

# **Preferences Towards Just Energy Transition Initiatives: Evidence from India**

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Literature Review</b>	<b>4</b>
<b>3</b>	<b>Theoretical Framework</b>	<b>10</b>
3.1	A Discrete Choice . . . . .	10
3.2	Random Utility Maximisation Modelling . . . . .	11
3.3	Using a Discrete Choice Experiment to Investigate Preferences . . . . .	13
<b>4</b>	<b>Methodology and Survey Design</b>	<b>15</b>
4.1	Experiment . . . . .	15
4.1.1	Attributes and their levels . . . . .	17
4.2	Sampling . . . . .	19
4.3	Survey . . . . .	20
<b>5</b>	<b>Results</b>	<b>22</b>
<b>6</b>	<b>Conclusion</b>	<b>33</b>
<b>A</b>	<b>Appendix: Survey</b>	<b>i</b>
A.1	Landing Page . . . . .	i
A.2	Ethics and Information . . . . .	i
A.3	Quota . . . . .	ii
A.4	Incentive . . . . .	ii
A.5	Q: Main Source of Electricity . . . . .	iii
A.6	Information Control (Shown for all) . . . . .	iv
A.7	Information Treatment (Only shown to Treated) . . . . .	iv
A.8	Attributes of DCE Explanation . . . . .	v
A.9	Instructions of DCE . . . . .	vi
A.10	Conditional Phone Adjustment . . . . .	vii
A.11	DCE and its Visual Design (Example) . . . . .	viii
A.12	Q: Policy Familiarity & Awareness . . . . .	ix
A.13	Q: Willingness to Bear Cost Support . . . . .	x

A.14 Q: Justice Principle Rankings . . . . .	xi
A.15 Q: Trust Towards Government . . . . .	xii
A.16 Q: Household Income . . . . .	xii
A.17 Q: Open End Question about Coal Industry in State . . . . .	xiii
A.18 Q: Feedback Screen Submit . . . . .	xiii

## **Abstract**

In the pursuit of mitigating climate change exacerbated by human-induced CO<sub>2</sub> emissions, governments globally are grappling with the challenge of garnering public support for the phasing out of coal, a major CO<sub>2</sub> contributor. This study focuses on India, a rapidly growing lower middle-income country with significant coal dependency and vulnerability to extreme weather events. Employing a pioneering discrete choice experiment (DCE), this research explores Indian citizens' attitudes toward just energy transitions, linking climate policy acceptance with the principles of a just transition. More concretely, I design an experiment based on definitions of distributive, spatial, procedural, recognition, and restorative justice. Findings underscore substantial support for short-term coal reduction strategies, emphasizing the perceived urgency of transitioning away from coal. Just transition policies, particularly those involving financial and technological support from wealthier nations, receive strong endorsement. Surprisingly, support levels do not significantly differ between individuals in coal-producing states and non-coal-producing regions, suggesting either limited economic concerns in coal-dependent areas or methodological limitations. However, individuals with low trust in government institutions and limited awareness of current energy policies exhibit resistance to coal reduction measures, underscoring the importance of transparent governance and effective communication strategies. The study's insights provide valuable guidance for policymakers seeking to enhance public support for climate policies in India and other lower middle-income countries, bridging the gap between climate justice ideals and practical implementation.

# 1 Introduction

Generating wide consensus in the scientific community, CO<sub>2</sub> emissions coming from human activity are pointed out as the main reason that temperatures rise all over the globe ([Murray & Rivers 2015](#), [Hagmann et al. 2019](#), [Metcalf 2019](#), [Lynas et al. 2021](#)). Governments are for this reason actively searching for solutions to reduce CO<sub>2</sub> emissions and mitigate the pace of climate change. The reduction and phasing out of coal stands out as one of the most important and efficient measures, as the consumption of coal itself accounts for over 40% of all CO<sub>2</sub> emissions globally ([IEA 2021](#)).

Transitioning away from coal demands large-scale investments and changes to the energy infrastructure, and one obstacle governments face is to gather and maintain public support for such policies. To do so, some argue that the transition to a sustainable future needs to be just, prioritizing fairness and inclusivity ([UN 2015](#), [Bennett et al. 2019](#), [Carley & Konisky 2020](#), [Commission 2022](#)). Focusing on both the environmental challenges and local and global socio-economic disparities, can not only increase but also be a key factor to maintain support for such energy transitions.

With this in mind, several advanced economies, like the US and countries in the EU, have come together to propose Just Energy Transition Partnerships (JETP). Currently, this is relevant for developing countries like Indonesia, South Africa, Vietnam, India, and Senegal ([Kramer 2022](#)). The main goal of JETP is, through foreign financial support, to accelerate the energy transition through energy and climate policies in less advanced economies, while maintaining focus on other social and economic issues.

However, a just transition is an ideal, and translating it into practical implementation poses challenges ([Winkler 2020](#)). What is considered "just" can vary significantly from one individual, community, or society to another. The perception of justice is therefore subjective as it may be influenced by diverse factors.

All this gives rise to an important question: How can policymakers enhance public support for such policies through the dimension of justice? The answer to this question is commonly addressed by governments and international institutions which motivates this master thesis to target two gaps in the literature in the context of just energy transition initiatives.

First, while governments and research support the principles of a just transition, the public perception of these policies remains relatively unexplored. Secondly, existing literature on attitudes towards climate policies, in general, is skewed towards studies conducted in high-income countries

(HICs), with lower-middle-income countries<sup>1</sup> (LMICs) receiving less attention. LMICs, despite facing unique challenges, are and will continue to be significant contributors to global emissions. Engaging with LMICs ensures global participation and facilitates a broader understanding of climate policy acceptance in the context of justice.

India stands out as a strong candidate of interest among LMICs for three reasons. First of all, the country has one of the fastest growing economies in the world ([World Bank 2023b](#)). With a population of over 1.4 billion people, India also holds a significant population base. A key argument as to why we need more studies on LMICs is that their economies and populations often are fast-growing, and rising carbon emissions will follow ([Saidi & Mbarek 2017](#)).

Secondly, coal holds an important role in the Indian economy. [Pai \(2021\)](#) estimates that over 40% of the 736 districts of India have some sort of coal dependency. Transitioning away from coal can therefore be expected to have large, and potentially unjust impacts in these districts.

Third and last, India's population has already experienced a significant amount of rapid changes to the environment. [Pandey & Sengupta \(2022\)](#) estimates that 88% of the days between the 1st of January and the 30th of September in 2022, the country witnessed an extreme weather event.

Undoubtedly, India presents a research landscape, covering pivotal aspects of lower-middle-income countries (LMICs). Moreover, it stands as a nation where the consequences of climate change have been visible over an extended period. The current coal phase-out strategy of India is however to achieve net-zero emissions by 2070, which is not aligning with international goals ([World Bank 2023b](#)). Investigating preferences in India, can for this reason also help the Indian government in planning a more ambitious energy strategy.

In this thesis, shifting the focus from HICs to LMICs, I conduct the first-ever discrete choice experiment (DCE) covering the topic of a just energy transition in India. It is, to my knowledge, also the first DCE that attempt to connect attitudes towards climate policies directly with the ideals of a just transition. The findings does not only contribute to the existing literature on climate policy acceptance but also provide valuable insights for policymakers in designing effective strategies tailored to the specific context of India. In this thesis, I ask: what are the preferences and attitudes of individuals in India towards initiatives aiming to secure a just energy transition, and how do they weigh the different concepts of justice attached to it?

This thesis aims to achieve the following objectives: (1) analyze preferences and attitudes of individuals in India towards just energy policies; (2) Identify how concepts of justice influence their decision-making process; and (3) Provide insights and recommendations for policymakers to enhance public support for climate policies in India.

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<sup>1</sup>Status as LMIC is based on Gross National Income (GNI) per capita [World Bank \(2023a\)](#).

To achieve this, I start in section two by reviewing the literature and examining various aspects related to climate policies and just transitions. I delve into the concept of justice, encompassing dimensions like distributive, spatial, procedural, and restorative justice. Following this, I lay out how research has earlier tried to understand public preferences and attitudes towards climate policies. Within this context, I also show how researchers have found that internal factors such as awareness, ideologies, and trust in government influence individuals' acceptance of such policies. The literature review also shows how most evidence comes from HICs, which emphasizes that there is a need to also understand the preferences of individuals in LMICs.

In the third section, to address preferences towards just energy transition initiatives, I introduce the theoretical foundation that discrete choice experiments (DCEs) build on and explain how it can be used to model and analyze the preferences of individuals.

In the next and fourth section, I provide an in-depth account of the design and implementation of the discrete choice experiment and the survey. The section underscores the use of various methodological measures and tools, offering a comprehensive insight into strategies for enhancing participant engagement, such as personalization of the experience. It also covers how to mitigate potential biases, such as carefully considering the question order and the application of randomization techniques. The online discrete choice experiment is run on a professionally gathered sample from India.

In the fifth section, I lay out the results, finding compelling evidence of substantial support for short-term coal reduction and phase-out strategies. These results underscore that the Indian population is under the opinion that there is an urgency connected to transitioning away from coal. Additionally, most of the just initiative policies proposed in the DCE, foster a significant increase in support, suggesting that they play an important role in providing a broad and strong majority of support. Especially financial and technological support from richer countries is fostering the overall highest support.

Interestingly, the study reveals that there are no significant differences in support between individuals residing in coal-producing states and those who are not. This result suggests that concerns about economic impacts in coal-dependent areas may either be indeed insignificant or that the methodology of this thesis does not use a sufficient proxy for how close a person is connected to the coal industry.

However, the results strongly confirm that individuals with low levels of trust in government institutions and limited awareness of current energy policies exhibit greater resistance to coal reduction and phase-out measures. These observations underscore the importance of government transparency and effective communication strategies to engage the public. It highlights the need

for comprehensive public education campaigns and awareness programs to ensure that citizens are well-informed about the benefits of transitioning to cleaner energy sources and the potential impacts on their communities.

## 2 Literature Review

The initial segment of this review sets the stage by emphasizing the unique nature of climate policies, putting weight on their distinctiveness from other policy domains. It then highlights their potential for both positive and negative impacts. In the subsequent section, I underscore how these potential co-benefits and adverse side effects of climate policies are related to principles of justice. Moving forward, the third part of this review looks directly at empirical evidence on public attitudes within the climate policy landscape and brings forward the factors that influence these attitudes.

Energy policies and climate policies are two distinct yet interconnected spheres that both need to be defined. Energy policies are in this thesis characterized as a set of strategies and regulations governing the production, distribution, and consumption of energy resources, with an emphasis on sustainability, security, and efficiency (Kohl 2004). Climate policies are often characterized as the urgent need to mitigate and adapt to the impacts of climate change through measures such as emissions reduction targets, carbon pricing, and conservation efforts. Climate and energy policies often intersect, given that energy production and consumption contribute significantly to greenhouse gas emissions (IEA 2022).

The challenges policymakers face in the context of energy and climate policies, that differ from other more conventional policies, is that *"it is basically about protecting a pure collective good, this good is truly global in scope, and time-lags between cause and effect are very long in some instances"* (Hovi et al. 2009). Policymakers should for this reason understand the importance of avoiding climate issues to be framed with a focus on the future, distant, global and, non-personal risk, and rather focus on the present, local, and personal risk associated with it (Linden et al. 2015). Additionally, they should put emphasis on the gains of immediate action and make policies that people associate with positive, tangible, and immediate returns, such that acceptance of the policy increases. Framing policies as fair and just can also go a long way in achieving this.

While an energy transition focuses on implementing and carrying through substantial amounts of energy policies, a just energy transition is rooted in principles of equity, recognizing that the burdens and benefits of these energy policies should be distributed fairly across society and the global world (Doyon & Williams 2019).

The focus on a just energy transition comes from the the fact that most climate policies are



followed by co-benefits and adverse side-effects ([Ürge-Vorsatz et al. 2014](#), [Klinsky & Winkler 2018](#), [Markkanen & Anger-Kraavi 2019](#)). On one side, improved public transport networks not only reduce carbon footprints but also increase the mobility of people without cars. On the other side, the closure of coal plants aimed at mitigating emissions might also be followed by unemployment in the sector. Some climate policies are particularly conflicting. For example, investing in hydropower with the goal of providing electricity on a large scale, can produce numerous workplaces, but might also displace populations and wildlife residing close to newly flooded lakes. Being aware of the positive benefits and negative side-effects of climate policies is important to avoid increasing inequality and social costs because it can increase the level of conflict attached to the policies ([Markkanen & Anger-Kraavi 2019](#)).

