SentimentSoldiers
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Technical Report

1 Motivation

Public opinion toward nuclear energy has become increasingly important as the United States faces rising electricity demand, pressure to reduce carbon emissions, and renewed policy interest in reliable low carbon power sources. Nuclear energy is especially relevant because it can produce large amounts of electricity with very low direct carbon emissions, while also raising public concerns about safety, waste storage, cost, and local siting.

This issue has become even more relevant as energy demand continues to rise. In particular, the rapid growth of artificial intelligence and the data centers needed to support it has increased interest in reliable, large scale electricity generation. At the same time, countries around the world are pushing to decarbonize their energy infrastructure. Because nuclear energy offers consistent electricity generation without the direct carbon emissions associated with fossil fuels, it has become a major topic of interest in energy policy, public opinion, and infrastructure planning.

Our group's central research question is:

How have energy policy preferences, public sentiment toward nuclear power, and nuclear electricity generation influenced one another over time in the United States, and do these relationships differ across political, educational, and generational groups?

More specifically, we examined whether public support for nuclear energy has changed over time, whether those changes correspond with national nuclear electricity production trends, and whether demographic factors such as political identity, age, and education help predict whether a person favors or opposes nuclear energy.

After conducting preliminary analysis, we developed three additional research questions:

1. **To what extent do the primary predictors of nuclear favorability shift across distinct chronological periods, and how does their relative influence evolve over time?**
2. **Is there a model that presents clear advantages when predicting nuclear favorability, and if so, what kind of model?**
3. **What variables are the strongest predictors of nuclear energy favoritism, and can those predictors be used to forecast future nuclear generation sentiment?**

This topic is worth exploring because nuclear energy has reentered national policy conversations. Gallup reported in April 2025 that 61 percent of Americans favored using nuclear energy as one way to provide electricity in the United States, which was near the highest level Gallup has recorded for this

question since 1994. Pew Research Center similarly found that support for expanding nuclear power has increased in both major political coalitions, with about six in ten U.S. adults favoring more nuclear power plants in 2025.

The stakeholders for this project include the Department of Energy, the Nuclear Regulatory Commission, Congress and state legislators, electric utilities, transmission organizations, energy consumers, environmental organizations, nuclear energy and supply chain businesses, local communities, energy investors, infrastructure funds, political parties, public opinion researchers, and academic researchers. Understanding the relationship between public sentiment and nuclear energy production can help these stakeholders communicate more effectively, anticipate public resistance, and evaluate whether support for nuclear energy is broad based or concentrated among specific political, educational, or generational groups.

2 Bibliography Annotation

U.S. Department of Energy. “U.S. Department of Energy Awards $2.7 Billion to Restore American Uranium Enrichment.” 2024.

The U.S. Department of Energy announced a $2.7 billion investment to strengthen domestic uranium enrichment over the next ten years. This source is important because uranium enrichment is a key part of the nuclear fuel supply chain. The article frames nuclear energy as not only an electricity generation issue, but also a national security, energy independence, and supply chain issue. For our project, this source helped explain why nuclear energy has gained renewed attention in recent years and why federal investment may influence future nuclear development.

However, the source does not provide a clear quantitative estimate of how this investment will directly affect nuclear electricity generation. While it shows that the federal government is prioritizing nuclear infrastructure, it does not fully explain how quickly this investment will translate into increased nuclear capacity or production.

SAGE Journals. “Public Opinion and Nuclear Energy.”

The SAGE article focuses on the role of public opinion in nuclear energy adoption. The article emphasizes that nuclear energy requires public trust, informed citizens, and transparent government communication because nuclear accidents can have severe social, environmental, and economic consequences. A major conclusion from this article is that trust and risk perception are among the strongest predictors of public attitudes toward nuclear power.

This source connects closely to our project because our research focuses on public sentiment toward nuclear energy. It helped us understand that support for nuclear power is not only based on technical facts about energy generation. Instead, public acceptance is shaped by how people perceive risk, whether they trust institutions, and how much they know about nuclear energy.

One limitation is that the article discusses public opinion broadly and does not fully answer how these attitudes have changed specifically in the United States over time. This gap helped motivate our use of Gallup data to examine U.S. nuclear sentiment by year and demographic group.

Organisation for Economic Co-operation and Development Nuclear Energy Agency. "Public Attitudes to Nuclear Power."

The OECD Nuclear Energy Agency discusses public attitudes toward nuclear power across different countries. One of the main conclusions is that people living in countries that already use nuclear power tend to have more favorable attitudes toward it. The report also suggests that people who are more informed about nuclear energy are generally more supportive of it.

This source was useful because it gave our group a broader international context. It showed that public support for nuclear energy may depend on familiarity, national energy policy, and public knowledge. This connects to our project because we are interested in whether public sentiment toward nuclear energy changes over time and whether certain groups are more likely to support nuclear power.

The main limitation is that the OECD report is global rather than U.S. specific. While the international patterns were useful, our project required data focused on the United States. This is why we used U.S. based public opinion data and compared it with U.S. nuclear energy generation data.

The White House. "President Trump Signs Technology Prosperity Deal with the United Kingdom." 2025.

The White House announcement describes a technology agreement between the United States and the United Kingdom. The agreement includes nuclear energy cooperation, with a focus on aligning regulations, strengthening nuclear fuel supply chains, and reducing dependence on foreign nuclear fuel sources. This source helped us understand nuclear energy as part of a larger international technology and security strategy.

For our project, this article was useful because it showed how nuclear energy is being treated as a priority in current policy discussions. It also helped connect public sentiment to real policy decisions. If governments are investing in nuclear technology and international nuclear cooperation, public acceptance becomes even more important.

A limitation of this source is that it is a government announcement, so it mainly presents the policy in a positive way. It does not deeply address public opinion, environmental risk, or political opposition. This created a need to compare it with sources focused on public attitudes and safety concerns.

Högberg, Lars. "Root Causes and Impacts of Severe Accidents at Large Nuclear Power Plants." PubMed Central.

Lars Högberg's article examines severe nuclear accidents, including Three Mile Island, Chernobyl, and Fukushima. The article explains that nuclear accidents can have major health, environmental, political, and economic consequences. It also discusses how accident prevention depends on strong safety management, regulation, and institutional learning.

This source was important because public concern about nuclear accidents is one of the strongest barriers to nuclear acceptance. Even if nuclear accidents are rare, their consequences can shape public opinion for decades. This connects to our project because shifts in nuclear sentiment may be influenced by how people remember or interpret nuclear accidents.

One unanswered question from this article was how safety management improvements can be measured in a way that directly changes public trust. The article explains why safety culture matters, but it does not fully show how public opinion responds when safety systems improve.

Shifotoka, Monika. International Atomic Energy Agency. "Six Global Trends in Nuclear Power You Should Know."

