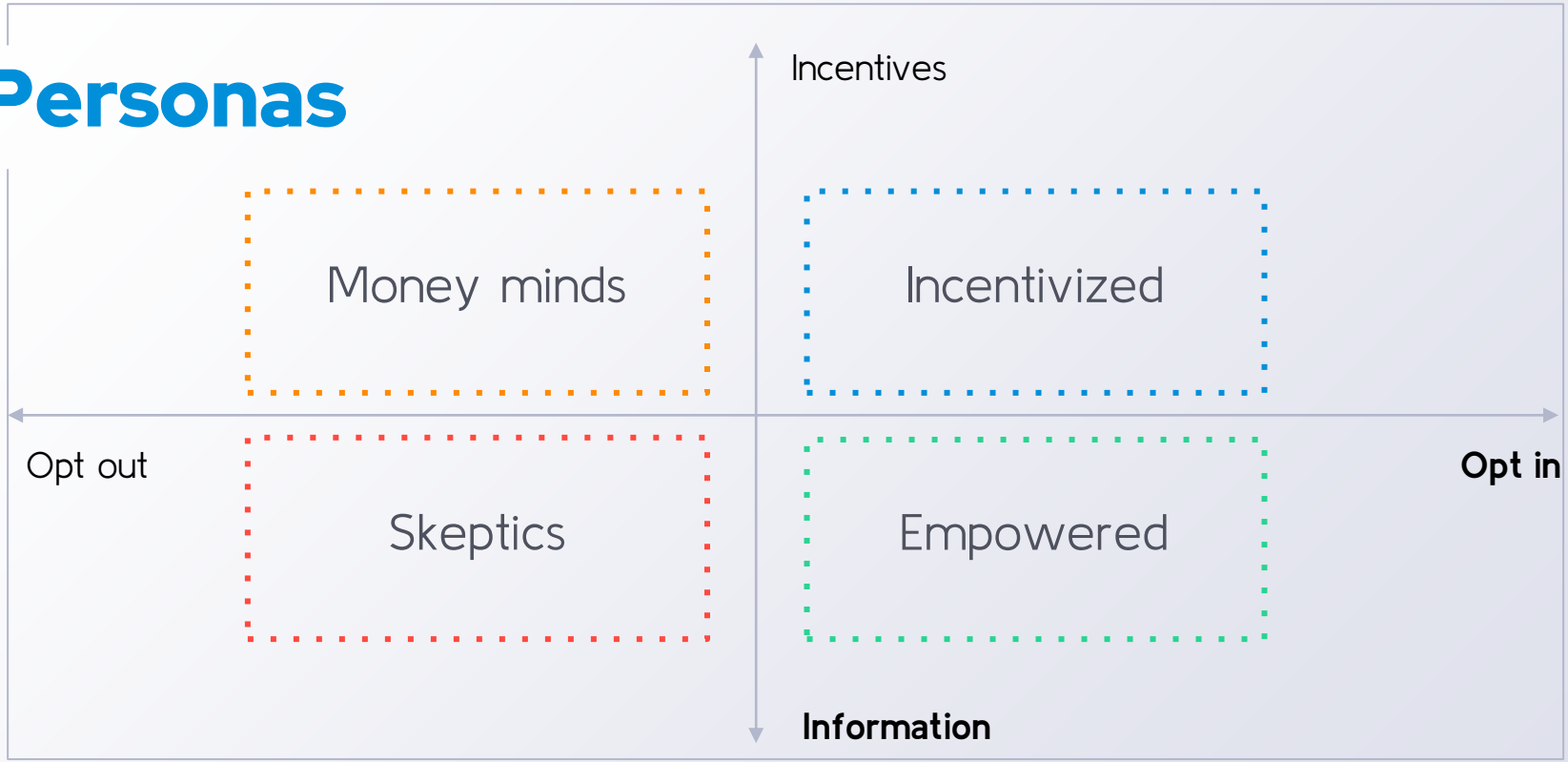
Personas


Incentives
Money minds
Incentivized
Opt out
Opt in
Skeptics
Information

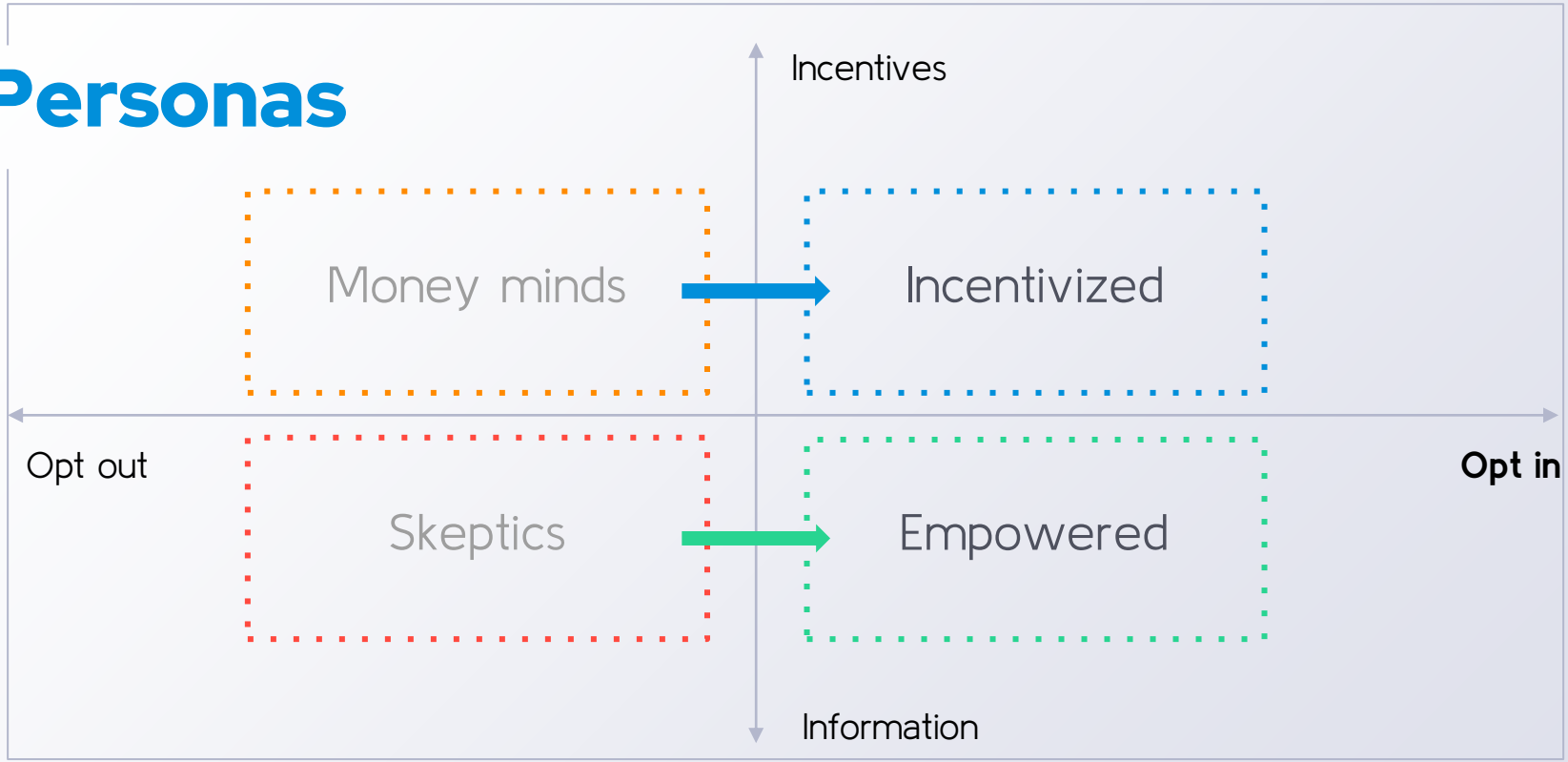
Personas


Incentives
Money minds
Incentivized
Opt out
Opt in
Skeptics
“I’d want to see how I’m supporting green energy!”
Information

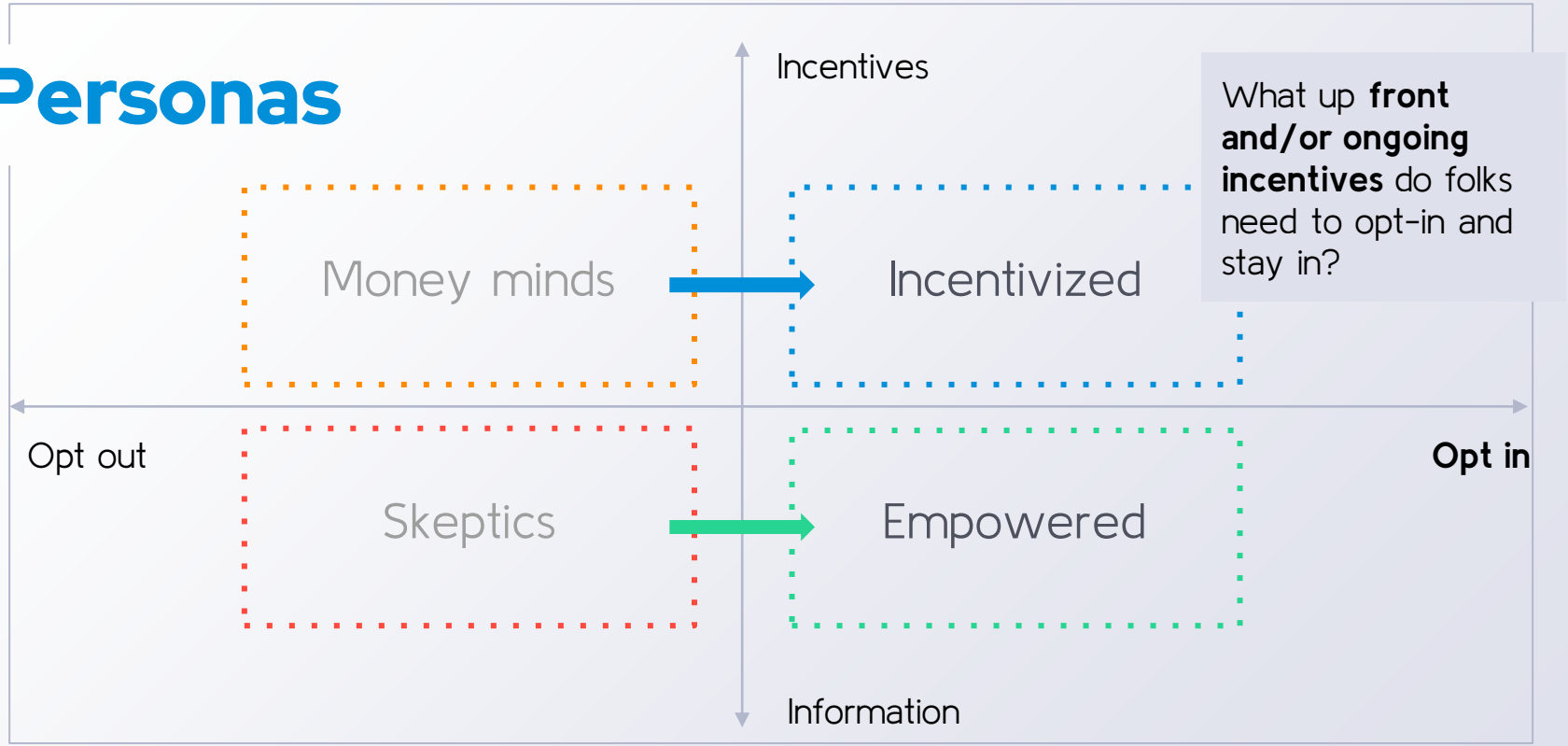
Personas


Incentives
Money minds
Incentivized
Opt out
Opt in
Skeptics
Empowered
Information