Climate policies also have the potential to significantly affect households. Analyzing the effect of the carbon tax [Goulder et al. \(2019\)](#) suggests that the distributional impact on household welfare depends on whether distributional objectives are considered. For instance, they emphasize the power of revenue recycling when collecting taxes, as an increase in energy prices through rising costs can significantly burden households. [Wang et al. \(2016\)](#) further supports this claim, as they find that carbon taxes without revenue recycling, are mostly regressive, imposing higher costs on lower-income households.

As climate policies may influence households through cost implications, these economic effects can also impact their attitudes and their voting behavior. [Colantone et al. \(2022\)](#) investigate a fossil car ban policy from Milan, Italy, to show how owners of the banned cars, which experienced higher costs, were significantly more likely to vote for the less climate action ambitious right-wing party. They also found that compensated owners, were not more likely to vote in this way, suggesting that there are ways to avoid increasing climate policy resistance and increase acceptance. The public's perception of the outcomes of climate policies may serve as a key predictor of their support.

The chosen approach for comprehending public perceptions of climate policies, as undertaken by this thesis, centers on the concept of justice. In the introduction, I emphasized how policymakers in recent times have emphasized the aspect of justice when discussing climate policies. Justice is defined by [The Cambridge Dictionary of Philosophy \(1999\)](#) as fairness in the way people are dealt with. The concept of justice holds significance in various fields of study, and this thesis will focus on the economic dimension where equality of distribution and welfare among individuals is in focus ([Hegtvedt 2018](#)). Justice finds particular prominence within the realm of economics due to the consideration of costs and benefits in decision-making. An individual is more likely to either accept or seek out policies when the benefits exceed the costs and justice plays a particular role, especially when weighting cost and benefit in non-pecuniary outcomes ([Colquitt et al. 2001](#)). In

essence, justice can be regarded as the weighing of diverse priorities concerning resource allocation, burden distribution, and societal benefit sharing. Relevant to this thesis, five main concepts stand out: distributive, spatial, procedural, restorative, and recognitional justice.

Distributive justice is the perceived fairness of the distribution of burdens and benefits to recipients ([Ambrose et al. 2007](#)). Considering climate and energy policies, their ability to address the distribution of burdens and adverse side effects is crucial. For instance, in the context of phasing out coal, the domain of distributive justice would cover the uneven burdens of job loss, higher electricity costs, and compromised energy security. Securing that these costs and benefits are distributed in a fair way across all layers of society, would be regarded as distributively just. [Schleich et al. \(2016\)](#) found prevalent inequalities when looking at the outcomes of three government-driven clean energy funding programs in the US. The amount of funding received in an area was closely related to racial composition, and positively correlated with education. [Ambrose et al. \(2007\)](#) found that distributive justice had a strong effect on long-term commitment, suggesting that individuals who perceive an action as distributively fair are more likely to maintain their support for similar actions over time. Distributive justice can be understood further by looking at the domain of spatial justice.

In relation to distributive justice, spatial justice is the spatial or geographical aspect of distributive justice. It mainly involves ensuring that resources are distributed fair and equitably in space, which also covers the opportunities to use them [Soja et al. \(2009\)](#). More directly, where we live can have negative and positive consequences on our life situation and opportunities. For instance, a coal region fosters workplaces, livelihood, and potential wealth for community members. Coal can also play a large role in citizens' identity and history. [Banerjee & Schuitema \(2022\)](#) examine a just transition program in Ireland and discover that stakeholders found the disruption of the peat industry problematic. This is due to their deep-rooted historical and socio-cultural connections to the industry, highlighting the significant role of regional identity in this context. When two coal plants in the largest coal region in the US unexpectedly closed down, [Cha \(2020\)](#) uses the opportunity to interview local stakeholders. She also finds strong opposition and skepticism towards a just energy transition in the region, due to the distress and abruptness of a long-standing industry in the region. Spatial justice is not only about what you take away from a region but also how benefits are distributed, such as when new climate mitigation projects are planned. [Torres et al. \(2015\)](#) finds that Mexicans, prefer forest carbon services to be implemented closer to their homes, as they seem to value the positive effect it can have on the responsibility, reputation, and identity of the region.

Procedural justice, as defined by [Hegtvædt \(2018\)](#), focuses on ensuring fair representation for all stakeholders in the outcomes. In the context of climate and energy policies, it covers for example the question of which of local voices, labor representatives, business owners, or other stakeholders

are included. Again, in the case of a coal phase-out, procedural justice ensures that affected individuals and organizations actively participate in decision-making and policy design (Klinsky & Dowlatabadi 2009). Chu et al. (2016) finds that putting emphasis on building multi-sector governance institutions, can secure long-term stability of programs. However, it lacks concrete evidence of what procedural justice means for the support of climate policies.

Restorative justice, as defined by Gavrielides et al. (2007) is a process where stakeholders of an offense collaborate to collectively address its aftermath and future implications. According to (Schleich et al. 2016), the accountability principle should weigh heavily when deciding on the burden sharing. In the context of reducing and phasing out coal consumption, restorative justice particularly addresses global injustices. Again, within the context of coal phase-out, restorative justice would place a particular focus on the actions of the largest wrongdoers, namely HICs. There is no doubt that the countries which now advocate climate action, are historically the most polluting, meaning that they have caused the most harm to the climate (Hoffmaister et al. 2014). Therefore global cooperation matters. Gampfer et al. (2014) finds evidence that US and German citizens are more likely to support climate funding of developing countries when they know it will be used for mitigation and adaption, showing that willingness to take restorative responsibility by donor countries is evident. Beiser-McGrath & Bernauer (2019) and Bechtel et al. (2022) further contribute to the literature, by finding evidence that joint forces, meaning a more global and multilateral response, increase support of climate action in the population of HICs. However there is a lack of literature investigating attitudes of LMICs in this regard, and how important the role of donation is in a country that potentially would receive support.

At last, and to summarize the four mentioned principles of justice, the fifth principle of justice worth mentioning in the context of this thesis, is recognitional justice. Recognitional justice is about recognizing the dignity of all individuals and nations (Honneth 2004). The definition is broad and therefore works as an umbrella term covering all the former justice principles mentioned. First of all, the coal phase out itself touches up on some important aspects of recognitional justice, as the goal is to preserve the environment and comes from recognizing the potential costs for the people in the future. Recognitional justice, together with distributive and spatial justice, also entails acknowledging and respecting the impacts on affected communities today. This includes recognizing the economic challenges faced by coal-dependent regions and providing support for workers as they transition to alternative employment opportunities. It also involves acknowledging the unique cultural identities of these communities throughout the transition. Additionally, recognitional justice addresses historical environmental injustices, as with restorative justice, and the disproportionate burden that developing countries face when phasing out coal. Together with procedural justice, it

emphasizes active engagement and participation of affected communities in decision-making processes.

Recognitional justice is in this thesis present across all the former principles of justice and is mostly mentioned to show that all principles of justice are often overlapping. The most important take-away is that categorizing the different concepts makes us able to structurally sort the issues of justice, such that it is possible to put policies in different baskets.

Some attempts have been made when it comes to connecting justice directly to perceptions and support of climate policies. [Eriksson et al. \(2008\)](#) identified perceived fairness and effectiveness as crucial factors influencing transport policies' acceptability. [Clayton \(2018\)](#) find that climate mitigation policies are rated as more acceptable when putting emphasis on "the collective" rather than "the individual". She also found that perceived justice had a stronger effect than perceived effectiveness. Evidence from [Visschers & Siegrist \(2012\)](#) supports this claim, and adds that there is a limited impact of procedural justice in the case of restoration of nuclear plants. ([Fanghella et al. 2023](#)), are conducting a discrete choice experiment to explore the distribution of costs, where participants by selecting between different burden-sharing rules, show a preference for a polluter-pays rule.

Until now, the literature has focused more on the role of justice, in terms of fairness, as a whole. Aiming to take this a step further, this thesis explores how different concepts of justice are weighted at an individual and social level. The weighting of different characteristics of climate policies has the last year gained increasing attention, but the role of justice remains rather unexplored ([Drews & Van den Bergh 2016](#)).

However, there are several studies looking into which factors alter individuals' perception and willingness to accept a climate policy, and the studies are dominated by discrete choice experiments, which is also the method used in this survey.

For instance, personal factors play a pivotal role in shaping individuals' perceptions and willingness to accept climate policies. From a personal perspective, various aspects such as disparities in life situations, levels of trust in institutions, and ideological orientations can significantly influence how people evaluate the complexities of climate change and subsequently form their perspectives on potential solutions.

Some personal factors that can influence your your acceptability of climate policies are your predispositions ([Kallbekken & Sælen 2011](#), [Dechezleprêtre et al. 2022](#)). [Aruga et al. \(2021\)](#) finds that the perceived urgency of climate action was positively related to being a woman, having higher education, and/or higher income. [Fanghella et al. \(2023\)](#) supports this claim by also finding evidence of lower-income households preferring doing nothing, towards implementing energy effi-

cient policies. There has also been produced evidence that compensation schemes to lower-income households, increase acceptability, indicating that personal economic concerns are higher among lower-income households ([Ivanova et al. 2020](#), [Hammerle et al. 2021](#), [Maestre-Andrés et al. 2021](#)). [Bergquist et al. \(2020\)](#) results show that linking economic and social issues to climate policies increases the acceptability, particularly among people of color.

Ideology and trust in the government have also been regarded as strong predictors of the acceptability of climate mitigation policies. [Mildenberger et al. \(2022\)](#) finds that tax rebate programs have lower support among conservative voters in Canada. [Sommer et al. \(2022\)](#) finds evidence, that preference towards green spending is associated with a higher acceptance of carbon tax. [Faure et al. \(2022\)](#), also finds a positive effect of a strong environmental identity on support. Additionally, they establish a positive relationship between an individual's trust in the government and the acceptability of coercive policies, such as taxes. [Levi \(2021\)](#) support this claim, stating that low political trust strongly predicts carbon tax opposition, but do not find this effect when it comes to other climate policies.

Also, external factors can have an impact on public attitudes towards climate policies. External influences like public interventions and the effectiveness of policy communication campaigns are instrumental in shaping opinions.

For instance, there is evidence that rebates increase public support for carbon taxes ([Fremstad et al. 2022](#)), indicating that governments addressing financial concerns of climate policies, will increase support.

Communication dynamics might also have a strong effect on the perception of climate policies. There is also strong evidence that framing the policy as a package, namely bundling other measures together with climate action, increases the support ([Bergquist et al. 2020](#), [Wicki et al. 2020](#)). How the policy is framed can also carry importance. [Diamond & Zhou \(2022\)](#) finds that framing the climate policy together with job creation, increases support. When provided accurate information that taxes in their country are progressive, [Hoy \(2022\)](#) found that respondents became more willing to pay taxes. This study is one of the few also conducted in developing countries.

Most of the evidence produced on these matters comes from HICs, and there is a limited amount of evidence from LMICs. [Malerba et al. \(2023\)](#) found a wide acceptance for carbon taxes in Ghana, Peru, and the Philippines, and a preference towards recycling revenue of the taxes towards environmental investments. [Dechezleprêtre et al. \(2022\)](#) includes middle-income countries when analyzing how climate policy acceptance changes when presented with different pieces of information in different countries. Their research indicates that emphasizing climate mitigation efficiency and their distributional impact on lower-income households, as well as how these policies affect respondents'

households, leads to increased support.

The review of the literature mainly establishes two gaps: 1) there remains a limited understanding of the specifics regarding how individuals imagine the design of just transitions and how they weigh various principles of justice in this context, and 2) while there is evidence of how some factors are weighted when supporting climate policies in HICs, LMICs remains relatively under-explored. [Fairbrother \(2022\)](#) sums it up: In order to tackle climate change, we need, especially in LMIC, to understand what kind of measures people want their governments to undertake.

To bridge these gaps in the understanding of just transitions and the preferences of individuals, particularly in low- and middle-income countries (LMICs), the utilization of discrete choice experiments (DCEs) emerges as a potent methodological approach, as it has been widely applied. DCEs are rooted in the framework of random utility theory, offering a systematic and quantitative means to detect individuals' preferences and trade-offs when faced with complex decisions. By presenting respondents with carefully designed choice scenarios that reflect various policy options, DCEs can unveil the nuances of how individuals prioritize justice principles and motivate the design of just transitions. In the next section, the theoretical framework will be laid out, showing that adopting DCEs can advance our understanding of just transitions.

### **3 Theoretical Framework**

To understand how we can capture preferences towards just transition initiatives through a DCE, a theoretical foundation is necessary. This section begins by showing how choices in a policy scenario often depend on discrete alternatives, and how these decisions can be modeled. Subsequently, it presents a random utility model building on the reasoning from the former part. Finally, the section shows that DCEs are founded on random utility modeling, and presents the methods used in this thesis, to empirically analyze preferences toward climate policies and just transition initiatives.