Monika Shifotoka's article for the International Atomic Energy Agency discusses major global trends in nuclear power. The article explains that more countries are entering the nuclear energy sector, including emerging economies such as Egypt, Bangladesh, and Turkey. It also notes that nuclear technology is being considered for non electric uses, including heating, desalination, hydrogen production, and industrial processes.

This source helped our group understand that nuclear energy is expanding beyond traditional electricity generation. For our project, this broader context was useful because it showed that nuclear energy is increasingly connected to climate goals, energy security, and industrial development.

However, the article leaves several questions unanswered. It does not fully address the economic feasibility of nuclear expansion, the risk of nuclear waste, the possibility of future accidents, or whether public acceptance will keep pace with government and industry goals.

World Nuclear Association. "World Nuclear Outlook."

The World Nuclear Association discusses projected global nuclear capacity through 2050. The report suggests that future nuclear growth is likely to be concentrated in a small number of major economies, including China, France, India, Russia, and the United States. This source was useful because it showed that nuclear energy is expected to remain an important part of future global energy planning.

For our project, this source helped support the idea that nuclear energy is not declining in importance. Instead, many countries are planning for nuclear growth as part of their long term energy strategies. This made our research question more relevant because public support could influence whether these future nuclear goals are politically realistic.

A limitation of this source is that it focuses more on industry projections and capacity targets than on public opinion. It does not fully explain how political polarization, economic risk, or public trust could affect nuclear development.

Overall Comparison of Sources

Together, these sources show that nuclear energy is shaped by both technical and social factors. The DOE, White House, IAEA, and World Nuclear Association sources emphasize investment, energy security, technology development, and future growth. In contrast, the SAGE, OECD, and Högberg sources focus more on public trust, safety, risk perception, and public acceptance.

This comparison helped us identify an important gap. Many policy and industry sources present nuclear energy as necessary for future energy systems, but public opinion research shows that adoption depends heavily on trust, safety concerns, and political attitudes. Our project addresses this gap by studying how U.S. public sentiment toward nuclear energy has changed over time and how that sentiment differs by political, educational, and generational groups.

3 Data Source

Our data collection consists of Gallup Survey Data and Nuclear Generating Statistics. Our Gallup Survey Data contains ~11k individuals' responses to a variety of survey questions. It includes thoughts on nuclear energy (support/disapprove), political stance, age, education level, environmental/economic views, environmental/economic outlook, and religion. Our Nuclear Generating Statistics data contains nuclear generation data from 1971 to 2026. It includes domestic/foreign uranium prices, nuclear generation and the share of total US energy generation coming from nuclear fuel.

Our Survey Data was acquired from Gallup national surveys, an independent polling agency. Gallup is a nationally recognized polling organization that conducts probability-based surveys of the U.S. adult population. Its data are widely used in academic research, media analysis, and public policy evaluation. Our group reached out to a representative at UVA who sourced the data for us. Our Nuclear Generation Data was sourced from a collection of agencies, including the U.S. Energy Information Administration (EIA), the Nuclear Energy Institute (NEI), and the International Energy Agency (IEA). Overall, our group was able to find all of the data we wanted, but most of it was incomplete in some way. Specifically, in some years, the Gallup poll never asked survey participants about their stance on nuclear energy, while the energy agencies we sourced our generation data from declined to report certain statistics during some years due to undisclosed reasons.

The labeled_gpss survey dataset was created from the raw Gallup survey data and cleaned to support clearer analysis of public attitudes toward nuclear energy. Nuclear favorability was converted into a binary variable from 2 variables. One being "nucfav" where respondents who somewhat or strongly supported the use of nuclear energy as one of the ways to provide electricity in the US were coded as 1 and those who somewhat or strongly opposed it were coded as 0. The other being "fav_nuclear" where respondents who favor the expansion of nuclear energy were coded as 1 and who oppose the expansion

were coded as 0. Approximately 200 respondents had 1 “nucfav” and 0 “fav_nuclear” or vice versa; these were dropped and the Nuclear favorability variable was created. Age was grouped into four categories, including 18 to 29, 30 to 44, 45 to 64, and 65 and older, while political affiliation was grouped into Democrat, Republican, and Independent. Labels were also adjusted throughout the dataset to improve clarity and consistency. The dataset_binary_favor dataset was then created by combining the Gallup survey data with nuclear generation data. To do this, the survey data were compiled by year and restructured so that variables represented the proportion of respondents in each category for a given year. These yearly survey measures were then merged with nuclear generating statistics, and the final dataset was trimmed to include data from 2000 through 2025.

4 Data Visualizations

Our exploratory analysis consisted primarily of building visuals to see which of our variables seemed to have an effect on nuclear sentiment. Later stages involved the usage of correlation heatmaps to investigate the correlation of specific levels of explanatory variables.

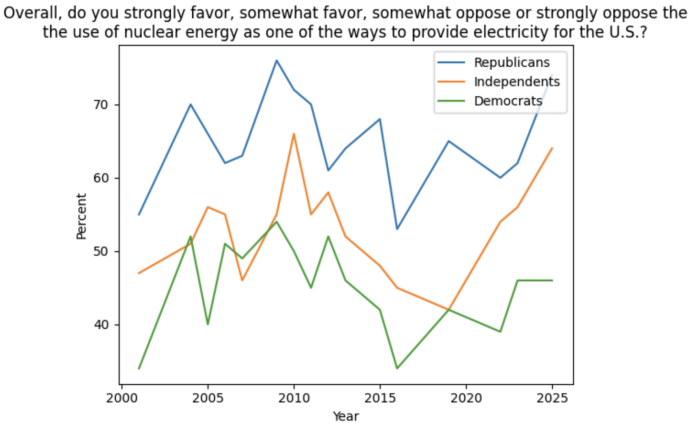

Figure 1

Figure 1 was constructed to analyze how nuclear sentiment is influenced by political affiliation. Overall, there seems to be a relationship between party affiliation and nuclear sentiment, as all three lines on the graph more or less exist on different levels and have little to no overlap. We see that Republicans consistently have had the highest proportion of favorability towards nuclear energy over the years, followed by Independents, and then Democrats with slight crossover around 2005-2010. In regard to our research question, this visual shows the relationship of nuclear favoritism across political groups. We see that favoritism has been on the increase since 2015 for Republicans and Independents, with a less prominent trend from Democrats.

