

# SCRUTINY OF ATOMIC POWER; THE PUBLIC LENS

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## Abstract

*Studies so far have shown that development (or fall) of the utilization of atomic power plants as an essential energy source that is typically affected by sentiments of the public (or lack thereof). This study engages a nation-wide examination to inspect the dynamics of the general enthusiasm for atomic power in India. By probing vital factors that have been established to have an influence on opinion of the general populace in the direction of atomic energy in numerous contexts, including the US, UK, South Korea, and China, the study also extends preceding studies in this sphere. In accordance to examination conclusions, the Indian populace muscularly favors atomic energy, and the populace have faith in the returns of atomic power that overshadow any likely apprehensions. The conclusions also direct that backing for atomic power is interrelated with reservations regarding power security and the effects casted by changing climate, signifying that Indians are equipped to admit atomic energy's likely perils in exchange for the rewards of energy safeguarding and, to a smaller degree, climate change prevention.*

## Introduction

India intends to considerably boost its utilization of atomic power under its total mix of power as fragment of its aim to improve power security, attain cent percent electrification, and reduce emissions associated with carbon. Around 46 TWh of electric power, or 3.2% of India's overall power, were generated by nuclear energy in 2020. The government intends to increase nuclear energy's use substantially to 25% by 2050. The anticipated enlargement necessitates a substantial inflow of funds in building new atomic power stations around the

nation. Moreover, as many as eight nuclear reactors were being erected as of the end of 2019, and an added 25 reactors are predictable to be erected across the State<sup>1</sup>. Public support will be necessary, among other things, for situating atomic power stations and carrying out this idea to considerably increase the use of atomic power. Any siting endeavor must take into account the public's willingness to embrace atomic technology and the host communities' support.

The hazards and advantages of the technology are currently the subject of heated discussions in India's atomic power strategy arena. In order to address Indian energy needs and goals with respect to the climate, supporters contend that atomic power ought to be a component of Indian energy plan. According to critics, solar power should continue to undertake a bigger part in India's energy mix because the potential hazards of atomic power exceed the advantages. Public perceptions of atomic power are likely to influence India's course and whether atomic power remains a significant source of emission-free, dependable electricity for its citizens in the face of these ingrained policy issues. However, nothing is known about Indians' attitudes toward atomic power and its utilization in general. On the one hand, the assurance of access to dependable and economical electricity may increase Indians' enthusiasm for atomic power to a higher extent than is seen elsewhere because grid failures are substantially more common in India than in advanced nations. For instance, The Jaitapur atomic "energy park" in Maharashtra, has recently faced substantial local hostility, which demonstrates that the persons are likewise well cognizant of the possible threats offered by the technology. More research on perceptions of the public, with respect to the technology and its prospects in India is required in order to further comprehend these complexities and the factors that impact support (or resistance) for atomic power. Due to its absence from NPT, India has a mostly domestic atomic power program with a widely recognized and autonomous atomic fuel cycle. Due to this restriction, India was able to develop

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<sup>1</sup> World Nuclear Association, 2020. Nuclear power in India. Retrieved from. <https://www.world-nuclear.org/information-library/country-profiles/countries-g-n/india.aspx>.

and maintain its civil atomic project independently of foreign fuel imports. After the Nuclear Suppliers Group arrangement in 2008, which allowed India to pursue civil nuclear cooperation agreements with other nations (India has signed civil nuclear collaboration agreements with the US, Russia, France, US, Japan, South Korea, and others)<sup>2</sup>, the prospective scope for atomic energy's evolution in India drastically altered. The Center has ambitions to increase the contribution of atomic power to the country's energy mix in order to take advantage of this potential for development. This development is a key part of India's strategy to electrify the entire country and increase its energy independence, resolving long-standing energy security challenges.

Atomic power is an vital constituent of India's green power approach since it aids the republic become entirely electrified and upsurges power security. Currently, almost 80% of the State's power is shaped by fossil fuels; this proportion ought to fall if India is to attain its determined climate targets. There are currently eight atomic power stations under building, with at least another 25 planned, in addition to investments in wind and solar energy. If India is to achieve its climate targets, these new atomic power plants will be required, but the accomplishment of efforts to locate them will largely depend on approval and support of the general populace.

We utilize statistics from a 2019 nationwide poll of Indians to study the structure of public sentiment for constructing new atomic power stations in India. Our research topics are as follows: (1) Does the populace of India support the expansion of atomic power? (2) What elements affect India's support for nuclear energy (or lack thereof)? And finally, (3) are Indians willing to balance off the risks connected with nuclear energy against those of climate change and power insecurity?

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<sup>2</sup> Levi, Michael A., and Charles D. Ferguson. *US-India Nuclear Cooperation: A Strategy for Moving Forward*. No. 16. Council on Foreign Relations Press, 2006.

