THE SUSTAINABILITY OF PERCEIVED BENEFIT: AN ADVERTISING AND PUBLIC RELATIONS ANALYSIS OF NUCLEAR ENERGY PRODUCTION IN JAPAN

by

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ABSTRACT

In an effort to analyze the use of perceived benefit in modern marketing practices, the advertising and public relations methods from Japan's nuclear energy (NE) production industry can be examined using public opinion polls conducted in Japan that demonstrate a positive public perspective shift on NE. Using Japanese economic data, I compiled stylized facts, descriptive statistics, and a series of regressions to test the conditional correlation between the Basket of Goods (BoG) in Japan before and after 2011, when the Fukushima Daiichi disaster halted all nuclear energy production. Out of five regressions, two regressions showed significant results ($p<0.01$) for a decrease in both the level of hours worked and the ln of hours worked post 2011; all other changes were not statistically significant. These results could suggest that NE production has no impact on the BoG for consumers due to the lack of conditional correlation between production and hours worked. Then, a sample of 10 webpages from five Japanese NE companies and organizations were observed using a combination of media theories such as Situational Theory of Publics, Uses and Gratification Theory, and Strategic Communications. Making observations using a system of five key metrics for analysis, I concluded that nearly all of the messages focused on the perceived benefit of the "sustainability" of NE using images, color, and language to invoke environmentally positive messages. There was no mention of direct economic benefit to consumers through the BoG. The observations made can be used to understand how the practice of perceived benefit messaging can be used to convince consumers to positively view products that they might have previously been wary about, even if there is no direct, trackable impact to said benefit.

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INTRODUCTION

In an age where companies are becoming more focused on selling ideas and behaviors rather than concrete products, it can be difficult for consumers to know what they're supporting. Currently, AI is dominating this conversation, with opposing sides constantly arguing whether or not AI can fulfill or ruin lives, leaving many to struggle to understand why they should or shouldn't support AI. However, AI is not the first product that has faced consumer wariness, nor the first product to depend on positive public perception to thrive in the market. Nuclear energy (NE) has been at the center of this debate for decades, stemming from the nuclear disasters in the late 20th century such as Chernobyl. However, support for the energy source has never quite gone away, with many countries (and AI companies hungry for energy) turning to NE production to fill the gaps left by moving away from fossil fuels.

To support this idea, I will be examining the NE advertising and public relations strategies of the NE production industry in Japan. Japan has come full circle surrounding public perception; from believing that nuclear energy was the perfect solution to their energy security problems, to completely dismantling their NE production after the Fukushima Daiichi disaster, to restarting production in an effort to restart the trajectory towards being dependent on nuclear energy production. In order to have this return of NE, public perception would have to be majority positive, meaning that the Japan NE industry successfully executed a strategic communications campaign, making the advertising media excellent to observe.

Using economic and nuclear production data from Japan, who experienced a complete reduction of NE production after the events of the Fukushima Daiichi disaster in 2011, I tested for conditional correlations to determine if there is significant change in aspects affecting the

consumer pre and post 2011. I compiled stylized facts, descriptive statistics, and a series of regressions to test the conditional correlation between the Basket of Goods (BoG) in Japan before and after 2011, when the Fukushima Daiichi disaster halted all nuclear energy production. Out of five regressions, two regressions showed significant results ($p<0.01$) for a decrease in both the level of hours worked and the ln of hours worked post 2011; all other changes were not statistically significant. The results indicate that there is little to no correlation between Fukushima and economic factors directly related to the consumer, also suggesting there is little to no correlation between NE production on consumers, meaning that advertising with such claims might be misleading, and henceforth unethical.

To further examine the advertising and public relations practices surrounding Japanese NE, I identify the factors contributing to the positive shift in public opinion in Japan using a method informed by media theory such as the Situational Theory of Publics, strategic communications, and the Uses and Gratifications Theory. All of the theories will be applied within the context of Japanese media, as it has different cultural signifiers and background than the western media many of these theories were originally developed in.

A sample of ten webpages across five companies and organizations was analyzed with five metrics created from various media theories. Using these metrics, I concluded that nearly all of the messages focused on the perceived benefit of the "sustainability" of NE using images, color, and language to invoke environmentally positive messages. There was no mention of direct economic benefit to consumers through the BoG. Concluding from the sample, we can understand that the current marketing strategies surrounding NE are not only focused on perceived benefits, but are specifically focused on the perceived public benefit of NE as a sustainable energy source.

From my research, I found that perceived benefit is the largest factor contributing to support from consumers that might not receive direct positive impacts such as economic benefits. What this further suggests is that companies can use this tool to market ideas and practices that might negatively impact individual consumers under the guise of public benefits that might be more difficult to quantify. Consumers should be aware of the ways that products and services impact them and the people they know individually and evaluate if the promised public benefit can truly be measured.

The thesis is organized as follows: Part 1 is the Economics analysis. Section 1 is the introduction. Section 2 presents the literature review in two parts: Section 2.1 describes the debate surrounding NE and its sustainability, and the importance of sustainability to consumers; Section 2.2 details the dynamics in energy pricing and profits, and explains how the thesis stands to investigate a gap in current research. Section 3 presents the stylized facts, descriptive statistics, and methodology. Section 4 details the empirical strategy and regression results. Discussion of results is detailed in Section 5. Section 6 presents limitations of the study. Section 7 provides a summary of results and concluding thoughts. Part 2 of the thesis is the Communications and Media Studies analysis. Section 1 is the introduction. Section 2 details the Literature Review in three parts. 2.1 introduces the history and current state of NE in Japan. 2.2 presents the changes to public opinion towards NE in Japan. 2.3 discusses theories that will be used to create the methods, including both foundation theories and specific aspects of Japanese media. Section 3 presents the methodology. Section 4 relays the findings, and Section 5 presents the discussion and analysis of the findings. Section 6 details the limitations and future directions of the research. Section 7 presents the conclusion and forward thoughts on the results.

PART ONE: ECONOMICS

SECTION 1: INTRODUCTION

Much of nuclear energy (NE) advertising revolves around the idea that NE is sustainable and poses NE as a solution to climate change. However, researchers disagree on the true nature of nuclear sustainability, with some noting the environmental impact of nuclear waste, or the reality of similar carbon emissions between nuclear energy and oil productions, as reasons for NE to not be labeled as sustainable. Despite this, consumers care deeply about sustainable practices, meaning that sustainability claims, regardless of accuracy, can consistently motivate consumers to view a practice positively. If the sustainability of nuclear energy is being called into question, a possible solution to engage in ethical, accurate advertising could be to instead comment on the direct economic impacts. The change in electricity prices in 2010 and 2012 increased for the residential sector by 25% and increased 59% from 2010 to 2022 (JAERO 2025). However, the industries pushing for the return of nuclear energy felt these impacts much more, with an increase of 38% from 2010 to 2012, and a 92% increase from 2010 to 2022, resulting in the loss of $2 trillion across all eight of the Japanese utility companies (JAERO 2025, Mastuo et al. 2013). The disparage between the two sectors draws the question of how much of an impact did the reduction of nuclear energy have on consumers economically; if consumers did feel strain as a result, then NE production could be advertised as a solution. Using economic and nuclear production data from Japan, who experienced a complete reduction of NE production after the events of the Fukushima Daiichi disaster in 2011, we can test for conditional correlations to determine if there is significant change in aspects affecting the consumer pre and post 2011.

Stylized facts show that from the year 2000 to 2025, the percent changes in the Unit Labor Cost (ULC) and Gross Domestic Product (GDP) in Japan display visible declines during the Great

Recession and the Covid-19 pandemic but don't suggest large declines in the year 2011, or the years directly after. Similar observations can be made through plotting the average consumer household expenditure on elements of the Basket of Goods (BoG), which includes costs of transportation, food, rent, and utilities. Out of five regressions, two regressions showed significant results ($p<0.01$) for a decrease in both the level of hours worked and the ln of hours worked post 2011; all other changes were not statistically significant. The results indicate that there is little to no correlation between Fukushima and economic factors directly related to the consumer, also suggesting there is little to no correlation between NE production on consumers, meaning that advertising with such claims might be misleading, and henceforth unethical.

SECTION 2: LITERATURE REVIEW

SECTION 2.1

The Tohoku Earthquake and Tsunami in 2011 caused a plethora of aftershocks across not only the Japanese economy, but the global economy, as perception of nuclear energy production (NEP) shifted. Output decreased drastically as reactors were decommissioned across the world; Japan itself saw a complete elimination by 2014.

Despite this, there has been an increase in NE production once more as the world continues to push towards sustainable and green energy sources. Recent publications about NE focus more on discussions of "renewables," "sustainable development," and "energy efficiency" suggesting that current discussions around NE are based towards "solutions to climate change and the transition to more sustainable energy sources" (Fernández-Arias et al. 2024). Researchers have concluded that NE is not only sustainable for G-7 countries, but that NE output is reliable and cost-effective long-term allowing for renewable energy integration (Qianqian et al. 2025). However,

these might not be all positive discussions, as researchers have begun suggesting frameworks for testing negative environmental impact of NE, or suggesting that carbon emissions reports use process based analysis that neglects to capture the full impact, or even draws attention back to the radioactive byproducts and waste created instead of carbon emissions (Amir 2024; Nikitina et. al 2019; Pearce 2012). Further, nuclear production only creates less CO2 emissions if the uranium ore used is a rich ore, a fuel source that will be depleted in less time than fossil fuels; using less rich uranium is also an option, but creates the same amount of CO2 emissions as gas fired plant at the same electrical capacity (Mez 2012; Storm van Leehuan 2007). Further still, there are reports claiming that other sources of renewable energy (RE) such as solar and wind can be more cost effective than nuclear options; in the UK, researchers found that investment towards a basket of renewables would garner 8.5% in cost savings compared to investing in the Hinkley Nuclear Power plant by itself (Suno 2016).

It cannot be understated by the impact of CO2 emissions in regards to NE production and public opinion. Public perception dictates much of public acceptance of NE, as perception of personal benefits strongly correlates to acceptance and approval across various countries and cultures (Latré 2019; Wang 2020). Consumers greatly considered green energy practices, as shown in an Eastern European study, in which of 222 participants, 81% agreed (28% Strongly Agreed, 53% Agreed) to participate in a demand response program, forgoing electricity during high demand hours, to reduce CO2 emissions and global impact (Tantau et al. 2021). Carbon emissions even take precedence over a decrease in energy bills, with 85% of survey participants willing to partake in the demand response program for decreased carbon emissions, and 80% willing to participate for lower bills (Tantau et al. 2021). This phenomenon is found in America and Japan as well, with a study analyzing willingness to pay for RE and/or NE. The article found that the

Americans were more willing to pay for RE, but only by a small margin ($0.31 to $0.26 for 1% of greenhouse emission reduction per month), and a much larger difference in their willingness to pay for a 1% increase in NE usage ($0.71 in America to $0.31 in Japan) (Murakami et. al, 2015). While more popular in America, Japan's willingness to participate in sustainable practices leaves room for individuals to be persuaded positively about NE. But, considering the disagreement on the sustainability of NE production, it's important to discuss potential other factors to garner positive public opinion.