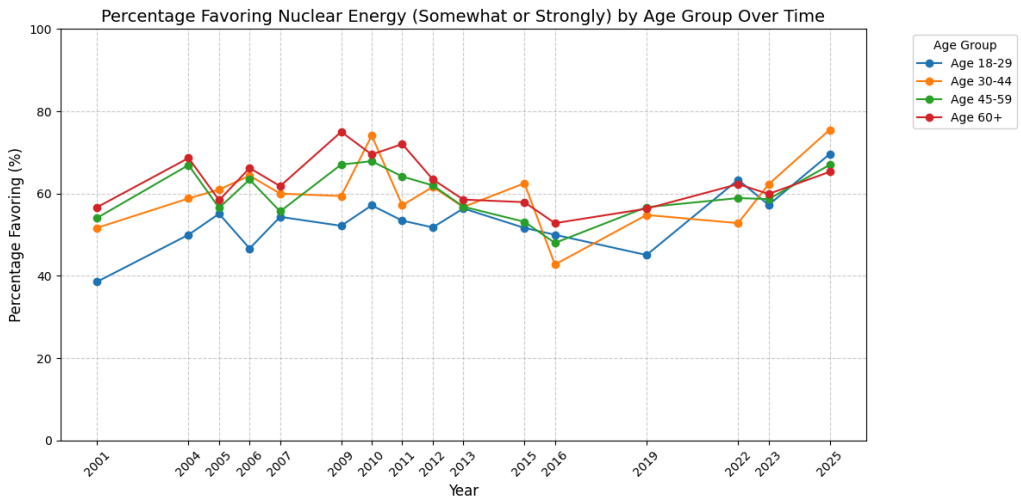

Figure 2

Figure 2 was created to see if age group plays into sentiment on nuclear energy. Based on the visual it can be inferred that age plays some role in nuclear sentiment, though not nearly as much as political affiliation (based on the visual above). In general, the proportion of each age group that favors nuclear energy remains distinct from each other, though they are much closer together than the values for political affiliation. We can note that current favoritism percentages have converged compared to 2001, with 2025 age values all encompassing the 60-80% range. This suggests that preferences across generational groups have converged over time in terms of nuclear energy support.

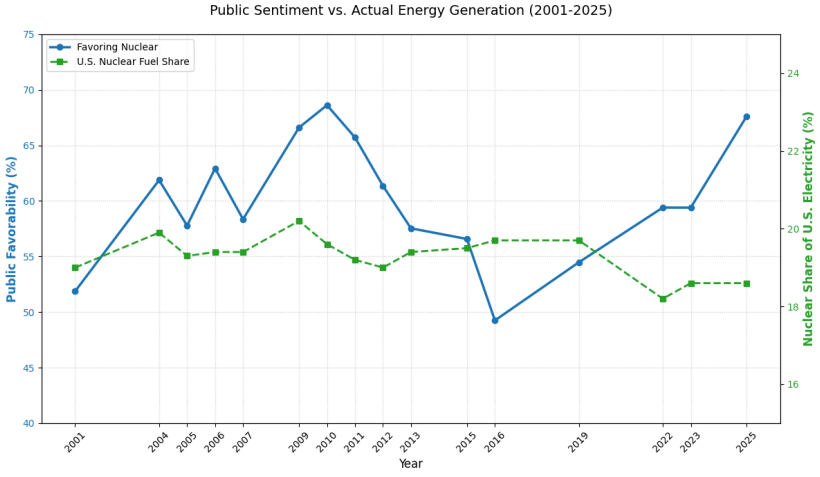

Figure 3

Figure 3 was created to determine if there was any correlation between the volume of nuclear energy generated and the public sentiment on nuclear energy in a given year. The idea behind this visual was to explore if the public became more accepting of nuclear energy as it became more common over

time. We can see that in 2001 about 19 percent of the US's energy came from nuclear fuel, while about 51 percent of survey respondents favored nuclear energy. The main takeaway from this graph is that there seems to be very little correlation between the share of nuclear energy the US produces and how the public feels about nuclear energy, providing meaningful insight into the significance of our nuclear generating statistics. The increase in public favorability since 2016 aligns with our literature regarding nuclear sentiment and overall trust of the public.

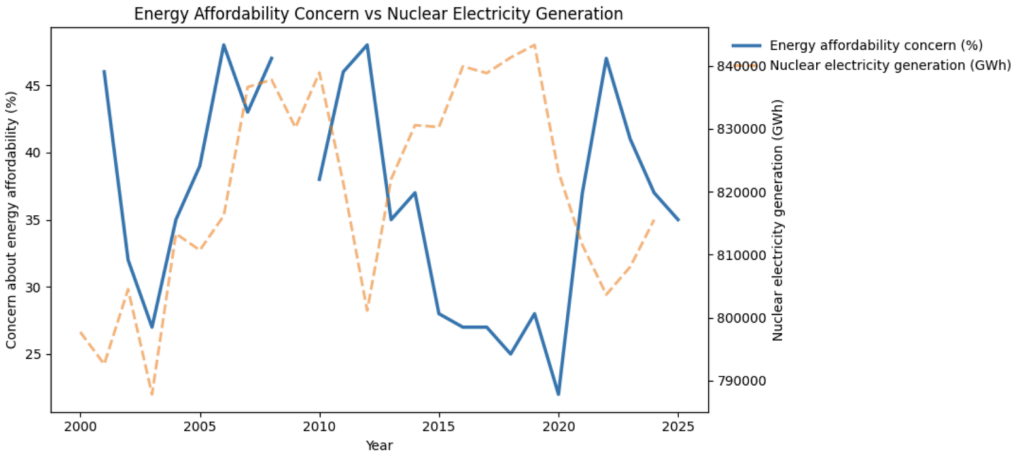

Figure 4

Figure 4 reveals the relationship between the percentage of people who expressed concern about energy affordability and nuclear electricity generation in GWh since 2000. We can see that the trends follow a similar proportional pattern and trend until 2015 where there is a clear inverse relationship that remains prominent now in 2025. We see that energy affordability concerns and nuclear generation were previously directly related and now seem to represent an inverse relationship after 2015. The decrease in concern in recent years aligns with our literature on public sentiment of energy as a whole.