#### **3.1 A Discrete Choice**

When choosing between a finite number of options, we refer to it as a discrete choice. Classical economic theory often portrays options as bundles of goods with continuous dimensions, implying the ability to choose from an infinite range of combinations. Under the assumption of rational behavior, this framework suggests that individuals can optimize their choices within their constraints.

However, in reality, especially when it comes to policy selection, options are typically discrete. Policies are often presented in a take-it-or-leave-it manner, leaving individuals with limited alter-

natives: either you are in favor, neutral, or in disfavor of a particular policy proposal. For instance, in a political context, voters may face discrete choices on a ballot, where they must choose one candidate, party, or policy option from a finite list.

The limitations of classical choice models become evident in such scenarios. They are ill-suited to analyze discrete choices, as they are designed for continuous substitution between options, a condition rarely met in policy decisions. Therefore, classical models prove inefficient and inaccurate when applied to the analysis of discrete choices, highlighting the need for alternative approaches in policy analysis (Mariel et al. 2021).

One such alternative is discrete choice modeling, which involves understanding the factors that influence choices and quantifying the probabilities of selecting each alternative. It allows researchers to gain insights into various real-world phenomena, such as consumer behavior, market demand, transportation planning, and, as in our case, policy analysis. One advantage of using discrete choice modeling over a classical model is its ability to provide a structured and systematic approach to understanding decision-making processes, allowing for more accurate predictions and informed policy decisions. However, one challenge that still remains in discrete choice modeling is that it still assumes rational decision-making, which can significantly increase the inaccuracy of the models, as individuals may be influenced by subjective factors that are difficult to capture empirically (Bierlaire 1998).

### 3.2 Random Utility Maximisation Modelling

One way to tackle this challenge is to use random utility models (RUM), which is a framework within discrete choice modeling that additionally to incorporate observable alternatives, it also includes unobservable factors to the individual's decision-making process. It assumes that individuals assign utility to each option and choose the alternative that maximizes their overall utility. By RUM considering both deterministic and random components, one advantage of random utility modeling is its ability to capture the heterogeneity and complexity of decision-making processes by incorporating unobservable factors and random variation that may affect a decision process. (Mariel et al. 2021).

Following Mariel et al. (2021) a RUM can be defined in the following way: from a given alternative  $j$ , an individual  $n$ , obtains a level of indirect utility, denoted by  $U_{nj}$ . It is called indirect because it is representing an individual's preferences by quantifying their satisfaction or utility derived from an alternative. Now both the observed characteristics of the individual  $s_n$  and of the alternatives presented to the individual  $x_{nj}$  will be included in the term  $V_{nj} = V(s_n, x_{nj}) \forall j$ .  $V_{nj}$  is



the deterministic component, which means it consists of non-random factors that can be observed and therefore be included in the analysis. Together with random factors  $\epsilon_{nj}$  the obtained utility of individual  $n$  from alternative  $j$ ,  $U_{nj}$  can be written as

$$U_{nj} = V_{nj} + \epsilon_{nj} \quad (1)$$

Where the vector of random factors is assumed to hold the joint density  $f(\epsilon_n) = f(\epsilon_{n1}, \epsilon_{n2}, \dots, \epsilon_{nJ})$  (Train 2009). The most important takeaway from this assumption is that it is necessary to be able to decouple the deterministic utility  $V_{nj}$  from the random factors  $\epsilon_{nj}$ . Our behavior model is: an individual  $n$  chooses alternative  $j$  if and only if  $U_{nj} > U_{ni} \forall j \neq i$ .

We will further follow the literature (Mariel et al. 2021) and assume that  $V_{nj}$  is linear in parameters, hence we can write  $V_{nj} = x'_{nj}\beta$ . In our case, we can regard  $x'_{nj}$  as a vector of variables describing the policy by its different characteristics, e.g.: How much does the policy cost? How long will it take to implement? Who is affected? All this information can be contained in  $x'_{nj}$ . Also, information about the individual  $n$  can be contained in  $x'_{nj}$ , such as their income, gender, and where they come from.  $\beta$  are the unknown coefficients attached to whether and by how much these characteristics affect the utility. The random factors that can affect  $U_{nj}$ , are (as mentioned)  $\epsilon_{nj}$ . We have

$$U_{nj} = V_{nj} + \epsilon_{nj} = x'_{nj}\beta + \epsilon_{nj} \quad (2)$$

To illustrate why including characteristics of an individual into the model is meaningful in the context of this thesis, consider the following examples: A high-income woman might have a strong concern for the environment and prefer policies that have a direct impact on reducing carbon emissions, such as a coal phase-out. A low-income man might prefer economic factors and prefer policies that focus on promoting renewable energy sources and creating jobs in the green energy sector. Controlling for some of these, can help improve our analysis and identify how different characteristics of individuals influence their perception of the policy packages.

There can also be random shocks influencing an individual's preferences for more or less costly climate policies. One individual could recently have experienced heavy floods or heatwaves, which has temporarily increased their fear of climate change. Another individual just lost their job, and fears rising prices that might come during an energy transition. These individual-specific characteristics are not directly observable, and are hard to generalize. The benefit of utilizing a RUM framework is that it releases us from the rigorous assumption that individuals are maximizing their utility, and leaves us with a tool to explain how explanatory factors relate to choices without having



to specify precisely how the choices are made (Train 2009).

Train (2009) addresses an important point about how RUM demands a lot from the researcher and the design when applying a DCE: as the observable variables  $V_{nj} \neq U_{nj}$ , the error term can be defined as  $\epsilon_{nj} = U_{nj} - V_{nj}$ . This means that, dependent on the researcher and research design, what is decided as the observable characteristics of both the policies and the individuals, will indirectly define what we induce as random factors. Leaving out factors that can correlate and disturb the distribution of the error term can potentially harm the empirical analysis, as there are underlying factors that can be the actual reason for how different choices are made. Including a significant amount of controls is therefore important and applied in this thesis.

### 3.3 Using a Discrete Choice Experiment to Investigate Preferences

The primary objective of this thesis is to map social preferences toward climate and energy policies while shedding light on the factors of justice that play a role in these choices. As discussed earlier, the coefficients in the vector  $\beta$  are unknown. Uncovering these coefficients will give us information about how individuals weigh the different attributes in a climate policy and therefore provide us with information about their preferences.

A DCE allows us to investigate the intra-relationship between different levels of a policy attribute, but also the inter-relationship between the attributes (Louviere et al. 2010). DCE is a research method in which individuals are presented with a series of choices between alternative scenarios or products, each described by a set of attributes with varying levels, ultimately quantifying the relative importance of attributes and their levels when an individual makes choices and expresses their support. In our context, we can 1) uncover how different measures to tackle one particular principle of justice are rated against each other and 2) we can find out how different justice principles are rated against each other across subgroups, addressing the research question of this thesis.

By rewriting equation (2) as a regular linear probability model, we can estimate the coefficients by ordinary least squares (OLS). Note that in (3) and (4), the subscript  $n$  still indicates an individual, but  $j$  is now the type of attribute (characteristic), e.g. *phase out strategy*, and  $l$  is the different levels an attribute can hold. For instance, the attribute *phase out strategy* can hold the level *phase out coal before 2070*. The different  $X_{jl}$  is simply dummies indicating whether or not an attribute level is included in a policy plan.

As we consider all choices, it will ultimately make us deal with the distribution of preferences over attributes, yielding sample-level preferences (Friedel et al. 2022). Now, in this case, we ask

participants to either support ( $Y=1$ ) or oppose ( $Y=0$ ) a policy proposal. Equation 5 can therefore be written

$$Y_n = \beta_0 + \beta_{11} \cdot X_{n11} + \beta_{12} \cdot X_{n12} + \dots + \beta_{JL} \cdot X_{nJL} + \epsilon_n \quad (3)$$

The estimated linear probability function is

$$Pr(Support) = Pr(Y = 1|X) = \beta_0 + \beta_{11} \cdot X_{11} + \beta_{12} \cdot X_{12} + \dots + \beta_{JL} \cdot X_{JL} \quad (4)$$

$\beta_{jl}$  can in this specification be interpreted as marginal probabilities (Hauber et al. 2016), expressing the probability of a policy package being supported, given that an attribute holds that particular level keeping all other attributes constant. Building on this, two main approaches to estimating preferences are chosen for the empirical part of this thesis.

First, I estimate average marginal component effects (AMCE), which seeks to determine the impact on the preferences toward a randomly selected policy proposal when one particular attribute changes from one level to another. Therefore, an estimation of AMCE involves setting a reference level for each attribute, and estimating the relative difference. As all the attribute levels of the policy proposals follow the independent uniform attribute distribution, meaning that levels of attributes are completely randomly distributed across policy packages (Zhirkov 2022), a slight respecification of equation (3), following Hainmueller et al. (2014), can give us robust estimates of AMCE:

$$Y_n = \beta_0 + \beta_{12} \cdot (X_{n12} - X_{n11}) + \beta_{13} \cdot (X_{n13} - X_{n11}) + \dots + \beta_{JL} \cdot (X_{nJL} - X_{nJ1}) + S_n\lambda + \epsilon_n \quad (5)$$

In equation (5), baseline levels for each attribute are subtracted. The practical implication of this is that the baseline is not part of the equation, and  $\beta_{jl}$  is in this context the expected change in the support towards a policy proposal when a specific attribute value is present instead of the baseline level (Hainmueller et al. 2014). Additionally,  $S_i$  includes observable controls characterizing the individual, which further makes sure that we keep unobservable factors to a minimum, as required by the reasoning from Section 3.3.  $\lambda$  is the corresponding vector of coefficients, representing the change of the dependent variable, in this case  $Y_n$ , associated with a one-unit change of a given control variable.

As we in a survey have the opportunity to collect differences across demographics, trust towards the government, and political awareness, we have the opportunity to analyze effects across subgroups. Leeper et al. (2020) have shown that comparing AMCEs among respondent subgroups can lead to misleading conclusions as the reference category used in the analysis tells a story within groups. This happens as the reference category is subtracted within the group, and not between

groups. To be able to compare the support of an attribute level across groups, it is better to use the overall probability of an attribute level being present when a policy proposal is supported, as this tells what the overall support is unrelated to any reference level. The second metric of interest is therefore marginal means (MM), which is defined as

$$MM_{jl} = E[Y_n = 1 | X_{njl} = 1] \in [0, 1] \quad (6)$$

MM possesses a straightforward interpretation of probabilities. Specifically, a marginal mean of 0 signals that respondents choose profiles with that particular feature level with a probability of 0. Conversely, a marginal mean of 1 signals that respondents choose profiles with that particular feature level with a probability of 1. Marginal means are commonly reported with respect to a level at 0.5, as this gives an indication of whether or not the majority of the sample supports a level.

Equations (5) and (6) will be the main specifications used when laying out the results of the DCE in Section 5.

## 4 Methodology and Survey Design

In this section, the details of the DCE are explained by shedding light on its design and execution. First, to address the methodological framework, the selected attributes and levels are explained. Also, the implementation of a treatment is motivated. Furthermore, the measurement of energy policy awareness and trust toward the government is highlighted. At last, the section walks us through the survey design. It emphasizes the efforts of ensuring a truly representative sample, and reveals strategies employed to keep the survey not just easy to understand but also engaging.

### 4.1 Experiment

In a DCE the participants are set to choose between different policy proposals. In the case of this DCE, participants are met with two fictive policy proposals and need to choose the one they prefer. The two policy proposals have 5 attributes (can also be called characteristics), where each attribute randomly holds one of the different levels, as they are defined in Table 1. Appendix A.11 includes a visual example of how the proposals appear in front of the participants. After choosing the preferred policy, the participant proceeds to answer how much they support the individual proposals from 1 to 7, where 1 indicates strong opposition and 7 indicates strong support.