Personas

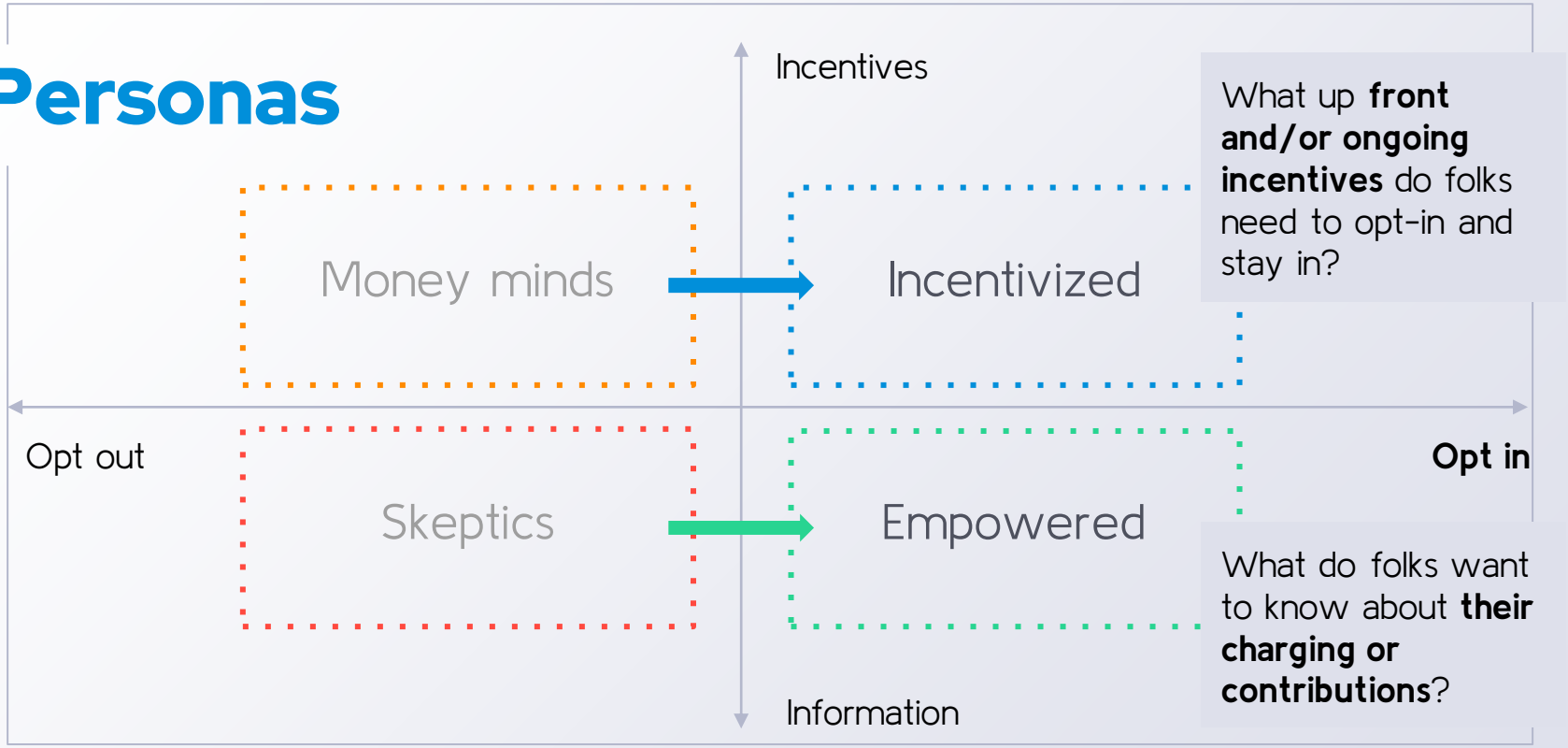

Incentives
Money minds
Incentivized
Opt out
Opt in
Skeptics
Empowered
Information

Personas

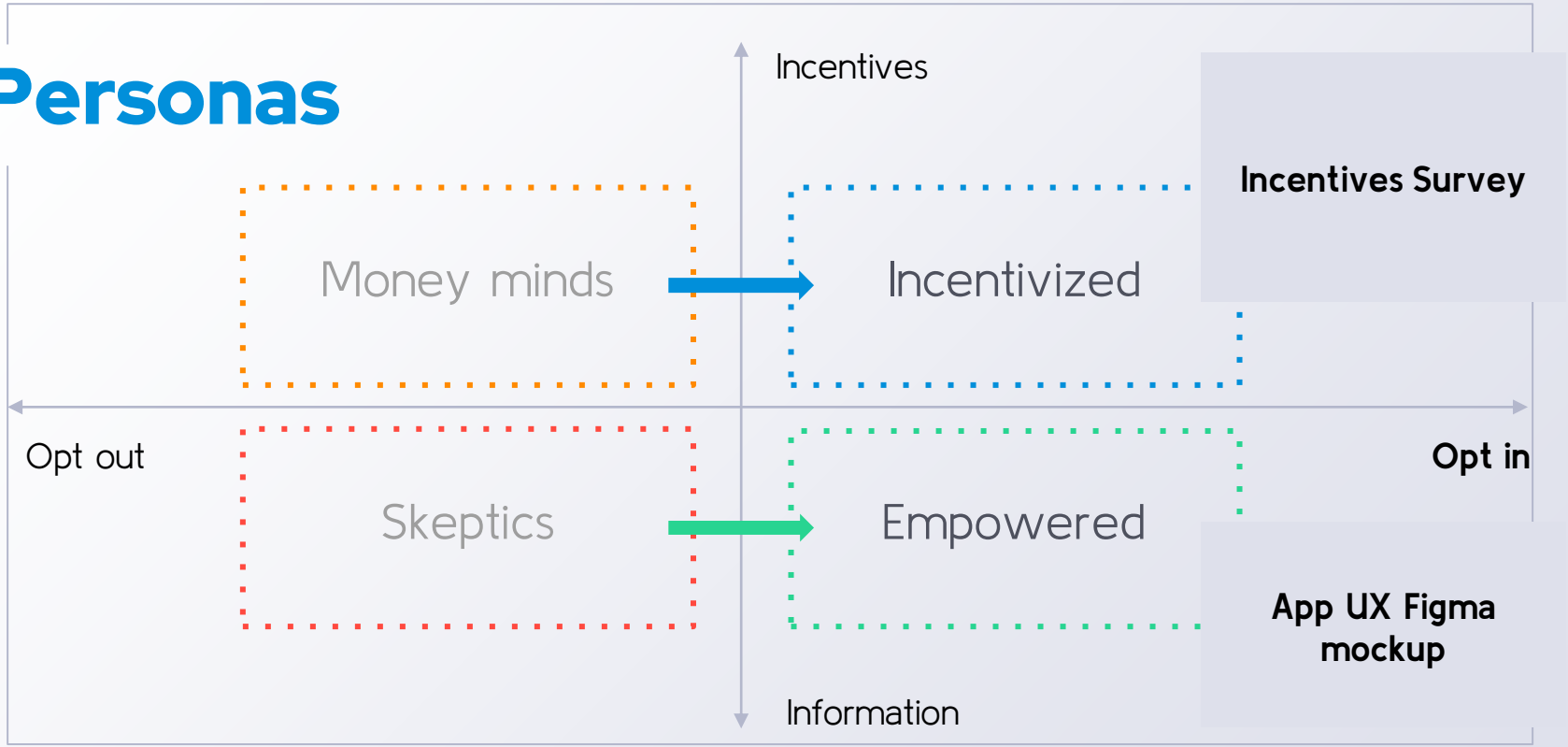


What up **front and/or ongoing incentives** do folks need to opt-in and stay in?

Personas


Incentives
Money minds
Incentivized
What up **front and/or ongoing incentives** do folks need to opt-in and stay in?
Opt out
Opt in
Skeptics
Empowered
What do folks want to know about **their charging or contributions**?
Information

Personas

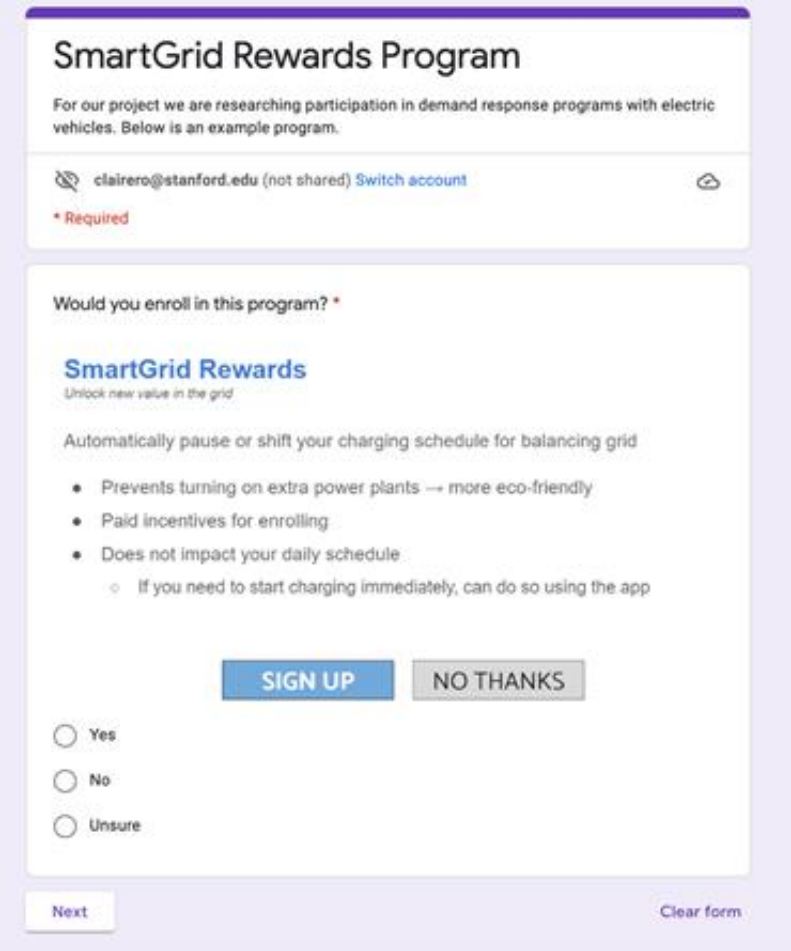

Incentives
Money minds
Incentivized
Incentives Survey
Opt out
Opt in
Skeptics
Empowered
App UX Figma mockup
Information

Incentives Survey

What incentives motivate EV owners?