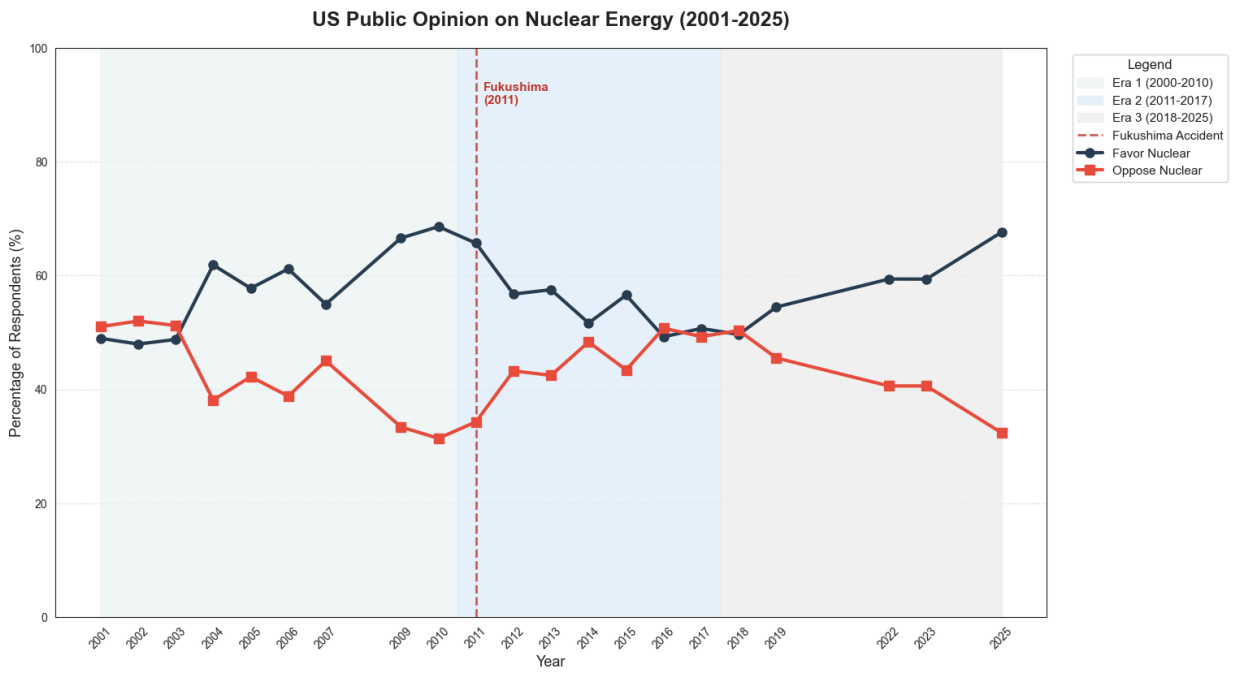

Figure 5

Figure 5 was created to illustrate the results of our time-segmented logistic regression. It shows the relationship of the proportion of survey respondents who favor and oppose nuclear energy over time and segments time periods based on similar data trends. In 2011, the Fukushima nuclear accident occurred and widely impacted public perception on the safety and reliability of nuclear energy. Here, we can clearly analyze overall public support for nuclear over 3 specific time periods: 2000-2010, 2011-2016/2018, and 2016/2018-present.

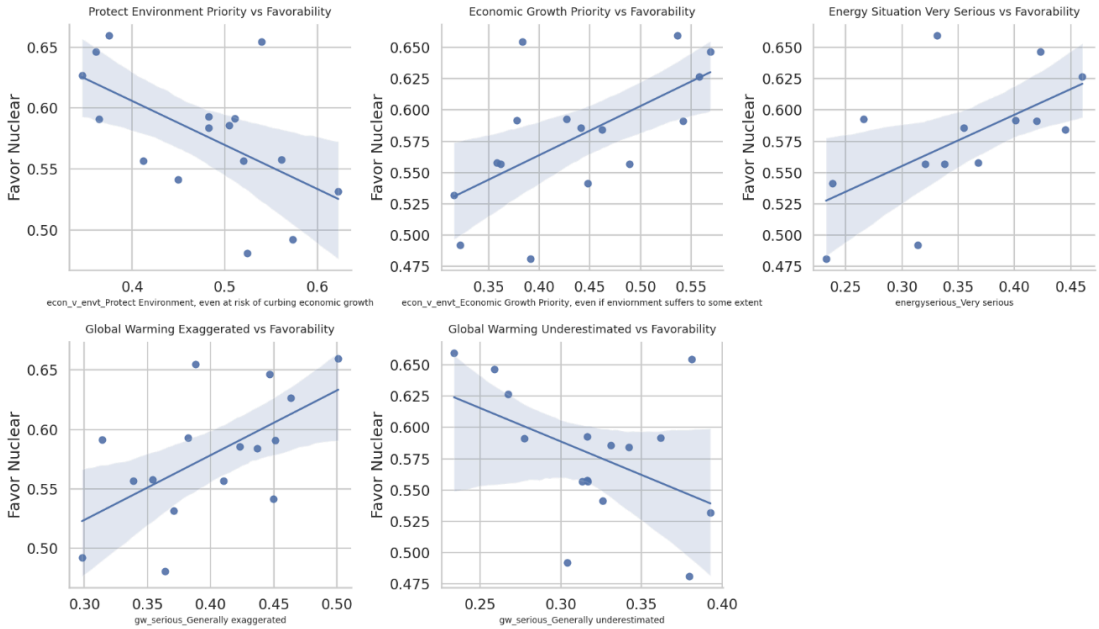

Figure 6

Figure 6 illustrates the relationship between energy and environment attitudes with nuclear favoritism. We see that the strongest positive linear relationships with increased nuclear favorability is by respondents who believe the seriousness of global warming is generally exaggerated, those who prefer economic growth even if the environment suffers, and those who view the energy situation in the US as very serious. The strongest negative linear relationships are among respondents who prefer to protect the environment at the expense of economic growth and believe the seriousness of global warming is generally underestimated.