Having 5 different attributes ensures a comprehensive coverage of relevant policies that deal with different principles of justice. To strike a balance between a variety of proposals and avoid-

**Table 1:** Attributes and Levels of Each Attribute in the DCE

<b>Phase Out Strategy</b> To decrease emissions, your government plans to:	<ul style="list-style-type: none"><li>• <b>Eliminate coal use</b> and only use alternative energy/electricity sources <b>by 2070</b> (Baseline)</li><li>• <b>Eliminate coal use</b> and only use alternative energy/electricity sources <b>by 2050</b></li><li>• <b>Reduce coal use</b> and increase the use of alternative energy/electricity sources <b>by 2030</b></li></ul>
<b>Social Distributive Policy</b> In parallel to reducing the use of coal, your government will:	<ul style="list-style-type: none"><li>• <b>Implement no additional policy</b> (Baseline)</li><li>• Ensure that <b>energy prices are low</b></li><li>• Implement <b>insurance programs for coal workers</b> if they lose their job</li><li>• Try to <b>expand energy access</b> to all citizens</li></ul>
<b>Economic Distributive Policy</b> To address negative economic consequences of coal regions, the government will:	<ul style="list-style-type: none"><li>• <b>Implement no additional policy</b> (Baseline)</li><li>• Facilitate <b>training for coal workers</b> to transition to new industries</li><li>• Facilitate <b>renewable energy industry</b> within coal regions</li><li>• Facilitate restructuring of coal regions based on <b>identity/history of the area</b></li></ul>
<b>Procedural Policy</b> To assure that the energy transition from coal to renewables is just and fair, the government will:	<ul style="list-style-type: none"><li>• <b>Lead the process alone</b> (Baseline)</li><li>• Form a commission with different actors especially including <b>local government</b></li><li>• Form a commission with different actors especially including <b>civil society groups</b></li><li>• Form a commission with different actors especially including <b>researchers</b></li><li>• Form a commission with different actors especially including <b>businesses</b></li><li>• Form a commission with different actors especially including <b>labor unions</b></li></ul>
<b>International Restorative Policy</b> The international community, and especially richer countries, will:	<ul style="list-style-type: none"><li>• <b>Leave financial and technical issues to India</b> (Baseline)</li><li>• Provide India with <b>only financial support</b></li><li>• Provide India with <b>only technical support</b></li><li>• Provide India with <b>financial and technical support</b></li></ul>

**Note:** All levels were independent of each other within and across attributes, providing a full randomization of policy proposals. Levels marked with "baseline" means that the level is set as a reference level, as explained in Section 3.3.

ing participant fatigue, there are six rounds of policy proposals, aligning with insight from prior research, resting on the work of [Mariel et al. \(2021\)](#). In summary, the policies and their associated characteristics represent both an approach to phase out coal and the government's commitment to principles of justice. In the following part, it is justified how these policies cover distributive, spatial, procedural, and restorative justice as described in the literature review. Note that recognitional justice is not linked directly to any group of policies. As is explained in Section 2: recognitional justice is present among all of the former mentioned principles of justice.

#### **4.1.1 Attributes and their levels**

Below follow explanations and definitions of each attribute and their levels. Note: as these policies are completely fictive, the word "government" is used, but it actually means a fictive government presenting different proposals. In [A.8](#) the reader can see how the DCE was introduced to each respondent, asking them to imagine that the proposals were real proposals, to be able to as accurately as they can, weigh the different attributes.

In the context of transitioning away from coal usage, the government outlines a phase-out strategy. As seen in Table 1, this strategy involves three distinct levels of action, with different levels of urgency. The softest strategy is a complete elimination of coal by 2070, which is also the current policy of the government ([World Bank 2023b](#)). This serves as a baseline. Eliminating coal use by 2050 is the medium strategy which is a strategy closer to the 1.5C° target, as it demands net-zero emission by 2050 ([UN 2015](#)). The hard strategy is set as a short-term reduction strategy, where coal use needs to be reduced by 2030. Even though the wording here is vaguer than the two foregoing strategies, the word eliminate was not included, as this is deemed to be unrealistic, breaking basic principles of designing a DCE ([Mariel et al. 2021](#)).

Alongside the phase-out strategy, the government introduces a social distributive policy with different levels of focus. As a baseline, the government has the option to 1) not implement any additional policy, to capture a scenario where no concern for justice is made. The other levels were selected on the basis of the literature review and included 2) ensuring low energy prices, 3) offering insurance programs for coal workers, and 4) expanding energy access for all citizens. These approaches reflect principles of distributive justice, particularly in terms of socioeconomic equity. The government seeks to minimize the disproportionate burdens placed on the vulnerable during the transition.

To address the potential economic consequences faced by coal regions, the government has designed an economic distributive policy with various levels of intervention. Again, the government

has the option to 1) implement no additional policy. Alternatively, they can 2) facilitate training for coal workers to transition to new industries, 3) facilitate new renewable energy sectors in coal regions, and 4) support the restructuring of these areas based on their historical and cultural identities. These levels adhere to the principles of distributive and spatial justice. By investing in alternative economic opportunities or preserving the identity and history of coal regions, the government aims to minimize economic disparities and uphold the dignity of affected communities and regions during the transition.

The government also formulates a procedural policy that involves establishing a commission with stakeholders. Additionally to 1) not include any stakeholder, they can include 2) local governments, 3) civil society groups, 4) researchers, 5) businesses, and 6) labor unions. This approach is rooted in principles of procedural justice, emphasizing transparency and participation across society.

At last, the government has outlined the role of foreign countries during the transition. There are four levels of support for India in its transition away from coal. To again capture a non-concern from the international partners, 1) financial and technical issues can be left to India alone. Alternatively, other countries can provide 2) only financial support, 3) only technical support, or 4) offer a combination of both. Technical support would primarily include international professionals in the process of building the new energy sectors. The reason for the difference between financial and technical support is to set a precedence about whether or not countries that provide funding, follow up with technical support (knowledge or technology) during the transition. This policy addressed principles of restorative justice, as foreign governments, and especially richer countries, through support could acknowledge the shared responsibility in reducing global emissions.

A unique challenge encountered in the design of the different levels of the different attributes came from the decision to not use numerical values in the attributes covering the government's just energy initiatives. Earlier applications of DCE mapping climate policy preferences involve transfer of payments or tax rates. For example, a social distributive policy could be to transfer 10 euros per month to vulnerable households, in a rebate setting, similar to what is done in [Fremstad et al. \(2022\)](#). However, including numbers in the principle of procedural justice is not as easy. Fearing that numbers are somehow easier and faster to comprehend, it is deemed undesired that some principles of justice take advantage of them, and some do not. To achieve a fair chance of all attributes to be considered, each characteristic is designed to hold a comparable word count, include neutral language, and be easy to comprehend. This might be achieved on the cost of some specifications being vaguer, and emphasize the challenge of translating principles of justice into policies.

As the different policies and their potential unjust consequences might not be clear to the participants, we explore whether the information provided to respondents about the concept and necessity of a just energy transition before the DCE affects their preferences. We have incorporated an information treatment where a control group gets a standard introduction to the ideals of a just transition (A.6). The treated are presented with the same information as the control group but also get additional and more specific information on potential opportunities for the government to make the transition just (A.7). The primary purpose of this treatment is to introduce variation in the amount of information the participants have, considering that the concept of a just energy transition may not be broadly understood. This approach enables an investigation into whether awareness of the concept itself has an impact.

## 4.2 Sampling

**Table 2:** Descriptive Statistics of Survey Data

Demographics	Sample	Population
Sample size	1395	NA
18-24	27.67%	27.08%
25-34	25.02%	24.77%
35-44	19.21%	20.55%
45-54	18.71%	15.98%
55-64	9.18%	11.59%
Male	53.76%	51.49%
Female	46.24%	48.41%
Southern Zone	24.52%	19.82%
Northern Zone	24.59%	30.39%
Eastern Zone	22.08%	22.33%
Western Zone	16.42%	14.44%
Central Zone	8.39%	9.24%
North-Eastern Zone	4.01%	3.76%
% living in a coal state	51.11%	46.49%

**Note:** Descriptive statistics are provided for the age, gender, geographical regions and share of respondents living in a coal state. Age and gender for the population follows [United Nations \(2022\)](#), and regions follow [Government of India \(2022b\)](#). Coal states are states with an active coal production, according to [Government of India \(2022a\)](#)

Employing a non-probability online survey sampling ([Toepoel 2015](#)), meaning that participants are strategically collected, aims at achieving representativeness. The survey is designed in collab-

oration with IDOS and was fielded by Cint between the 5th of September and 12th of September 2023. Quota-based sampling is through the survey tool Qualtrics utilized: (a) 2 gender groups (female, male), (b) 5 age groups (18-24, 25-34, 35-44, 45-54, 55-64), and (c) 6 regions (Southern, Western, Eastern, Northern, North Eastern and Central Zones). In the end, a representative sample of 1395 Indian citizens is obtained.

Table 2 shows how representativeness across gender, age, and regions is achieved, with some limitations. The northern zone is slightly underrepresented, and the southern zone is slightly overrepresented. Males are also slightly overrepresented, and consequently, females are underrepresented. The oldest age group is slightly under the national level, and the age group 45-54 is slightly above. However, a large and diverse sample is obtained, minimizing bias and increasing the external validity of the results, which ensures that respondents accurately reflect the views, preferences, and characteristics of the broader Indian population. Also, it is worth noting that 51,11 % lives in a coal state, which is slightly above the national level.

### 4.3 Survey

To ensure the integrity and validity of the survey and experiment, I prioritize adhering to a set of fundamental principles during the programming and design phase of the survey. Especially principles following [Mariel et al. \(2021\)](#) serve as the foundation for this. The full survey can be found in Appendix A, and the following subsection goes through it step by step.

The survey maintains a transparent, neutral, and engaging question structure. It includes an informed consent process, outlines the research details, names of researchers, and the commitment to maintaining participant anonymity ([A.1](#), [A.2](#)). Questions are constructed in an unbiased tone and are devoid of any leading tendencies. Recognizing the need for clarity and respondent comprehension, screenshots and illustrations are incorporated ([A.9](#)). Making the design of the survey modern and visually attractive makes the process even smoother ([A.11](#)). These visual aids serve to thoroughly introduce the concept of the DCE, making the survey experience more accessible and ensuring that respondents have a clear understanding. Graphics are used to avoid the information being gray and monotone ([A.8](#), [A.7](#)).

Diversity in response options is another key aspect of the methodology. It is important to avoid survey monotony, which can lead to maturation effects and non-responses. To address this concern, respondents are presented with a variety of response mechanisms. These include Likert scales ranging from 1 to 7, in line with [Taherdoost \(2019\)](#). Additionally, an open-ended question is incorporated, taking into account the potential costs and benefits of such inquiries ([Reja et al.](#)



2003). For example, an open-ended question can feel intimidating when a respondent does not know what to answer, or they feel unengaged. To increase engagement in the open-ended question, the name of their state (which they provide) is included when asking about their thoughts about the role of the coal industry in their state (A.17). Asking an open-ended question like this aimed at getting some indication of engagement, as longer text responses indicate more engagement. On average participants wrote 12 words, with a median of 8, indicating a fair amount of engagement among the participants. Including an open-ended question also serves as an overall quality check and helps disclose internet bots during sampling.

In the survey design, questions related to the coal industry, justice, and trust are strategically positioned after the DCE. This deliberate sequencing is intended to minimize anchoring effects, as respondents might be influenced by prior questions when answering subsequent ones (Mariel et al. 2021). Addressing these sensitive topics after the DCE aims at maintaining the integrity of the responses and reduces potential biases (A.12, A.13).

Tools of randomization are used to avoid selection bias and neutralize ordering effects. Leveraging embedded tools in Qualtrics, which randomly allocate respondents to the respective treatment groups, eliminates the potential for selection bias. The treatment group receives additional information regarding the potential benefits of a just transition (A.7). To mitigate any potential influence of the order in which these benefits are presented, the order of the different parts of information is randomized. This eliminates the possibility of the order of the information text itself determining the treatment effect and concentrates the cumulative impact of the information provided to consider the information as a whole (Mariel et al. 2021). A randomized order is also implemented for questions related to various dimensions of energy policy (A.12) and for the order of justice principles initially presented to the respondent (A.14).

To ensure that genuine responses are collected, an inconsistency check is incorporated as well as allowing for a broad set of opinions. As participants rate policy packages and select their preferred one, inconsistent responses are screened out, increasing the quality of the overall sample. An example of an inconsistent response is when a participant chooses proposal A over B but rates B higher than A (A.11). As screening out participants this way has the potential to alter the experiment from investigating preferences to imposing them (Lancsar & Louviere 2006), participants are allowed to abstain from selecting any policy during the DCE. Fearing that screening out inconsistent responses can select out "protesters", allowing for dissent expression makes it possible to express a broad range of opinions.

Discrete Choice Experiments have commonly been applied in HICs, and employing such in a LMIC brings some extra considerations. In line with recommendations from Mangham et al.

(2009), measures are implemented to adapt to this context. Given that the survey was administered online, strategically designing it to be user-friendly for respondents who might access it via their phones, recognize the importance of accessibility. An example of this is how phone users are specifically recommended to flip their phone for better comparability of policy packages (A.10). As mentioned, customizing the open-ended question to consider their state, is done to awaken some sort of emotional or regional attachment to their response. It is also worth highlighting the significant effort invested in crafting the introduction to the DCE. As using concrete examples can induce order effects, all attributes in the example screenshot are blurred (A.9).

At last, it is worth mentioning how participants were incentivized to take the survey and to provide genuine answers. First, participants received a reward for their involvement, facilitated by the survey company Cint. Secondly, even though DCEs are considered especially well at omitting social desirability bias, meaning that participants answer in a way aligning with what they believe is correct (Mariel et al. 2021), participants are informed that their survey responses may have a real-world impact: each response can be randomly selected to contribute to a charitable cause aligned with their answer (see A.4 for how this was explained in the survey). This approach aims to even further mitigate social desirability bias in line with Malerba et al. (2023).