90+ respondents sourced from:

- Previous interviewees
- Official Ford Mach-E forum
- r/RenewableEnergy
- r/BoltEV
- r/F150Lightning
- r/MachE

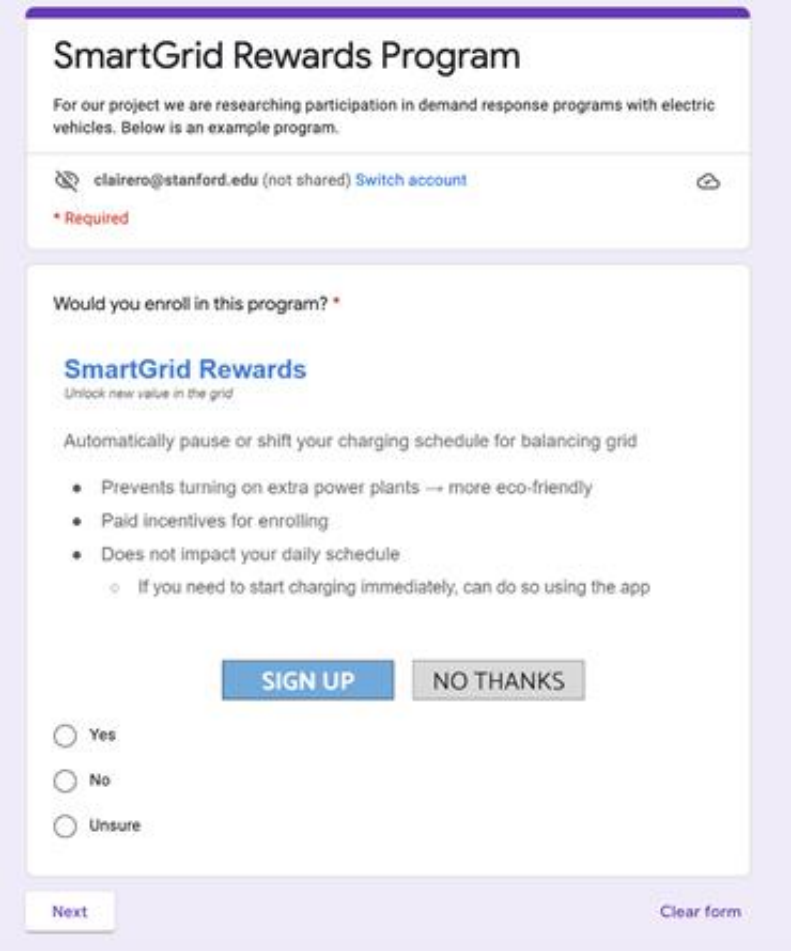


Incentives Survey

What incentives motivate EV owners?

Takeaways

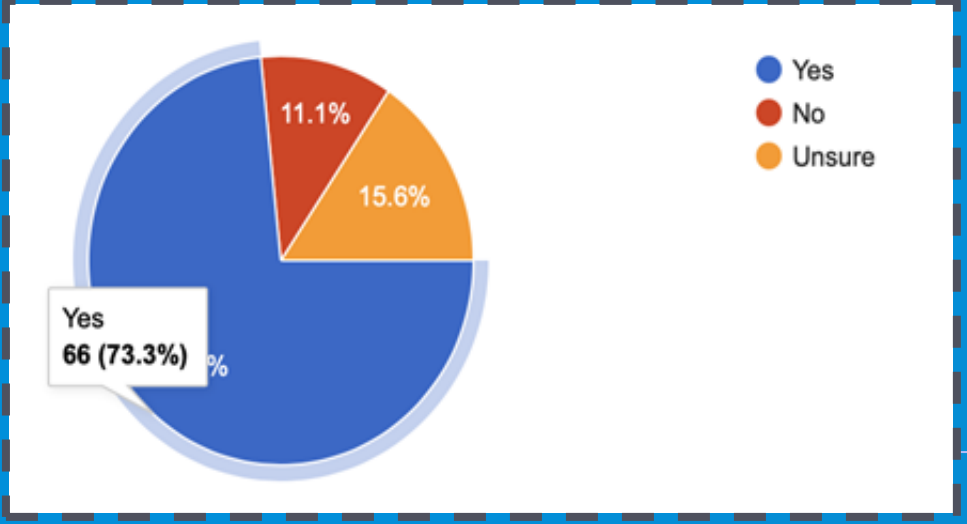
1. Earning miles is more exciting than earning cash.
2. Environmental impact is a top priority.

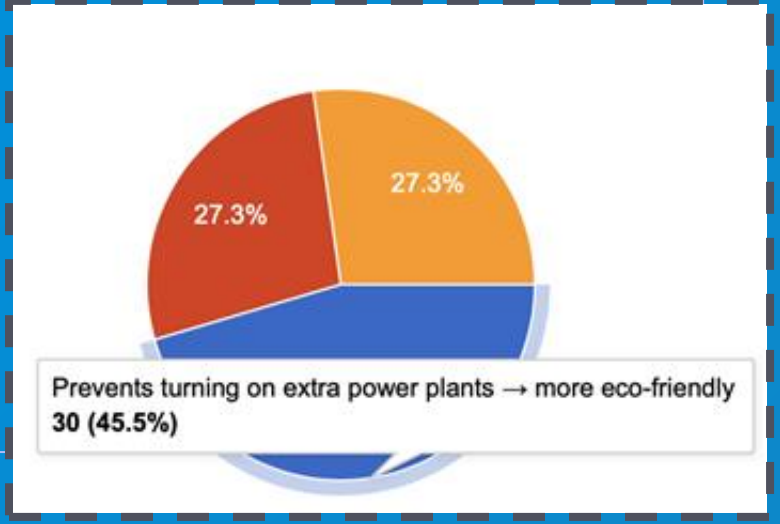


Will you enroll in the program?

What's your motivation?

Yes! I want to prevent turning on extra power-plants

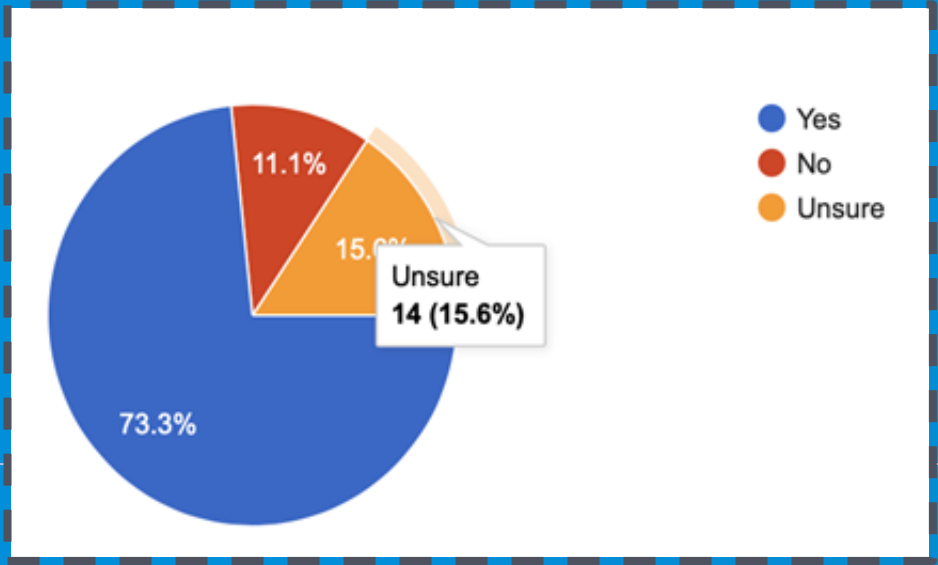


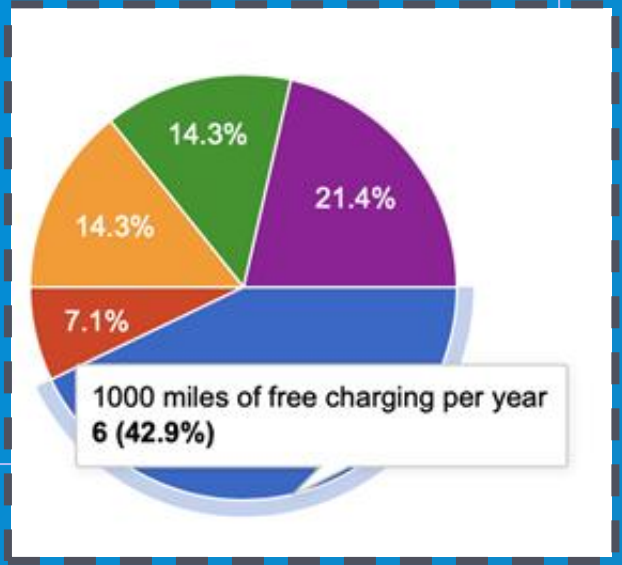


Will you enroll in the program?

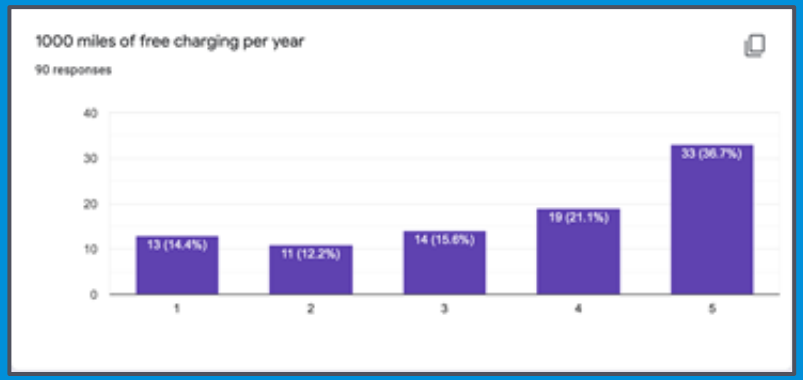
What will convince you if not?

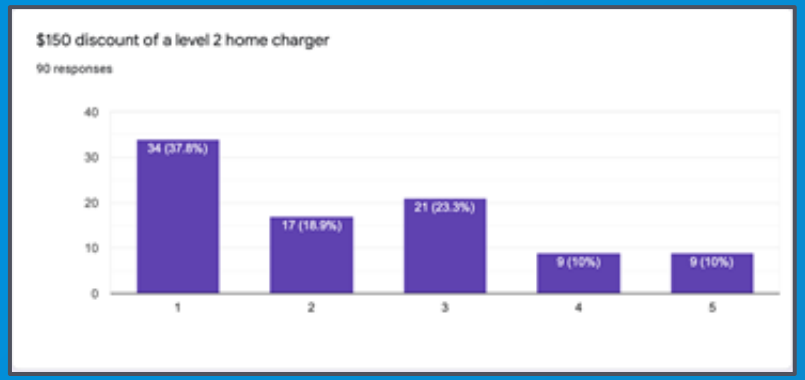
Not sure. 1000 miles of free charging/year could make me change my mind

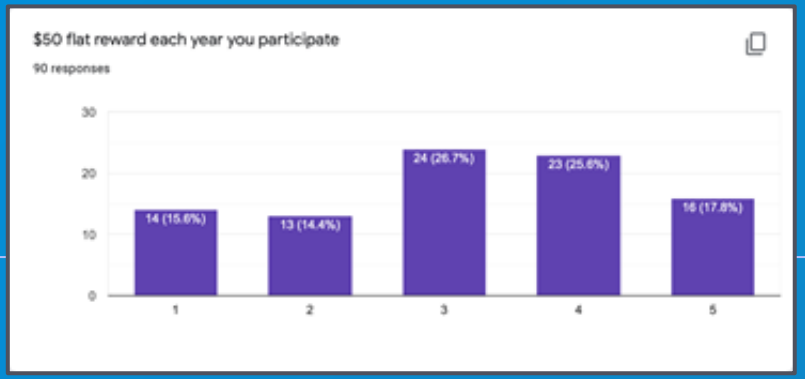




Rate the appeal of each incentive (from 1-5)