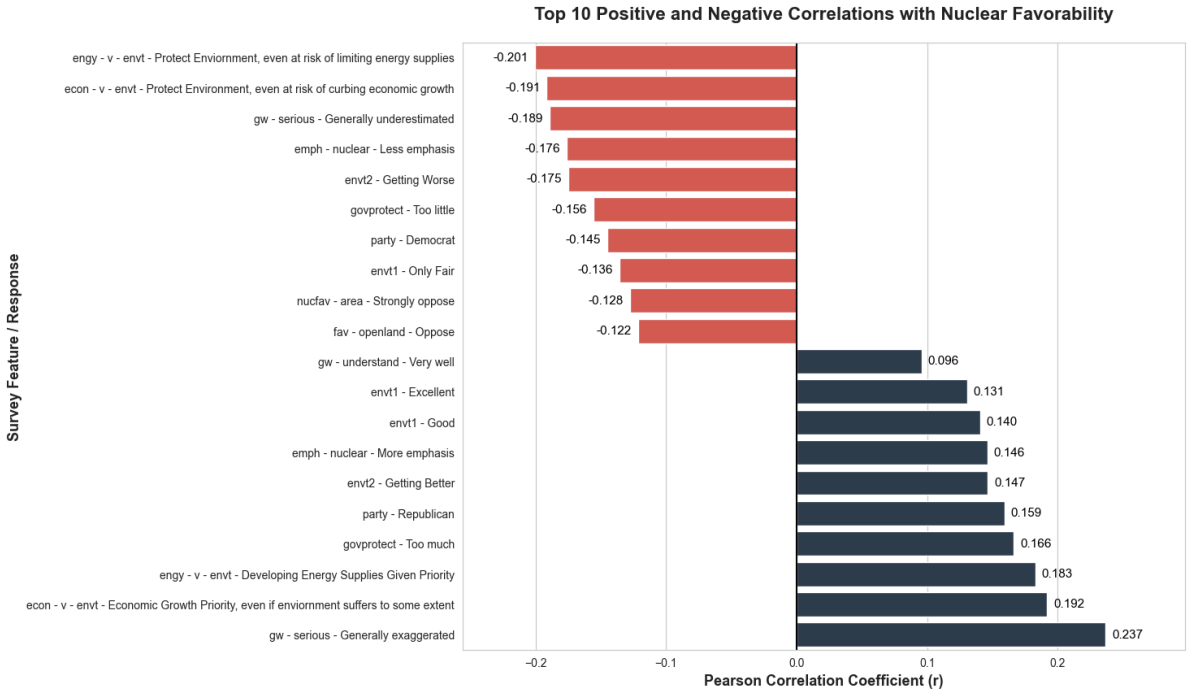

Figure 7

Figure 7 shows the top 10 variables with the highest positive and negative correlation with nuclear favorability. We see that the two highest negative correlations with favoring nuclear energy are survey respondents who prioritize protecting the environment at the risk of limiting energy supplies and at the risk of curbing economic growth. This is consistent with literature stating that the cleanup after nuclear accidents takes much longer than other energy infrastructure accidents. Those who are conscious about the environment would naturally be wary of plants which are capable of such long term damage. Some variables with high positive correlations are survey respondents who prioritize economic growth and those who feel that expanding our energy supply should have priority over environmental protection.

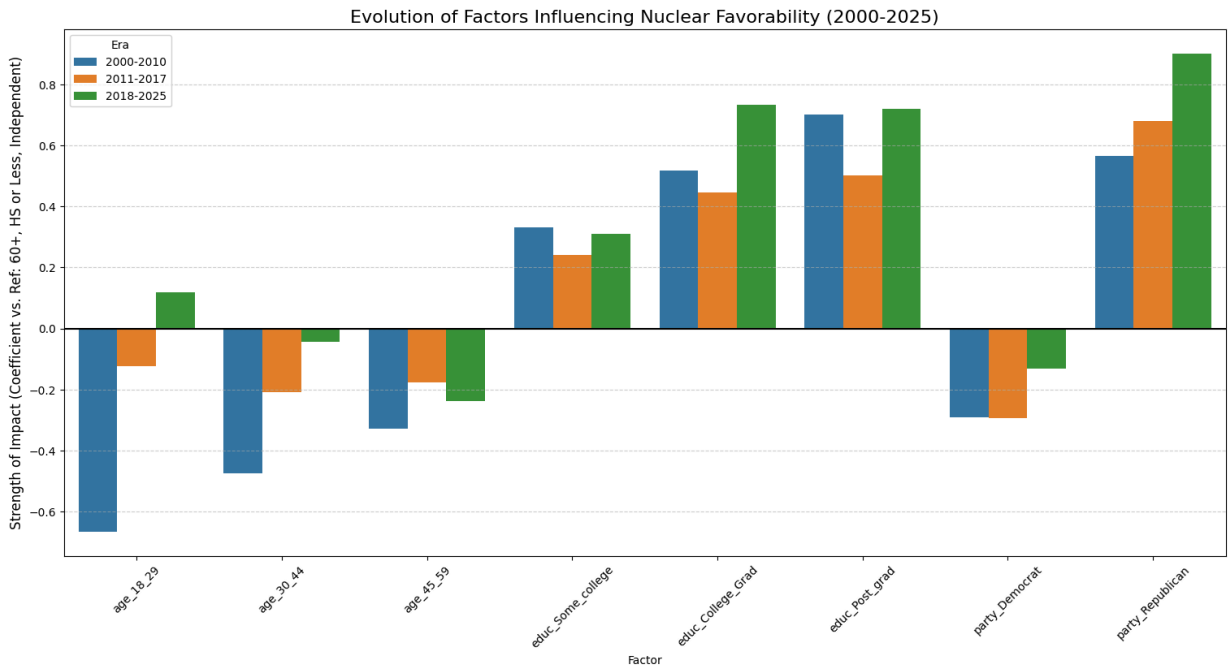

Figure 8

Figure 8 shows the coefficients of 3 logistic regression models modeled across different time periods with 60+ year old, High school graduate republicans as a baseline. From analyzing this visual three major conclusions can be drawn. First, since 2000, most age groups have warmed up to the idea of nuclear energy, with groups 18-29 shifting from a negative to a positive coefficient and 30-44 moving from a strong negative coefficient to falling close to 0. Second, nuclear energy has become more popular across both political parties, with the democratic coefficient shifting from negative to positive and the republican one staying positive but growing in size. Lastly, education's role in determining one's stance on nuclear hasn't seemed to have shifted much as the coefficients haven't largely changed in the 25 year span analyzed.

5 Modeling

We chose to look at 4 different models with our dataset: logistic regression, decision tree, neural networks, and SVM.

Logistic Regression

We initially built a single logistic regression model, mostly for proof of concept. We obtained a pseudo R^2 value of 0.04788. We saw that all levels of age/politics/education were significant within the model. The next iteration of Logistic regression saw 3 separate models made, one for each of 3 time periods, 2000-2010/2011-2017/2018-2025. These models were also built on more complete data which incorporated opinions from a larger range of years. This was mainly done to analyze if the importance of factors changed at all throughout time.

The biggest takeaway from this is that factors relevant in predicting nuclear sentiment have shifted over time. Most notably is that young age shifted from being a negative predictor to being a

positive one. Also, across the entire political spectrum support for nuclear energy rose in the last 25 years with Republican favor skyrocketing and Democrats becoming less opposed. Shifting the cutoff value and analyzing confusion matrices for value revealed that within a few hundredths of 0.5 was an optimal cutoff value for the probability of favoring nuclear energy.

Confusion matrices for each period showed a maximum accuracy of around 61% with remarkable consistency. Because logistic regression is such a simple model compared to all others used, we thought it best to only use age, education and political affiliation so the models wouldn't have too many coefficients. This was done mainly so the models could be interpreted easily. Analysis for the logistic regression models can be found with the description of Figure 8, which shows the evolution of their coefficients over time.

Decision Tree

Decision trees were utilized following the same method used in the logistic regression models, that being making a model for each of the previously specified time periods. This was mainly done to display the hierarchy of public opinion. Our group also felt it would be beneficial to see if there were any interactions between explanatory variables, which logistic regression could not do as easily. The hierarchical structure allowed for a clear visual representation of the logic behind public sentiment, making it easier to communicate findings to non-technical stakeholders. Pruning revealed an optimal depth of 2, 4 and 3 across the time periods, respectively. Accuracy plummeted on test data at higher depths due to overfitting. This revealed to us that sentiment on nuclear energy is overall a more or less simple situation and identifying niche populations offers little benefit.