This work complements and advances prior research in a number of ways. By looking at how the Indian population feels about nuclear energy, we significantly fill a gap. By examining important variables that have been demonstrated to affect public sentiment about atomic power in other countries, including the US, UK, South Korea, and China, we also build on previous research. We specifically pay attention to a pair of factors: people's perceptions of the advantages and disadvantages of atomic power, along with the potential risk trade-offs they might make between the dangers associated with environmental degradation and power instability. We use an associated data of US public perceptions to juxtapose and distinguish the results among Indians because there is a dearth of studies on public attitudes about atomic power in India as well as other developing nations' contexts. Understanding the importance of our research results and their consequences, both for policies in India and for the development of atomic energy internationally, requires the capacity to juxtapose changes in Indian civic sentiment with the views of the US public.

## Historical Context and Review of Literature

- The Sentiment of the General Populace pertaining to Atomic Energy: Governments must gain public support for nuclear power generation if they want to make it a practical energy source. The direction, scope, and impact of the industry have been impacted globally by widespread public resistance to nuclear energy, which has also slowed the expansion of what was formerly a flourishing industry. Previous studies on how the public feels about nuclear energy have discovered a variety of variables that affect attitudes, indicating a link between perceived dangers, advantages, trust in significant parties, and an eagerness to adopt nuclear energy<sup>3</sup>.

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<sup>3</sup> Abdulla, A., Vaishnav, P., Sergi, B., Victor, D.G., 2019. Limits to the deployment of nuclear power for decarbonization: insights from public opinion. *Energy Pol.* 129, 1339–1346.

Governments must gain public support for nuclear power generation if they want to make it a practical energy source. The direction, scope, and impact of the industry have been impacted globally by widespread public resistance to nuclear energy, which has also slowed the expansion of what was formerly a flourishing industry. Previous studies on how the public feels about nuclear energy have discovered a variety of variables that affect attitudes, indicating a link between perceived dangers, advantages, trust in significant parties, and an eagerness to adopt atomic power.<sup>4</sup>

Although nuclear energy was originally seen as a way to meet the world's growing energy demands, it now conjures up unfavorable images and sentiments due to the incidents at Three Mile Island, Chernobyl, and Fukushima. More generally, American research shows that negative perceptions of nuclear power are linked to increased perceptions of nuclear risk, which inevitably are linked to increased opposition to atomic power. Similar to this, popular perceptions around the world indicate that there are considerable risks connected with nuclear energy, with many noting radiation's long-term consequences, the difficulty of disposing of waste, and the sector's association to weapons of mass destruction. The cumulative impact of such unfavorable public impressions has led to risk perceptions that are significantly greater than the actuarial threat related to nuclear power plants and are based on anxieties. We assume that there will probably be an adverse correlation among risk perceptions as well as backing for atomic power since it is probable that the Indian populace views the hazards of atomic power in ways that are comparable to those seen in other nations.<sup>5</sup>

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<sup>4</sup> Yeo, S.K., Cacciatore, M.A., Brossard, D., Scheufele, D.A., Runge, K., Su, L.Y., Xenos, M., Corley, E.A., 2014. Partisan amplification of risk: American perceptions of nuclear energy risk in the wake of the Fukushima Daiichi disaster. *Energy Pol.* 67, 727–736.

<sup>5</sup> Abdulla, A., Vaishnav, P., Sergi, B., Victor, D.G., 2019. Limits to the deployment of nuclear power for decarbonization: insights from public opinion. *Energy Pol.* 129, 1339–1346.

One of the alleged advantages of atomic power is the potential for a safe, plentiful supply of energy, which is possibly the main justification for why nations have undertaken civilian nuclear programs. Additionally, one of atomic power 's primary benefits over conventional fuels, hydroelectricity, and regenerating resources is the beneficial financial effect of comparatively affordable and dependable power combined with an environmentally acceptable method of power creation. For many of the identical reasons, including the attractiveness of nation's self-sufficiency in power, inexpensive output, reliable supply, and low-carbon emissions, research finds that greater quantities of supposed advantages translate into stronger support for atomic power in the US.

The perceived advantages of the use of atomic energy have been expressed across many Asian nations in national policies that have made nuclear power a significant component of the energy mix with the goal of securing a source of energy that is sufficiently inexpensive to support meeting rising demand while reducing emissions of greenhouse gases. For instance, nuclear energy has played a significant role in the various economic growth strategies of Japan, South Korea, China, and India for decades. More recently, the notion that nuclear energy is a critical strategy for addressing climate change has started to gain traction. Although the relationship among anticipated financial advantages and assistance for nuclear power is widely known, perceptions of environmental advantages have not always resulted in a strong public consensus in favor of the technology. In fact, studies show that public support for nuclear energy is frequently greatly influenced by heights of confidence in authorities and facility managers as well as experience with the technology due to closeness to operating power facility.

The advantages of nuclear energy appear particularly significant in the background of India, a growing country with aspirational economic development where request for energy vastly exceeds supply. Atomic power can play a significant part in decreasing carbon emissions, which together

with the advantages of a local source of energy offer a practical answer to India's challenging power supply issues and aspirational climate goals. For these factors, we predict that benefit estimations and backing for nuclear energy will be positively correlated.