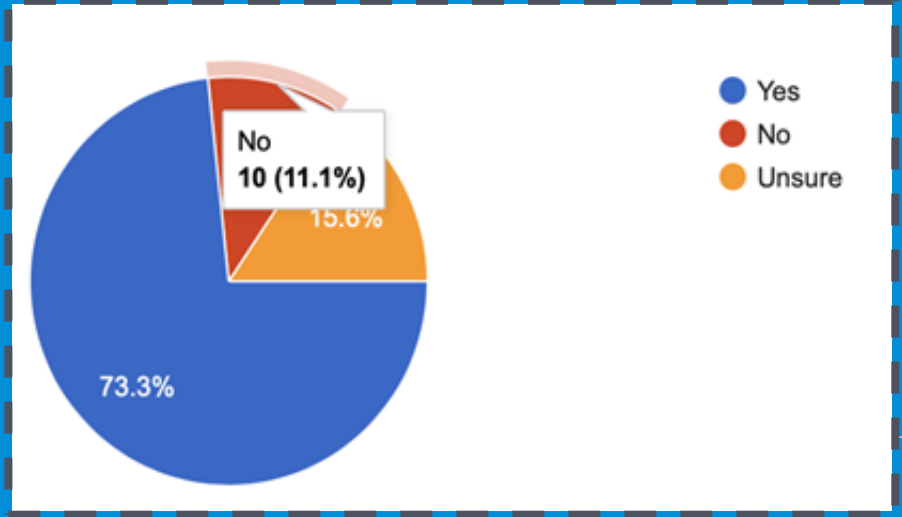


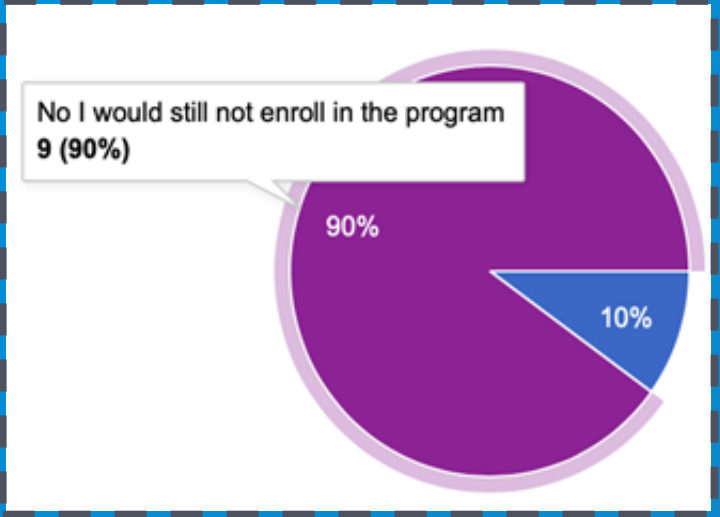




Will you enroll in the program?
What will convince you if not?

No :(Incentives can't convince me to change my mind





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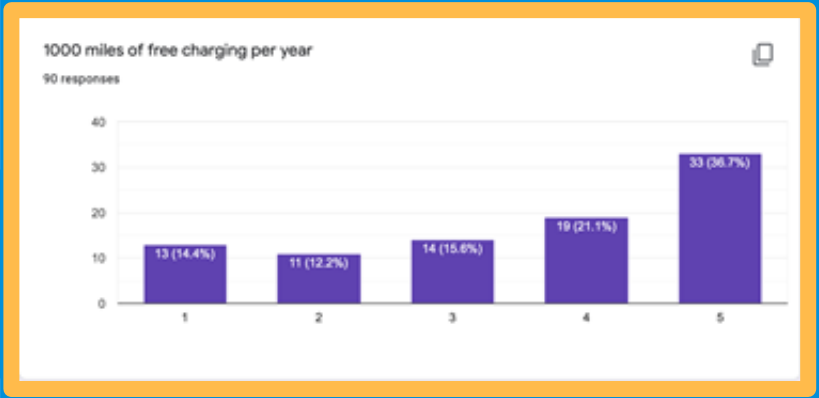
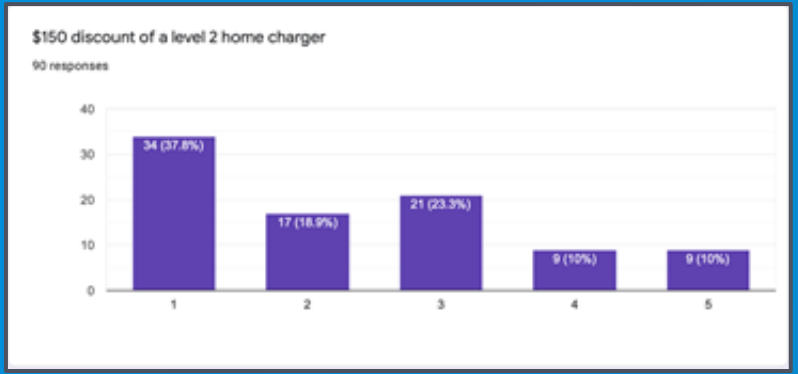
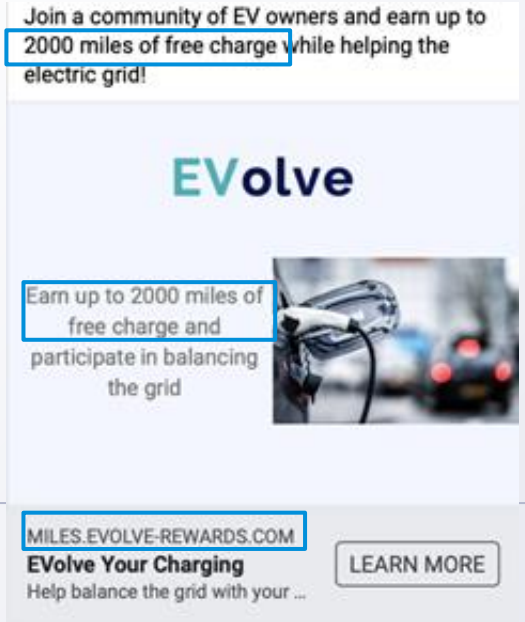




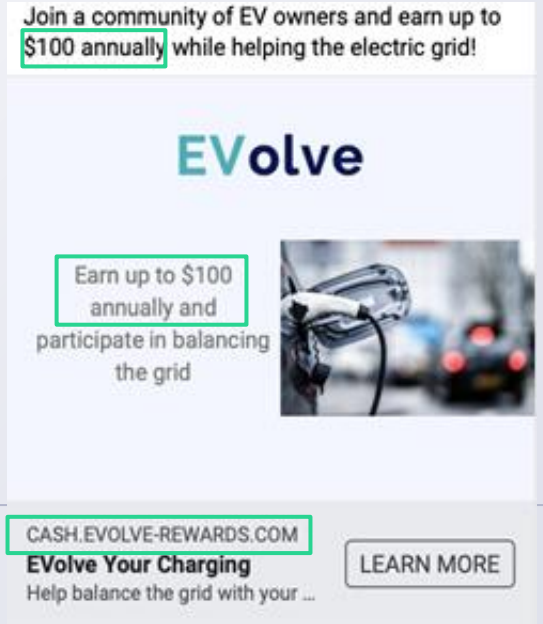
A/B Test: Facebook Ads

Comparing miles rewards vs. money rewards

Mile



Money rewards



A/B Test: Landing Pages

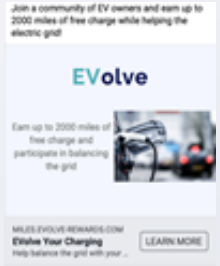
Comparing miles rewards vs. money rewards

Mile

Money rewards

Facebook A/B Test

Comparing miles rewards vs. money rewards



Takeaways

1. Facebook tests are difficult.
2. More research is needed to confirm that miles rewards are more incentivizing than money rewards.

	Miles	Money
Impressions	1769	1677
Clicks	21	20
Click Through Rate (CTR)	1.18%	1.19%
Signups	4	3

Landing Pages

Mile rewards: https://www.miles.evolve-rewards.com/

Money rewards: https://www.cash.evolve-rewards.com/

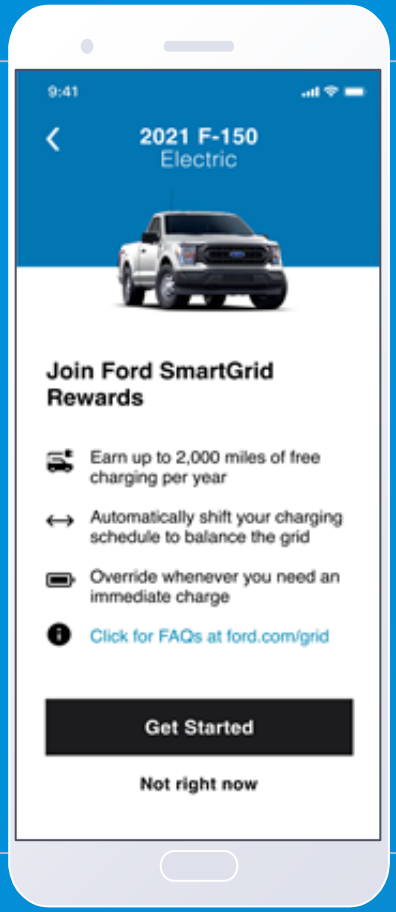
Section 3: **Our Minimum Viable Product**

...why customers choose us: They can get the best-in-class technology they are already familiar with in a *fully integrated* experience.

- Alex Purdy, Director-Business Operations, Enterprise Connectivity, Ford Motor Co

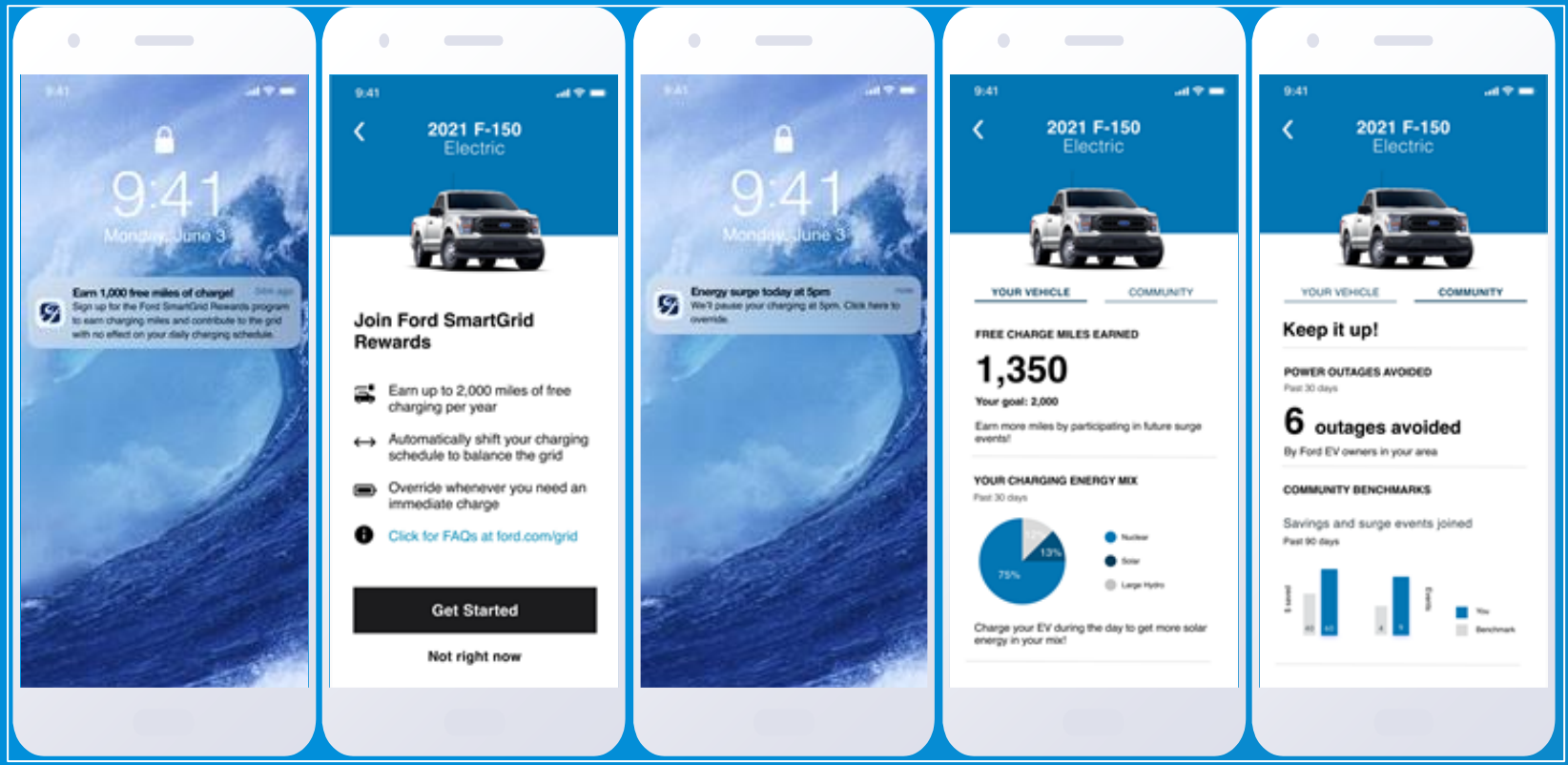
Why SmartGrid UX?