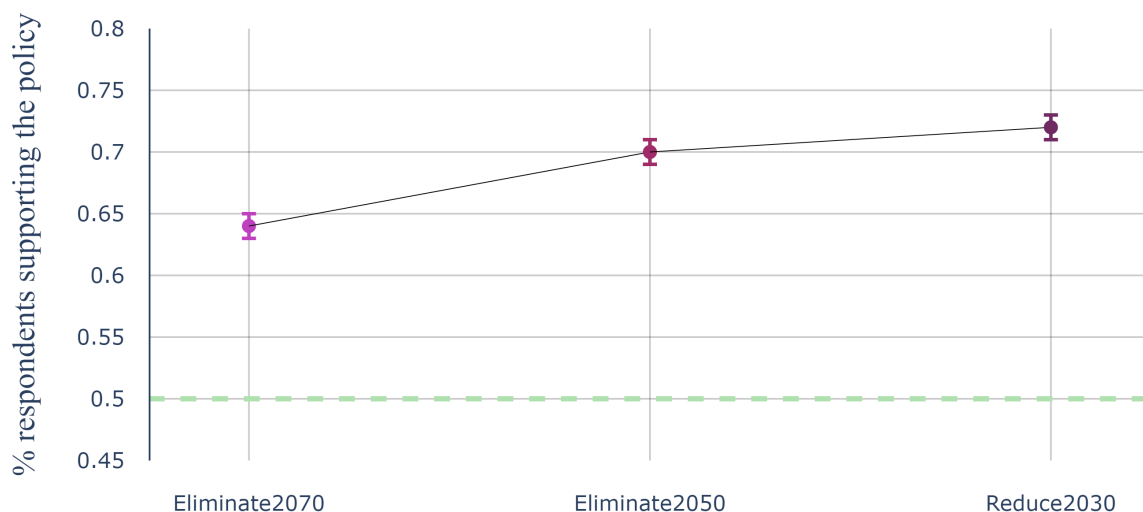
On average respondents spend 15.11 minutes on the survey, with a median of 12.72 minutes, indicating that respondents gave up a considerable amount of their time to answer.

## 5 Results

First, the result of this thesis shows an overall majority of support obtained by all three reduction and phase-out strategies, as illustrated in Figure 1. On average, participants are in favor of all policies, indicating that the Indian population has a strong positive attitude towards an energy transition where the main goal is to reduce or phase out coal. Decreasing the time horizon of the reduction or phase-out deadline increases support.

The results align well with the findings of Leiserowitz et al. (2022). In 2022, they found that 64% of Indians say that the government should do more to address climate change. This survey reveals a slightly higher average support, where doing more than the status quo (eliminate coal use before 2070) increases support, to over 70%. Overall, the results support the finding of Malerba et al. (2023), showing another LMIC that holds a high level of support for implementing a climate policy.

Before moving on to the broader findings of this thesis, it has to be declared that the treatment did not provide any results, and the larger analysis of the treatment is therefore omitted in this



**Fig 1:** Showing overall support for each phase-out strategy. The points showing the probability of a coal phase-out strategy receiving support, independent of which other attributes are shown together with it. The lines correspond to 95% leveled confidence intervals, based on non-clustered standard errors.

section. However, the finding is noteworthy as the treatment is implemented with the expectation that it fosters a stronger focus on just initiatives, as respondents might not be aware of the potential side effects of phasing out coal. The logic would be: as the participants possess more information on how just initiatives could help tackle issues of justice, they would provide more focus towards policies dealing with these issues. One potential reason why there was no evident effect, might be that this information was not strong enough. The design might have been overly optimistic about what a single information page (A.7) would do with the mindset of respondents. It could also be that participants already weighed principles of justice with high regard, which made the treatment redundant.

Table 3 shows the main results of the DCE and the effect on support when one attribute is compared to the baseline. Recall that the baseline is the reference level for each attribute, as explained in Section 4 (it can be found as the first level for each attribute in Table 1).

The first takeaway from running 3 specifications of equation 6, with and without controls, is that the experiment has successfully utilized the tools of randomization as the results are robust across all specifications, and yield very small to no differences. This is expected as it is employed an independent uniform attribute distribution (Hainmueller et al. 2014). Secondly, the results also show that for all attributes, the baseline was the least desired. Recall that the coefficients for a given level, as explained in Section 3, can be interpreted as the probability of an individual supporting a proposal when the policy switches from the baseline to the given level. As all coefficients are either

**Table 3:** Linear Probability Models (Estimated with OLS)

	(1)	(1C)	(2)	(2C)	(3)	(3C)
const	0.638 (0.010)	0.494 (0.023)	0.534 (0.014)	0.406 (0.025)	0.473 (0.019)	0.354 (0.026)
Eliminate2050	0.068 (0.010)	0.069 (0.009)	0.066 (0.010)	0.067 (0.009)	0.065 (0.010)	0.066 (0.009)
Reduce2030	0.086 (0.010)	0.086 (0.010)	0.084 (0.010)	0.084 (0.010)	0.083 (0.010)	0.083 (0.010)
EnergyAccess			0.074 (0.010)	0.074 (0.010)	0.073 (0.010)	0.074 (0.010)
InsureWorkers			0.080 (0.011)	0.081 (0.011)	0.080 (0.011)	0.081 (0.011)
LowPrices			0.079 (0.010)	0.079 (0.010)	0.080 (0.010)	0.079 (0.010)
WorkersCoalRegion			0.073 (0.011)	0.072 (0.011)	0.072 (0.011)	0.071 (0.011)
IndustryCoalRegions			0.070 (0.011)	0.068 (0.011)	0.068 (0.011)	0.067 (0.011)
IdentityCoalRegions			0.046 (0.011)	0.045 (0.011)	0.046 (0.011)	0.045 (0.011)
Gov&LocalGov					0.052 (0.013)	0.054 (0.013)
Gov&LaborUnions					0.039 (0.013)	0.041 (0.013)
Gov&Businesses					0.026 (0.013)	0.028 (0.013)
Gov&Researchers					0.044 (0.013)	0.045 (0.013)
Gov&CivilSociety					0.041 (0.013)	0.041 (0.013)
FinSupportOnly					0.015 (0.011)	0.014 (0.011)
TechSupportOnly					0.015 (0.011)	0.015 (0.011)
Fin&TechSupport					0.084 (0.011)	0.083 (0.011)
Obs	1395	1395	1395	1395	1395	1395
R2	0,006	0,014	0,016	0,023	0,022	0,029
f-statistic	40,540	878,625	25,892	597,962	18,408	428,040

**Notes:**[1] Baselines for each attribute are *Eliminate2070*, *NothingSoc*, *NothingEco*, *GovAlone* & *NoInterference*

[2] Standard Errors are clustered on participants IDs

[3] All models are measured on the basis of equation 5. 1C - 3C controls for age, gender, and geographical zone.

positive or not significant, this indicates that all levels are better or as good as the baseline.

Before further going into the depth of the results, it is important to keep in mind that the size of the coefficients is not directly comparable across attributes, as they are anchored to a baseline level within the attribute. Also, as each respondent made six rounds of choices, standard errors are clustered by respondent ID.

In (1) and (1C), only the phase-out strategy is considered, yielding the strongest support for reducing coal use by 2030. There seems to be a stronger favor of a more urgent phase-out strategy. When presented with a random policy proposal, compared to the baseline of eliminating coal by 2070 (which is the current outspoken policy by the Indian government), respondents are on average 8,6% more likely to support a policy proposal aiming at reducing coal use by 2030. Respondents are also 6,8% more likely to support a policy aiming at eliminating coal use before 2050, the strategy which aligns closer to the 1.5C° target when compared to the baseline.

In (2) and (2C), the social and economic distributive policy are included. Overall, for both attributes, all policies increase the support significantly, compared to doing nothing, which is an expected result. The experiment can not successfully make any conclusion on which social policy is in favor indicating that all policies are deemed important for the respondents. For example, in contrast to [Diamond & Zhou \(2022\)](#), there is no strong evidence that focusing on workers makes a huge difference, even though it achieves some of the overall highest support. This may indicate that respondents overall do not have a strong preference, as long as some distributional justice is addressed. In the case of the economic policy, there seems to be a similar conclusion, but with a weaker preference for maintaining the historical identity of coal regions.

In the last two specifications (3) and (3C) some interesting results are present, as there are significant differences between the AMCEs of the levels within the two last attributes. Considering the inclusion of stakeholders and the principle of procedural justice, there is a weaker preference for including businesses, as it is barely significant to the 95% level. All other constellations are between 3,9% and 5,4% more likely to foster support than the baseline of the government implementing the transition alone, well over the 99% confidence level. The local government achieves the largest positive effect on support. One reason for this can be that all the other stakeholders are vaguely defined, while the local government is a more clearly defined entity. The inclusion of local government also corresponds to some sort of spatial justice dimension, as it includes the regional stakeholder in a nationwide policy proposal.

In the restorative justice attribute, the message is clear: both financial and technological support from third-party countries is necessary, to significantly foster more support for the policy. Participants are 8.4% more likely to provide support when this is part of the policy proposal, compared to

the baseline of the Indian government going on alone. This contributes to the literature of [Gampfer et al. \(2014\)](#), [Beiser-McGrath & Bernauer \(2019\)](#) and [Bechtel et al. \(2022\)](#), by confirming that multilateral forces are indeed important in climate policies, and adding that India, as a receiving country, demands broad foreign support when committing to an energy transition.

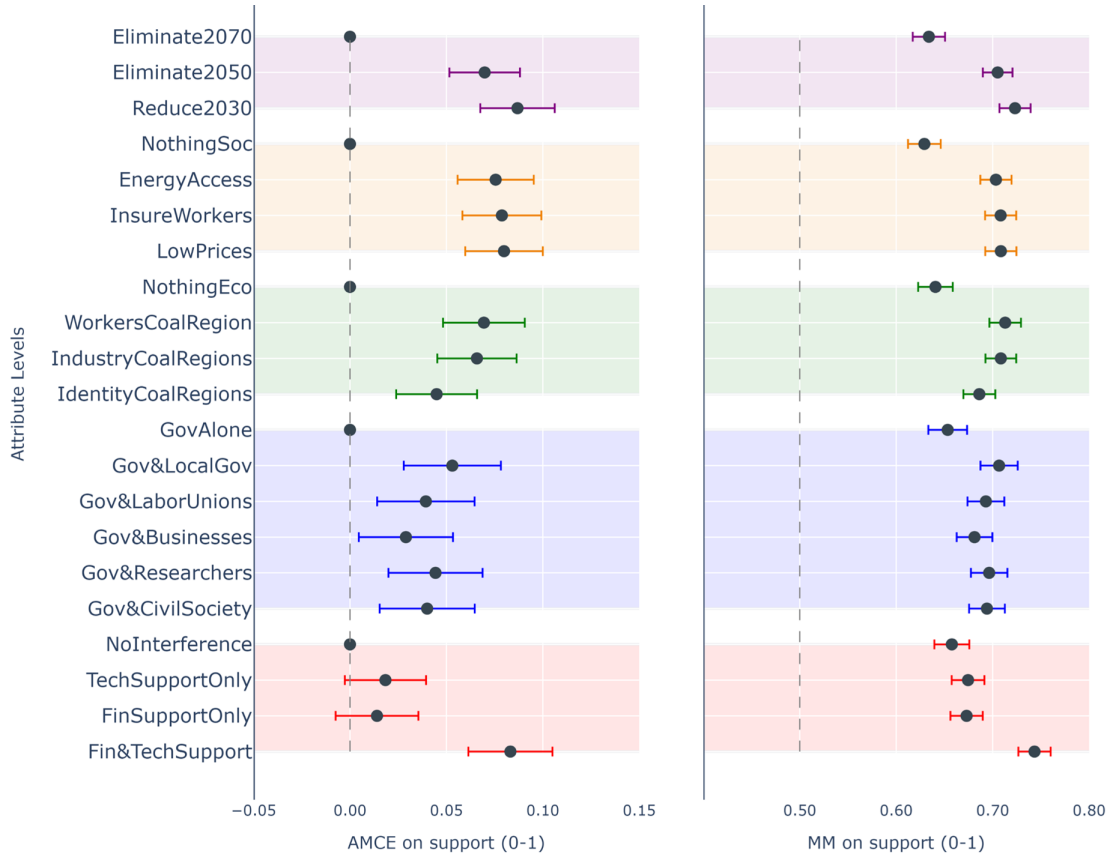
Additionally to regard the results one by one attribute, it is worth mentioning that the result as a whole raises a potential for some criticism towards the design of the DCE. First, there seems to be a case of an overload of positively regarded attributes and levels. The design can benefit from including more "deal breaker" alternatives or negatively regarded policy phenomena. Doing so can produce policy proposals that foster less support, and therefore more variation, which will potentially produce clearer results. Secondly, there is very little and no significant difference between all levels within the social distributive policy. One reason for this might be that the policies are all clearly dealing with potential side-effects of a coal phase-out, and therefore respondents cannot make up their mind about which one is better. Third and last, the procedural policy seems to suffer from a similar case, but can additionally suffer from the fact that they are a bit vague when it comes to the questions of who the researchers, labor unions, and business stakeholders are. This might, as mentioned, be the reason that local governments receive the highest level of support. These points are important to keep in mind, especially for future research on justice principles, as tackling these potential weaknesses can yield stronger and clearer results.