- Trade-offs in Atomic Power and Associated Threats: One might conceive a collection of linked or neighboring dangers that re-count to thoughts about atomic energy given the variety of potential risks and advantages connected with atomic power. Some scholars have talked about the idea as a "Threat to Threat" tradeoff, where potential risks from climate change outweigh potential risks from nuclear energy, rendering the latter more popular. We assert that the same scenario may be applicable in the event of a threat trade among energy scarcity and the dangers associated with nuclear energy, even though this topic has not yet been covered explicitly in the literature. In this situation, some people would agree to the risks associated with nuclear energy in exchange for reducing the risks associated with a more widespread energy insecurity. Mixed findings have been reported in studies on the present idea of a threat-to-threat trade (an idea involving the exchange the dangers of atomic power with the perils of climate change). For instance, in spite of exclusive rhetoric presenting atomic power as a key component of a resolution to climate change, this idea has failed to gain any momentum among the US population. This may be due to the fact that these hazards tradeoffs rarely involve a straightforward transaction in which an unwillingness to welcome the potential hazards of atomic energy is readily countered by the peril of climate change. Instead, a recognition of atomic power as a component of a strategy to mitigate climate change is frequently dependent on an array of distinct factors, such as the accessibility of clean sources of energy.



Risk-risk tradeoffs instead represent an intricate network of opinions about atomic power and change of climate.<sup>6</sup>

The notion of atomic energy as an extremely hazardous sector that directly endangers the environment is a major factor in how the public feels about a risk trade-off related to climate change. Americans choose natural gas or renewable energy sources over nuclear power only when there are few other options, notwithstanding their necessity and desire to minimize carbon emissions. Other Western contexts exhibit similar trends. When compared to other energy sources, nuclear energy is a second-best choice in the UK, where people have indicated that they are only willing to embrace atomic power as fragment of an exertion to combat climate change when regenerating sources are unavailable. However, in some situations, like Finland and France, researchers discover that a threat-to-threat trade exists in supporting atomic power as a tool to combat change of climate, in part due to a track record of properly running and regulating atomic power facilities.<sup>7</sup>

When comparing the hazards of nuclear power and environmental change, popular opinions toward nuclear energy outside of America and Europe show comparable convoluted reasoning. For instance, in Australia, it has been discovered that people are, at best, ambivalent about nuclear energy and, at worst, opposed to it. 40% of the populace is unwilling to embrace nuclear energy as a part of the response to climate change because they believe that the risks outweigh any potential benefits, despite the fact that nuclear energy is less polluted than fossil fuels. The risk-reward tradeoff between using nuclear energy and reducing climate change is also

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<sup>6</sup> Nick F. Pidgeon, Irene Lorenzoni, Wouter Poortinga, Climate change or nuclear power—No thanks! A quantitative study of public perceptions and risk framing in Britain, *Global Environmental Change*, Volume 18, Issue 1, 2008, Pages 69-85, ISSN 0959-3780, <https://doi.org/10.1016/j.gloenvcha.2007.09.005>. (<https://www.sciencedirect.com/science/article/pii/S0959378007000623>)

<sup>7</sup> Yeo, S.K., Cacciato, M.A., Brossard, D., Scheufele, D.A., Runge, K., Su, L.Y., Xenos, M., Corley, E.A., 2014. Partisan amplification of risk: American perceptions of nuclear energy risk in the wake of the Fukushima Daiichi disaster. *Energy Pol.* 67, 727–736.



confounded by an abundance of confounding factors, including as perceived risk and trust in government, according to research from other parts of Asia. Partisan politics appear to have an impact on people's views of danger and their lack of trust in the government in South Korea, wherein just one-third of the population supports using nuclear energy to combat climate change. Chinese public opinions, on the other hand, show a higher willingness to embrace nuclear power as a component of an environmentally friendly energy mix intended to combat climate change, particularly when confidence in the government is high.

Research on Indian citizens' opinions about nuclear energy is now noticeably lacking. However, we are aware that Indians' popular opinion on climate change reflects similarly nuanced views on supply of energy in general. Despite being viewed as crucial by the majority of Indians, research reveals that efforts to combat climate change are frequently seen as competing with efforts to fight poverty and advance economic growth. The preference for renewable energy sources as a sustainable source of energy has grown in India as solar energy prices have decreased, offering a more attractive option to non-regenerating energy alternatives such as , petroleum and maybe even atomic power.

Analysis on threat tradeoffs among nuclear power and energy instability is poorly developed. Since the 1970s, popular perceptions of power security—defined as the accessibility of a plentiful power supply with concomitant affordability—have waxed and waned. According to research, the American populace frequently views power security as nuclear energy's top benefit, placing this technology's capacity to deliver safe and dependable local energy beyond environmental advantages. Similar worries about energy security are revealed in UK public opinion surveys, and they tend to raise support for nuclear energy.

The idea of atomic energy as an extremely hazardous sector that directly endangers the environment is a major factor in how the public feels about a risk trade-off related to climate change.