- Need for a **user-centric mobile app SmartGrid UX** to bridge the gap between
  - Technical infrastructure,
  - B2B relationships, and
  - **User awareness, motivation, incentives, and engagement**
- We're focused on:
  - How to increase opt-in?
  - How to inform, communicate with, and incentivize users?



Current FordPass App

Our Proposed FordPass Addition: SmartGrid UX



User journey – opt in

Owns Ford EV

Charges at home

Gets notification to join SmartGrid from FordPass app

User journey – during event

Utility notifies Ford about demand response event

Ford owner is notified with option to override event

Charging automatically paused for duration of event

User journey – after event

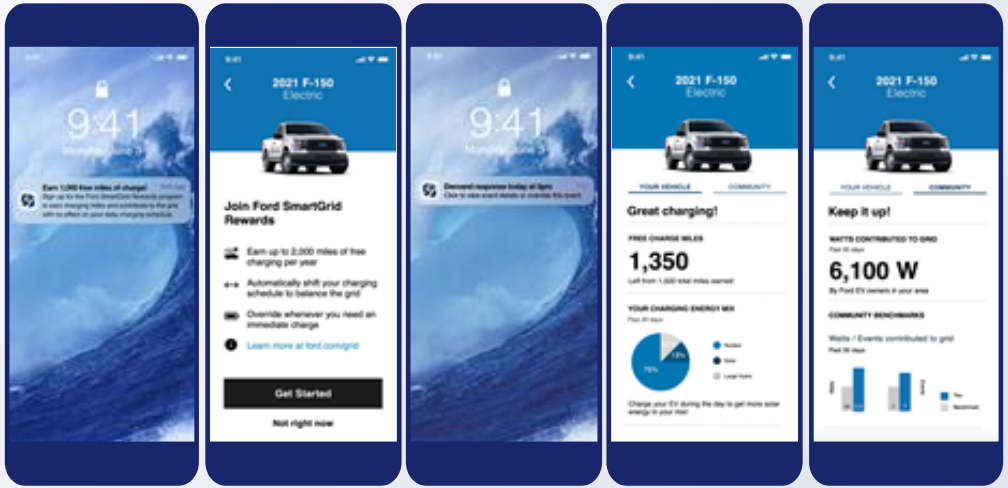
User earns charge miles for event participation

User gets personalized data on charging and community

User takes action to earn more rewards and/or optimize charging

MVP Feedback

From 12 UX interviews with current EV owners.



Design Principles for MVP

From our interviews and surveys with EV owners

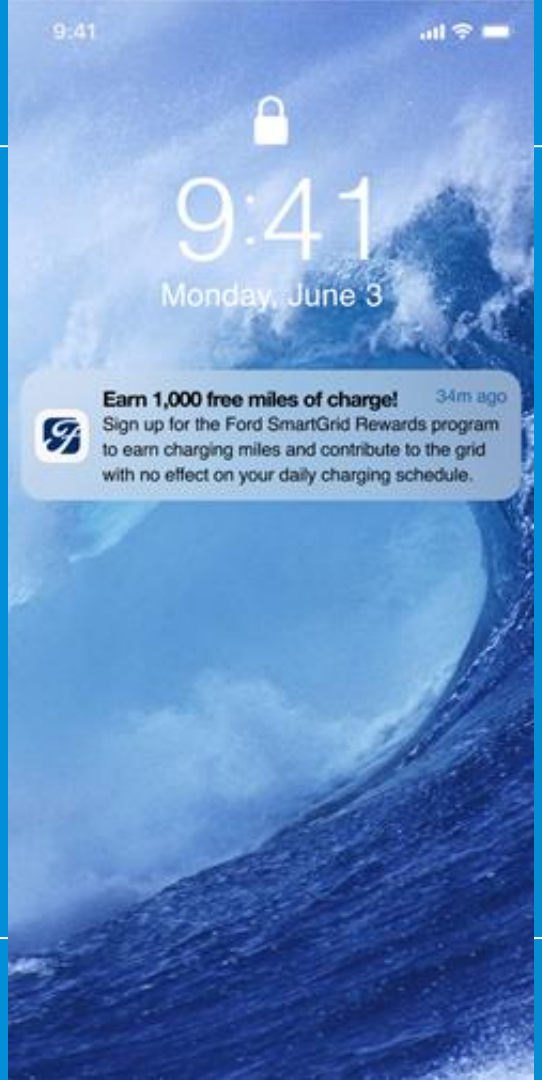
- Educate and empower users to participate
- Experience should be simple and “hands-off”
- Give users ability to override
- Tap into users’ motivations to save $ and help the environment

Important Features To Be Included in MVP

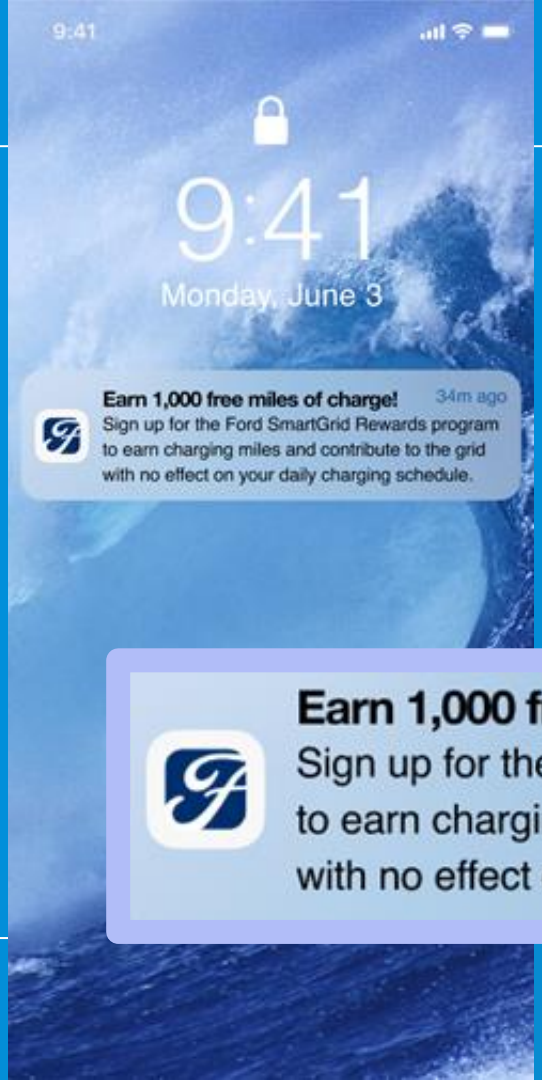
From our interviews and surveys with EV owners

- **Notification** to EV owners to opt in to the program
- **Opt-in page** that is simple and compelling
- **Notification** to override a demand event
- **Metrics** on how a user is benefiting from the program
  - charge miles “earned”
  - green energy usage
  - community contributions + comparisons

Screen 1: Initial notification



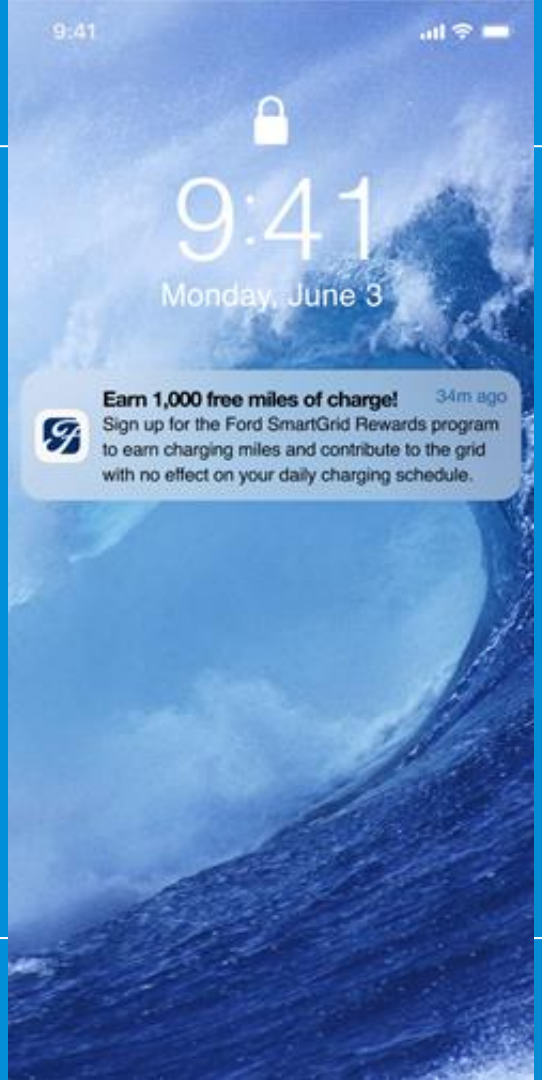
Screen 1: Initial notification



Earn 1,000 free miles of charge! 34m ago
Sign up for the Ford SmartGrid Rewards program to earn charging miles and contribute to the grid with no effect on your daily charging schedule.

Screen 1: Initial notification

- 11/12 interviewees click on this notification
- *"Looks interesting"*
- *"Sounds great, is there a catch?"*