With these potential limitations in mind, it seems however that respondents have understood the process of choosing and rating policy proposals in the DCE, given that we have some clear and significant effects.

Estimating AMCE as done in Table 3 together with marginal means, can yield a visually desirable representation of preferences, which is easy to interpret. Using the definitions from Section 3, Figure 2 illustrates the AMCEs from model (3C), and Figure 3 shows the MMs. As explained in Section 3, MMs are the probabilities of a policy being supported when particular attribute levels are included.

AMCEs are great for visualizing and presenting preferences within an attribute. For instance, it is very clear that financial and technical support is of particular importance for the respondents.

Marginal means (MM) however allows us to 1) infer and visualize the overall probability of support, and 2) explain which attribute levels foster the highest probability of support. First, it is clear that there is an overwhelming amount of support for all proposals, as no attribute level receives less than an MM of 60%. Secondly, the attribute level with the highest probability of support is the one ensuring that foreign countries provide both financial and technical support. This leans towards an impression that the restorative justice principle is especially important to respondents.



**Fig 2 (left) & Fig 3 (right):** On the left AMCE is estimated on the basis of table 3, model 3C, and shows the relative difference between the baseline level and the given level, within each attribute. On the right MM are estimated according to equation 5, and show the overall probabilities of support when the given level is included. For both estimates, there are robust standard errors taken on respondent ID, which are illustrated by 95% confidence intervals.

The attribute and principle of justice that seems to influence support less, is procedural justice. The baseline (the Indian government alone), receives the lowest support within the attribute and receives the highest support between attributes. This indicates that when presented with the policies, the procedural policy had a lower effect on the support. In other words, which level the procedural policy held was less important to the respondents.

This aligns well with the respondents' ranking of justice principles, as shown in Table 4. Note that spatial justice was not defined due to its close connection to distributive justice (see A.14 for the question design). First of all, there are no clear results here, only slight differences. On average, when participants are given the definitions of the four distinct principles of justice, recognitional justice tends to be ranked as the most important. It is also most rarely ranked as the least important. As mentioned in Section 2, the aspects of recognitional justice can be present in all the other

**Table 4:** Justice Principle Importance

Principle	Most Important	Least Important	Average Importance
Procedural Justice	21.74%	27.15%	2.57
Distributive Justice	24.05%	29.14%	2.59
Recognitional Justice	28.90%	19.98%	2.37
Restorative Justice	25.31%	23.72%	2.47

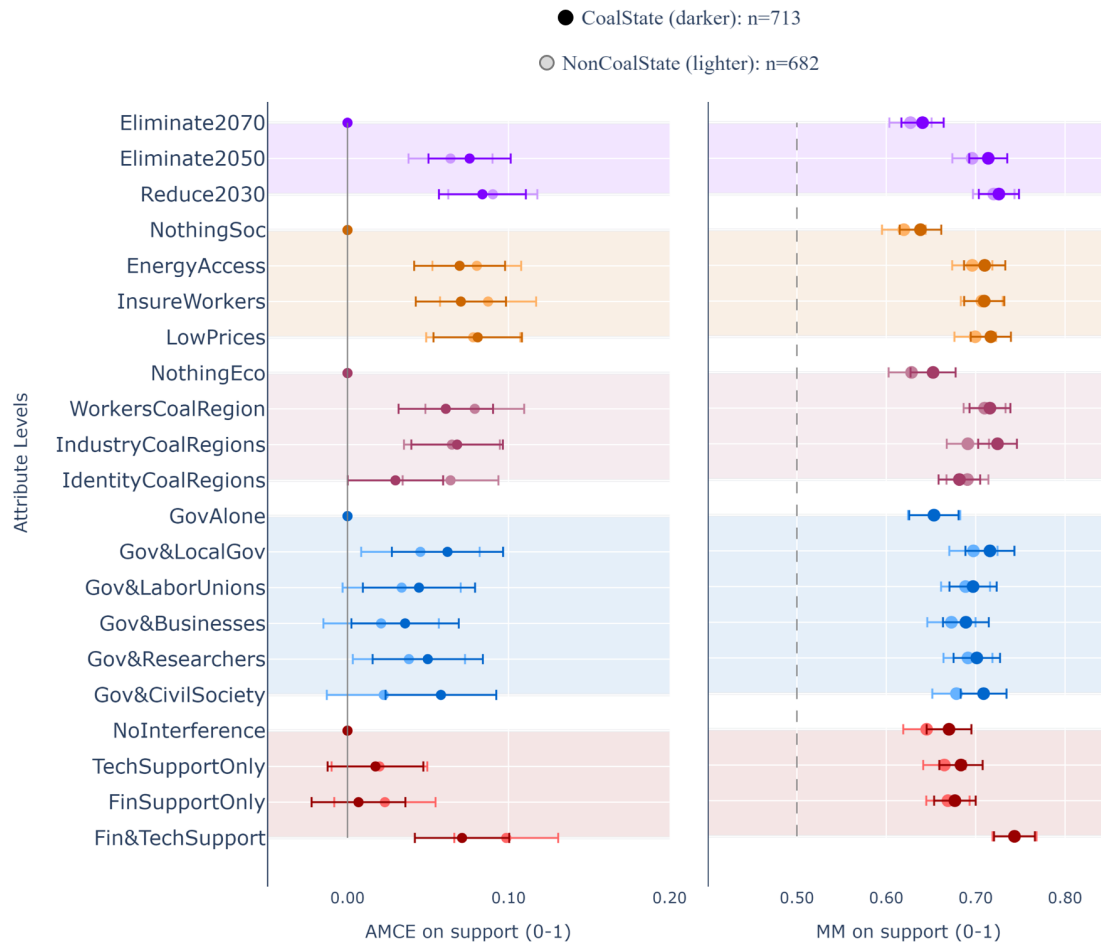
**Notes:** Summarizing the responses to question about ranking of justice principles [A.14](#). For average importance, lower number indicates more important.

principles of justice, and as it receives the highest rank the most often, this aligns well with the fact that all principles of justice seem to be highly regarded, with no clear differences. However restorative justice seems to be the second highest ranked, while procedural justice follows the opposite pattern, ranked as most important the least, and ranked the least important second most. Again, one should be careful concluding on these remarks as there are small differences between the average importance obtained by all principles of justice. However, as the results in the DCE align with the ranking, it works as an indication that the attributes rooted in justice principles are successfully representing their particular domain.

Diving deeper into the principles of justice, one particular interesting facet of distributive justice is as mentioned in Section 2 spatial justice. As respondents provided information about which state in India they came from, it is possible to look at two subgroups, people living in a state producing coal and people not. This can address differences between populations that most likely would observe and experience different consequences regarding an energy transition with a focus on phasing out coal. Coal states are states with active coal production, according to [Government of India \(2022a\)](#).

Figure 4.1 and 4.2 shows how the two groups compare, where noncoal state respondents are in a lighter tone, and coal-state respondents are in a darker tone. Surprisingly, there are no significant differences found over all attributes and levels. There can be several reasons for this. One reason can be that there are no large differences on the state level. Whether or not you live in a coal state, may be a bad proxy of how much you care about the coal industry and the consequences of an energy transition. Coal mines are often far away from large cities, and respondents living in large cities might not have a different view on the topic than other regions. In addition to this, the effect of living in a coal state can yield arbitrary directions of effects. On one side, scaling down the coal industry can foster opposition, as found by [Banerjee & Schuitema \(2022\)](#) and [Cha \(2020\)](#). On





**Fig 4.1 (left) & Fig 4.2 (right):** Lighter-shaded dots are the estimates coming from individuals not living in a coal state, and darker-shaded dots are the estimates coming from individuals living in a coal state. On the left AMCEs are estimated on the basis of table 3, model 3C, for each group, and shows the relative difference between the baseline level and the given level, within each attribute within each group. On the right MMs are estimated according to equation 5, and shows the overall probabilities of support when the given level is included, also within groups. Robust standard errors on respondent ID, which are illustrated by 95% confidence intervals.

the other side, recall that [Torres et al. \(2015\)](#) found a desire of regions to show responsibility and improve their reputation. One can not be too sure about which effects dominate. However, one would expect that policies directly aimed at coal regions yield more support. The results do not indicate this, as the results are not significantly different between the two groups. One noteworthy observation in Figure 4.1 is however that in coal-state, the attribute level "identity of the coal region" does not significantly foster more support than doing nothing. This increases the suspicion that the coal state indicator is not successfully working as a proxy to express someone's attachment

**Table 5:** Energy Policy Awareness and Living in a Coal State

Subgroups	Living in a Coal State	Not Living in a Coal State	Sum
<b>High Awareness</b>	30.86%	27.13%	405
<b>Low Awareness</b>	69.14%	72.87%	990
Sum	713	682	1395

**Notes:** High and low energy and coal policy awareness is assigned on the basis of getting 3/3 correct when guessing/providing the answer to questions in [A.5](#) & [A.12](#).

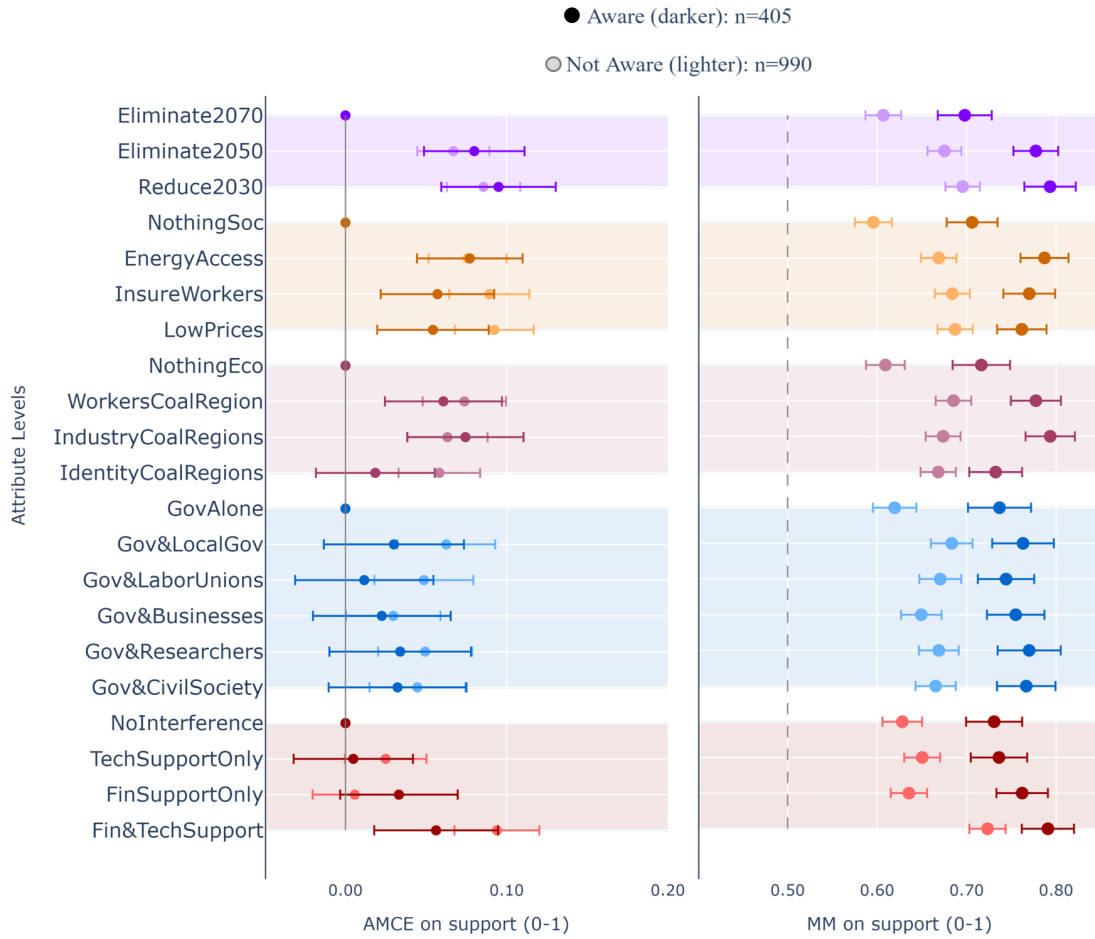
to the coal industry.