Americans choose natural gas or renewable energy sources over nuclear power only when there are few other options, notwithstanding their necessity and ambition to minimize carbon emissions. Other Western contexts exhibit similar trends. When compared to alternative energy sources, nuclear energy is a second-best choice in the UK, where people have demonstrated a readiness to accept atomic energy as a means of reducing climate change only in the absence of renewable sources. However, in other situations, such as Finland and France, researchers discover that a threat-to-threat balancing exists in favor of atomic power as a tool to combat climate change, in part due to a track record of properly running and supervising nuclear power facilities.

When comparing the hazards associated with radioactive energy and climate change, popular opinions toward nuclear energy outside America and Europe show comparable convoluted reasoning. People in Australia, for instance, have been found to have ambivalent attitudes toward nuclear power, with 40% of the population unwilling to accept it as a part of the remedy to the issue of climate change because they believe the risks outweigh any potential benefits, despite the fact that it is cleaner than fossil fuels. The threat-reward tradeoff between using atomic power and reducing change in the climate is also confounded by an abundance of distracting variables, including as concerns about threats and trust in government, according to research from other parts of Asia. Partisan politics appear to have an impact on people's views of danger and their lack of trust in the government in South Korea, where just 1/3<sup>rd</sup> of the population supports using nuclear energy to combat climate change. In dissimilarity, Chinese public sentiment shows a higher willingness to embrace atomic as a component of an environmentally friendly energy mix intended to combat climate change, particularly when confidence in the government is high.

There is now a glaring void in the body of knowledge regarding Indian citizens' opinions of nuclear power. However, we are aware that Indians'

popular opinion on climate change reflects similarly nuanced views on sources of energy in general. Research reveals that despite being valued by the majority of Indians, efforts to combat climate change are frequently seen as competing with efforts to fight poverty and advance economic growth. The preference for renewable energy sources as an environmentally friendly form of energy has grown in India as solar energy prices have decreased, offering a more attractive option to traditional sources of energy like petroleum, Fossil Fuels, and maybe even nuclear energy.

Study on threat tradeoff between atomic power and power insecurity is poorly developed. Since the 1970s, popular perceptions of energy security, which is defined as the obtainability of a plentiful power supply with concomitant access, have waxed and waned. According to research, the American public frequently views security of energy as the main advantage of nuclear power, prioritizing this benefit over the ability of nuclear power to produce safe and dependable domestic energy. Similar worries about energy security are revealed by surveys of public opinion in the UK, which tend to raise support for nuclear power.

Similar developments in public views toward worries about energy security and acceptance of nuclear power may be seen across Asia. For nations that are susceptible to supply interruptions have been set as primarily a risk management issue intended to reduce the threat of power deficits, especially in regards to the availability of fossil fuels and the ability to continue providing affordable electricity, energy security has grown to be a significant issue. For instance, research shows that adoption of nuclear energy is positively correlated with public opinions in China that imitate fairly higher levels of worry for energy power.<sup>8</sup>

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<sup>8</sup> Wang, B., Yu, H., Wei, Y., 2013. Impact factors of public attitudes towards nuclear power development: a questionnaire survey in China. *Int. J. Global Energy Issues* 36 (1), 61-79.

Like China, India must balance the risks presented by bringing in fossil fuels with the pressure from other countries to switch to cleaner forms of energy in order to develop an energy strategy that meets the needs of an expanding population, growing standards of living, and sustained growth in its economy. The depth of this issue is reflected in sentiments of energy insecurity among the Indian population, which are fueled by concerns about an excessive reliance on imported traditional fuels and the higher price of substitute energy sources. When viewed in connection to one another, research reveals that as energy insecurity increases overall and within the US people, backing for atomic energy also does. However, it is unclear if India's insights of power insecurity would shadow documented tendencies in other nations in demonstrating a favorable link with nuclear energy acceptability.

We speculate that there will be a beneficial connection among apprehension round climate variability and enthusiasm for atomic power among Indians, as well as an optimistic relationship among concern regarding energy insecurity and encouragement for atomic power, grounded on Indian efforts to mitigate change of climate and its craving to reduce power insecurity.

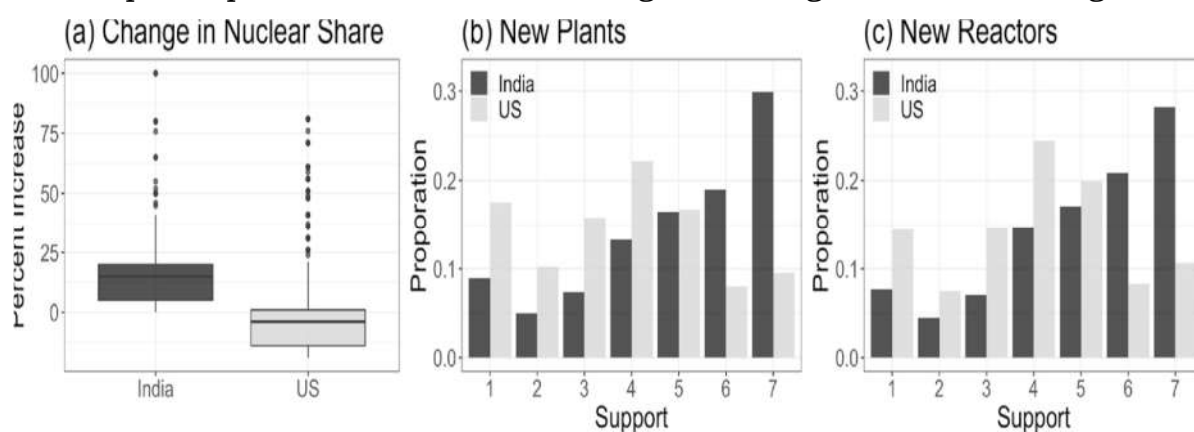
### **Opinions from the public on the potential for atomic energy<sup>9</sup>**