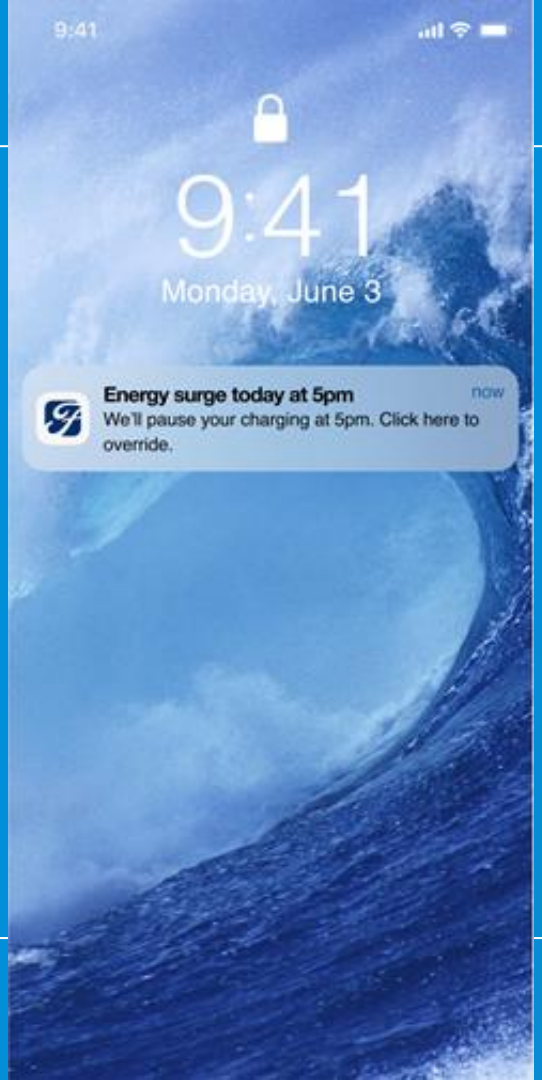


Screen 2: Opt-in page

Screen 2: Opt-in page

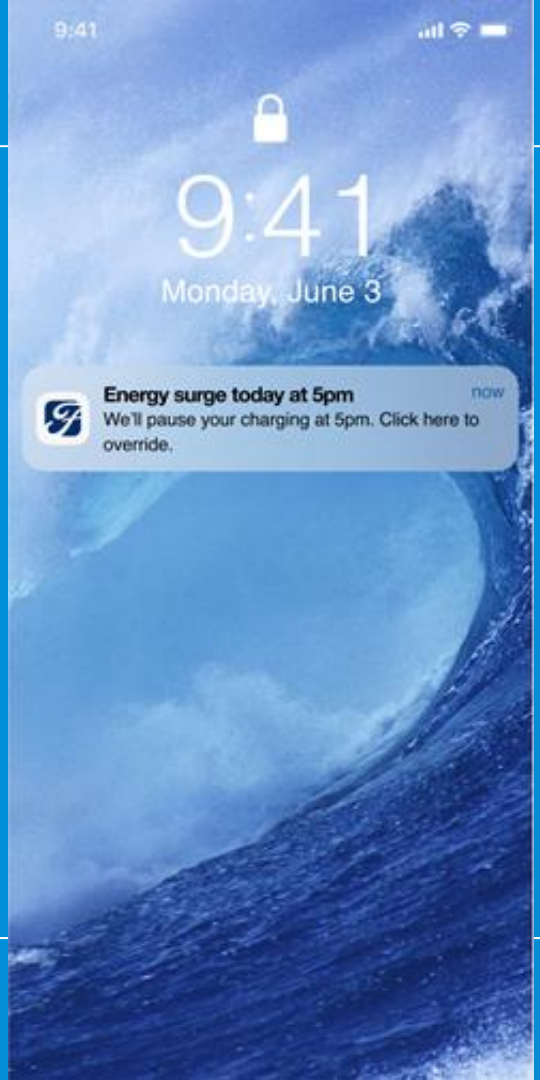
- 11/12 interviewees click Get Started
- FAQs:
  - *"How do I use miles?"*
  - *"How do I override?"*
  - *"What does automatically shift your charging schedule mean?"*

Screen 3: Event override



Screen 3: Event override

- *"I couldn't care less when it charges, as long as it's ready by the morning"*
- *"It's good that I can override if needed."*
- *Demand response → surge*



Screen 4: Vehicle profile

Screen 4: Vehicle profile

- Desire for "achievable" goal
- Curiosity in energy pie chart
  - *"It's black magic"*
  - *"I've always been curious about my energy mix"*
  - *"Totally fascinating to see the mix"*

Screen 5: Community

Screen 5: Community

- Relatable metrics
- Some are motivated by competition, some by contribution
  - *"There's a competitive streak in me."*
  - *"Oh nice! I'd love to see my zip code."*

Assumptions in Our MVP

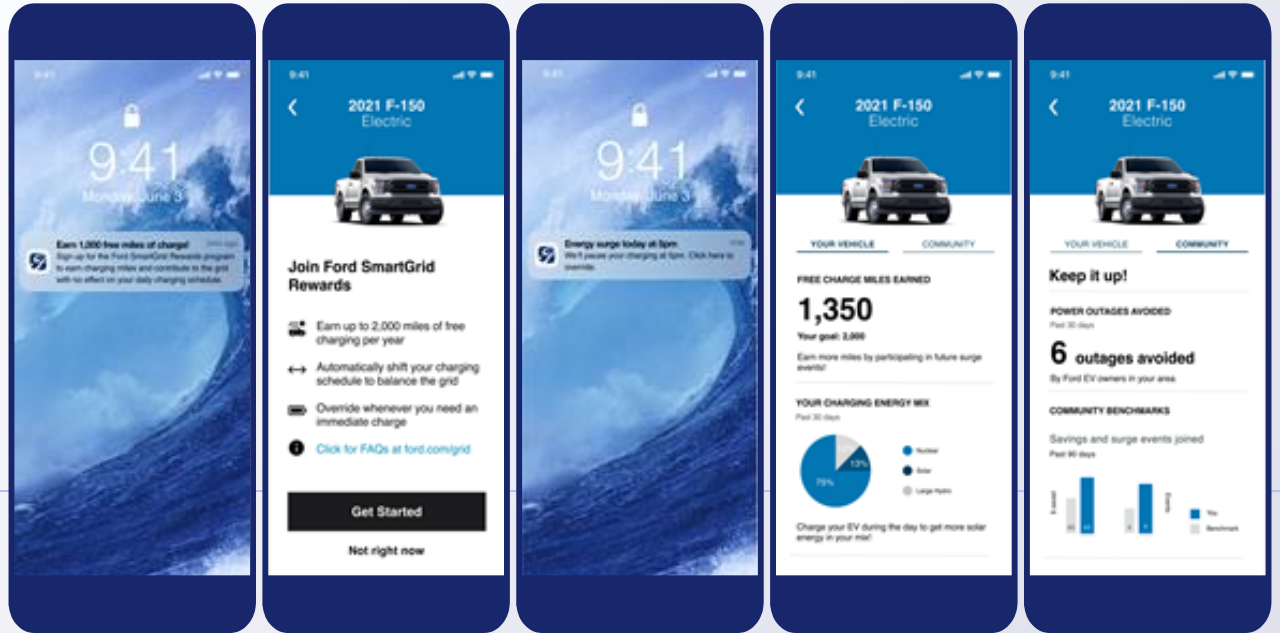
- Initial 1,000 miles of up-front miles earned
- Additional 1,000 miles available to earn through participation in events
- Ford can authenticate users with utility companies during opt-in
- Ford has access to detailed energy mix data from utilities
- Ford can quantify aggregate community contributions (outages avoided, savings)

Lessons for Ford SmartGrid UX

- ★ Reword “demand response” to “surge”
- ★ Utilize notifications, but allow users to personalize
- ★ Balance hands-off UX with user understanding
- ★ Consider what metrics each persona wants to see
  - money-minded vs. incentivized / skeptics vs. empowered

Final MVP

For integration into the current FordPass App.

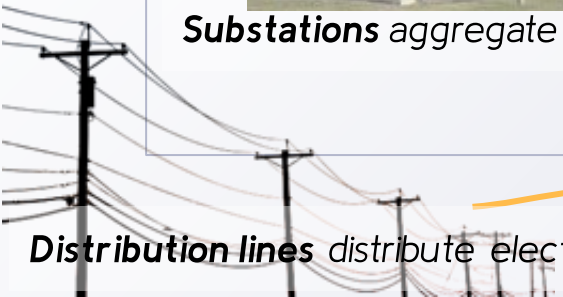


Section 4: **Technical Feasibility**

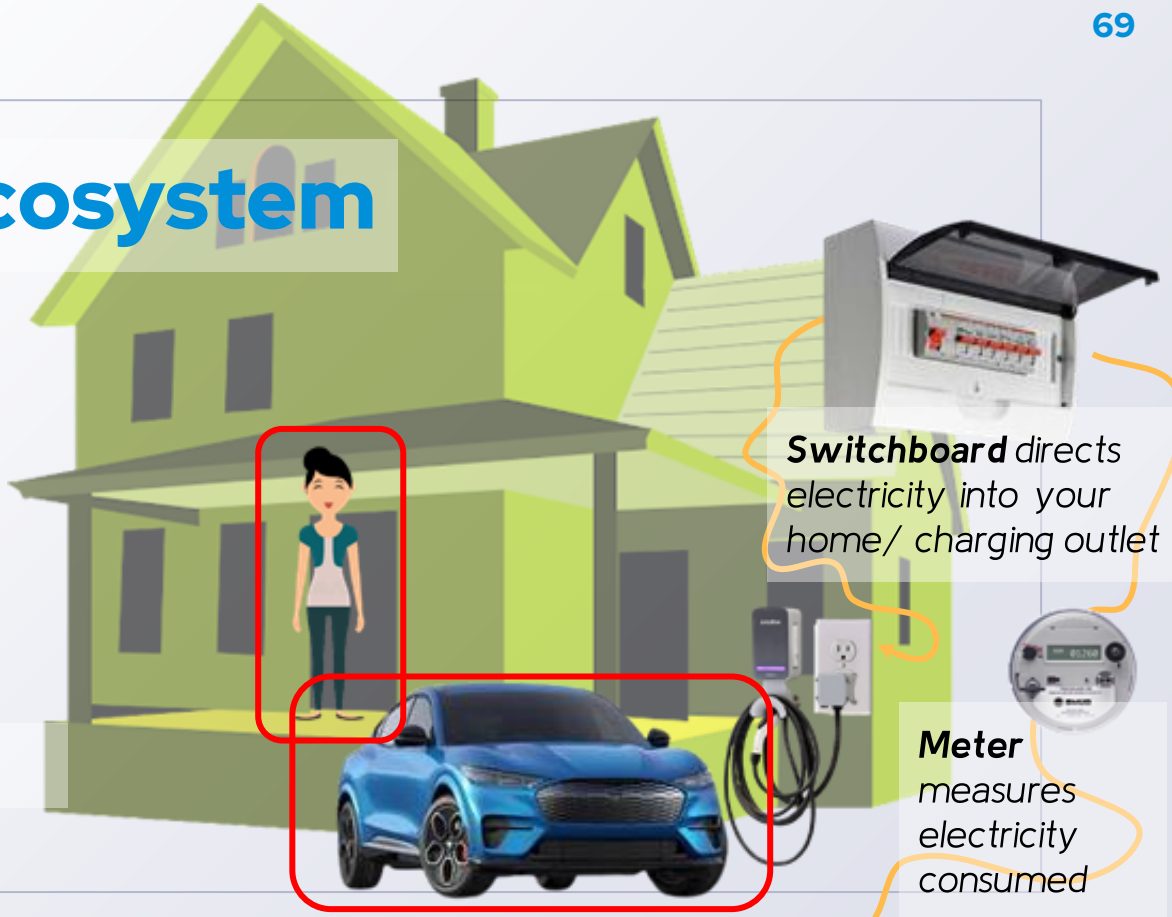
EV Charging Ecosystem

Electricity *is generated*

Substations *aggregate electricity*



Distribution lines *distribute electricity locally*



Energy provider *delivers your home electricity*

Switchboard *directs electricity into your home/ charging outlet*

Meter *measures electricity consumed*

Process Graph

Dependencies

- Details of the agreement between Ford and Utilities:
  - How much is Ford paid?
  - Incentive structure- currently utility driven
- Data transfer from utilities to Ford:
  - Proposed features in the UI use some data by utilities
- Authentication of the user
- Turning on/off charging: The Open Vehicle Grid Integration Program (OVGIP) API available to OEMs

Dependencies → Risks

- Details of the agreement between Ford and Utilities:
  - How much is Ford paid?
  - Incentive structure – currently utility driven

Dependencies

- Redeeming the mile rewards:
  - Leverage the current Electrify America partnership
- Compatibility with chargers → doesn't need to be Ford Chargers
- Edge cases in SmartGrid system
- Integration with different charge management systems
- The app!

Feasible?

Absolutely!

Need to be cognizant of risks and dependencies

Section 5:
Product Development Plan

Product Development Plan

Task: add new functionality to the FordPass App

+

EVolve

Product Development Plan

Technology needed to develop product:

- **Front-end**: Interface that with end-users interact
- **Back-end**: Tools and software needed to create the underlying processing on the server
- **Development**: Platform with the necessary libraries and interfaces to build the app
- **Supporting**: Tools to improve the security, flexibility, and performance of the app

Product Development Plan

Team Size and Roles

- **2** Frontend App Developers
- **2** Backend Developers
- **1** UI Design Expert
- **1** Product Manager
- **2** Utility Operations

Product Development Plan

Timeline

- Projecting a **9** month development timeline

Cost

- **2** Frontend App Developers: $130k * 2 * 0.75 = $195k
- **2** Backend Developers: $130k * 2 * 0.75 = $195k
- **1** UI Design Expert: $130k * 1 * 0.75 = $97.5k
- **1** Product Manager: $130k * 1 * 0.75 = $97.5k
- **2** Utility Operations: $85k * 2 * 0.75 = $120k

Total Cost: $712.5k

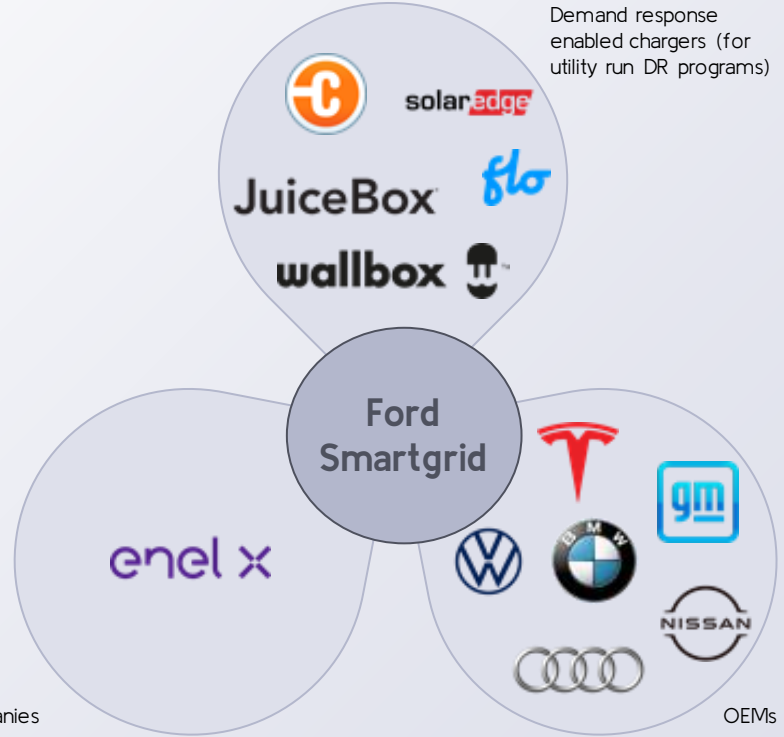
Industry Trends

Current players:

- Demand Response Companies
- Charger Companies

Emerging Players:

- OEMS



Competition or Coalition?

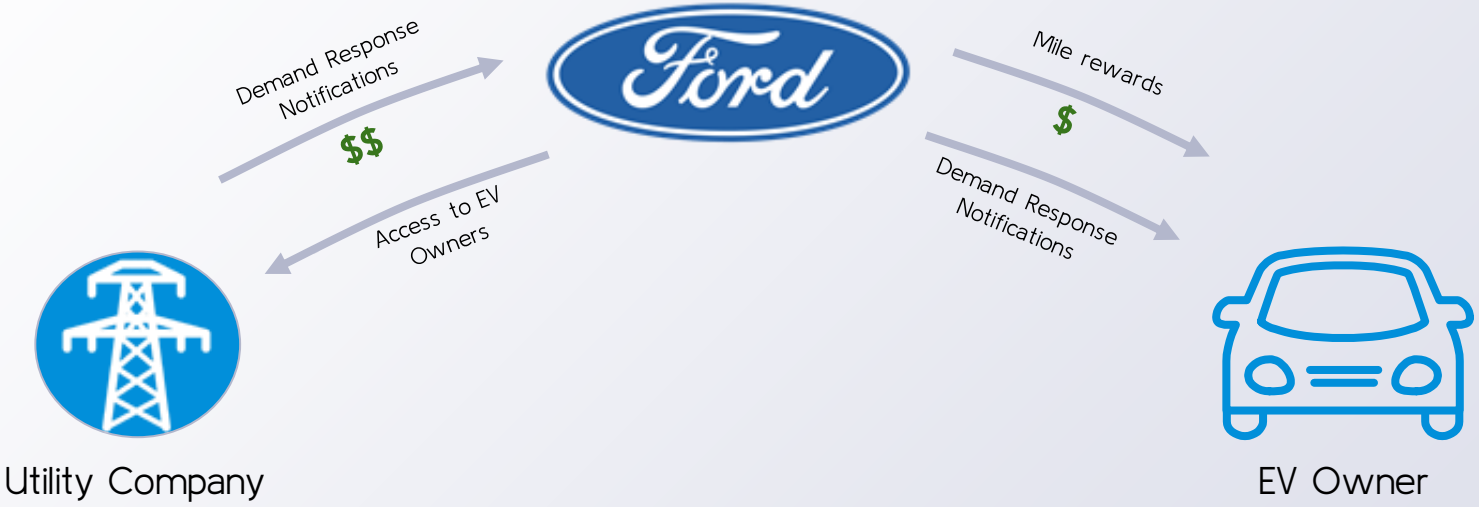
- Other OEMs pursuing this space → validation!
- For the program to succeed, all OEMs need to come together!

Section 6: **Business Model**

Project EVolve Value Proposition

Offer users a hands-off and easy-to-understand experience in which they can earn rewards for helping the grid.

Business Model



Business Model

Resources

- **Development team** to create and manage the app
- **Marketing team** to increase user base
- **Operations team** to maintain and develop relationships with new local utilities

Processes

- Monetary processes can be automated via the app
- Sign up will require validation from both Ford and the Utility

Partners

- Utilities are eager to work with OEMS for demand response
- Utilities and Ford must reach alignment on incentives

Revenue Estimate (2025)

Key Assumptions:

- **1,223,000** Ford EVs
- **20%** opt-in rate to SmartGrid
- **10%** overlap in charging and demand response events
- **13,500** miles driven per user annually
- **$6320** / MW

Total Revenue: $13,200,000
Total Revenue per User: $77

Calculations in Table 1 in appendix

Total Costs (2025)

Key Assumptions:

- **20%** opt-in rate to SmartGrid
- **25%** of incentive cost paid by Ford
- **80%** of annual revenue per user is returned as incentive
- **2%** of revenue spent on marketing
- Team of **8** working on SmartGrid

Total Cost: $13,800,000

Calculations in Table 2 in appendix

CAC (2025)

Key Assumptions:

- **445,000** Ford EVs sold
- **20%** opt-in rate to SmartGrid
- **$100** up-front incentive to enroll
- **25%** of incentive cost paid by Ford
- **2%** of revenue spent on marketing

CAC: $32

Calculations in Table 3 in appendix

LTV (2025)

Key Assumptions:

- **80%** of annual revenue per user is returned as incentive
- **70%** retention rate
- **10%** overlap in charging and demand response events
- **13,500** miles driven per user annually
- **$6320** / MW

LTV: $51

Calculations in Table 4 in appendix

Profitability (2025)

Revenue: 13.2 million

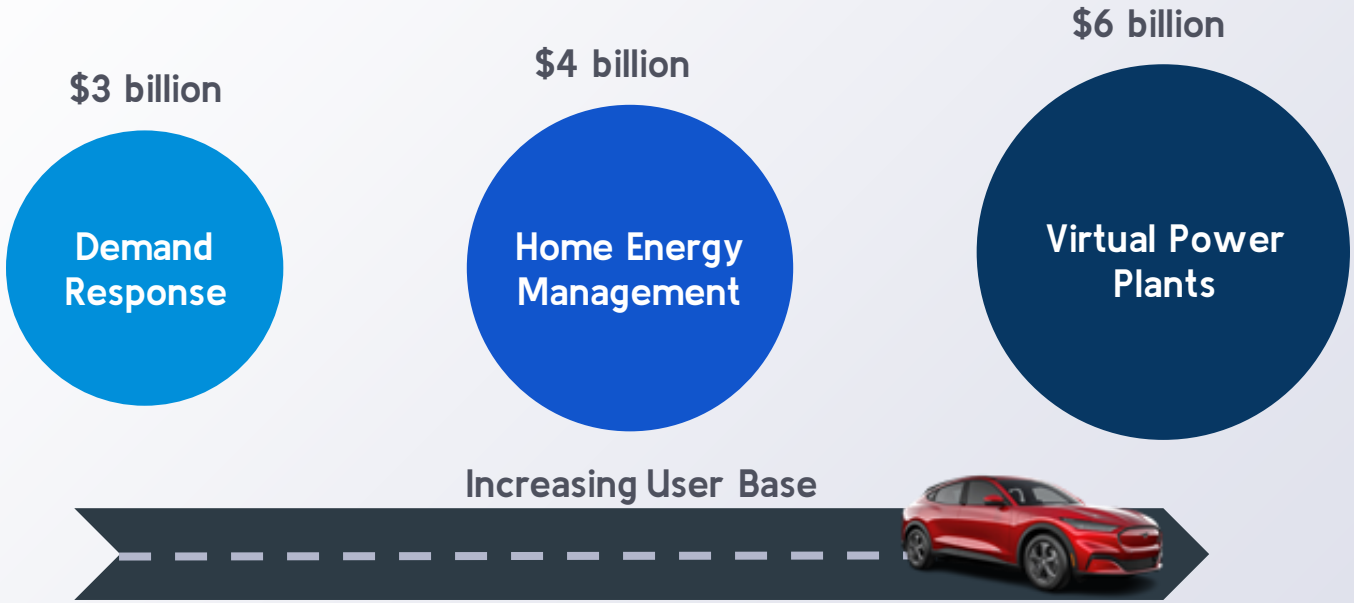
Cost: 13.8 million

Profit: -0.6 million

Profit Margin: -4%

LTV / CAC: 51 / 32 = 1.5x

First Step into New Energy Markets



The digital transformation of the auto industry now enables us to leverage our strong foundation, *add new capabilities, deepen loyalty with our customers and scale our growth*.

– Jim Farley, President and CEO

Virtual Power Plant

VPP Revenue Estimate (2025)

Key Assumptions:

- **1,223,000** Ford EVs
- **20%** opt-in rate to SmartGrid
- Battery size of **0.08** MWh
- **$50** MWh
- Average charge of **80%**
- Charge reserve of **20%**
- **75** VPP events annually

Total Revenue: $30,780,000
Total Revenue per User: $180

Calculations in Table 5 in appendix

VPP Total Additional Costs (2025)

Key Assumptions:

- **80%** of annual revenue per user is returned as incentive
- **2%** of revenue spent on marketing

Total Cost: $25,000,000

Calculations in Table 6 in appendix

DR & VPP CAC (2025)

Key Assumptions:

- **445,000** Ford EVs sold
- **20%** opt-in rate to SmartGrid
- **$100** up-front incentive to enroll
- **25%** of incentive cost paid by Ford
- **2%** of revenue spent on marketing

CAC: $38

Calculations in Table 7 in appendix

DR & VPP LTV (2025)

Key Assumptions:

- **80%** of annual revenue per user is returned as incentive
- **70%** retention rate
- Battery size of **0.08** MWh
- **$50** MWh
- Average charge of **80%**
- Charge reserve of **20%**
- **75** VPP events annually
- Assumptions from DR LTV

LTV: $171

Calculations in Table 8 in appendix

DR & VPP Profitability (2025)

Revenue: 43.9 million

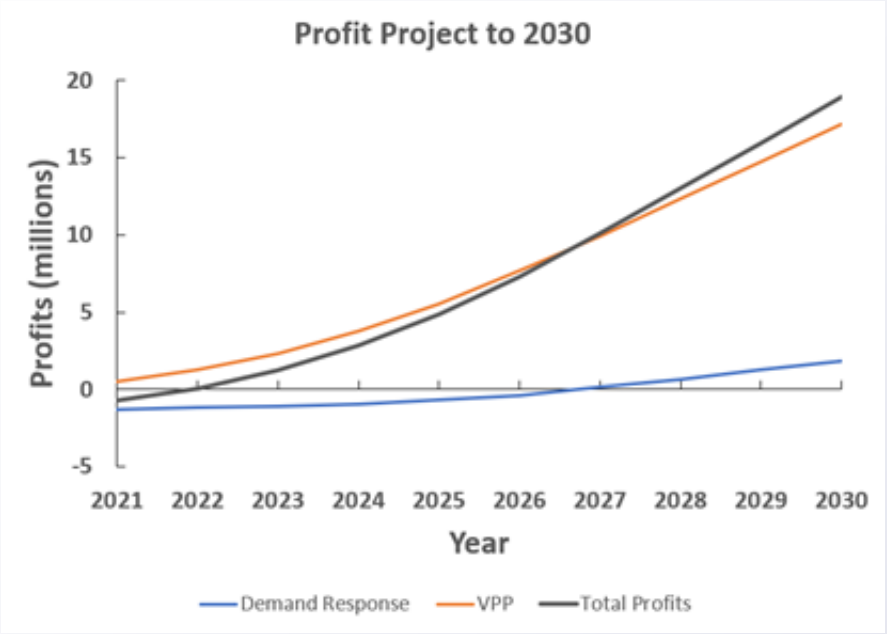
Cost: 38.8 million

Profit: 5.1 million

Profit Margin: 12%

LTV / CAC: 171 / 38 = 4.5x

Profit Projections



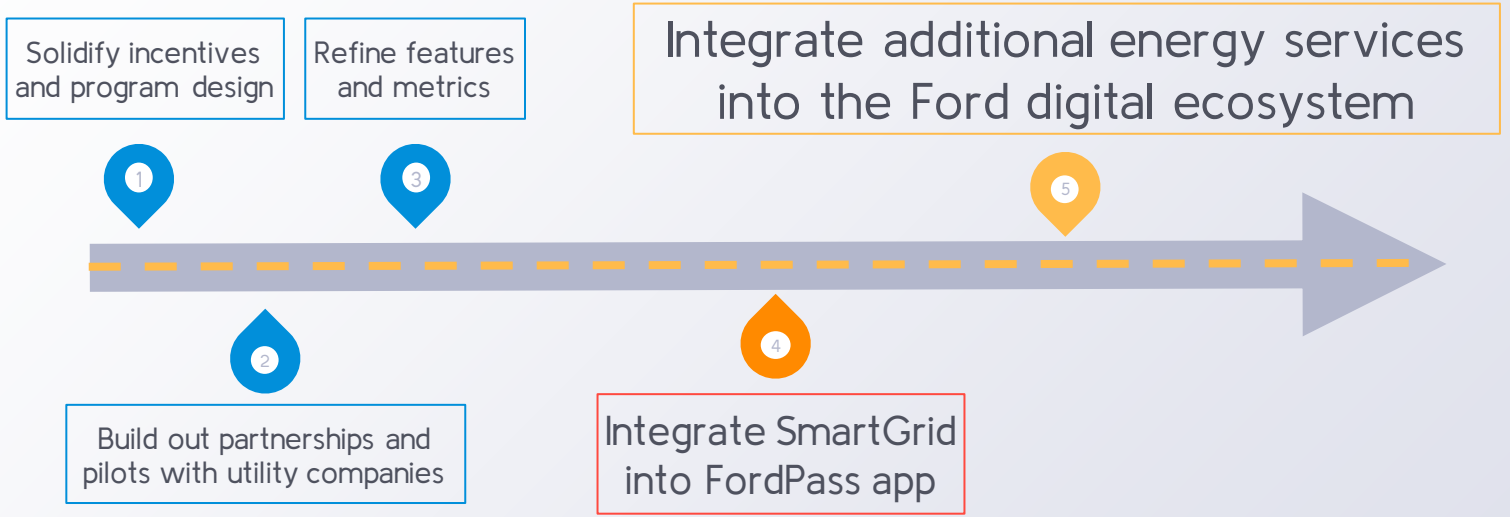
- Demand response not profitable until 2027
- Project **17 million in profit** by 2030 for demand response and VPP combined

Section 7: **Moving Forward**

Pilot App Recommendation

- Work with 1 utility already partnered with SmartGrid (such as DTE Energy) for initial integration
- Roll out FordPass+SmartGrid app to select users
- Solidify incentives design
- Over several months, study users' interaction with the app and get their feedback

Road Map of Next Steps



Recap

- EV energy services is a **promising & profitable** industry
- With an effective mobile app experience, the SmartGrid demand response program will generate **users & profit** for Ford
- Investing in this program is an **investment in Ford's digital ecosystem**

A Unique Alignment of Motivations

Ford, utility companies, EV owners, and the planet all win from this program.

This Is An Awesome Opportunity For Ford

- Ford has the **potential** to make **meaningful impact**
  - Ford can **bridge the stakeholders** into a more integrated ecosystem
  - Ford can make **impact** in the advancement of grid balancing
  - Ford can **lead the charge** in EV grid services
- Ford must create a top-notch **user experience**
  - Boost Ford **customer loyalty** + get **closer** to customers
  - Create a network of **engaged participants** in Ford's programs

A digital ecosystem and resulting network effects will create a *first-mover advantage and stickiness for Ford for years to come.*

– Hau Thai-Tang, Chief Product Platform & Operations Officer

Q&A

Appendix

Contents:

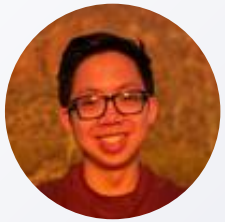
1. Our contact information
2. Team journal
3. Business model canvas
4. Financials

Contact Us!

Zac Ettensohn
MS MS&E
zte@stanford.edu

Aniket Bhátia
MS EE
aniket21@stanford.edu

Pranjal Agarwal
MS MATSCI
pranjal9@stanford.edu



Philip Phan
MS AeroAstro
ptphan@stanford.edu

Erika Francks
MS Product Design
efrancks@stanford.edu

Claire Rosenfeld
BS CS + MS MS&E
clairero@stanford.edu

Business Model Canvas

Key Partners

- Will need to partner with utilities across the country to establish demand response programs
- Partnering with other OEMs can also create collective agreements to hasten demand response adoption

Key Activities

- Facilitating the rewards program for participation
- Remotely shift EV charging
- Aggregating & presenting SmartGrid data to users

Key Resources

- Leveraging Ford's size in the automotive industry to create new partnership with utilities and other OEMs

Value Propositions

- Maintain the health of the grid with the increased adoption of EV's
- Allow Ford to enter new markets in the energy management sector
- Ultimately create an ecosystem that provides more value to the end user

Customer Relationships

- Provide more value for being part of the Ford ecosystem when owning an EV
- Help end users better manage their power usage at home and with their vehicle

Channels

- Opt-in notifications using the current FordPass app
- Notification from local utilities companies to users

Customer Segments

- Home EV owners
- Fleet Vehicle Managers
- Utility companies

Cost Structure

- 80% revenue goes to EV owners, 20% revenue to Ford (typical market split)
- Ford pays 25% of upfront incentive cost during opt-in

Revenue Streams

- Revenue is ultimately provided by utilities for providing access to demand response EV user base
- Ford is directly compensated for the amount of electricity they decrease in supply during demand response event

Table 1 - Demand Response Revenue Estimate (2025)

Year	EV Cars	Opt in Rate	Overlap Percent	Miles Driven Per year	MWh Per Mile	Total MWh	MW per event	Cost for MW	Yearly Added Revenue	Yearly Revenue	Users to Date
2021	81,359	0.2	0.1	13,500	0.000678	14,894	199	$6,320	$1,255,031	$1,255,031	16,272
2022	136,753	0.2	0.1	13,500	0.000678	25,034	334	$6,320	$2,109,525	$2,988,047	38,741
2023	225,755	0.2	0.1	13,500	0.000678	41,327	551	$6,320	$3,482,462	$5,574,095	72,270
2024	334,124	0.2	0.1	13,500	0.000678	61,165	816	$6,320	$5,154,148	$9,056,015	117,413
2025	445,726	0.2	0.1	13,500	0.000678	81,595	1,088	$6,320	$6,875,704	$13,214,914	171,335

Table 2 – Demand Response Total Costs (2025)

Total Users	171,000
Number of Ford EVs	445,726
Participation Rate	0.2
Number of Participants	89,145
Incentive Cost	$100
Incentive Expenses	$8,914,519
Percent of Incentives Paid by Ford	0.25
New User Incentive Costs	$2,228,630
Accumulated Incentive Costs	$10,533,600
Marketing Costs	$434,000
Developer Costs	$520,000
Utility Ops Costs	$170,000
Total Costs	$13,886,230

Table 3 – Demand Response CAC (2025)

Incentive Costs	
Total Fords Sold in US	2,653,131
Percent EVs	0.168
Number of Ford EVs	445725.929
Participation Rate	0.2
Number of Participants	89145.18581
Incentive Cost	$100
Incentive Expenses	$8,914,519
Percent Absorbed as Cost	0.25
Incentive Total Expenses	$2,228,630

Utility Ops Costs	
Utility Ops Employees	2
Utility Ops Salaries	$85,000
Utility Ops Total Expenses	$170,000

Marketing Costs	
Marketing Employees	2
Projected Smart Grid Revenue	13,200,000
Percent Revenue on Marketing	0.02
Marketing Campaign Spend	$264,000
Marketing Salaries	$85,000
Marketing Total Expenses	$434,000
CAC	$31.78

Table 4 – Demand Response LTV (2025)

Retention Rate	70.00%
Annual Revenue per User	$77.13
Percent Revenue Paid as Incentive	0.2
Revenue per User Less Incentive	$15.43
LTV	$51.42

Table 5 - Virtual Power Plant Revenue Estimate (2025)

Battery Size MWh		0.08
Charge Level		80.00%
Charge Reserve		20.00%
Cost per MWh		$50.00
Events per Year		75
Total Users		171,000
VPP Annual Revenue per User		$180.00
VPP Annual Revenue		$30,780,000.00

Table 6 - Virtual Power Plant Total Additional Costs (2025)

Accumulated Incentive Costs	$24,624,000
Marketing Costs	$615,600
Total Costs	$25,239,600

Table 7 - Demand Response & Virtual Power Plant CAC (2025)

Incentive Costs	
Total Fords Sold in US	2,653,131
Percent EVs	0.168
Number of Ford EVs	445725
Participation Rate	0.2
Number of Participants	89145
Incentive Cost	$100
Incentive Expenses	$8,914,519
Percent Absorbed as Cost	0.25
Incentive Total Expenses	$2,228,630
Utility Ops Costs	
Utility Ops Employees	2
Utility Ops Salaries	$85,000
Utility Ops Total Expenses	$170,000

Marketing Costs	
Marketing Employees	2
Projected Smart Grid Revenue	43,900,000
Percent Revenue on Marketing	0.02
Marketing Campaign Spend	$878,000
Marketing Salaries	$85,000
Marketing Total Expenses	$1,048,000
CAC	$38.66

Table 8 - Demand Response & Virtual Power Plant LTV (2025)

Retention Rate	70%
Percent Revenue Lost As Incentive	0.8
DR Annual Revenue per User	$77
DR Annual Revenue per User Less Incentive	$15
VPP Annual Revenue per User	$180
VPP Annual Revenue per User Less Incentive	$36
Total Annual Revenue Less Incentive	$51.40
LTV	$171.33