The primary risk of using decision trees is overfitting, and this was addressed by not adding too many explanatory variables to the model as well as pruning to reduce depth. The end decision trees only addressed age, political affiliation and education. The decision trees were more accurate than their logistic regression counterparts for 2 of the 3 time periods, if only slightly. Across all 3 trees, classifying as Republican is an automatic prediction that the individual favors nuclear energy. This suggests that out of all predictors, Republican party ideology is the strongest and most constant predictor for favoring nuclear energy.

The tree for 2000 to 2010 had only one split other than on party affiliation, which was the existence of a postgraduate degree. This suggests that nuclear energy was a much simpler topic in that era, with clear lines between who did and didn't support it. The tree for 2018 to 2025 follows a similar pattern, though it throws college graduates into the bucket of those who do support nuclear energy along with the postgrads. The 2011 to 2017 tree is the most complex, with it making multiple splits on age and degree type before making a prediction, suggesting the Democratic party and Independents were much less unified during this time. Notably, most of this period takes place during the Obama administration.

Neural Network

We used a neural network model because our research question focuses on whether demographic, political, educational, and time-related factors can predict whether an individual favors nuclear energy. A neural network was useful because it can detect more complex patterns than a simple linear or logistic regression model. While logistic regression is helpful for explaining how each variable relates to nuclear support, a neural network is better suited for prediction because it can learn nonlinear relationships and

interactions between variables. This was especially important for our project because public opinion on nuclear energy is likely shaped by several overlapping factors, including political identity, age, education, environmental concern, and the time period in which people were surveyed.

There were limitations in using this model for our question of interest. Neural networks are often less interpretable than traditional statistical models, meaning they can tell us whether prediction is possible but do not always clearly explain why a prediction was made. This makes it harder to identify the exact effect of each individual variable. Another limitation is that the model's performance was moderate rather than highly accurate. Across the different eras, the model showed that it could predict nuclear support better than random guessing, but it still made a meaningful number of classification errors. This suggests that attitudes toward nuclear energy are influenced by factors beyond the variables included in the dataset. In addition, survey responses may be affected by wording, current events, media coverage, and social context, which are difficult to fully capture in a structured model.

The neural network results showed that nuclear energy support can be predicted to some extent using demographic and attitudinal variables, but the strength of prediction varied across time periods. The model performed moderately well across the eras, suggesting that public opinion toward nuclear energy has some consistent structure but is not fully explained by the available predictors. This connects with the literature on nuclear energy attitudes, which often finds that public support is shaped by trust, political ideology, environmental concern, perceived risk, and perceived benefits. For example, people may support nuclear power when they view it as a reliable low-carbon energy source, but oppose it when they associate it with radioactive waste, accidents, or safety concerns. Our results support this idea because the model was able to identify patterns in support, but not with enough accuracy to suggest that public opinion is simple or determined by one factor alone.

The implications of these conclusions are important. Since support for nuclear energy is only moderately predictable, policymakers and energy communicators should avoid assuming that one message will work for all groups. Public opinion appears to differ across demographic and political groups, meaning that communication about nuclear energy may need to be tailored to different audiences. The results also suggest that increasing support for nuclear energy may require more than simply emphasizing its role in electricity generation. Public trust, safety concerns, environmental values, and political identity likely play major roles in shaping whether people favor nuclear power. Overall, the neural network analysis suggests that nuclear energy attitudes are complex, changing over time, and connected to broader social and political contexts.

SVM

Support Vector Machine was chosen as one of our classification models due to its strong performance with data that contains a large amount of features/columns and ability to model complex decision boundaries. SVM is well-suited for our data due to our large amount of predictors. Ultimately, SVM is a classification algorithm that works to find the optimal separating boundary, or hyperplane, between classes. Some limitations of using this model are that non-linear SVM's are hard to interpret, reliance on accurate standardization, and potential under or overfitting due to poor tuning. SVM is also less interpretable than logistic regression or decision trees for explaining relationships. We included SVM to provide a classification approach that performs well on data with high parameter quantities. It

complements our other models well with strong predictive performance and the ability to handle complex relationships.

Overall, we see that demographic variables like age, political affiliation, and education provide moderate predictive power with accuracy values between 0.59 and 0.61. F1-scores for “favor” are around 0.6-0.65 across all periods. This indicates that these variables alone don’t explain the breadth of nuclear favorability. Political affiliation was found to be the dominant factor as it had the largest coefficients in every period. For the 2000-2010 period, Republican had a coefficient of 0.995 and Independent had a coefficient of 0.644. For 2011-2017, Republican had a coefficient of 0.992 and Independent had a coefficient of 0.663. For 2018-2025, Republican had a coefficient of 0.989. These values are larger than all other variables, thus we an conclude that political affiliation is the only consistently strong predictor of nuclear favorability.

Age group coefficients are extremely small across all periods, typically being less than 0.00015. There was no improvement in recall or accuracy when including age, thus age has a negligible impact on nuclear favorability. Education coefficients were also near zero and typically less than 0.0002 across all periods. Education doesn’t improve classification metrics like accuracy, this, education has no meaningful predictive effect on nuclear favorability. The model struggles to classify nuclear attitudes with a high error rates such as a false negative rate of 0.468 and false positive rate of 0.33-0.49.

We see that model performance doesn’t improve meaningfully over time as accuracy remains around 0.59 to 0.61. The influence of age and education is negotiable. By 2018-2025, only Republican affiliation remains significant and the Independence effect is approximately 0. Thus, demographic influence is mainly contributed by political identity. Overall, demographic variables only explain a portion of variation with accuracy values between 0.59 and 0.61. Nuclear favorability is not strongly driven by age or education, but mainly associated with political identity.

Results Table Comparing Models

Model	2000 to 2010 Accuracy	2011 to 2017 Accuracy	2018 to 2025 Accuracy	Best Era	Main Result
Logistic Regression, best threshold	61.38%	61.16%	61.38%	2000 to 2010 and 2018 to 2025	The models show age, politics and education as important predictors. Examining change in coefficients allows analysis of varying importance of different predictors over time. As the logistic regression models are so basic, they are consistently among the least accurate.

Decision Tree, best depth	60.82%	62.57%	62.61%	2017 to 2025	Republican affiliation is the single most effective predictor of nuclear sentiment.
Neural Network, threshold = 0.50	60.6%	60.4%	60.4%	2000 to 2010	Performance was consistent across eras, but did not substantially improve prediction.
Neural Network, best threshold	60.8%	61.3%	58.3%	2011 to 2017	Adjusting the threshold slightly improved performance for the first two eras, with the best threshold being 0.55 for 2000 to 2010 and 2011 to 2017, and 0.60 for 2018 to 2025.
Support Vector Machine	58.5%	60.7%	59.0%	2011 to 2017	SVM had the weakest predictive performance, specifically in the 2000 to 2010 era.

6 Conclusions

Overall, our analysis suggests that public sentiment toward nuclear energy is shaped by meaningful demographic and political patterns, especially age, education, and party affiliation, but that these variables do not fully explain support on their own.

From our research, visuals, and model results we have gained a clear picture of the relationship between nuclear energy favorability and age, education, and political affiliation. We see that the importance of variables has shifted over time, with unique trends rising for each level of categorical variable examined. Most notably, we say that in the time period, perception toward nuclear energy actually flipped among 18 to 29 year olds, with it shifting from having a firm negative perception among the demographic to having a slight positive one. Also, support for nuclear energy became a more bipartisan cause, with Republican support vastly increasing and Democratic opposition declining.

Our model with the best predictive power was the decision tree model. Our model found that Republican party ideology is the strongest and most constant predictor for favoring nuclear energy. Nuclear energy was a much simpler topic in 2000 to 2010, as there was only one split other than on party affiliation, the existence of a postgraduate degree. The 2018 to 2025 tree identifies college graduates as

those who do support nuclear energy along with the postgrads. We can theorize that the Democratic party and Independents were much less unified during 2011 to 2017, which was our most complex tree as it had multiple splits on age and degree type. Overall, the decision tree model along side our visuals and analysis confirm the strong relationship between political identity and nuclear favorability. Ultimately, there are a multitude of factors that contribute to nuclear favorability in the United States, and political identity has proven to be significant.

Appendix

Data Dictionary for Linear Regression Data: dataset_binary_favor.csv

Variable	Description	Categorical/Quantitative	Response Types
Favor_nuclear (key response variable)	Percentage of survey respondents who favor nuclear energy	Quantitative	0.593, 0.646
oppose_nuclear	Percentage of survey respondents who oppose nuclear energy	Quantitative	0.365, 0.411
U.S.-origin uranium (weighted-average price)	Weighted-average price (typically $ per pound U_3O_8) of uranium purchased from U.S. suppliers	Quantitative	43.86, 40.63
Foreign-origin uranium (weighted-average price)	Weighted-average price (typically $ per pound U_3O_8) of uranium purchased from foreign suppliers	Quantitive	54.07, 38.11
Nuclear Fuel Share (Percent)	Percentage of total U.S. electricity generation attributable to nuclear fuel	Quantitive	11.0, 16.6
nuclear_support_pct	Percentage of survey respondents who support the use of nuclear energy	Quantitative	46.0, 56.0
nuclear_opposition_pct	Percentage of survey respondents who oppose the use of nuclear energy	Quantitative	48.0, 43.0
republican_nuclear_support_pct	Percentage of Republican respondents who support nuclear energy	Quantitative	55%, 70%
independent_nuclear_s	Percentage of	Quantitative	55%, 66%

upport_pct	Independent respondents who support nuclear energy		
democrat_nuclear_support_pct	Percentage of Democratic respondents who support nuclear energy	Quantitative	52%, 40%
pct_prefer_nonrenewable_energy	Percentage of respondents who prefer nonrenewable energy sources (e.g., fossil fuels, nuclear)	Quantitative	26.0, 34.0
pct_prefer_alternative_energy	Percentage of respondents who prefer renewable or alternative energy sources (e.g., solar, wind)	Quantitative	66.0, 59.0
pct_concern_energy_affordability	Percentage of respondents who report concern about energy affordability	Quantitative	48.0, 43.0
nuclear_generation_gwh	Total electricity generated from nuclear energy measured in gigawatt-hours (GWh)	Quantitative	792604.0, 836634.0
percent_favor	Percentage of respondents who favor nuclear energy	Quantitative	58.0, 57.0
percent_oppose	Percentage of respondents who oppose nuclear energy	Quantitative	42.0, 44.0
percent_strongly_favor	Percentage of respondents who strongly favor nuclear energy	Quantitative	29.0, 32.0
percent_strongly_oppos	Percentage of	Quantitative	15.0, 12.0

e	respondents who strongly oppose nuclear energy.		
Nuclear Generating Units, Total Operable Units	Total number of operable nuclear reactor units in the U.S.	Quantitative	11.0, 13.0
Nuclear Generating Units, Net Summer Capacity	Combined net summer generating capacity of operable nuclear units in MW	Quantitative	0.733, 0.055
Nuclear Electricity Net Generation	Net electricity generation from nuclear power plants (after plant use), typically measured in MWht	Quantitative	2270.0, 3657.0
Nuclear Share of Electricity Net Generation	Proportion of total electricity generation that comes from nuclear power	Quantitative	0.1, 1.0
Nuclear Generating Units, Capacity Factor	Percentage of maximum possible output actually produced by nuclear generating units over a period of time	Quantitative	76.2, 71.1
age_group	Age category of the survey respondent	Categorical	Levels: 18_29, 30_44, 45_64, 65_plus
educ_group	Highest level of education attained by the survey respondent	Categorical	Levels: College_Grad, HS_or_Less, Post_Grad, Some_College, College_Grad,
party_group	Political party affiliation or partisan leaning of the survey	Categorical	Levels: DK, Independent no lean, lean

	respondent		democrat, lean republican, Republican, Democrat
econ_v_envt	Survey respondent answer to: protection of the environment should be given priority, even at the risk of curbing economic growth (or) economic growth should be given priority, even if the environment suffers to some extent?	Categorical	Levels: Equal Priority (VOL, Protect Environment, even at risk of curbing economic growth, REF,
energyserious	Survey respondent answer to: how serious would you say the energy situation is in the United States--very serious, fairly serious, or not at all serious?	Categorical	Levels: DK, Fairly serious, Not at all serious, REF, Very serious
engy_v_envt	Survey respondent answer to: protection of the environment should be given priority, even at the risk of limiting the amount of energy supplies -- such as oil, gas and coal -- which the United States produces (or) development of U.S. energy supplies -- such as oil, gas and coal -- should be given priority, even if the environment suffers to some extent]?	Categorical	Levels: Both Equally (VOL), DK, Developing Energy Supplies Given Priority, Neither/Other (VOL), Protect Environment, even at risk of limiting energy supplies, REF
envt1	Survey respondent	Categorical	Levels: DK,

	answer to: how would you rate the overall quality of the environment in this country today -- as excellent, good, only fair, or poor?		Excellent, Good, Only Fair, Poor, REF
envt2	Survey respondent answer to: right now, do you think the quality of the environment in the country as a whole is getting better or getting worse?	Categorical	DK, Getting Better, Getting Worse, REF, Same (VOL),
govprotect	Survey respondent answer to: Do you think the U.S. government is doing too much, too little, or about the right amount in terms of protecting the environment?	Categorical	Levels: About the right amount, DK, _REF, Too little, Too much
gw_serious	Survey respondent answer to: Thinking about what is said in the news, in your view is the seriousness of global warming -- [ROTATED: generally exaggerated, generally correct, or is it generally underestimated]?	Categorical	Levels: DK, Generally exaggerated, Generally underestimated, Generally correct, REF
gw_understand	Survey respondent answer to: next, thinking about the issue of global warming, sometimes called the "greenhouse effect," how well do you feel	Categorical	Levels: DK, Fairly well, Not at all, Not very well, REF, Very well

	you understand this issue -- would you say very well, fairly well, not very well, or not at all?		
prezjob_energy	Survey respondent answer to: Do you think George W. Bush/Barack Obama/Donald Trump will do/is doing a good job or a poor job in handling each of the following issues as president. How about -- [READ AND Rotate A-C]? B. Improving the nation's energy policies	Categorical	Levels: DK, Fair/Mixed (VOL), Good job, Poor job, REF,
religion	Religious beliefs of the survey respondent	Categorical	Levels: Agnostic, Atheist, Buddhism, Catholic, DK, Hinduism, Jewish, Muslim, Other Christian, Other Non-Christian, Protestant, REF

Data Dictionary for Logistic Regression Data: labeled_gpss.csv

Variable	Description	Categorical/Quantitative	Response Types
id	Unique respondent ID	Categorical	Unique numeric ID
yr	Survey year	Quantitative	Year values such as 2000, 2001, 2002
worry_cchange	Level of worry about climate change	Categorical	Not at all; A little; A fair amount; A great deal

prezjob_envt	Approval of president's handling of environmental issues	Categorical	Approve; Disapprove
prezjob_energy	Approval of president's handling of energy issues	Categorical	Approve; Disapprove
govprotect	View on whether government is doing too much, too little, or the right amount to protect the environment	Categorical	Too much; About the right amount; Too little
envt1	General environmental attitude item 1	Categorical	Survey response categories
envt2	General environmental attitude item 2	Categorical	Survey response categories
econ_v_envt	Preference between protecting the environment and promoting economic growth	Categorical	Protect environment even at risk of curbing economic growth; Favor economic growth
engy_v_envt	Preference between energy development and environmental protection	Categorical	Favor energy development; Favor environmental protection
envworry_toxicwst	Concern about toxic waste	Categorical	Not at all; A little; A fair amount; A great deal
envworry_radioactivity	Concern about radioactivity	Categorical	Not at all; A little; A fair amount; A great deal
gw_understand	Self reported understanding of global warming	Categorical	Very well; Somewhat; Not much; Not at all

gw_serious	Belief about how serious global warming is	Categorical	Not serious; Somewhat serious; Very serious
gw_laws_econ	Opinion on whether climate laws hurt the economy	Categorical	Yes; No; Unsure
fracking	Support for or opposition to fracking	Categorical	Favor; Oppose
energyserious	Perceived seriousness of the energy situation	Categorical	Not serious; Somewhat serious; Very serious
energy_shortage	Concern about an energy shortage	Categorical	Yes; No; Unsure
solution_conserv	Support for conservation as a response to energy problems	Categorical	Favor; Oppose
Nucfav (Key)	General favorability toward nuclear energy	Categorical	Strongly favor; Somewhat favor; Somewhat oppose; Strongly oppose
nucsafe	Belief about whether nuclear energy is safe	Categorical	Very safe; Somewhat safe; Not too safe; Not at all safe
nucfav_area	Favorability toward a nuclear plant or nuclear development in one's local area	Categorical	Favor; Oppose
Fav_nuclear (Key)	Binary indicator for favoring nuclear energy	Categorical	1 = favor; 0 = oppose
fav_openland	Support for opening more land for energy production	Categorical	Favor; Oppose

fav_mandateC02	Support for mandates limiting carbon dioxide emissions	Categorical	Favor; Oppose
fav_solar	Support for solar energy expansion	Categorical	Favor; Oppose
fav_altfuel	Support for alternative fuels	Categorical	Favor; Oppose
fav_mandateC02bus	Support for carbon dioxide mandates on businesses	Categorical	Favor; Oppose
fav_engylimits	Support for limits on energy use	Categorical	Favor; Oppose
fav_coal	Support for coal as an energy source	Categorical	Favor; Oppose
emph_coal	Whether the country should emphasize coal more	Categorical	Emphasize more; Keep same; Emphasize less
emph_oil	Whether the country should emphasize oil more	Categorical	Emphasize more; Keep same; Emphasize less
emph_ngas	Whether the country should emphasize natural gas more	Categorical	Emphasize more; Keep same; Emphasize less
emph_wind	Whether the country should emphasize wind more	Categorical	Emphasize more; Keep same; Emphasize less
emph_solar	Whether the country should emphasize solar more	Categorical	Emphasize more; Keep same; Emphasize less
emph_nuclear	Whether the country should emphasize nuclear energy more	Categorical	Emphasize more; Keep same; Emphasize less
favor_reduce_fossil	Support for reducing fossil fuel use	Categorical	Favor; Oppose

envdone_vote	Whether respondent has voted based on environmental concerns	Categorical	Yes, have done; No, have not done
envdone_reduce	Whether respondent has reduced personal consumption or waste for environmental reasons	Categorical	Yes, have done; No, have not done
envdone_petition	Whether respondent has signed a petition or taken similar public action for the environment	Categorical	Yes, have done; No, have not done
envdone_stocks	Whether respondent has made stock or investment decisions for environmental reasons	Categorical	Yes, have done; No, have not done
envtrust_congress	Trust in Congress on environmental issues	Categorical	None; A little; A moderate amount; A great deal
envtrust_reps	Trust in Republicans on environmental issues	Categorical	None; A little; A moderate amount; A great deal
envtrust_dems	Trust in Democrats on environmental issues	Categorical	None; A little; A moderate amount; A great deal
pay100more	Willingness to pay $100 more for environmental protection or cleaner energy	Categorical	Yes; No
environmentalist	Whether the respondent considers themselves an environmentalist	Categorical	Yes; No

econ1	General economic attitude item 1	Categorical	Good; Fair; Poor
econ2	General economic attitude item 2	Categorical	Survey response categories
arealive_rec	Recoded area of residence or community type	Categorical	Urban; Suburban; Rural or similar
age	Respondent age	Quantitative	Numeric age in years
educ	Highest education level attained	Categorical	HS or Less; Some College; College Graduate; Post Graduate
party	Political party identification	Categorical	Democrat; Republican; Independent
jobtype	Employment or job type classification	Categorical	Job categories
religion	Religious affiliation	Categorical	Religious categories

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