We examine public opinion on increasing the use of atomic power in India in order to respond to our primary research question, which is that

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<sup>9</sup> Kuhika Gupta, Joseph T. Ripberger, Andrew S. Fox, Hank C. Jenkins-Smith, Carol L. Silva, The future of nuclear energy in India: Evidence from a nationwide survey, Energy Policy, Volume 156, 2021, 112388, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2021.112388>.  
(<https://www.sciencedirect.com/science/article/pii/S0301421521002585>)

whether the general public supports this. The amount of electricity generated by nuclear energy as a percentage of all electricity generated, also the positioning of new reactors that produce electricity (at standing positions) and the construction of added atomic power stations (at new positions), are all possible ways to assess the prospective growth of nuclear energy. Public opinions on each of these aspects are shown in Fig. 1. In relation to the nation's existing nuclear production, the panel on the left shows answers for the amount of electricity individuals want to be generated by nuclear power. According to our research, respondents in India want nuclear energy to provide between 10 and 20 percent additional power than it does now, on average, in the country's overall electricity mix. The encouragement for new atomic power facilities and new atomic power stations (at current positions) may be seen in the other two panels. Once more, we find that among Indian respondents, backing for the expansion of atomic power is comparatively higher. The majority of respondents are in favor of building new atomic reactors, however they are more likely to do so at existing sites than at new ones. For some background, it should be noted that respondents from the US are substantially less supportive of building new nuclear reactors and significantly less likely to support atomic power production either remaining at existing levels or declining.



*Figure 1*<sup>10</sup>

### **Various influences that affect backing for atomic power**<sup>11</sup>

The next part focuses on our two remaining research questions, which are (a) what variables affect attitudes toward atomic power and (b) whether the general populace is prepared to make threat trade-offs between atomic power, changing climate, and power insecurity, on the one hand, and nuclear power on the other. We start by looking at bivariate connections between atomic power and our main autonomous variables, including concerns about danger, benefits, the environment, and energy. After that, we investigate multivariate analysis to learn more about the factors that influence the public's enthusiasm for nuclear energy and how these factors interact. We also account for fundamental demographic factors like age, gender, and educational attainment in the multidimensional models, in addition to geographic locations.

According to hypotheses 1 and 2, public backing for the erection of new atomic reactors may be influenced by perceptions of risk and benefit. The linear link amid these impressions and civic backing is seen in Fig. 2. As may be seen, we discover some evidence to support our theories. Support for building nuclear reactors is strongly and favorably influenced by

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<sup>10</sup> Kuhika Gupta, Joseph T. Ripberger, Andrew S. Fox, Hank C. Jenkins-Smith, Carol L. Silva, The future of nuclear energy in India: Evidence from a nationwide survey, *Energy Policy*, Volume 156, 2021, 112388, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2021.112388>. (<https://www.sciencedirect.com/science/article/pii/S0301421521002585>)

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respondents' opinions of the benefits. Contrary to the majority of the previous research and outcomes in other nations, we find that the public's backing for nuclear power expansion in India is not affected by risk perceptions. Increased risk perception among Indian citizens has trivial to no impact on their backing for atomic power. Comparatively, we observe comparable, albeit weaker, effects of value perceptions on backing for atomic power among US respondents. Backing for nuclear energy is strongly negatively impacted by respondents' views of risk, which is more in line with the majority of the previous studies in this field.

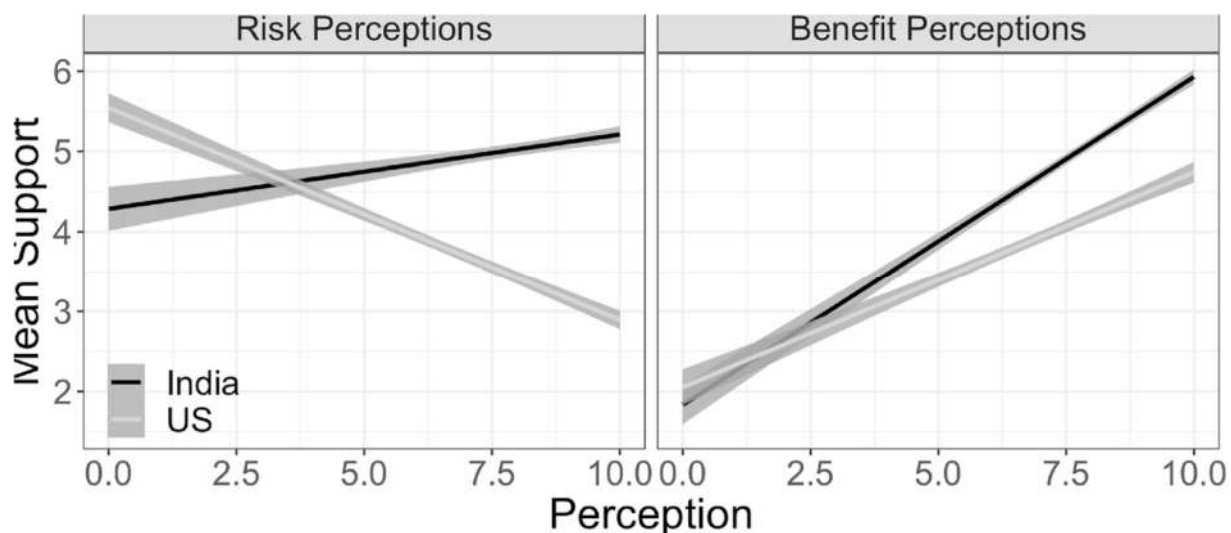


Figure 2<sup>12</sup>

Next, we examine the potential connections between dangers related to nuclear power that could have a real impact on public acceptance. We anticipate that the Indian population could be prepared to put up with the

<sup>12</sup> Kuhika Gupta, Joseph T. Ripberger, Andrew S. Fox, Hank C. Jenkins-Smith, Carol L. Silva, The future of nuclear energy in India: Evidence from a nationwide survey, *Energy Policy*, Volume 156, 2021, 112388, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2021.112388>.  
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dangers of atomic power in order to reduce the dangers of climate change as well as energy scarcity. Figure 3 displays the findings of this investigation.

We discover evidence for our hypotheses in both cases. On both of the criteria we described in our hypothesis, Indian respondents appear to be open to risk tradeoffs. Enthusiasm for nuclear energy is rising along with concern over its impacts, which suggests that people are prepared to tolerate some of its hazards in exchange for less risks related to climate change. Similar to this, we observe that public backing for nuclear energy increases as anxiety over the cost and accessibility of energy does. This indicates that, as we predicted, the Indian populace is prepared to swap the hazards of atomic power for a reduction in the hazards of energy insecurity. Contrarily, we discover that Americans are hesitant to make the same trade-offs, as evidenced by the failure of the dangers associated with climate change as well as energy scarcity to enhance support for nuclear energy.

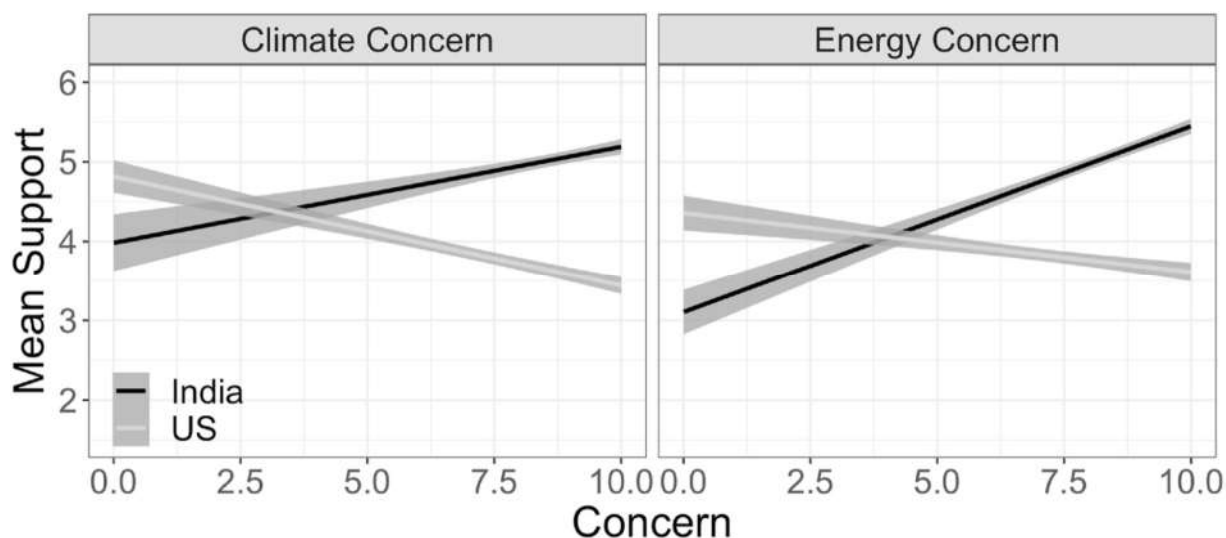


Figure 3<sup>13</sup>

### **An examination of multiple variables of public acceptance for nuclear power<sup>14</sup>**

The multidimensional impact of beliefs and trade-offs on the public's backing for atomic power are what we will now discuss. The numerous regression models we employ take into consideration the likelihood that perceptions of risk and benefit, as well as energy and climate tradeoffs, concurrently influence support. So, to start the analysis, we look at how these explanatory variables relate to one another. Figure 4 displays these correlations as well as density contours. According to Fig. 4(a), respondents in India perceive risk and reward in a comparatively strong positive association, indicating that those who sense significant risk also sense high gain. The mass outlines also show that a significant part of Indian participants are located in the "high threat, high advantage" quadrant. 78% of Indian interviewees perceived elevated levels of danger and benefit if we take 5 (the middle value on a 0 to 10 range) as the cutoff threshold. However, in the US, there is no correlation between risk perceptions and perceived benefits, and only 50% of the participants fall within high-risk, perceptions; the middle-of-the-scale respondents make up the remaining half of the sample alternatively, in the opposing quadrants—high risk, low advantage, or the opposite. as well Fig. 4(b)

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<sup>13</sup> Kuhika Gupta, Joseph T. Ripberger, Andrew S. Fox, Hank C. Jenkins-Smith, Carol L. Silva, The future of nuclear energy in India: Evidence from a nationwide survey, *Energy Policy*, Volume 156, 2021, 112388, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2021.112388>. (<https://www.sciencedirect.com/science/article/pii/S0301421521002585>)

<sup>14</sup> Kuhika Gupta, Joseph T. Ripberger, Andrew S. Fox, Hank C. Jenkins-Smith, Carol L. Silva, The future of nuclear energy in India: Evidence from a nationwide survey, *Energy Policy*, Volume 156, 2021, 112388, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2021.112388>. (<https://www.sciencedirect.com/science/article/pii/S0301421521002585>)

demonstrates that there's a favorable impression of risk and gain. India's energy and climate concerns are related, and that the 80% of participants from India indicate high apprehension regarding both items. In the US, there is also a tie between good, but the number of replies suggests greater variety throughout the two different areas of worry. Just 58% of Americans who responded say they have high concerns about energy use and the environment.

According to the associations in Fig. 4, there is probably some intersection in how much perceptions and worries affect the public's backing for atomic power in India. Table 3's multiple regression coefficients statistically eliminate this overlap to highlight each variable's independent influence on public support. Additionally, the equations take into account many of the demographic variations that can affect support. Table 3's first column displays model findings for respondents in the US, the next column for participants in India, and the 3rd column displays typical outcomes for Indians after taking regional disparity into account.

Value assessments are the most significant predictor of public backing for atomic power in India, according to the numerous deterioration coefficients in Table 3, which are consistent with the results of the bivariate study presented above. On a scale from 0 to 10, an increase in benefit perceptions correlates to an increase of 0.4 points in support for nuclear power plants on a scale from 1 to 7. Threat-perceptions are demonstrated to have a major adverse influence on backing after controlling for other factors, albeit the link is not as significant as it is for advantage impressions. A 0.1-point decrease in support is correlated with each point on the threat insights gauge. With two significant exceptions that emerged in the bivariate analysis, the trend in the influence of beliefs on backing is roughly comparable to the sequence we notice in the US: (1) advantage perceptions appear to be of greater significance in India compared to the US; and (2) Threat perceptions appear to be fewer significant in India compared to in the US.

Contrary to the bivariate study presented above, when security of energy, risk, and benefit perceptions are taken into account, the numerous deterioration coefficients designate that worry over issue about climate change does not independently influence backing for nuclear power in India. The weakening of this link is probably brought on by India's significant energy and climate concerns (see Fig. 4). Contrary to the US, fewer respondents in India are concerned about climate change yet upbeat about energy security; as a result, it is challenging to separate the two elements and pinpoint each factor's individual impact. Despite the challenges, the models can identify a link between backing of nuclear power and anxiety about energy security among Indians. On a scale of 0 to 10, a rise in energy concern correlates to a minor but statistically significant increase in support of 0.05 points on average. The sequence of discoveries in India contrasts sharply with the one we observe in the US, unlike perceptions. Support for nuclear power in the US does not correlate with worries about energy security. Perhaps more significantly, there is a substantial correlation between backing of nuclear power and worry about climate change in the US, which is probably due to underlying links between ecological and antinuclear sentiment there. Indian responses do not appear to be affected by this link.

We fleetingly discuss the demographic and geographic coefficients listed in Table 3 in order to give some further insight on those who are more or less expected to embrace atomic power in India. The demographic coefficients suggest that gender, age, and possibly education may all be important factors. In general, older, better-educated, and female participants supported atomic power more than male, younger, and less educated participants. Support among respondents was not significantly influenced by income. We employ the word potential in respect to gender because, when we take into account variations in support between regions, the impact of gender is reduced. If there are significant disparities in support across the country, a regional study can help determine whether those

areas of backing coincide with the proposed development of atomic power. The figure shows that in India, support is most prevalent in the north and least prevalent in the south, with minor changes in modest favor in the middle regions.

There are a number of significant and intriguing patterns when contrasting public support with the sites of upcoming and future nuclear reactors. First, we discover that there is a clear correlation between the locations of the majority of the nation's operating nuclear reactors—eight and six, respectively—located north and west—and the generally high levels of public enthusiasm for nuclear power. Our results imply that an alike pattern exists in India. Prior studies have shown that the backing of the general populace is frequently positively connected with knowledge with nuclear facilities. Second, we observe that there may be conflicting possibilities for the extension of atomic power. Eight reactors are being built, five of which are in the north and west, where support is generally high. The remaining three are in the south, where acceptance tends to be poorest.

Furthermore, nine of the approximately 25 strategic reactors are located in the south, which, when combined with the generally lack of backing from the public, may point to a challenging path to completion.

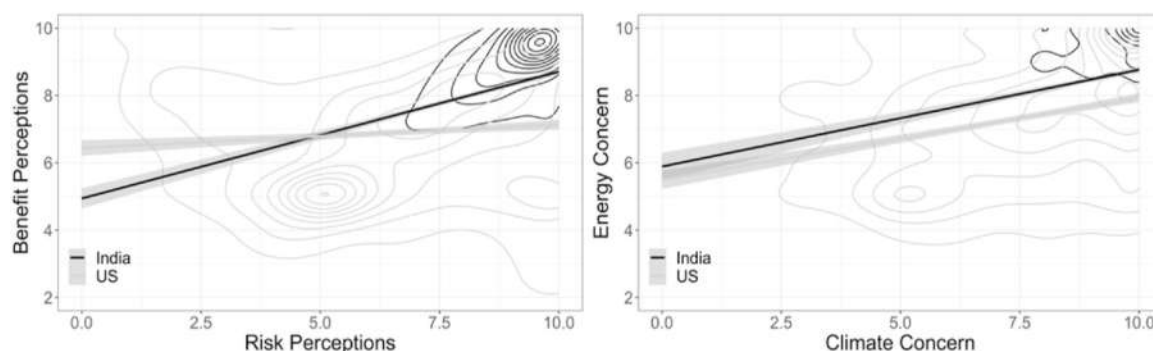


Figure 4

**Table 3**  
Multiple regression models of public support for nuclear energy.

	US (1)	India (2)	(3)
Risk Index	-0.20*** (0.01)	-0.10*** (0.02)	-0.10*** (0.02)
Benefit Index	0.30*** (0.01)	0.40*** (0.02)	0.40*** (0.02)
Energy Concern	0.010 (0.01)	0.050** (0.02)	0.040** (0.02)
Climate Concern	-0.10*** (0.01)	-0.010 (0.02)	-0.010 (0.02)
Age	-0.010*** (0.00)	0.010*** (0.00)	0.010** (0.00)
Education	0.010 (0.02)	0.10*** (0.03)	0.10*** (0.03)
Male (v. Female)	0.40*** (0.10)	-0.20** (0.10)	-0.10 (0.10)
Household Income	0.10* (0.04)	0.020 (0.04)	-0.010 (0.04)
Region-East vs. North			-0.20** (0.10)
Region-Northeast vs. North			-1.0*** (0.20)
Region-Central vs. North			-1.0*** (0.20)
Region-South vs. North			-1.0*** (0.10)
Region-West vs. North			-0.10 (0.10)
Constant	4.0*** (0.20)	2.0*** (0.20)	2.0*** (0.20)
Observations	1930	1921	1921
Adjusted R <sup>2</sup>	0.30	0.30	0.40

Note: standard errors in parentheses; \*p < 0.1; \*\*p < 0.05; \*\*\*p < 0.01.

## Conclusion

Overall, our research shows that the Indian people strongly supports the expansion of atomic power. This is evidenced from preferences for expanding the share of atomic power in the State's power over the course of the next twenty years as well as from widespread support for the nation's nuclear reactor expansion program. For background, the average Indian



would want to see the proportion of electricity produced by nuclear energy increase from the present 3% to in excess of 16%, which is noticeably greater than the choices of US respondents. In addition, respondents from India were far more in favor of building new nuclear-powered reactors than respondents from the US. Despite the fact that public support is only one of many variables (including financial feasibility, supervisory oversight, institutional factors, and politics variables) that can affect a nation's policy path, our results indicate that India's future for atomic power is noticeably more lucrative than the US's. Moreover, a similar view has also been adopted by the Apex Court in the Kundakulam Case which is as follows:

*109. Public opinion, national policy, economic growth, sustainable development, energy security are all intrinsically interlinked. One cannot be divorced from other, all the same, a balance has to be struck. National policy of this country, as already stated, is that atomic energy has a unique position in the emerging economics in India. Nuclear energy is, therefore, considered to be a viable source of energy and it is necessary to increase country's economic growth. Nuclear energy is now considered in India as a sustainable source of energy and India cannot afford to be a nuclear isolated nation, when most of the developed countries consider it as a major source of energy for their economic growth. Renewed momentum against the setting up of NPPs picked up fast after accidents at the Three Miles Island Power Plant in USA, Chernobyl in Ukraine and Fukoshima in Japan. Primary reason for such opposition seems to be on the issues of the impact of nuclear installations on life and property, environment, flora and fauna, marine life, nuclear waste disposal, health, displacement of people etc. which has a direct link with Article 21 of the Constitution of India and the environmental laws of the country.*

Hence, with a perusal of this judgement, our present discussion comes to an end with a hope to see an expansion in the utilization and acceptance of the nuclear energy in India.