Low Carbon Tech Narratives

https://osf.io/gt46s/

Technology Survey

Definitions

To ensure clarity for the purposes of the survey please utilize the below definitions of electric vehicle and heat pump when answering survey questions.

> **Electric Vehicles** have an electric motor instead of a gasoline combustion engine. They use a large battery pack to store electricity and power the electric motor. Hybrid vehicles are not considered electric vehicles for the purposes of this survey.
>
> **Heat Pumps** are an electric alternative to furnaces and air conditioners. Heat pumps transfer heat rather than generating heat by burning fuel. During the winter, heat pumps warm your home by moving heat from outdoors to indoors. During the summer, heat pumps cool by moving heat from your house outdoors.

EV and HP Open ended questions

How familiar are you with electric vehicles? * not at all familiar * not very familiar * somewhat familiar * familiar * very familiar

Do you own or use an electric vehicle? * Yes * No

How familiar are you with heat pumps? * not at all familiar * not very familiar * somewhat familiar * familiar * very familiar

Do you own or use a heat pump? * Yes * No

Are you seriously considering buying or leasing an electric vehicle in the next three years? * Yes * No

What is the biggest barrier preventing you from buying or leasing an electric vehicle? [Text Input Box]

What is the main reason why you are interested in buying or leasing an electric vehicle? [Text Input Box]

(Question shown only if "Yes" to "Do you own or use an electric vehicle?") **What is the main reason why you bought or leased your electric vehicle?** [Text Input Box]

HP Open ended questions

Are you seriously considering buying or leasing a heat pump in the next three years? * Yes * No

What is the biggest barrier preventing you from buying or leasing a heat pump? [Text Input Box]

What is the main reason why you are interested in buying or leasing a heat pump? [Text Input Box]

(Question shown only if "Yes" to "Do you own or use a heat pump?") **What is the main reason why you bought or leased your heat pump?** [Text Input Box]

Instructions Entire

We ask that you carefully read each of the statements in the next pages and assess whether the statement is True or False. Please note that some statements are true and some are false.

A **true** response indicates that the claims made in the statement are true.

A **false** response indicates that the claims made in the statement are false.

For each statement, we will then ask how confident you are in your answer on a slider scale which ranges from not at all confident to completely confident.

While answering the following questions, please think about the United States specifically.

HP Block Begins Recall

> Recall that **heat pumps** are an electric alternative to furnaces and air conditioners. Heat pumps transfer heat rather than generating heat by burning fuel. During the winter, heat pumps warm your home by moving heat from outdoors to indoors. During the summer, heat pumps cool by moving heat from your house outdoors.

HP_System

Heat pumps can both heat and cool my home. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Practical

Widespread adoption of heat pumps is practical today because we have enough electricity across all states to keep them powered. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Climate Change

Heat pumps are better for the climate than traditional furnaces because they emit fewer greeenhouse gases when in use. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Incentives

With all the federal and state purchase incentives available for heat pumps, most owners typically spend less than $5,000 on purchase and installation. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP List Price

All central heat pump models sold in the United States costs more than $10,000 to buy and install. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP maintenance

Furnace and air-conditioner system require more frequent and extensive maintenance than heat pumps. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP cold conditions

Heat pumps do not require a backup heating system in subzero temperatures (below 0° Fahrenheit). * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP infrastructure integration

Heat pumps cannot be integrated into existing systems and ductwork, making them incompatible with most homes. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Dealer

Contractors are more likely to sell me a natural gas furnace than a heat pump system. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP efficiency

Heat pumps use electricity to transfer heat which is more efficient than burning fossil fuels. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Overseas

Most of heat pump manufacturing takes place overseas. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP refrigerants

Leaking refrigerants from heat pumps contribute more to climate change than fossil fuels used in furnaces. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Workers

The United States has more than enough trained workers to install heat pumps nationwide. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Fuel

Heat pumps end up being more expensive to run because electricity is more expensive than natural gas. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP lifespan

Heat pumps do not last as long as a furnace system. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP supply chain delays

People have to wait a long time to get parts to fix their heat pumps. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

HP Installation

All heat pumps require the installation of a new and expensive electrical panel. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Definition Recall

Recall that **electric vehicles** have an electric motor instead of a gasoline combustion engine. They use a large battery pack to store electricity and power the electric motor. Hybrid vehicles are not considered electric vehicles for the purposes of this survey.