One might expect that living in a coal state would influence the perception of the policy proposals because people closer to the industry can be more aware of it. The survey design also allows us to further investigate this. With the aim of collecting an indication of whether or not respondents had an overview of the current energy policy environment, three questions were asked: First, based on information from [Laan et al. \(2022\)](#), the respondents were asked to 1) state the main source of electricity in India ([A.5](#)), with the correct answer being coal. The question was asked before the survey especially mentioned the coal industry, avoiding anchoring effects. Secondly, after the DCE, to avoid anchoring effects, the respondents were asked if 2) the government supports the electricity market to keep prices low, and if 3) the government financially supports the coal industry. The answer to both of these questions is yes. Respondents achieving 3/3 correct are categorized as having a high awareness, while the rest are assigned low awareness.

Table 5 further supports the reasoning that there may be little to no distinction between respondents in coal states and those outside of them when it comes to general awareness of the industry and energy market. It is clear that the awareness does not seem to correlate well with living in a coal state, as first expected.

Even though no clear effect of living in a coal state was present, what about the effect of being aware of the energy policy landscape? Grouping on high and low awareness as in Table 5, Figures 5.1 and 5.2 shows a strong overall effect. Figure 5.2 illustrates how being more aware of the energy market clearly correlates with higher support overall. Reducing coal use by 2030 almost obtains 80% support. One should be careful in concluding that low awareness causes lower support, and the opposite, as awareness can be determined by many demographic and socioeconomic factors. For example, awareness could be highly correlated with both education and income, which [Aruga et al. \(2021\)](#) found to have a strong effect on the perceived urgency of climate action.

As two of the questions about the energy policy in India include the fact that the government



**Fig 5.1 (left) & Fig 5.2 (right):** Lighter-shaded dots are the estimates coming from individuals obtaining a low awareness score, and darker-shaded dots are the estimates coming from individuals obtaining a high awareness score. On the left AMCEs are estimated on the basis of table 3, model 3C, for each group, and shows the relative difference between the baseline level and the given level, within each attribute within each group. On the right MMs are estimated according to equation 5, and shows the overall probabilities of support when the given level is included, also within groups. Robust standard errors on respondent ID, which are illustrated by 95% confidence intervals.

already uses financial resources to intervene with the market, defining a level of awareness on this premise, makes it likely that aware respondents know that the government already spends money on energy policies. They may for this reason hold the opinion that the government might as well do something else with the same money.

It's important to recognize that more aware respondents might have answered all the potentially easy questions correctly because they might have provided a heightened focus and attentiveness throughout the entire survey. Interestingly, when we looked into it, there didn't appear to be any

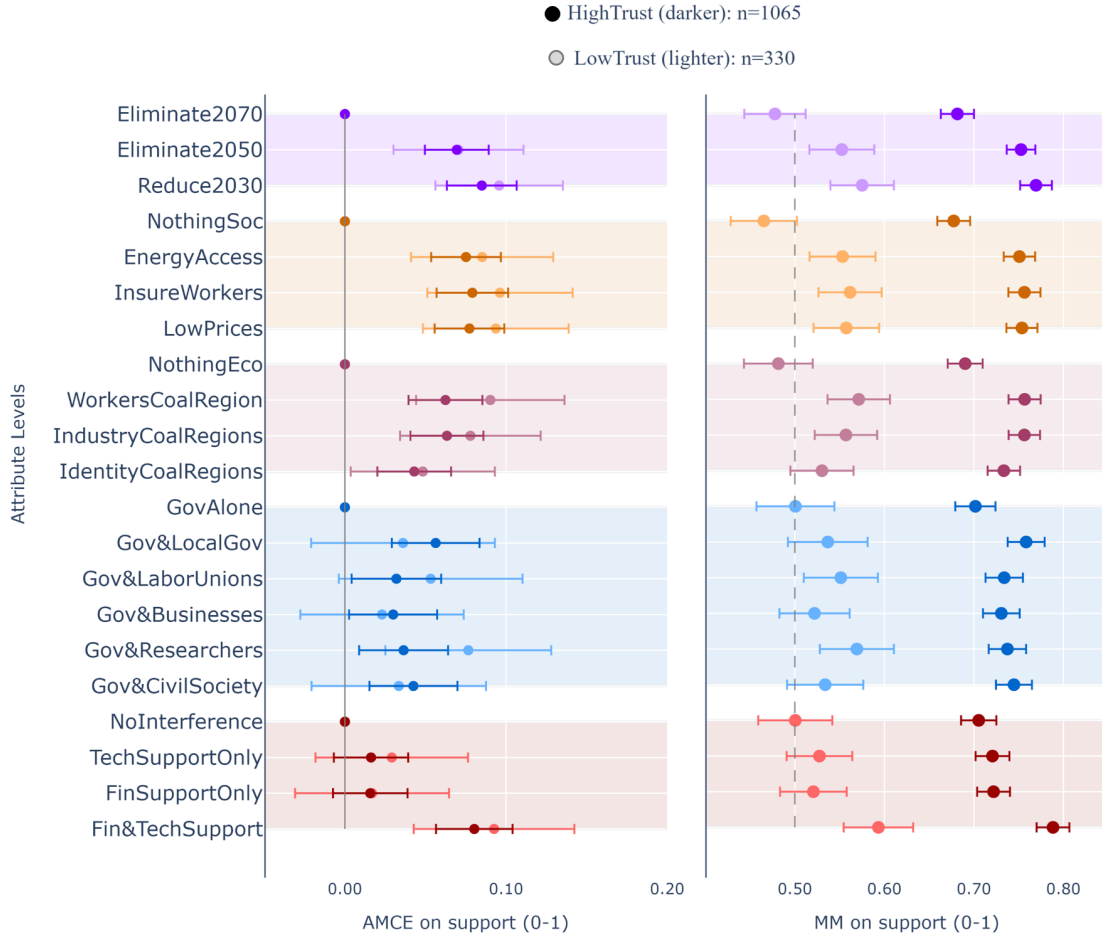
significant disparities in the time spent on the survey between those who were aware and those who were not. On average, both groups dedicated around 15 minutes, with a median time of between 12 and 13 minutes.

At last, following the literature, the role of trust is also investigated. By using Likert scales from 1 "Strongly Disagree" to 7 "Strongly Agree", responses to three questions about how the participant agreed with different statements regarding their trust towards the government (inspired by [Faure et al. \(2022\)](#)) are used to produce averages (see [A.15](#)). If respondents have an average of 5 or above, they are categorized as having a high level of trust. In both [Faure et al. \(2022\)](#) and [Levi \(2021\)](#), low trust predicts opposition towards the government plan of carbon taxation and taxation in general. This is not an illogical result, as low trust is assumed to make people more skeptic towards the intention of the government and therefore potential policy proposals. However, these studies did not find results with regard to other climate policies and they originate from Europe, so investigating the same effect in a coal phase-out and in an LMIC outside Europe is necessary.

Grouping by high and low trust, Figures 6.1 and 6.2 show that trust plays a significant role. First of all, a majority of the sample has a high trust in the government. Moving on, having low trust yields a strong effect, reducing overall support, where some levels do not even foster a significant majority of support. Figure 6.2 goes as far as showing that respondents with low trust towards the government, require either complimentary distributive policies, involvement of either labor unions or researchers, and substantial financial and technical support, to provide a significant majority support. The last factor is especially important, as it is almost 10% more likely to foster support when compared to no interference from other countries.

Trust in government, much like awareness of the energy market, can indeed be correlated with factors such as education and income, potentially yielding significant effects coming from these or other variables. Nevertheless, it is undeniable that justice and trust are two intertwined components of society. A lack of trust can breed suspicion about the government's capacity to uphold principles of justice, while unjust governance can decrease the population's trust. The findings of this thesis firmly establish a relationship between these two critical aspects.

To summarize, the results show how a government dealing with different principles of justice can foster more support for climate policies. While there was no clear difference between individuals residing in and not in coal states, the results establish a precedence that awareness and trust play important roles.



**Fig 6.1 (left) & Fig 6.1 (right):** Lighter-shaded dots are the estimates coming from individuals with low trust towards the government, and darker-shaded dots are the estimates coming from individuals with high trust. On the left AMCEs are estimated on the basis of table 3, model 3C, for each group, and shows the relative difference between the baseline level and the given level, within each attribute within each group. On the right MMs are estimated according to equation 5, and shows the overall probabilities of support when the given level is included, also within groups. Robust standard errors on respondent ID, which are illustrated by 95% confidence intervals.

## 6 Conclusion

This thesis aims to achieve some objectives, as explained in the introduction, and the objectives will now be discussed and concluded.

First of all, when analyzing the preferences and attitudes of individuals in India towards just energy policies, this thesis finds and confirms that a majority of Indian citizens are in favor of transitioning away from coal. It also finds that overall, policy proposals addressing principles of

justice increase the already substantial support.

Secondly, this thesis also identifies how concepts of justice influence individual decision-making processes. A noteworthy finding is the effect of the international restorative justice policy, which suggests that it is important that foreign states, and especially richer countries, support LMICs. This indicates that Just Transition Partnerships is a step in the right direction. It also became evident that procedural justice was somehow given less attention, but this thesis fails to conclude on the question of why it is like this, even though one may expect that a vague definition of stakeholders might take some blame. Also, in hindsight, the international restorative justice policy may have a hint of procedural justice in it, as it involves how other countries are included in the process.

Furthermore, this thesis is unable to establish significant differences in respondents' attitudes based on their proximity to coal-producing regions. This challenges prior assumptions about the importance of spatial justice in just transitions, but as mentioned, could also be because the coal state classification fails to establish an individual's connection to the coal industry.

Third and last of the objectives, this thesis does provide insights and recommendations for policymakers on how to enhance public support for climate policies in India. The results hold particular implications for climate policy development in India. The overwhelming support for transitioning away from coal underscores a clear mandate for policymakers to accelerate the shift toward renewable energy sources.

However, the support in the population is dependent on maintaining high levels of awareness and trust. The significant impact of possessing awareness of energy policies and trust in the government on overall support, emphasizes the need for transparent and informative communication during the energy transition process. Policymakers may for instance prioritize education and engagement to ensure continued public support for just transition initiatives to achieve this.

Acknowledging the strengths and limitations of the study is important. A strength lies in the extensive survey data, providing a comprehensive understanding of public attitudes. Another strength is that the results in the DCE and the ranking of justice principles (while not conclusive) align. At last, the design of the DCE, the survey as a whole, holds a high and modern standard.

However, I acknowledge limitations, such as the lack of exploration of less desirable policies or more abrupt transitions. This could have provided additional insight, as it could create a larger understanding of what does and does not foster support. Future research should consider going deeper into these dimensions, and take the results of the design of this thesis into account while doing so. This thesis has aimed to shed sufficient light on the challenges of addressing and investigating attitudes towards different principles of justice, and future work can benefit from taking these challenges into consideration when designing similar studies.

A last mention-worthy limitation and also a recommendation for future research is the limited external validity of investigating only one LMIC. It is important to keep in mind the variations that exist among individual lower-middle-income countries, as their unique circumstances and development trajectories influence their specific challenges and opportunities and limit the external validity of studying only one country alone. Making studies covering multiple countries increases the insight and validity of the results.

In conclusion, this thesis contributes valuable, novel evidence regarding attitudes towards just energy transition initiatives. Moving forward, it serves as a solid foundation for future research focused on understanding attitudes towards just transition initiatives, especially within the context of shifting from coal to renewable energy sources.

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# A Appendix: Survey

## A.1 Landing Page



### Citizens' preferences for just climate policies

#### Welcome to our survey!

Thank you for taking the time to participate in our survey.

It will in total take approximately **15 minutes to complete**. Your valuable input is highly appreciated!

We kindly request your full concentration, as it will lead to the best results. Please take your time to carefully read all the provided information.

Note that this survey is designed to be **completely anonymous** and does not collect any information traceable to your personal identity.

To navigate to the next page, simply click the arrow button as indicated below.

## A.2 Ethics and Information



#### Who is responsible for the study?

Daniele Malerba & Sjur Løne Nilsen

Contact: daniele.malerba@idos-research.de & sjur.nilsen@uni-bonn.de

German Institute of Development and Sustainability (IDOS)

Tulpenfeld 6 D-53113 Bonn, Germany

#### What is the purpose of the study?

We are interested in the preferences of citizens in relation to energy and climate policies. The goal is to understand how energy and climate policies would ideally be designed, such that the policies can be built around the interests of the population.

#### Your answers in this survey matters!

Your response, and your preferences, will affect the distribution of money. This will be explained in the next page.

► [Double click to read the declaration of consent](#)

☐ Yes, I hereby give my consent.