SECTION 2.2

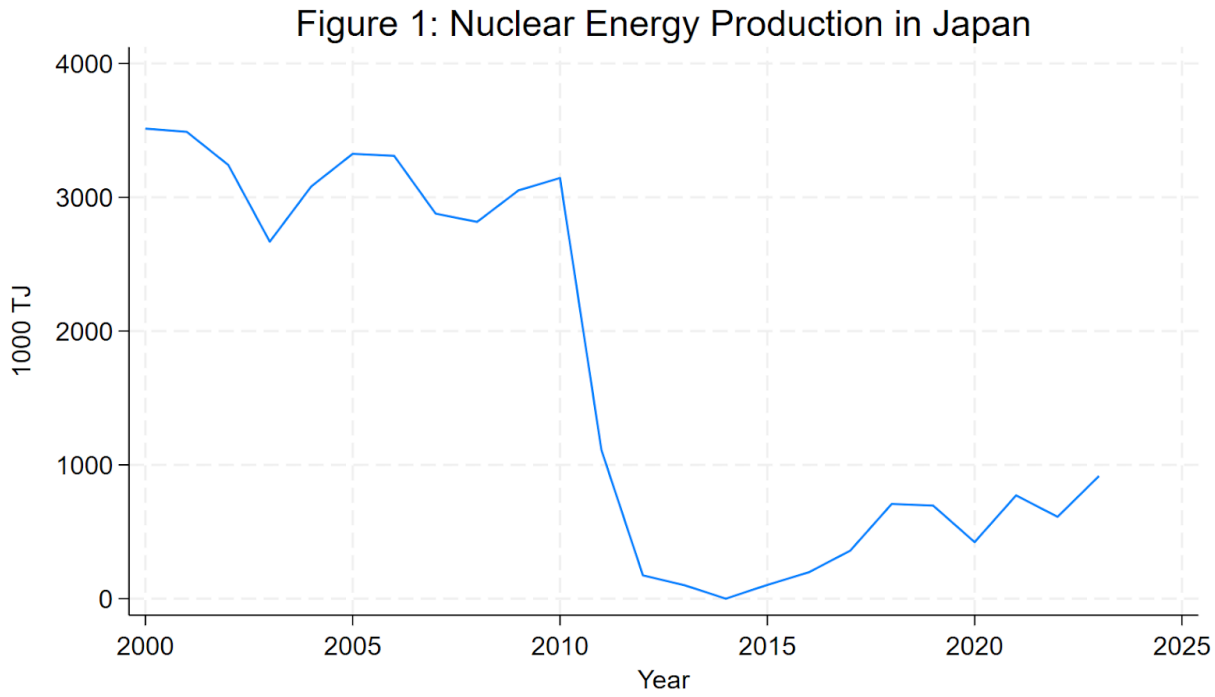
One such major factor is costs for consumers. The sudden elimination of nuclear energy in Japan put strain on an already tight energy budget, increasing the fuel costs of thermal power generation to nearly double from $3.7 billion in 2010 to $6.1 billion in 2011 (Masuto et. al. 2013). In 2014, when NE output was zero, the household electricity prices were 25% higher than they were in 2010, due to the higher fuel costs, and the increase in renewable energy surcharges as a result of the "feed-in tariff system" (JAERO 2025). However, though consumer households face a burden of increased costs of energy production, the larger portion of the burden falls on the industrial sector. Industrial electricity costs in 2014 rose 38% (14% higher than residential costs), and in 2022 were 92% higher than 2010 costs while the residential sector only saw a 59% increase (2025). All eight of the utility companies across Japan saw massive decreases in earnings from 2010 to 2012, with a loss of nearly two trillion yen between them (2013). If the cost increase for consumers was a great strain on household expenses, the consumers would be more inclined to have NE production return, but discussion around NE still heavily circles sustainability despite the claims that the prices are detrimental to Japanese households and industries.

Since NE production is highly correlated to public opinion of NE, understanding if changes to NE production change public opinion through economic impacts on consumers can help determine the accuracy and efficacy of NE PR practices. To discern the correlation, I propose investigating a conditional correlation using the consumer's Basket of Goods (BoG), measured using the Consumer Price Index (CPI), alongside indicators of consumer strain (GDP, Real Wage Index (RWI), unemployment) to examine the average hours worked between 2000 and 2025 in Japan and by observing potential impacts of Fukushima and the following reduction of nuclear energy on the average consumer. The average amount of hours worked for consumers can be used to determine the strain of the BoG; if the hours worked increases when CPI or particular prices increase, it could suggest strain on the consumer. If Fukushima and the subsequent extreme reduction of nuclear energy increased the cost of the Japanese Basket of Goods, the amount of hours worked by consumers post 2011 should increase. However, a lack of statistical significance in the conditional correlation would instead suggest that Fukushima and the reduction of nuclear energy does not correlate with an increase in strain on consumers beyond year inflation.

SECTION 3: EMPIRICAL DATA

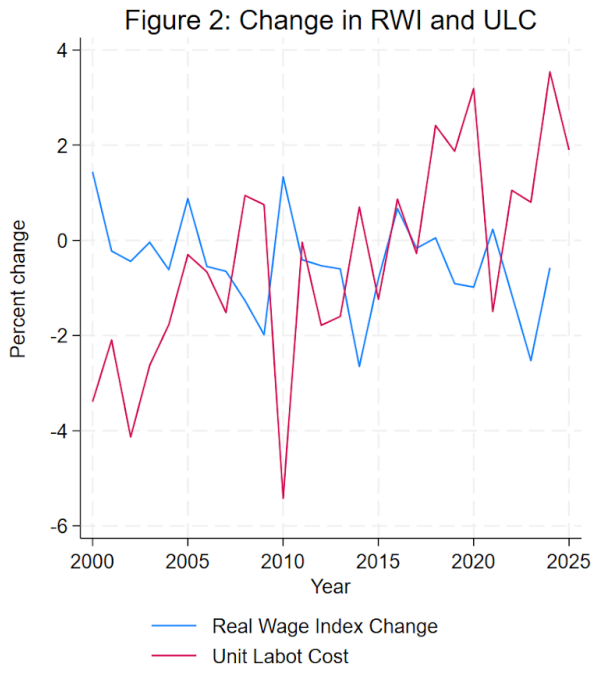
SECTION 3.1 STYLIZED FACTS

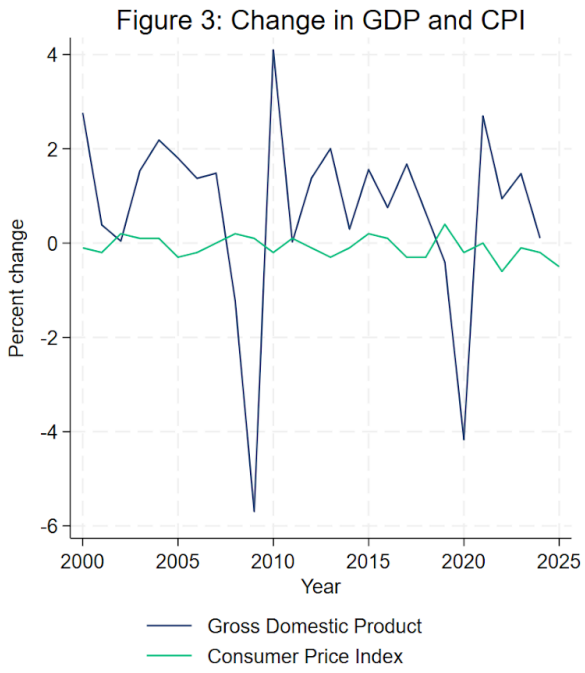
The dip and return in nuclear energy production in Japan since the year 2000 can be clearly illustrated in Figure 1. While the Tohoku earthquake and tsunami, and



Source: IEA (2024)

subsequently the Fukushima Daiichi nuclear disaster, happened in 2011, it took time to pass legislation regarding the abolishment of nuclear production, as well as time to implement said legislation, leading to the bottom of the drop being in 2014, with 0 TJ produced. Using this figure, we can analyze its effects on the economy.





Sources (in order):

Ministry of Health, Labor, and Welfare in Japan (2025)

Organization for Economic Co-operation and Development via FRED® (2025)

JP. Cabinet Office via FRED® (2025)

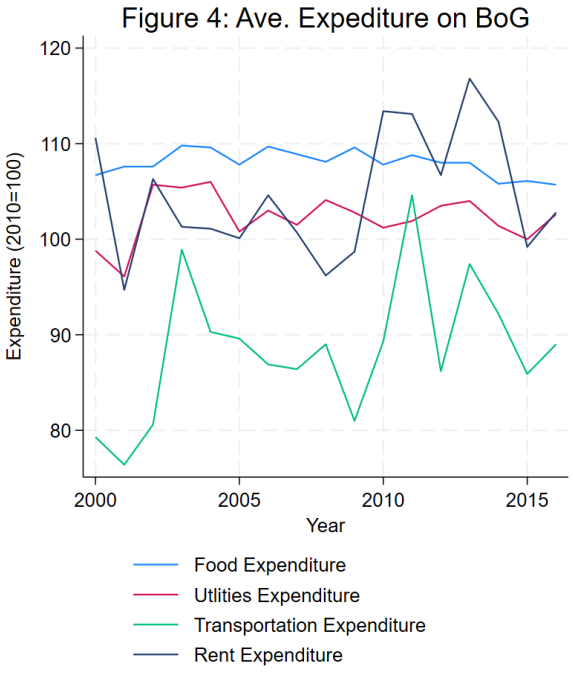
Ministry of Internal Affairs and Communications (2025)

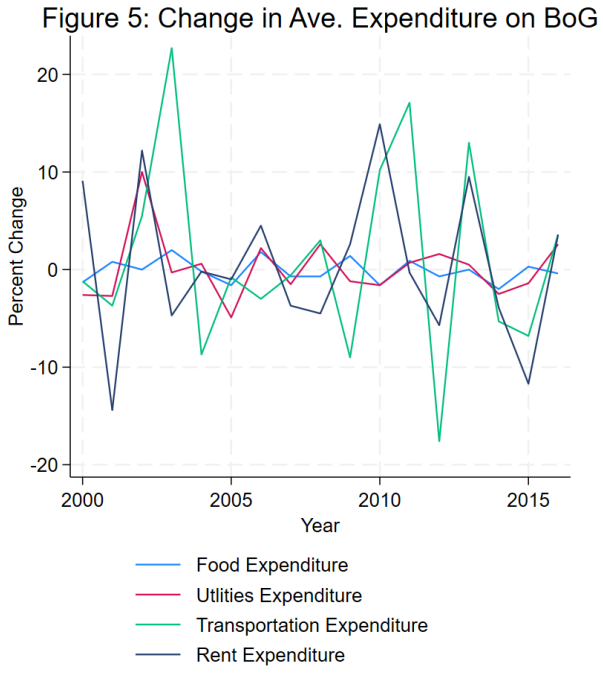
Observing Figures 2 and 3, there is a visible decline in Unit Labor Cost (ULC) and change in Gross Domestic Product (GDP) before 2010, feasible to be the effect of the Great Recession that spanned from roughly late-2007 to mid-2009, as well as a noticeable dip in both in 2020, likely from the Covid-19 pandemic. A dip in both suggests that during these times, there was a decrease in worker pay since there was also a decrease in product created (GDP). However, due to the lower fluctuation in CPI, change in the Real Wage Index (RWI) has not been as extreme, meaning

consumers have maintained a fairly similar purchasing power for the past two decades. There appears to be no noticeable correlation between Figures 1, 4, and 5.

In determining how nuclear energy production could be beneficial to the everyday citizen of Japan, or more specifically the average member of the workforce, it is essential to note the evolution of prices for major elements of the Japanese Basket of Goods (BoG). Major elements of the BoG include monthly costs for food, rent, utilities (specifically noted as fuel, light, and water), and transportation. Transportation, while it may seem an outlier to the other necessities in the BoG, is a crucial element to day-to-day life in Japan due to the common practice of using public transportation (railways, subways, buses, shinkansen) to commute to work and back.

Using data from the Statistics Bureau of Japan's Family Income and Expenditure Survey, in Figure 4 we can observe trends in expenditure volatility in the components of our BoG from the year 2000 to 2016 for worker households adjusted by the number of members of the household.





Source: Ministry of Health, Labor, and Welfare in Japan (2025)

While unable to draw correlations, Figure 4 shows that two regular consumer expenditures have similar patterns to the reduction in nuclear energy production. Rent expenditure increased exponentially after 2008, likely a cause of the Great Recession, but continues to rise through 2011, likely due to the loss of infrastructure because of the earthquake and tsunami. There is also a slight increase in price around 2014, which might be correlated to the complete reduction of nuclear energy production. Transportation Expenditures could also reflect a change from nuclear production, as transportation expenditure increases drastically from 2011 to 2013. However, this could also be a reflection of destroyed transportation and the costs for alternative methods or routes for commutes through areas impacted by the disaster. The percent change in expenditure does not seem to have long standing similarities to the nuclear energy production in Japan, further suggesting that production has no direct economic impact on the consumers in Japan.

SECTION 3.2: DESCRIPTIVE STATISTICS

Beyond tracking changes in prices over time, in this section we will study data collected for thirty variables relevant to the analysis at differing frequencies over the course of 2000 to 2025. Displayed in Table 1 are descriptive statistics of seven of the variables that are used in the regression: hours worked (hrsworked), the ln of hours worked (ln_hrs), the CPI in levels (cpi), the percent change in CPI (cpichange), percent change in GDP (gdpperchange), the yearly unemployment rate (unemployrt), and the change in RWI (rwichange). All other variables mentioned can be found in Table 2, detailing all of the thirty variables analyzed, which is located in the Appendix.

The average amount of hours worked in a month was higher than the average scheduled hours (hrssched), suggesting consistent existence of overtime, a conclusion also backed by the

maximum number of hours worked in a month which was 10 hours higher than the hours scheduled monthly. Hours worked in manufacturing (hrsworkedman) have a lower average, as well as a lower standard deviation, suggesting that there is less overtime worked in this industry, as well as restrictions around the hours worked.

Table 1: Descriptive Stats for Regression

Variable	Obs	Mean	Std. dev.	Min	Max
hrsworked	25	116.273	25.19176	93.55833	154.3667
ln_hrs	25	4.735012	.2046814	4.538585	5.039331
cpi	25	97.859	3.548221	94.35	108.7417
cpichange	27	-.0795215	.2297207	-.6	.4
gdpperchange	25	.7093837	2.046364	-5.693236	4.097918
unemployrt	27	3.724647	1.03216	2.358333	5.358334
rwichange	25	-.499	1.002195	-2.65	1.441667

Regarding data in Table A (located in the appendix), the values of carbon emissions in Japan (co2emiss) (units: tCO2/Capita) have little variation, with a std. dev. of less than 1. The std. dev. is much larger for nuclear energy production (neprod) (units: in 1000 TJ), and it is important to note that there are large fluctuations in values because of the steep decline in production after 2011. The minimum value of nuclear production is not an outlier, as there was a year of no nuclear output in Japan (2014), and this data point is essential for further testing.

For the consumer basket of goods (BoG), std. devs. are close in value between variables, with food month cost (foodmonth) having the highest average of the four. However, food has the smallest range of all of the BoG. Utilities, rent, and transportation costs (utilitiesmonth, rentmonth, transmonth) each have larger ranges, suggesting gradual changes over time considering the std. dev. in relation to the range.

Looking at the energy consumption in Japan by sector can further explore the impact of the loss of nuclear energy production, as it allows for understanding of what sectors are using electricity besides the consumers directly. Japan's electricity consumption is categorized between eight sectors, the largest of which is the industry sector, with the highest mean value, as well as a data range in higher values than most other sectors' max energy usage. It can be determined that residential is not the highest energy consumer, and instead much of the energy goes to the Industry, Transportation, and Commercial sectors.

These sectors not only consume electricity, but they produce carbon emissions into the environment. Since much of the benefits of nuclear energy production are said to be a reduction in carbon emissions, analyzing the emissions created outside of nuclear energy production (MtCO2) is of relevance. The residential, agricultural, and fishing sectors have lower yearly emissions and less variability in the output levels. However, the residential sector still produces up to 12 times the emissions on average than the other two specified sectors. Much of the carbon emissions are produced by the industry and transportation sectors, of which a majority of the energy produced by nuclear turbines is distributed. However, such a large std. devs. could suggest a change in carbon emissions over time, potentially a decline as carbon efficient policies get passed and implemented.

One last major note is the small std. dev for the CPI of Japan from 2000 to 2024. Since the CPI is a measure of the average price of the consumer's BoG, it's critical to note that there were not large fluctuations during this time. The mean is also a central value between the minimum and the maximum value, a sentiment backed by the percentiles of the CPI, which suggest data that is gradually changing in value and staying within a particular range.

SECTION 4: EMPIRICAL STRATEGY

In this section, we will detail the empirical strategy to analyze the effect of Fukushima on hours worked by the consumer. For this study, the following regression was adopted:

$$hours_t = \alpha_0 + \alpha_1 cpi_t + \alpha_2 post_t + \alpha_3 cpi * post + x_t\beta + \varepsilon_t$$

The variable *hours* represents the hours worked by the average consumer in Japan. The variable *CPI* represents the Consumer Price Index, and is used to demonstrate the price of the basket of goods for consumers. The difference in time frame was noted using the dummy variable *Post*, which would be valued at 1 if the year was after 2011, and 0 if it was before. CPI*Post is the specific measure of consumer price index after 2011. The beta coefficient represents the controls of the regression: percentage change in gross domestic product (GDP), the unemployment rate, and the percentage change in the Real Wage Index (RWI). Finally, ε_t is the error term to account for any other impacting factor.

Table 2 shows the estimation results of different model specifications. In particular, we are interested in changes in the relations between hours worked, the levels of CPI, the ln of hours worked, and the percentage change in CPI pre and post 2011. These variables can be used to assess the change that would impact the consumer in a way that could motivate them to work more hours; if there is higher unemployment, for example, individuals might work more hours to gain more purchasing power. This way, the cost of living for consumers can be reflected into the hours worked by consumers and examined for differences pre and post Fukushima.

Table 2: Regressions

	(1) Hours Worked Standard	(2) Hours Worked	(3) Log of Hours Worked	(4) Hours Worked Percent Change in CPI	(5) Log Of Hours Worked, Change in CPI
CPI (levels)	8.944	10.263	0.086		
	(8.328)	(9.236)	(0.074)		
Pre 2011	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Post 2011	801.645	927.364	7.773	-42.258***	-0.349***
	(800.872)	(949.341)	(7.634)	(6.649)	(0.050)
Pre 2011, CPI	0.000	0.000	0.000		
	(.)	(.)	(.)		
Post 2011, CPI	-8.780	-10.105	-0.085		
	(8.329)	(9.927)	(0.080)		
Change in GDP		3.528*	0.030*	3.169	0.027
		(1.839)	(0.015)	(2.237)	(0.018)
Unemployment Rate		-0.727	-0.008	-1.653	-0.016
		(6.401)	(0.050)	(3.845)	(0.031)
Change in RWI		-1.228	-0.013	-0.852	-0.008
		(3.400)	(0.027)	(2.460)	(0.020)
Percent Change in CPI				1.285	0.029
				(36.582)	(0.292)
Pre 2011, Percent Change in CPI				0.000	0.000
				(.)	(.)
Post 2011, Percent Change in CPI				-2.254	-0.040
				(35.839)	(0.286)
Constant	-719.039	-845.159	-3.299	143.542***	4.967***
	(800.821)	(872.419)	(7.041)	(15.797)	(0.122)
N	25	25	25	25	25
R2					

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Column 1 shows hours worked increases when CPI is increased, and hours worked

increases by 801 hours after 2011. The point estimate suggests CPI post-2011 has a negative effect on hours worked, causing a decrease in hours, but it is not statistically significant.

Column 2 shows the same core regression, with the added controls. The variables CPI, Post, and CPI and Post combined have the same positive and negative values, with slightly adjusted magnitudes: 10.3 hours, 927.4 hours, -10.1 hours, respectively. Of the three controls, GDP change has a positive coefficient although we cannot conclude any casual inference. The others have negative coefficients, suggesting that increases in the unemployment rate decreases hours worked, and when the RWI increases, hours worked decreases. The relationship between hours worked and unemployment is slightly unexpected, but could be a result of loss of labor, rather than consumers choosing to work less.

In Column 3, the dependent variable is ln of hours worked, with no significant results. The effects matched the previous results, with smaller coefficients since they show the impact of the time it takes to reach a set amount of hours worked: an increase in CPI increases hours worked by 9%; if the year is after 2011, hours worked increases by 7.7%; an increase in CPI after 2011 decreases hours worked by 8%; an increase in GDP change increases hours worked by 3%; an increase in unemployment decreases hours worked by 1%; an increase to RWI change decreases hours worked by 1.2%.

In Column 4, the dependent variable is hours worked in levels while CPI is measured as a percent change. The results showed that there was significance in the impact of the year being post 2011 ($p<0.01$), with a decrease in hours worked by 42.3 hours when all other variables are held constant. While this seems drastic, with labor reforms and a push for a better work life balance, having a decrease in hours worked makes economic sense for more recent years. It does not support the hypothesis that a decrease in nuclear energy as an impact of the Fukushima disaster, and/or a

potential structural change aside from Fukushima, would cause an increase in hours worked to cover rising prices. The other variables have similar effects on hours worked as they have previously when CPI decreases by 1%: a 1% increase in CPI change equates to an increase in hours worked by 1.3 hours; a 1% increase to CPI change after 2011 decreases hours worked by 2.3 hours; a 1% increase in GDP change increases hours worked by 3.2 hours; a 1% increase in unemployment rate decreases hours worked by 1.7 hours; a 1% increase in RWI change decreases hours worked by 0.9 hours.

Column 5 regresses the ln of hours worked against the percent change in CPI, controlling for other variables. There were significant results ($p<0.01$) when the year was after 2011, equating to a decrease in hours worked by 35 hours, holding all other variables constant. The other variables behave in a similar manner as previous results; a 1% increase in CPI change meant an increase by 3 hours; a 1% change in CPI after 2011 caused a decrease by 4 hours; a 1% increase in the change in GDP indicates an increase by 3 hours; a 1% increase in unemployment means a decrease by 2 hours; a 1% increase in the change of RWI decreases hours worked by 1 hour.

SECTION 5: RESULTS DISCUSSION

The results of the regression do not have strong enough correlations to support the hypothesis that Fukushima pushed consumers to work more hours to make up for the lack of nuclear production's impact on the economy. In the first three regressions, the value of CPI increased both hours worked and the time taken to work a set number of hours, but the results were not significant. Neither was the increase caused by the dummy variable Post at a value of one. The last two regressions showed that the percent change in CPI decreased both the amount of hours worked and the time taken to work that set amount of hours after 2011, with Column 4

demonstrating that the average amount of hours worked decreased by 42.3 hours after 2011 when CPI is held constant ($p<0.01$), and Column 5 demonstrating a 35% decrease in hours worked after 2011 when holding all other variables constant ($p<0.01$).

Due to the statistical significance of these observations, the conditional correlation between hours worked and CPI percent change after 2011 have an inverse relationship, and that increase in percent change in CPI led to lower working hours for consumers despite the reduction of nuclear production. This differs from the hypothesized outcome of an increase in hours worked after 2011 and suggests that the factor of pre or post Fukushima alone is not enough to draw correlation with hours worked by consumers.

All of these observations are only conditional correlations with no claim to causation. There is no method of singling out Fukushima Daiichi as a natural experiment for nuclear production considering that it cannot be proven that Fukushima alone is the cause of the complete reduction of nuclear energy, despite being a large factor contributing to the change.

SECTION 6: LIMITATIONS AND FURTHER RESEARCH

The sample collected was rather small, since data had to be collapsed into yearly values instead of quarterly or monthly to match the nuclear energy production data. While more specific output of generation might have been published elsewhere, much of the data was published in Japanese databases, making it hard to navigate, or inaccessible to me because I cannot read Japanese. The data is also national data, meaning that there was no way to investigate the regional impact of the decline of nuclear production or the impact of the Fukushima Daiichi disaster. As mentioned, the regression can only analyze a potential conditional correlation to not being able to establish Fukushima as a natural experiment by ensuring there were no other structural changes

that occurred in 2011 that would impact nuclear production that was not a by-product of the disaster.

In future research, having regional data might have been able to create more specific conditional correlations, as impacts could be compared between which regions had high amounts of nuclear production and those with very little. There might also be data around the BoG for each of these regions, as much of the population measured lives in cities that are not close to NE production. However, those numbers might be influenced more by the individuals working for said power plants as an absence of work, rather than an absence of energy provided by NE production. Another lens to use this research method with would be the impact of the lack of NE production of the industrial companies in Japan, as much of NE production powers industrials. It could potentially show the group that actually holds a positive relationship with NE production, and could be used to even further support the motives of certain companies to participate in positive NE publicity and advertising.

SECTION 7: CONCLUSIONS

Using a series of regressions, the study investigated a conditional correlation between the average hours worked between 2000 and 2025 in Japan and the consumers BoG using CPI, alongside indicators of consumer strain (GDP, Real Wage Index (RWI), unemployment) to examine and observe potential impacts pre and post Fukushima with reduction of nuclear energy on the average consumer. Of the five regressions, the fourth and fifth regressions were the only ones to produce coefficients of any statistical significance. The fourth regression demonstrated that hours worked decreased by 42.3 hours after 2011 when CPI is held constant ($p<0.01$). The

fifth regression showed that there was a 35% decrease in hours worked after 2011 holding all other variables constant ($p<0.01$).

These outcomes were counter to the hypothesized results where hours worked would increase after 2011 as a result of Fukushima and the reduction of nuclear energy production, or potential other external events. The results show that a lack of statistical significance in the conditional correlation would instead suggest that the reduction of NE production after Fukushima did not have a significant increase in strain on consumers.

Based on the observations, the avoidance of economic impacts of NE production on the consumer is not only practicing truthful advertising, but it is also beneficial to the companies promoting it. To have a product that does not benefit the consumers directly as individuals despite the heavy reliance on the public to continue production is risky, as it gives the consumers room to question negative impacts that might be more direct. It's likely why there was a gap in literature surrounding this topic; companies or organizations invested in nuclear energy would have no incentive to sponsor and publish research showing that NE production not only doesn't have a large positive economic impact on them, but its absence doesn't change much either.

As a result, it can be concluded that any media accessed in the sample from [Part 2] of my research that directly addresses or claims economic benefits to consumers without providing researched evidence are not only making unsupported claims but advertising using information now observed to be either not correlated, or counter to any correlations found.

PART 2: COMMUNICATIONS AND MEDIA STUDIES

SECTION 1: INTRODUCTION

After determining that the economic impacts of the absence of nuclear energy do not have statistical conditional correlation with the amount of hours worked by consumers or their regular expenditure on their Basket of Goods, we can properly assess exactly how nuclear energy is being advertised to members of the general public. Once again, Japan will be used as a center focus, due to our economic analysis and the history surrounding nuclear energy in the country. Japan was one of the largest producers of nuclear energy in the world until the events of Fukushima, when a country previously traumatized at the hands of nuclear weapons pulled the plug completely on the energy source. However, the firmness in this belief has faded, with 14 of 54 of the offline reactors having been restarted, with 11 more currently under review (WNA 2025). While it makes sense for there to be a push by government officials and industries due to Japan's energy insecurities and high cost for nonrenewable fuels, NE production relies heavily on positive public opinion to move forward.

Recent polling has demonstrated that there is, in fact, a majority of the public that is accepting of NE production, with 18.3% of JAERO survey participants saying they accepted nuclear energy (either entirely or somewhat) in 2025, which is over 8 points higher over the course of a decade (Tanehara 2025). More interesting, the portion of individuals who have "no opinion" regarding NE production is up 12.5 points over the course of the decade, at 33.1%, with 35% of those participants citing that they can't determine which information regarding NE can be trusted (Tanehara 2025). These changes in opinion could be a result of marketing and advertising campaigns designed to create perceived benefit from NE, a correlation that has been proven to be statistically significant ($p<0.01$) across various countries and cultures (Wang 2020,

S. Wang 2020). The focus was shifted from not discussing NE in a pre-Fukushima landscape to releasing positive NE statements to create ideas of benefits to consumers and to society and dissuading critical journalism surrounding production (Weiss 2020).

This study aims to identify the factors contributing to the positive shift in public opinion in Japan using methods informed by media theory such as The Situational Theory of Publics, strategic communications, and the Uses and Gratifications Theory. All of the theories will be applied within the context of Japanese media, as it has different cultural signifiers and background than the western media many of these theories were originally developed in.

A sample of ten webpages across five companies and organizations were analyzed with five metrics: 1) colors and images used in the media; 2) language used in the media and if it was translated; 3) the direct message of the media; 4) presence of claims of economic benefits directly to consumers; 5) the messages' persuasive appeal and intended audience. Most of the sample was written in English, with only two webpages being auto translated, and nearly all of the sample demonstrated appeals to the public (society, Japan, the world) rather than individuals. The sources featured light colors, such as light teals, blues, and whites, as well as saturated images with blues, greens, and yellows in natural, healthy landscapes. The overall messages were similar, with all but JAERO focused on equating their support of nuclear energy to their efforts in sustainability; JAERO was focused on informing the public about various elements of NE production, including the dangers, with the goal of exciting a new generation of students into becoming engineers. There were no claims of direct economic impact to consumers made. Concluding from the sample, we can understand that the current marketing strategies surrounding NE are not only focused on perceived benefits, but are specifically focused on the perceived public benefit of NE as a sustainable energy source.

SECTION 2: LITERATURE REVIEW

SECTION 2.1 NUCLEAR ENERGY IN JAPAN

Since nuclear energy's (NE) triumphant introduction in the mid-sixties, Japan's governing forces have been some of the most pro-nuclear voices on the planet, with Japan producing the third largest amount of NE in the world in 2010, behind the United States and France (CarbonBrief 2015). There were plans to transition the country to using even more nuclear power, with the Japan Atomic Energy Commission (JAEC) announcing that a 30%-40% share of the entire country's energy portfolio was to be made up of NE by 2030 (WNA 2025). However, after the devastating impact of the Tohoku Earthquake and Tsunami in 2011 and the following meltdowns of the reactors at the Fukushima Daiichi plant, Japan rapidly decommissioned all of the nuclear reactors in the country, dropping their production of NE to zero by 2014 (IEA 2024).

Despite the impacts across the country from the disaster, Japan has found itself back in a pro-nuclear mindset, with a total of 14 reactors restarted, and 11 more currently under review (WNA 2025). While lower than the previous goal, with a currently depleted fleet of reactors, Japan hopes to have 20% of the country's energy portfolio be composed of NE (2025). Pre-Fukushima, NE was seen by the National Diet (Japan's legislative branch) as the best energy solution for a densely populated island with no natural resources for energy generation, becoming one of the only ways to loosen dependence on allies and trade partners (Hermwille 2016). NE has also shown trends of being sustainable, with researchers finding positive correlations between decreasing carbon emissions, Nuclear Energy, and environmental taxes between the years 1990 and 2020 (Habib 2025). NE also decreased in carbon emissions in both

positive and negative shocks to NE in Japan, though the positive shock was more impactful (Habib 2025).

NE is not a source of energy that can be easily introduced into any country. In studying the correlation between democratic government development to developing nuclear power in a country using a pool of 166 countries over the span of 57 years (1960-2017), researchers found that higher democratic development was more favorable to nuclear development, based on the notion that strong democratic governments are much more suited to creating and following the complex safety protocols needed when creating NE (Neumann et. al 2020). Japan is a strong democratic country that has continuous backing and support from various other democratic nations such as the United States or various countries in the UN, putting it in an optimal place for creating effective nuclear safety protocols and procedures (negating previous failures). The creation of the Japan Nuclear Human Resource Development Network (JNHRDN) can be used as an example of this capability; the JNHRDN is a network designed to share information and academia at a governmental level that can be used to build interest in nuclear development, citing collaborating with engineering students as a method to inspire interest in nuclear development (Fujiwara 2017).

There has also been support for NE in Japan for a long period of time. As mentioned previously, Japan has no natural resources of its own, leaving it at high risk to unstable energy security. Pre-2011 energy policies in Japan were focused on the diversification of imported energy (due to the 1970-80s oil crisis), as well as the bolstering of renewable energy sources that could be used on Japanese soil (Feldhoff 2011). Despite the interruption to NE production, the diversification of the Japanese energy portfolio was successful, pulling away from what was a 75.5% oil generated portfolio in 1973 to only 37.1% oil in 2019 (METI 2022). However, the

majority of the portfolio is still imported sources, leaving the demand for NE production to increase, as well as room for renewable and sustainable energy sources to grow.

Considering that the government was more than willing to jumpstart the production of NE once more, the only thing that could hinder it would be the citizens of Japan, and their fear.

SECTION 2.2: PUBLIC OPINION

Despite having a past with nuclear impacts since the end of WWII, the driving factor behind the majority of nuclear energy fears in Japan come from the Fukushima Daiichi meltdowns in 2011 following the Tohoku earthquake and tsunami. Immediately after Fukushima, public acceptance of NE tanked. In polling from October 31 to November 12, 2014, the majority (47.8%) of men and women ages 15-79 in Japan believe that NE should be "continued for the moment but gradually phased out," (Kimura 2021). Roughly 16% wished for the abandonment of NE completely, and another large portion of respondents simply answered, "No Opinion," with 20.6% of responses (Kimura 2021). Responses in this same poll showed respondents also concerned about hazards due to Japan being prone to earthquakes, surrounding areas to power plants lacking a proper disaster protocol, and contamination of soil, food, and water from NE production, with each question having over 50% of answers either fully or somewhat agreeing (Kimura 2021). There were also individuals who were pro-NE, with the combined percentages of wanting an increase in NE and maintaining a power level equal to that before Fukushima (1.3% and 8.8% respectively) totaling at 10.1% (Kimura 2021).

Nuclear as a word even tends to have negative connotations with individuals. In a 2020 survey, when asked if they have a negative or positive connotation with nuclear weapons and NE (as separate categories), 80.4% of responses said a negative connotation with nuclear weapons,

and a 68% negative connotation with NE, suggesting that even being associated with nuclear draws negative reactions (Baron 2021).

However, there has been a shift in these opinions. In the 2025 Japan Atomic Energy Relations Organization (JAERO) NE survey, only 38% of individuals thought that NE should be continued but phased out, and 18.3% of survey responses were pro-nuclear (combining positive answers), which is up over 8 points in a decade (Takehara 2025). More concern, the number of individuals who have "no opinion" is up to 33.1%, and is the highest ever recorded, up 12.5 points (Takehara 2025). Of the individuals that did not have an opinion, 33.5% cited "I'm not sure what information can be trusted," as the reason for their indecision. There was also a large portion that cited that they were just tired/didn't want to think about NE, at 20.9% (Takehara 2025). The public's view of NE is shifting, but whether or not they are being convinced of its benefits or are just burned out by conversations that go nowhere is harder to pinpoint.

Views around NE can be impacted by a multitude of factors. In a study conducted in Belgium in 2015, support for NE was statistically significantly ($p<0.01$) impacted by the perception of personal benefit, the perception of personal risk, consideration for climate change and renewable energy, and trust in the management of the production of NE (Latré 2019). Personal benefit, both generally and locally, was also a large factor for citizens in certain areas of China approving of new nuclear reactors being installed in their towns; notions proved statistically significant ($p<0.01$) in a regression of the results of a questionnaire answered by 326 individuals (Wang 2020). Perceived benefit can be impacted by information publicity, or the sharing of information publicly, as analyzed data from 751 questionnaire respondents in China (S. Wang 2020). The correlation between perceived benefit and willingness to accept NE was statistically significant ($p<0.05$), and in a similar vein, perceived risks negatively correlated with

willingness to accept NE ($p<0.01$), drawing on the importance of managing perceptions of individuals (S. Wang 2020). Perceived benefit can also be correlated to public acceptance (PA), which again, is one of the main barriers to continuous nuclear industry growth. Countries such as China struggle with PA because of a lack of information publicity, leaving individuals feeling uneducated and sometimes deceived (S. Wang 2020).

Japan falls dangerously close to a similar situation. Using concepts of sociotechnical imagery (imagined forms of social life and order from a collective that appear in the design and function of technology or nation-specific projects) and civic epistemology (the practices of political information spreading through social and institutional practices), researchers have been able to determine that pre-2011, NE was prevailing due to the unworried, uninformed citizens and the discrediting of anti-nuclear messaging (Saito 2022). Positive nuclear messaging was supported by the concept of "nuclear villages," a concept referring to the use of electrical company funds being disrupted to companies and organizations (construction companies, universities, politicians) with both the ability to benefit NE production, but also spread positive persuasive messaging (Saito 2022). This money also finds its way into media and specifically into journalism, creating incentives for positive nuclear sentiments (Saito 2022).

Sometimes, the funds flowing towards newspapers and news sources are not for the publishing of positive views of NE, but just for a lack of news on the topic. Before 2011, there was a "nuclear blind spot" in the media, a result of continuous and organized pressure from energy monopolies on journalists and publications, where regardless of positive or negative views on NE, there was rarely any critical press on the subject (Weiss 2020). While perhaps a practice of the past, the previous existence of a "nuclear blind spot" could have a long-lasting impact on the views of individuals. In particular, one of the newspapers with the most pro-

nuclear writers was the Yomiuri Shimbun, which has a much larger demographic of lower income, lower educated individuals who might use the Yomiuri as one of their sole sources of "reliable" information (Weiss 2020).

The key for nuclear companies to overcome negative perceptions therefore relies not only on internal safety practices and government support, but the ability to change public perceptions around the benefits and risks of NE.

SECTION 2.3: THEORY

The basis for understanding the audience's interpretation of media can be summarized through a few tried and tested theories. The Shannon-Weaver model shows information and communication flowing through the process of encoding and decoding, with the addition of inhibiting facts (Al-Fedaghi 2012). Similarly, Reception Theory, a collection of findings from various theorists such as Stuart Hall and Hans Robert Jauss, where audience members are dominant, negotiated, or oppositional to the messaging, influenced inconsistently due to individual experiences and preferences (Dziak 2024). This also leads to how individuals "use the media to satisfy specific needs or desires," as described by Uses and Gratifications Theory, creating a further separation between the media and the received message (Schechter 2023). This can lead to the creation of echo chambers for the audiences when the media they consume begins to cater towards their uses and gratifications in order to reach them, as demonstrated in a study in the U.S. on media surrounding COVID-19 vaccinations where the messaging went the farthest by being specific to more audience uses (Shawe 2025). One such component of these messages is the colors used within them, as researchers have proven associations to colors, particularly to the hue, brightness, and chroma of a color, to be effective when relaying advertising messages

(Awad 2025, Romeh 2024). As such, if an advertisement were to use bright colors, it might evoke a sense of liveliness, and the colors green and blue are highly associated with “the sky, water, greenery, and plants” (Romeh 2024).

To combat the large amount of interference between the encoder and the decoder, many public relations campaigns utilize Strategic Communications. Strategic communications became a subject of conversation in the 1990s, with researchers such as Carl Botan defining strategic communications as the practice of planning out goals and objectives, then targeting particular types of publics and using chosen tactics to fulfill the need of the strategy, or more simply, “planned, research-based, persuasive and informational campaigns” (Boton 1997).

In a similar sense, Richard Halloran’s definition starts broad, as “a way of persuading other people to accept one’s ideas, policies, or courses of action,” but quickly moves into examples of governmental and militaristic use, differing from Botan (Halloran 2007). Key elements to a strategic communication campaign are “a defensible policy, a respectable identity, [and] a core value,” and Halloran notes that a strategic communications plan “hasn’t been built that can pull a poor policy decision out of trouble,” but rather are structured to particular audiences (Halloran 2007).

For a robust communications strategy, many encoders look to the theory of Situational Theory of Publics to create a shared narrative amongst a large group of people. As defined, a “public” is formed whenever individuals “face a similar problem, recognize the problem, and organize to resolve the problem” (Sriramesh 2007). There are four types of publics (active, latent, aware, and nonpublic), and depending on the type of public best suited to the end goal of the message, the messaging itself can be manipulated with the goal of creating a certain kind of public in response (Sriramesh 2007). Publics interact with their problem through problem

recognition, constraint recognition, and level of involvement, demonstrated in a study analyzing how climate change deniers in Europe were gaining traction within their small but active public (Xifra 2015).

Publics can also lead to detrimental effects for a group, as seen in the Spiral of Silence model where true opinions of individuals in a public are not shared, leading to the belief of an incorrect majority opinion that is counter to actual beliefs (Shawe 2025). This particular model should be kept in mind for a public such as the Japanese, as the monoculture environment is not welcoming to ideas and opinions that could be seen as opposing, leading to Spirals of Silence in matters such as NE policy. Considering earlier mentions of "nuclear blind spots" and the increasing number of individuals with "no opinion" in energy polls, the goal of the current messaging is to create and/or maintain a latent public (in which the individuals do not understand how they are impacted). Again, the potential to inspire hesitancy or non-involvement through individual's constraint recognition could be within reach of Japanese nuclear publicity strategies.

Advertising in Japan uses imagery that contains various cultural signifiers and monoculture narratives to encourage group and public ideals. Even outside of modern advertising, messaging in Japan (particularly in magazines and newspapers) has been for the elites to use against the lower classes in attempts to regain a power similar to that of the Meiji Era (Frentiu 2014). As such, many magazines contain imagery that becomes symbols of "socio-cultural convention," pushing individuals to keep tradition at the forefront of what they do, a message that could be warped to support Japan-made NE in times of wavering energy security (Frentiu 2014). Many visuals, when analyzed through a visual social semiotic approach, perpetuate the idea of a sense of self for the Japanese customers and products, and others anything that is Western to continue this shared view of the self (Minowa et al 2016). This sense

of self, however, is still playing into the idea of monoculture and connective cultural norms, a concept seen in public service announcements that rely on a sense of duty to the community (and potential communal shame) to persuade audiences (Bîrlea 2019). The strong sense of community and harmony is a tool in Japanese advertisements to insight conformity and acceptance of ideals and practices; how far of a leap would the acceptance of NE be?

Research from 2019 analyzed how these techniques have been adopted post-2011, when citizens are demanding more information regarding NE. With the end goal of changing perceptions in mass, energy companies rely on a five-step system: "(i) problematizing the issue, (ii) laying a foundation for change, (iii) reshaping perspectives, and (iv) entrenching support" (Valentine et. al 2019). This framework, while not saying it directly, focuses on changing perceptions of NE by posing it as a solution to a different problem, such as the recent energy crisis due to political turmoil within and outside of Japan.

SECTION 3: METHODOLOGY

A media sample was collected from two major nuclear organizations and three energy companies from Japan: 1) the Japan Atomic Energy Agency (JAEA); 2) Japan Atomic Energy Culture Organization; 3) Hitachi; 4) Mitsubishi Heavy Industries' sector; 5) Toshiba. The sample consists of webpages containing statistics and infographics regarding the current production of nuclear energy, company mission statements addressing nuclear production goals, and advertising archives. The information is all from the past five years, meaning that the media being examined was not a part of the initial phases of the pro-nuclear campaigning, but rather are a product of a later stage, where the Japanese have become more tolerant (or tired) of the

discussion. The later products also have more of an incentive to be geared towards audiences that are not Japanese, which is noted in the final observations.

I observed five key features: 1) colors and images used in the media; 2) language used in the media and if it was translated; 3) the direct message of the media; 4) presence of claims of economic benefits directly to consumers; 5) the messages' persuasive appeal and intended audience. Observing the colors and images will give an understanding of the tone of the media, and will establish how the visuals that the nuclear industry chooses to correlate itself to impact public opinion. The language in the media can distinguish between a translated piece of media and a piece of media intentionally written in English for a non-Japanese audience to understand based on content and grammar. The separation of the media from the Japanese public could change the messaging, considering the common belief of the Japanese that Western elements are "other" to them and their culture (Minowa et al 2016, Bîrlea 2019).

If the message is in English, then the direct words of the message will be analyzed as direct communication from the nuclear company/organization. The goal will be to determine similarities in the messaging between companies and determine how the message is promoting nuclear energy. Potential messages include describing consumer benefits, describing ecological benefits, and describing manufacturing benefits. From there, the message will be analyzed for who it is targeting; the individual or a public. If the message is more individualistic, it will likely appeal to the benefits of the family or the decrease in prices, whereas climate and industry related messages are more geared towards a public with the goal of benefiting a larger group.

Much of the media being examined will be in English due to translation constraints and the lens of the intended audience being for Western countries, where speaking/reading English is very common, despite the media itself being made by Japanese companies/organizations. Since

the media is being accessed through the Google search engine, some of the media that might have originally been in Japanese could be auto translated. This will be noted, but for accessibility, any messages will be analyzed using the translation. There are also instances of media that have been translated before being uploaded, and therefore have instances where the message is conveyed in an incorrect grammatical form. These messages will still be analyzed if the original message is clear, but if the original message has become unclear, then either a portion or the entirety of the translated message will be negated from the observations.

The addition of looking for claims of economic benefits will not only tie in previously mentioned research, but will allow for a gauge in accuracy and priorities in the messaging. Advertisers using claims such as lower prices in factors contributing to the Japanese BoG (such as expenditure on food, rent, transportation, or utilities) could be potentially misleading if offering up vague claims with proven evidence, as my previous regressions indicate no conditional correlations that would suggest that those claims could be accurate. If there are economic claims made, there may be grounds to question the efficacy of the campaign. However, if there are economic claims made that provide data to support them, then this dilemma is avoided. The use of economic claims could also indicate an appeal towards individuals, as impacts to the BoG would be felt individually.

SECTION 4: FINDINGS

To begin my analysis, I examined the webpages of the three companies advertising their involvement in NE production, starting with Hitachi. There were two webpages featured for Hitachi: a webpage titled "Thinking About Energy" and an image from a digital image library called "A significant step towards carbon neutrality." "Thinking About Energy" featured bright,

accessible diagrams and figures regarding various forms of energy production, with a light teal or white background throughout. Notably, the text was not black, but rather a dark grey that had a softer feel to it. The information was written in English and not auto translated, and described the energy goals of Japan, the types of sustainable energy production, and information as to why Hitachi's investment in sustainability is important. There were no claims towards economic benefits to the consumer, though there was discussion of the cost of energy as a whole for Japan. The message is focused on the greater benefit to all of Japan, indicating a public appeal. "A significant step towards carbon neutrality" is a flyer composed of 11 images that feature many saturated blues, greens, and yellows, and display various combinations of engineers/maintenance crew members, Japanese children, Japanese families, and illuminated cities at night. The text is written in English, and claims that Hitachi is investing in nuclear energy to push for a sustainable society, reliable energies, carbon neutralities, and economic growth. Once again, there were no claims of economic benefits for consumers, and the message was an appeal to the larger group and the whole of Japan.

The Mitsubishi Heavy Industries webpage on "Nuclear Power Generation" is a branching point to the more specific types of generation and parts that the company offers, but features an image promoting Mitsubishi's stance on nuclear energy. It consists of two images and a diagram blended together; an image of a beach with a mountain range at sunrise, an image of an illuminated city by the water at night, and a diagram of a nuclear production plant. The text of the design is in English and claims that Mitsubishi supports nuclear power production for "a carbon neutral society and a stable energy supply" (2025). There was no discussion of direct economic benefit for consumers. The message is appealing to the public, as the goal of the message is to better Japanese society, as well as the rest of the world that they offer service to.

Toshiba's "Nuclear Power Solutions" webpage features a white and light gray background with large, saturated images of distant nuclear power plants shot from a rapeseed field, an image of a park obscured by a setting sun, and an image of a flower that is predominantly a deep green. There is one figure that uses dark blue and green to show data, in which the data is written in English, like the rest of the text. Different from the webpages of the other industrial companies, the message of the page is that Toshiba provides proper continuous nuclear production support and maintenance, as well as working to help construct and commission reactors around the world, meaning that it speaks to potential business partners rather than an outside individual trying to inform themselves. Still, the message appeals more to a larger public due to the descriptions of the benefit the sustainable practices have had on society around the world. There was also no mention of direct economic benefits towards consumers.

The JAEA's website has information regarding the central message and goal of the organization across multiple webpages, but three stand as the most important to analyze in terms of pro-nuclear advertising: the "What is JAEA" introduction webpage, the "Message from President" webpage, and "JAEA's Catchphrase." "What is JAEA" features a mostly light teal background, with the colors yellow, pink, and blue being used to differentiate between the three main components of JAEA's mission in the central diagram. Throughout the page, there is a large use of blue, mostly for use of links, and highlights. Diagrams of reactors use multiple colors, focusing on blue and green, with imagery of trees and houses in many of the depictions of reactors. The entire page is written in English, is meant to establish the goals of JAEA through the core parts of their mission statement (synergy, sustainable, ubiquitous), and gives short introductions to the different research projects currently ongoing. There are no mentions of

economic benefits to consumers. The message is an appeal to the public, as it promotes benefit to the future of Japan and the world.

The "Message from President" webpage has a simple white background, and a small image of the current president. Written in English, the message from the president aims to establish the JAEA as an agency working to maximize the peaceful use of nuclear energy and explain the three core parts of JAEA's mission (synergy, sustainable, ubiquitous) once again. It also appeals to a large group due to the benefits to a wider society in Japan and the globe. The message did not include any claims of economic benefits to consumers. The webpage "JAEA's Catchphrase" features a single image of the logo on a white background. The logo itself is dark blue text in both English and Japanese, with two red squares subtly representing a "burst of spirit, energy, and creativity" into the future (JAEA 2025). Interestingly, the English translation of the logo is more prominent, with the Japanese being framed as a secondary by being placed smaller in the top right. This webpage details descriptions of the logo, and how it is meant to represent the future of nuclear energy in Japan and the world, which does not include any claims to economic benefit for consumers. The logo and the message of the webpage are both public appeals due to the emphasis on a brighter future for the whole of Japan and the world.

JAERO's website is harder to navigate due to many of the headings and labels being images that featured un-auto translatable Japanese, so the two pages selected for analysis were given nicknames in English, as the actual headlines could not be determined: "Selection of Nuclear Information" and "General Information Page." "Selection of Nuclear Information" is designed similarly to a chapter select, as it has various sections of information that are color coded for easy selection, as well as short write ups further down the page; again, color coded. There is a large use of white and pale teal for the background and green for major headings.

Images are mostly diagrams to convey technical information, but the historical chapter has historical images as its cover. However, unlike the other webpages, JAERO is originally written in Japanese, meaning all of the text is auto translated by Google. This also means that all of the text in the diagrams and images (like the headings) are not translated. The overall goal of the webpage is to provide access to information about nuclear energy including, but not limited to, history, safety, disaster prevention, and the laws and regulations. The type of information for each section (detailed further on the page) seems to be geared towards a more academic audience, or at least an audience already familiar with nuclear machinery and processes. There are no claims to economic benefit for consumers on the webpage despite the large array of information. Said information, while available for the public, feels more self-serving, as the information is there for individuals to access and does not attempt to appeal to a greater impact on Japan or the world.

"General Information Page" is very similar, with a white background and pale teal writing for major headings (or vice versa). There are occasional diagrams and images of newsletter front pages, but many pictures are place holder stock photos, with some being of Japanese children or students. Once again, all text that is accessible in English has been auto translated through Google translate, with all text in images and headings remaining in Japanese. The page is similar to the last; a selection of links with information about nuclear energy and its future, including teaching materials and newsletters to stay up to date in the most current progress in nuclear energy research. However, it feels much more approachable and appeals to advertising itself to high school students and teachers rather than those already in the field. The page has no information that directly claims economic benefits to consumers. While the page is

also directly serving the viewer, it feels like more of a public appeal, considering that it is more accessible to a wider array of people with the goal of reteaching nuclear energy to a larger group.

SECTION 5: DISCUSSION AND ANALYSIS

The overall messaging strategy across all five of the sources can be summarized as either attempting to be calming and accessible, or visually representing a hopeful, bright future. The presence of light color palettes for the backgrounds (the light teals, whites, and light blues) accompanied by bright colors for diagrams depicting industrial structures implies a lighter, more approachable tone to a very serious and intense kind of information. The image selection across the sample is also very upbeat and hopeful, with bright, colorful, green and blue imagery reflecting the hope of success through sustainability efforts to mitigate climate change alongside happy children and families. Most of the sample strayed away from discussing the details of the operations behind nuclear energy production, instead focusing on the future benefits to both the Japanese energy portfolio and sustainable energy efforts. In fact, nearly every source in the sample discussed sustainability efforts, painting investing in nuclear energy as a massive step taken by companies and organizations alike to combat the harsh effects of climate change.

Due to this heavy focus on future benefits, audiences will come away from these resources having created an idea of perceived benefit since the impact of future events has yet to be seen. However, the perceived benefit does not stem from economic factors, such as a lower Basket of Goods for consumers as none of the sources directly touch upon the impact on the economy. All of the discussions were solely based on creating a stable energy supply through sustainable means, without advertising false promises of lowered electricity prices to consumers.

The majority of the sources were also written entirely in English, meaning that the messages were conveyed as close to intended as could be. It also suggests that the intention of these sources was to communicate with English reading audiences, such as Americans and large portions of the Western world. The goal of communicating directly with this audience could be to help keep positive conversations around nuclear energy production, an incentive that industrial companies have if they wish to expand their businesses globally. Tobashi demonstrates this mindset not only through the self-flattering text written on the webpages, but the pictures featuring distant reactors; rapeseed is very commonly grown in large fields like those featured in both Japan and France, where nuclear production has been very favorable to the public.

JAERO appears to have the lowest stakes in positively changing perspectives towards nuclear energy and its benefits. The website is not easily navigable for individuals who don't read Japanese, and much of the information provided in English was discussing the prevention of nuclear accidents or how best to mitigate the dangers of working in environments with high levels of radiation, neither of which inspire much confidence. However, JAERO still makes efforts to educate a younger population of Japanese citizens to both lower stigma around production and to attempt to attract more students to study subjects that would benefit nuclear production.

Overall, all of the sources are working to bolster discussions surrounding nuclear energy in a positive way, be it through building sustainable and stable energy sources for Japan and the rest of the world or enticing students into becoming nuclear engineers and researchers. There is no direct discussion of positive economic impacts on consumers, meaning that all of the messaging is relying on the perceived benefits, with particular focus to positive future environmental benefits that impact the larger public rather than the individual.

SECTION 6: LIMITATIONS AND FUTURE DIRECTIONS

Working with Japanese media as someone who doesn't speak or read Japanese is challenging, as it limits what media I have full access to. It also means that the information and messaging collected couldn't be compared with the messaging to Japanese citizens, leaving questions of whether or not the purely English messages have been changed slightly. The sample size was also relatively small, despite being chosen across large companies and organizations in the Japanese nuclear industry, leaving room for question about how robust the observations made could really be.

For future research, the sample size should be expanded to include not only more companies and organizations, but potentially various types of media from these companies. Potential companies to incorporate would be the eight different electric companies in Japan, if those companies have specific information regarding their stance or their stake in nuclear energy. Companies that directly manage nuclear power plants may also be good sources for media for the sample. In terms of media for the sample, a wider array could be more robust. Currently, the sample is consistent due to all of the sample being drawn from webpages, but having a larger array of advertising and messaging material could be beneficial. New types of material could include pamphlets, TV ads, and social media content.

SECTION 7: CONCLUSIONS AND FORWARD THOUGHTS

This study analyzed a sample of web pages from different Japanese companies and organizations regarding NE production for specific advertising metrics. The metrics included: 1). colors and images used in the media; 2). language used on/in the media and if it was translated; 3). the direct message of the media; 4). presence of claims of economic benefits directly to

consumers; 5). the messages' appeals to the public versus the self. The results showed that the current marketing strategies surrounding NE are focused on perceived benefits of NE as a sustainable energy source. The industrial companies push that they support nuclear energy production as a significant way to support future sustainability, and the nuclear organizations propose nuclear energy as the future of energy production for Japan due to its sustainability and the fact that it can be produced by Japan rather than imported.

The materials in the sample avoided the discussion of economic impacts towards the consumer, both positive and negative, demonstrating a willingness to be accurate in the messages based on the finds from [Part 1]. It suggests that the companies might be aware that there is little to no significant positive economic impact on consumers, but there is no evidence in this study to say so completely.

Based on the observations made within the study, I would suggest that sustainability is one of if not the driving force behind public opinion change in NE production in Japan. Nearly every single piece of the sample included notes about sustainability as a positive step for not only Japan, but for global society. It further demonstrates the importance of sustainability to individuals and shows the power of a perceived benefit from a product or service that might not deliver direct benefits to the consumers they need public acceptance from. This framework could be used to analyze different goods and services that claim to hold benefits to consumers over a long period of time, such as A.I., to determine if the perceived benefit stems from direct impacts to consumers or a sold idea of public benefit in the future. A.I. might outright claim to be sustainable, but their efforts to do so stem from their investment in NE production for their data centers, such as the deal between Crane Clean Energy Center and Microsoft, or OpenAI's endorsements of the nuclear start up, Helion.

The technique utilized in Japan, or at least by Japanese companies, is not contained to Japan, and instead is being used across the world as a way to sell consumers on products that might not ever bring direct positive impacts to them. While not inaccurate, consumers should be aware of what information is left out of their advertisements, rather than just what is stated.

CONCLUSION

This study examines the advertising and public relations messaging used by the Japanese NE industry by analyzing potential economic impacts to consumers and analyzing messaging media in a sample of NE advertising. Using Japanese economic data, I compiled stylized facts, descriptive statistics, and a series of regressions to test the conditional correlation between the Basket of Goods (BoG) in Japan before and after 2011, when the Fukushima Daiichi disaster halted all nuclear energy production. The regressions demonstrated that hours worked decreased by 42.3 hours after 2011 when CPI is held constant ($p<0.01$) and that there was a 35% decrease in hours worked after 2011 when CPI increased by 1% ($p<0.01$), but there were no other conditional correlations that could suggest that NE production had a positive impact on the BoG for consumers. Then a sample of 10 webpages from five Japanese NE companies and organizations were observed using a combination of media theories such as Situational Theory of Publics, Uses and Gratification Theory, and Strategic Communications. Making observations using a system of five key metrics for analysis, I concluded that nearly all of the messages focused on the perceived benefit of the "sustainability" of NE used images, color, and language to invoke environmentally positive messages. There was no mention of direct economic benefit to consumers through the BoG.

Based on the observations, the avoidance of economic impacts of NE production on the consumer is not only practicing truthful advertising, but it is also beneficial to the companies promoting it. To have a product that does not benefit the consumers directly as individuals despite the heavy reliance on the public to continue production is risky, as it gives the consumers room to question negative impacts that might be more direct. It's likely why there was a gap in literature surrounding this topic; companies or organizations invested in nuclear energy would have no incentive to sponsor and publish research showing that NE production not only doesn't have a large positive economic impact on them, but its absence doesn't change much either.

Instead, sustainability is one of if not the driving force behind public opinion change in NE production in Japan. Nearly every single piece of media in the sample included notes about sustainability as a positive step for not only Japan, but for global society. It further demonstrates the importance of sustainability to individuals, and shows the power of a perceived benefit from a product or service that might not deliver direct benefits to the consumers they need public acceptance from.

This framework of study could be used to analyze different goods and services that claim to hold benefits to consumers over a long period of time, such as A.I.. Many A.I. companies, for instance, could be actively using this technique with their products. A.I. might not outright claim to be sustainable, but their efforts to be "sustainable" stem from their investment into NE production for their data centers, such as the deal between Crane Clean Energy Center and Microsoft, or OpenAI's endorsements of the nuclear start up, Helion. However, investment into a cleaner energy source doesn't exactly make up for the environmental damage done by the data centers these companies are creating.

Nuclear energy and artificial intelligence are far from the same product, but the kind of fear that members of the public hold for them is similar in the way that it can be difficult to make the reasoning behind the fear seem rational. NE is touted as one of the safest methods of energy production on the planet, and yet the world, and Japan, saw one of the worst nuclear disasters in history less than 20 years ago. Regardless of the odds for unprecedented disasters, perhaps consumers should stop and consider why they support the products they do, and whether or not they've been rewarded for their support before they receive the short end of the stick.

REFERENCES

Al-Fedaghi, S. (2012). A conceptual foundation for the Shannon-weaver model of communication. *International Journal of Soft Computing, 7*(1), 12–19. https://doi.org/10.3923/ijscomp.2012.12.19

Awad, Z., Eida, M., Soliman, H., Alkaramani, M., Elbadwy, I., & Hassabo, A. (2024). The psychological effect of choosing colors in advertisements on stimulating human interaction. *Journal of Textiles, Coloration and Polymer Science, 21*(2), 427-434. https://doi.org/10.21608/jtcps.2024.259790.1323

Bîrlea, O.-M. (2019). A cultural-semiotic approach to Romanian and Japanese advertising discourse. Case study: Public service print advertisements. *Journal of Romanian Literary Studies*, (17), 662–672.

Barnaby, F., & Kemp, J. (2007). *Secure energy?: Civil nuclear power, security and global warming*. Oxford Research Group.

Baron, J., & Herzog, S. (2020). Public opinion on nuclear energy and nuclear weapons: The attitudinal nexus in the United States. *Energy Research & Social Science, 68*, 101567. https://doi.org/10.1016/j.erss.2020.101567

Botan, C. (1997). Ethics in strategic communication campaigns: The case for a new approach to public relations. *Journal of Business Communication, 34*(2), 188–202. https://doi.org/10.1177/002194369703400205\

Dziak, M. (2024). *Reception theory: Research starters: EBSCO research*. EBSCO. https://www.ebsco.com/research-starters/social-sciences-and-humanities/reception-theory

Feldhoff. (2011). Japan's quest for energy security: Risks and opportunities in a

changing geopolitical landscape. *Frankfurt Working Papers on East Asia, 5,* (1-22) 2190-7080.

Fernández-Arias, P., Lampropoulos, G., Antón-Sancho, Á., & Vergara, D. (2024). Progress, challenges, and sustainable perspectives in nuclear energy strategies. *Applied Sciences, 14*(24), 11864. https://doi.org/10.3390/app142411864

Frentiu, R. (2014). The "self-shaping" of culture and its ideological resonance: the complicity of ethos and pathos in the Japanese advertising disco. *Journal for the Study of Religions and Ideologies, 13*(39), 91+. https://link.gale.com/apps/doc/A396321403/AONE?u=anon~2bae4025&sid=googleScholar&xid=8eac68af

Fujiwara, K. (2017). Japan nuclear human resource development network. *Energy Procedia, 127*, 35–43. https://doi.org/10.1016/j.egypro.2017.08.094

Habib, Y., Ali, M., Mehmood, U., & Rahman, N. R. (2025). Decarbonizing Japan: The role of nuclear energy and environmental taxation in mitigating CO2 emissions. *Environmental Challenges, 18,* 101097. https://doi.org/10.1016/j.envc.2025.101097

Halloran, R. (2007). Strategic communication. *The US Army War College Quarterly: Parameters, 37*(3). https://doi.org/10.55540/0031-1723.2378

Hermwille, L. (2016). The role of narratives in socio-technical transitions—Fukushima and the energy regimes of Japan, Germany, and the United Kingdom. *Energy Research & Social Science, 11*, 237–246. https://doi.org/10.1016/j.erss.2015.11.001

IEA. (2024). *World Energy Balances Highlights*. International Energy Agency, Paris. https://www.iea.org/data-and-statistics/data-product/world-energy-balances-highlights, Licence: Terms of Use for Non-CC Material

JAERO. (2025). *Energy economic efficiency and price stability.* Japan Atomic Energy Relations Organization. https://www.jaero.or.jp/sogo/detail/cat-01-06.html

Kimura, H. (2021). Introduction of the public opinion and discussion how to provide information concerning nuclear energy. *Insights Concerning the Fukushima Daiichi Nuclear Accident Vol. 2&3, 3*, 166–172. https://doi.org/10.15669/fukushimainsights.vol.3.166

Latré, E., Thijssen, P., & Perko, T. (2019). The party politics of nuclear energy: Party cues and public opinion regarding nuclear energy in Belgium. *Energy Research & Social Science*, *47*, 192–201. https://doi.org/10.1016/j.erss.2018.09.003

Matsuo, Y., & Yamaguchi, Y. (2013). The rise in cost of power generation in Japan after Fukushima Daiichi accident and its impacts on the finances of electric power utilities. *Institute of Energy Economics*.

METI. (2021). *Understanding the current energy situation in Japan (part 1).* Agency for Natural Resources and Energy; Ministry of Economy, Trade, and Industry. https://www.enecho.meti.go.jp/en/category/special/article/detail_171.html#topic02

Mez, L. (2012). Nuclear energy–any solution for sustainability and climate protection? *Energy Policy, 48,* 56–63. https://doi.org/10.1016/j.enpol.2012.04.047

Minowa, Y., & Belk, R. W. (2016). Ad hoc japonisme: How national identity rhetorics work in Japanese advertising. *Consumption Markets & Culture, 20*(4), 329–349. https://doi.org/10.1080/10253866.2016.1239085

Muhammad Amir, R., & Zeler, I. (2024). Discourses on the sustainability of nuclear energy: A semi-systematic literature review of scientific production. *Discover Sustainability, 5*(1). https://doi.org/10.1007/s43621-024-00596-6

Murakami, K., Ida, T., Tanaka, M., & Friedman, L. (2015). Consumers' willingness to pay for renewable and nuclear energy: A comparative analysis between the US and Japan. *Energy Economics, 50*, 178–189. https://doi.org/10.1016/j.eneco.2015.05.002

Neumann, A., Sorge, L., von Hirschhausen, C., & Wealer, B. (2020). Democratic quality and nuclear power: Reviewing the global determinants for the introduction of nuclear energy in 166 countries. *Energy Research & Social Science, 63*, 101389. https://doi.org/10.1016/j.erss.2019.101389

Nikitina, M., Davydov, V., Grebenikova, N., Valiullin, L., Dudkin, V., & Batov, Y. (2019). Methodology for assessing the adverse effects of the use of nuclear energy on agricultural land. *IOP Conference Series: Earth and Environmental Science, 390*(1), 012024. https://doi.org/10.1088/1755-1315/390/1/012024

Pearce, J. M. (2012). Limitations of nuclear power as a sustainable energy source. *Sustainability, 4*(6), 1173–1187. https://doi.org/10.3390/su4061173

Qianqian, D., Zhen, W., Mehboob, M. Y., & Shehzadi, A. (2025). Does green innovation mitigate consumption-based carbon emissions? the role of nuclear energy consumption and energy productivity in G-7 Nations. *Nuclear Engineering and Technology, 57*(5), 103384. https://doi.org/10.1016/j.net.2024.103384

Romeh, R., Elhawary, D., Maghraby, T., Elhag, A., & Hassabo, A. (2024). Psychology of the color of advertising in marketing and consumer psychology. *Journal of Textiles, Coloration and Polymer Science, 22*, 289–298. https://doi.org/10.21608/jtcps.2024.259025.1272

Saito, H. (2022). The imaginary and epistemology of disaster preparedness: The case of Japan's nuclear safety failure. *Poetics, 93,* 101594. https://doi.org/10.1016/j.poetic.2021.101594

Schechter, S. (2023). *Public relations: From strategy to action*. essay, British Columbia. https://pressbooks.bccampus.ca/publicrelations/chapter/chapter-3/.

Shawe, R. (2025). Evolving U.S. public opinion and communication strategies on the COVID-19 vaccination. *Journal of Public Health Issues and Practices, 9*(2). https://doi.org/10.33790/jphip1100240

Sriramesh, K., Moghan, S., & Kwok Wei, D. L. (2007). The situational theory of publics in a different cultural setting: consumer publics in Singapore. *Journal of Public Relations Research, 19*(4), 307–332. https://doi.org/10.1080/10627260701402424

Suna, D., & Resch, G. (2016). Is nuclear economical in comparison to renewables? *Energy Policy, 98,* 199–209. https://doi.org/10.1016/j.enpol.2016.08.023

Storm van Leeuwen, J.W. (2007). Civil nuclear power, security and global warming: CO2 emissions from nuclear power,. *Secure Energy?* pp. 40–44. http://www.oxfordresearchgroup.org.uk/publications/briefing_papers/secureenergy.phpS

Takehara N. (2025, April 16). JAERO releases results of latest public poll on nuclear energy. *Japan Atomic Industrial Forum, Inc.* https://www.jaif.or.jp/en/news/7462

Tantau, A., Puskás-Tompos, A., Stanciu, C., Fratila, L., & Curmei, C. (2021). Key factors which contribute to the participation of consumers in demand response programs and enable the proliferation of renewable energy sources. *Energies, 14*(24), 8273. https://doi.org/10.3390/en14248273

Valentine, S. V., & Sovacool, B. K. (2019). Energy transitions and mass publics: Manipulating

public perception and ideological entrenchment in Japanese nuclear power policy. *Renewable and Sustainable Energy Reviews, 101,* 295–304. https://doi.org/10.1016/j.rser.2018.11.008

Wang, S., Wang, J., Lin, S., & Li, J. (2020). How and when does information publicity affect public acceptance of nuclear energy? *Energy, 198,* 117290. https://doi.org/10.1016/j.energy.2020.117290

Wang, Y., Gu, J., & Wu, J. (2020). Explaining local residents' acceptance of rebuilding nuclear power plants: The roles of perceived general benefit and perceived local benefit. *Energy Policy, 140,* 111410. https://doi.org/10.1016/j.enpol.2020.111410

Weiss, T. (2020). Journalistic autonomy and frame sponsoring. explaining Japan's "nuclear blind spot" with field theory. *Poetics, 80,* 101402. https://doi.org/10.1016/j.poetic.2019.101402

WNA. (2025). *Nuclear power in Japan.* World Nuclear Association. https://world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power#reactor-development-1970-onwards

Xifra, J. (2015). Climate change deniers and advocacy: A situational theory of publics approach. *American Behavioral Scientist, 60*(3), 276-287. https://doi.org/10.1177/000276421561340

APPENXIX A.

Table A

Variable	Obs	Mean	Std. dev.	Min	Max
neprod	24	1695.399	1390.942	0	3513
hrsworked	25	116.273	25.19176	93.55833	154.3667
hrssched	25	112.795	20.48573	94.34167	144.55
hrsworkedman	24	99.38368	2.088472	94.63553	102.2799
ulc	26	-.3974699	2.19789	-5.418943	3.540684
cpi	25	97.859	3.548221	94.35	108.7417
cpichange	27	-.0795215	.2297207	-.6	.4
gdpperchange	25	.7093837	2.046364	-5.693236	4.097918
foodmonth	17	102.6892	3.22692	98.7	108.5
utlitiesmo~h	17	98.26863	4.874869	87	103.625
rentmonth	17	99.19461	5.927417	84.25	107.3083
transmonth	17	96.99951	5.767591	87.69167	106.4917
industrycons	24	3748887	402802.6	3037466	4296440
transportc~s	24	3220522	372955.1	2610715	3761894
residenti~ns	24	1912254	117288.1	1647276	2067725
commercia~ns	24	2174427	190783.2	1786588	2470880
agricultu~ns	24	140016.3	19655.2	103837	169399
fishingcons	24	75537.5	9087.527	60267	90074
nonspecons	24	38889.21	9813.641	22738	53266
nonengcons	24	1453550	146030.3	1069483	1658639
co2emiss	23	8.883217	.5245327	7.793	9.72
electricit~s	24	502.0651	56.38363	417.651	619.328
transporte~s	24	224.0867	26.88348	180.485	263.621
industryem~s	24	206.7798	22.18441	164.482	235.716
residenti~ss	24	60.27224	7.060937	46.026	71.315
commercia~ss	24	65.99476	13.58868	43.65	87.244
agricultu~ss	24	9.516736	1.436785	6.918	11.693
fishingemiss	24	5.445382	.7028438	4.327	6.57
nonspecemiss	24	3.750319	.9290525	2.537	5.663
otheremiss	24	43.60498	5.834839	32.595	50.802

Sources: IEA (2024)

Ministry of Health, Labor, and Welfare in Japan (2025)

Organization for Economic Co-operation and Development via FRED® (2025)

JP. Cabinet Office via FRED® (2025)

Ministry of Internal Affairs and Communications (2025)

Ministry of Health, Labor, and Welfare in Japan (2025)