EV Electrical practicality

Widespread adoption of electric vehicles is practical today because we have enough electricity across all states to keep them charged. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Time

Even with the fastest charging technology, it takes several hours to charge an electric vehicle. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Public

Four of every five electric vehicle owners are not able charge their cars when visiting a public charging station. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Climate

Electric vehicles have a smaller carbon footprint than gasoline cars, even when accounting for the electricity used for charging. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Incentive

With all of the federal and state purchase incentives available for electric vehicles, most consumers spend less on an electric vehicle than a comparable gasoline vehicle. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Maintain

Gas-powered vehicles require more frequent and expensive maintenance than electric vehicles. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Cold

An electric vehicle can drive as far as a gasoline car in freezing conditions. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Fuel

Charging an electric vehicle from your home is equivalent in cost to purchasing gasoline for under $1.20 per gallon * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Charging

A significant barrier to electric vehicle adoption is lack of public charging stations. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Range

The driving range of an average electric vehicle is enough to meet the average long-distance road trip needs of typical Americans. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Efficiency

Electric vehicles use electricity more efficiently than gas powered cars use gasoline. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Dealer

Dealers are more likely to sell me a gas-powered vehicle than an electric vehicle. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Fires

Electric vehicles are more likely to catch fire than gasoline vehicles. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Battery Recycling

It is economically viable to recycle the whole battery of an electric vehicle. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Overseas

Globally, China makes most of the parts used in electric vehicles. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV List Price 40k

All new electric vehicle models sold in the United States cost more than $40,000. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

EV Mining

Electric vehicles are bad for the environment because of the mining practices required to build them. * True * False

How confident are you in your answer? *(Slider scale: Not confident <—> Somewhat confident <—> Completely confident)*

Manipulation

How did you feel about the kinds of statements you read about electric vehicles and heat pumps? * They were primarily positive * Some were positive and some were negative * They were primarily negative

---

Captcha

Please complete: [ ] I'm not a robot reCAPTCHA (Privacy - Terms)

Attitudes

Should the US transition away from gasoline vehicles towards electric vehicles? * Strongly Agree * Agree * Neutral * Disagree * Strongly Disagree

Should the US transition away from furnaces and air conditioners towards electric heat pumps? * Strongly Agree * Agree * Neutral * Disagree * Strongly Disagree

---

EV Exposure

Have you ever driven an electric vehicle? * Yes * No

Have you ever charged an electric vehicle? * Yes * No

Have you seen an electric vehicle in person or in an advertisement? * Yes * No

Do you know of any friends or family members who have purchased an electric vehicle? * Yes * No

---

HP exposure

Have you seen a heat pump in person or in an advertisement? * Yes * No

Do you know of any friends or family members who have purchased a heat pump? * Yes * No

---

Proportions

What percentage of homes in the U.S. have heat pumps? [Text Input Box - Number]

What percentage of people in the U.S. have an electric vehicle? [Text Input Box - Number]

Do you pay your utility bills/ownership

Do you rent or own your home? * Rent * Own

Do you pay your own electric utility bill? * Yes * No * Does not apply

Do you pay your own gas utility bill? * Yes * No * Does not apply

---

Community

Has anyone in your community ever talked to you about a heat pump? * Yes * No

Has anyone in your community ever talked to you about an electric vehicle? * Yes * No

---

Climate Change Perceptions

Do you think that climate change is happening? * Yes, definitely * Yes, probably * No, probably not * No, definitely not

How important is the issue of climate change to you personally? * Very important * Somewhat important * Not too important * Not important at all

---

Demographics

How many hours a day do you spend on social media (this includes YouTube, Facebook, TikTok, Instagram etc.)? *(Slider or input for number 0-24)* Number of hours: [____]

Which best describes your political orientation? * Very conservative * Conservative * Somewhat conservative * Moderate * Somewhat liberal * Liberal * Very liberal

What is your age? [Text Input Box - Number]

What is your gender? * Man * Woman * Non-binary * Other [Text Input Box] * Prefer not to answer

What is your racial identity? * American Indian or Alaskan Native * Asian * Black or African American * Hispanic or Latino * Native Hawaiian or Other Pacific Islander * White * Middle Eastern or Arab * Other [Text Input Box] * Prefer not to answer

What is the highest level of education you have attained? * Some schooling, but no diploma or degree * High school diploma or GED * Some college * College degree * Some graduate school * Graduate degree

During 2023, what was your yearly household income before tax? Your best estimate Is fine. * None * less than $20,000 * $20,000 - $40,000 * $40,000 - $80,000 * $80,000 - $120,000 * $120,000 - $200,000 * $200,000 - $300,000 * More than $300,000

What is your zip code? [Text Input Box]

Closing Thoughts

Do you have any additional thoughts or comments about the survey that you would like to share with us? [Large Text Input Box]

End of survey

Some of the narratives you read were true and some were false. We recommend you to do your own research to find out what is true about both these technologies. Below we have provided several links about electric vehicles and heat pumps to help get you started:

Electric vehicles https://www.epa.gov/greenvehicles/electric-vehicle-myths https://homes.rewiringamerica.org/projects/driving-homeowner https://www.jdpower.com/business/releases/2023-us-electric-vehicle-consideration-evc-study

Heat pumps https://www.epa.gov/burnwise/heat-pumps https://www.rewiringamerica.org/circuit-breakers-heat-pumps

Thank you for completing the survey.

Please continue to the next screen to be automatically redirected to Prolific.

(Powered by Qualtrics)