## A.3 Quota

As this survey is aiming to collected responses across all age groups and regions across India...

Please provide us with information of which region you are from:

Please provide us with your age:

Please provide us with your gender:

## A.4 Incentive

**Your answers within this survey matter!**

Apart from informing research and policymakers, your choices will help guide the distribution of funds across a variety of causes.

Here's how it works:

1. First, we collect all the reponses.



2. Then, from these responses, **few responses will be randomly chosen.**

3. Finally, for each selected response, we will allocate ₹900 to different organizations based on the choices stated in the selected responses.



More information about this will be given at the end of the survey.

Rest assured, **your responses are completely anonymous and confidential. No personal information will be linked to the donation!**

## A.5 Q: Main Source of Electricity

Let's get started!

It is very helpful for us to understand how much people know about their country's electricity and energy consumption and production. In this part we therefore ask you to take your best guess!

Do not worry, your answer will not follow any consequences in the rest of the survey!

**In your best guess, which is the main source of electricity in India?**

☐ Oil

☐ Gas

☐ Other

☐ Coal

☐ Nuclear Power

☐ Solar

☐ Hydropower

☐ Wind

## A.6 Information Control (Shown for all)

### General Information About a Just Energy Transition:

A just energy transition is a process with two aims. First, it aims at reducing greenhouse gas emissions by replacing the use of fossil fuels with renewable energy sources; this can be defined as the energy transitions. Second, it aims to achieve this energy transition in a socially just way, such as making sure that vulnerable people and communities, such as coal workers are addressed; this is important as there may be some negative effects in the short term when significantly changing the energy system.

The government of **India** is currently discussing with the international community the possibility to receive international funding to mobilize a shift towards cleaner energy sources.

## A.7 Information Treatment (Only shown to Treated)

### Importance of Implementing a Just Energy Transition:

A just energy transition can have numerous positive effects:



**Environmental effects:** A just energy transition would reduce and halt emissions in the long term.

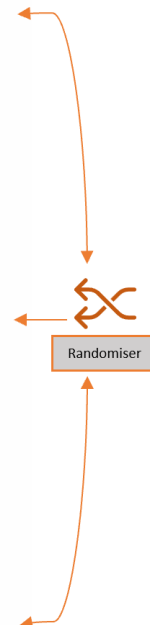
This would lead to cleaner air, less frequent weather hazard and extreme weather events, and reduced ecological impacts. Research has shown that there would be less extreme weather events and the temperatures will be less hot.



**Economic effects:** A just energy transition would stimulate economic growth, foster innovation in renewable energy technologies, and create green jobs in emerging industries. Research has shown that there could be new jobs created and that people that loose their jobs, can find jobs in other sectors.



**Social effects:** A just energy transition would incentivize cleaner energy alternatives, improve public health, increase energy access and affordability. Research has shown that it could save many lives.



## A.8 Attributes of DCE Explanation

**Thank you for your time so far!**

We will now proceed to the main part of the survey.

As previously said, the government of India is discussing a just energy transition partnership with the international community. We will now ask you to compare specific proposals for the just transition partnership. Their features differ, and you will be asked to tell us whether you support or oppose these proposals.

**Please read carefully:** Some sets of features and proposals may look similar but could still differ in one or more important aspects. You will be asked to compare the two proposals and tell us which one you think the government of India should adopt.

We want you to imagine that these proposals might actually be implemented some time in the future, and that you now have an opportunity to show whether you support or oppose the proposal.

Each package includes specification of **5 different categories**:



### **The future plan for the energy sector:**

What is the future plan for the energy sector? How fast will India commit to reduce or eliminate coal?



### **Social policy:**

What social policies will the government implement to deal with potential negative social effects of energy policies?



### **Economic policy in coal regions:**

What economic policies will the government implement to deal with potential negative economic effects in coal regions?



### **Stakeholders:**

Which actors will participate and have an important role in the process?



### **International efforts:**

How will other countries support India? Will they support with finances, technology and expertise?

## A.9 Instructions of DCE

### Procedure:

**Step 1:** You will be presented with the two packages in the following format, where each category will be in the same row:

Proposals	A	B
To decrease emissions, your government plans to:	Reduce the use of coal and increase the use of renewable energy sources	Reduce the use of coal and increase the use of renewable energy sources
In parallel to reducing the use of coal, your government will:	Reduce the use of coal and increase the use of renewable energy sources	Reduce the use of coal and increase the use of renewable energy sources
To address negative economic consequences of coal regions, the government will:	Provide training for coal workers to transition to other sectors of the economy	Provide training for coal workers to transition to other sectors of the economy
To ensure that the energy transition from coal to renewable is just and fair, the government will:	Ensure a transition with different costs	Ensure a transition with different costs
The international community, and especially richer countries, will:	Provide funds to support the transition	Provide funds to support the transition
...and...	Use other policies to decrease the use of coal and increase the use of renewable energy sources	Use other policies to decrease the use of coal and increase the use of renewable energy sources

**Step 2:** After comparing A and B, you click on the desired package of the two. Please read the categories carefully, and make sure that you click the correct option. Say that you prefer B over A, you will then click B.

None of them <input type="radio"/>	A <input type="radio"/>	B <input checked="" type="radio"/>
---------------------------------------	----------------------------	---------------------------------------

**Step 3:** After doing so, you will be asked to indicate how much you like the two packages from Strongly Dislike to Strongly Like:

Please answer the following questions:

	Strongly Unsupport	Unsupport	Somewhat Unsupport	Neutral	Somewhat Support	Support	Strongly Support
How much do you support proposal A?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How much do you support proposal B?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

This will be repeated **6 times**. Please consider each round as an independent decision. You do not have to remember what you did in the earlier rounds.

We thank you for considering spending a fair amount of time to compare the two proposals!

## A.10 Conditional Phone Adjustment

**We now ask for your full concentration for the next part!**

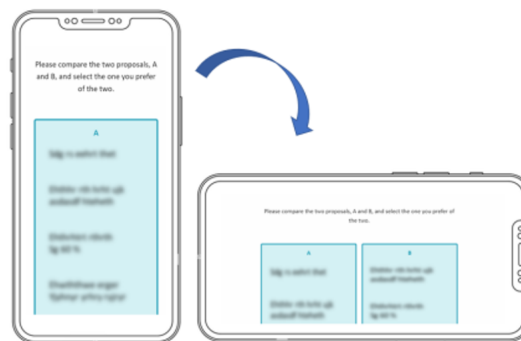
### Remember!

The answers you give will affect the allocation of money across different organizations.

Condition: Only shown if respondent used a phone:

If you are using a phone, this survey is better done horisontally.

Turn your phone on the side for the next part. It will be easier to compare the two alternatives side-by-side!



## A.11 DCE and its Visual Design (Example)

### Round 1 of 6

Please compare the two proposals, A and B, and select the one you prefer of the two. If you do not prefer any, please choose none of them.

Proposals	A	B
To decrease emissions, your government plans to:	<b>Eliminate coal use</b> and only use alternative energy/electricity sources <b>by 2070</b>	<b>Eliminate coal use</b> and only use alternative energy/electricity sources <b>by 2070</b>
In parallel to reducing the use of coal, your government will:	Try to expand <b>energy access</b> to all citizens	Ensure that <b>energy prices are low</b>
To address negative economic consequences of coal regions, the government will:	Facilitate <b>renewable energy industry</b> within coal regions	Implement <b>no additional policy</b>
To assure that the energy transition from coal to renewables is just and fair, the government will:	Form a commission with different actors especially including <b>businesses</b>	Form a commission with different actors especially including <b>local government</b>
The international community, and especially richer countries, will:	<b>Leave financial and technical issues to India</b>	Provide India with <b>only financial support</b>

None of them <input type="radio"/>	A <input type="radio"/>	B <input type="radio"/>
---------------------------------------	----------------------------	----------------------------


Please answer the following questions:

	Strongly Unsupport	Unsupport	Somewhat Unsupport	Neutral	Somewhat Support	Support	Strongly Support
How much do you support <b>proposal A?</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How much do you support <b>proposal B?</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


# A.12 Q: Policy Familiarity & Awareness

Self declared familiarity of policies:

How familiar are you with your government's efforts to address **environmental issues and reduce greenhouse gas emissions?**


	Very unfamiliar	Quite unfamiliar	Somewhat unfamiliar	Neutral	Somewhat familiar	Quite familiar	Very familiar
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How familiar are you with your government's efforts to **address energy issues and secure energy access** to the population?


	Very unfamiliar	Quite unfamiliar	Somewhat unfamiliar	Neutral	Somewhat familiar	Quite familiar	Very familiar
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge about policies:

How familiar are you with your government's efforts to address **environmental issues and reduce greenhouse gas emissions?**

	Very unfamiliar	Quite unfamiliar	Somewhat unfamiliar	Neutral	Somewhat familiar	Quite familiar	Very familiar
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How familiar are you with your government's efforts to **address energy issues and secure energy access** to the population?

	Very unfamiliar	Quite unfamiliar	Somewhat unfamiliar	Neutral	Somewhat familiar	Quite familiar	Very familiar
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## A.13 Q: Willingness to Bear Cost Support

Are you generally willing to bear higher costs or to change your behavior and lifestyle in order to protect the climate?

☐ Yes

☐ No

☐ I don't know

To what extent do you support policies to protect the climate and reduce emissions?

Very  
unsupportive      Quite  
unsupportive      Somewhat  
unsupportive      Neutral      Somewhat  
supportive      Quite  
supportive      Very  
supportive



To what extent do you support policies to protect the climate and reduce emissions **if you know that no other country than India will do the same?**

Very  
unsupportive      Quite  
unsupportive      Somewhat  
unsupportive      Neutral      Somewhat  
supportive      Quite  
supportive      Very  
supportive



## A.14 Q: Justice Principle Rankings

We will now wrap up the survey, by asking some last questions.

A just transition put emphasis on justice. We are therefore interested in what kind of justice is more important to you.

**Which of the following concepts of justice in the context of an energy transition more important?**

*Please indicate how important you think the different contexts are compared to each other, by sorting them from most important **1**, to the least important **4**. You can simply drag the boxes to the position you want. If you think something is more important, you put it higher in the stack.*

**1**

**Procedural justice:**

Access to decision-making processes that govern the energy transition should be equitable and the procedure should engage all stakeholders in a non-discriminatory way.

**2**

**Restorative justice:**

In the energy transition focus should be on the needs of the victims, such as nations, citizens and nature. It restores them to their original position prior to a damaging activity.

**3**

**Recognitional justice:**

Individuals must be fairly represented in the energy transition process, free from physical threats and granted complete and equal political rights. A lack of recognition can manifest as various forms of cultural and political domination, insults, degradation and devaluation

**4**

**Distributive justice:**

The distribution of costs and benefits from the energy transition should be just and fair.

## A.15 Q: Trust Towards Government

Below you will find 3 statements. Please indicate how much you agree with the statements on a scale from Strongly Disagree to Strongly Agree.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The government will take many perspectives into account when making a decision about policies to decrease the consumption of coal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The government provides all of the available information to the public when making a decision about policies to decrease the consumption of coal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I trust the government.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## A.16 Q: Household Income

In order to understand respondents answers, it helps to know a bit more about their life situation.

First, please indicate the total amount of adults with household income in the box below. With adult we mean any person in the household, contributing with income.

Number of adults in household:

**Monthly household** income means the total amount of income in the household you live within, over one month. You provided that you were 1 adults in your household.

Please find the corresponding interval:

Less than ₹3800  
₹3800 - ₹11500  
₹11500 - ₹14000  
₹14000 - ₹16500  
₹16500 - ₹19500  
₹19500 - ₹23300  
₹23300 - ₹28400  
₹28400 - ₹37000  
₹37000 - ₹59500  
More than ₹59500

## A.17 Q: Open End Question about Coal Industry in State

In our two last question, we are interested in what you think!

*To answer is completely voluntarily. However, anything you write is valuable for us!*

Do you have any thoughts **about the role** of the coal industry in 

Repsondent's  
State

 after doing this survey?

## A.18 Q: Feedback Screen Submit



Thank you for your response. Based on some randomly selected responses, funds will mainly be allocated among the following social, environmental and labour organizations:

**Navdanya** (<https://www.navdanya.org/>)

**CARE India** (<https://www.careindia.org/>)

**SEWA** (<https://sewabharat.org/>)

Finally, we would really appreciate hearing what you think about the survey and your experience. Please write a short sentence (or more if you like) about what you think about this survey.

I hereby confirm that the work presented has been performed and interpreted solely by myself except for where I explicitly identified the contrary. I assure that this work has not been presented in any other form for the fulfillment of any other degree or qualification. Ideas taken from other works in letter and in spirit are identified in every single case.

Date:

Place: Bonn, Germany

Signature: