Phasing out coal-fired power in Indonesia

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Abstract

How do voters in developing countries view the green energy transition? Global efforts to stem emissions in the face of climate change increasingly focus on decommissioning legacy fossil fuel assets in the Global South. But this can open new cleavages between citizens in developing countries who differ in their climate and development goals. We leverage the unexpected announcement of the premature decommissioning of the Cirebon-1 coal plant in the weeks prior to the 2024 Indonesian national election to understand the effects of the energy transition on political support and attitudes. We use an interrupted survey design with geolocated data to test the countervailing pressures of economic development and environmental damage for citizens in the wake of the decommissioning announcement. We find that people situated near the plant become more opposed to the status quo candidate and less likely to support environmental policies. We then extend this to consider individuals sited near each Indonesian coal-fired power plant to examine how variation in local attitudes should inform the design of just transition packages that can accompany future decommissioning projects.

1 Introduction

The green energy transition is essential for addressing global climate change, and its politics have been extensively studied in developed countries. The existing research has examined different policy instruments — especially carbon pricing (Rabe, 2018), technology standards (Stokes, 2020), and bans (Rentier *et al.*, 2019) — and paid careful attention to whether these can be designed to maximize public support (Bergquist *et al.*, 2020). One key finding from this field is that citizens often have clear preferences for policies with lower costs and prefer bundles of policies that reduce the distributive implications of the post-carbon transition (Gaikwad *et al.*, 2022). Policymakers are learning to better tailor energy policy's incidence of costs and benefits to build durable supporting coalitions (Bolet *et al.*, 2024).

But we know less about these politics in developing countries. This is a substantively meaningful oversight because developing countries are now a majority of global greenhouse gas emissions (Meng *et al.*, 2023). It is also theoretically important because the energy transition will look different in these countries because the tradeoffs between environmental and other developmental or economic objectives are more stark (Bos & Gupta, 2019). How do voters in developing countries view the energy transition?

We address this by studying changes in public attitudes following 2023 announcement to decommission a 660-megawatt coal-fired power plant in Indonesia.[1]. We focus on Indonesia, a middle-income country with the fourth highest population globally, sixth-highest annual greenhouse gas emissions, and a deep dependence on coal (Ordonez *et al.*, 2022; Hsiao & Kuipers, 2025; Gao *et al.*, 2021). Closing coal-fired power plants has been a high-impact mitigation strategy in developed countries (Millar *et al.*, 2021; Rentier *et al.*, 2019; Le Quéré *et al.*, 2019), but has faced political barriers (Bridle *et al.*, 2018; Egli *et al.*, 2022; O'Brien-Udry, 2023). Surveys that ask about attitudes can generate descriptive baselines for climate and energy preferences (Gaikwad *et al.*, 2022; Dechezleprêtre *et al.*, 2025). But these measures may have limited external validity to the extent that they poll attitudes when climate and energy policy are less salient. The sudden announcement to decommission the

[1] `https://ekonomi.bisnis.com/read/20231203/44/1720455/tok-pltu-cirebon-1-pensiun-dini-desember-2035-tran`

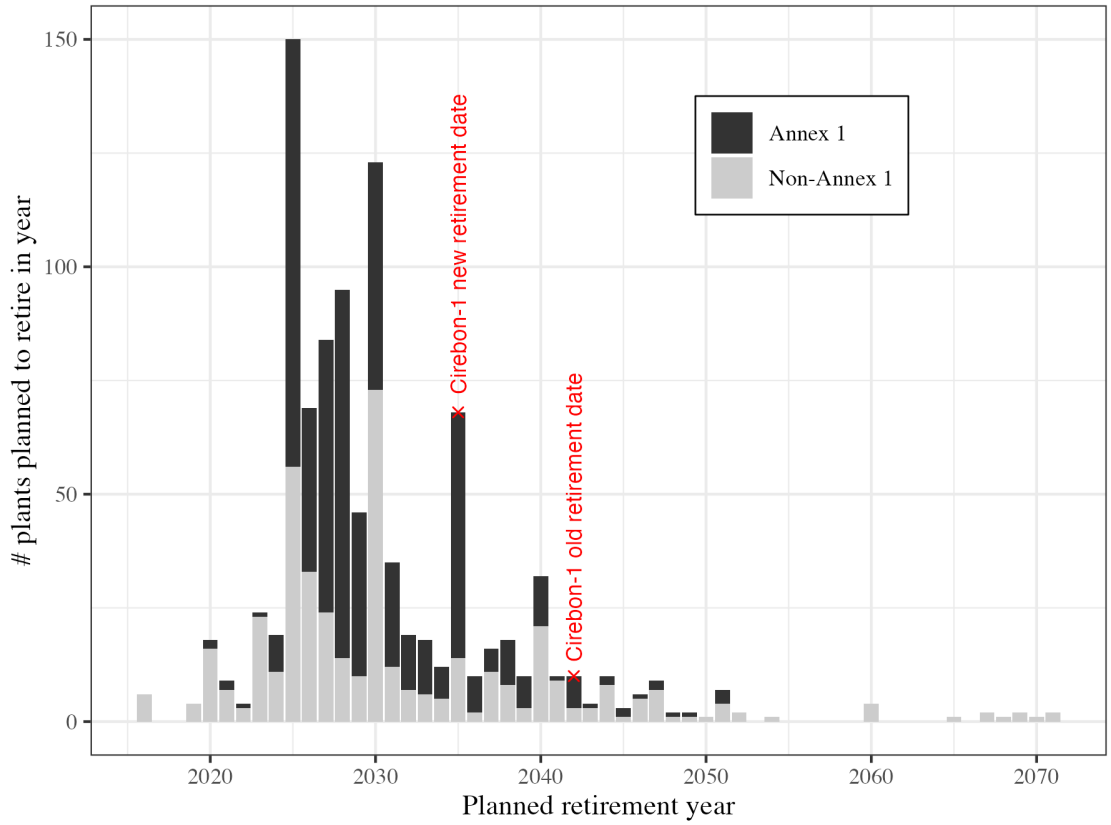

Figure 1: Planned retirement years for coal plants in Annex-1 and non-Annex-1 countries. Cirebon-1 plant original and new retirement dates in red.

Cirebon-1 coal-fired power plant in West Java, Indonesia creates a context for examining attitudinal changes about the energy transition. Figure 1 shows the change in retirement year for Cirebon-1 in the context of global coal plant retirements for Annex-1 and non-Annex-1 countries.

We use an unexpected event during survey design to estimate changes in political and environmental attitudes among the respondents most exposed to the plant closure. We take an existing survey and augment its geolocated responses to measure respondents' distance from the Cirebon-1 plant (Kuipers & Sumaktoyo, 2025). We then use a version of difference-in-differences to estimate the effect of the decommissioning announcement on attitudes. The December 3, 2023 announcement, released by the Asian Development Bank, a major sponsor of the coal plant, preceded the Februrary 14, 2024 Indonesian presidential election by roughly

two months, so it occurred during a period of active political campaigning and reflection. We also believe the policy change can be clearly attributed to the incumbent Joko Widodo administration, and therefore creates a chain of accountability to the incumbent's chosen successor, Prabowo Subianto.

We find that respondents near Cirebon-1 shifted against Prabowo after the announcement. We see falling vote intentions for Prabowo and rising vote intentions for the main alternative candidate, Anies. We then corroborate that the Cirebon-1 decommissioning is a likely driver of this political reversal by showing falling levels of support for a range of environmental variables, including explicit concerns about pollution and support for carbon pricing. In an extension, we examine average attitudes near every coal-fired power plant in Indonesia and show that residents near Cirebon-1 are actually the most pro-climate and relatively unconcerned about economic development compared to residents near other plants. This suggests that Cirebon-1 may have been a relatively easy case for decommissioning and that other plants will be harder to close.

Our main contribution in this paper is the examination of the consequences of phasing out coal-fired power on political and environmental attitudes. We observe a political and environmental backlash. For the energy transition, this is undesirable because decarbonization requires sustained political attention and effort over decades. If incumbents are penalized for mitigation policy, then they will have fewer incentives to pursue it. As such, research should focus on how to design these programs in ways that can build, rather than undermine, public support.

2 The energy transition in developing countries

While developed countries are responsible for most of global cumulative greenhouse gas emissions, developing countries' emissions have surpassed those of developed countries on an annual basis and are rapidly catching up in cumulative terms. Energy demand in developing countries is the main driver of emissions growth globally, and as incomes and living standards rise in lower-middle- and upper-middle-income countries in particular, energy demand

will continue to grow rapidly. Currently, fossil fuels dominate electricity generation in these countries, as many countries burn large amount of coal to meet local energy demand. Fossil fuel infrastructure — such as coal- or natural gas-fired power plants — has long lifespan, typically 40–50 years with proper maintenance, so emissions will remain high in these countries unless this infrastructure is decommissioned and replaced with clean energy. Phasing out coal-fired power accounts for a large share of accomplished decarbonization in high income countries, such as the United Kingdom, United States, and Canada (Rentier *et al.*, 2019; Millar *et al.*, 2021). Similar coal phase-outs would be high leverage climate policy interventions in developing countries.

If phasing out coal-fired electricity will continue to be a major pillar of global climate policy, then we should learn more about its political, economic, and social implications for local residents and impacted communities. The overall implications are somewhat ambiguous, since the policy creates advantages and drawbacks for different policy goals.

Developing countries face a trade-off between their climate and development goals (Grossman & Krueger, 1991). In the near-term, the energy transition is costly because it involves installing new clean energy capacity and taking legacy fossil fuel infrastructure offline. The relatively high cost of capital for new clean energy projects relative to fossil fuels makes clean energy expensive to finance in the first place, but adding compensation for owners of fossil fuel assets compounds costs (Steffen, 2020). This becomes especially problematic in developing countries where cost considerations tradeoff with other developmental priorities more acutely.

Economic growth depends on access to reliable electricity; there are no low-power, high-income countries.The majority of existing electricity generation in developing countries currently comes from fossil fuels. Until recently, coal was the cheapest and most accessible form of electricity generation in the Global South, leading to carbon lock-in across countries with early fossil fuel industry development. Transitioning away from fossil fuels requires funds for new energy investment that developing countries don't have and would prefer to use on other development needs (Bos & Gupta, 2019). While the costs of solar and wind energy have

fallen dramatically over the last decade, cash-poor countries have incentives to preserve all existing energy sources as rising demand for electricity powers their economic development (Seto *et al.*, 2016). Nationally, the costs of the energy transition are likely to be high when developing states have existing fossil fuel resources.

Even as developing countries face national barriers to decarbonization, the subnational effects of the green energy transition are likely to vary within countries (**?**). Subsequently, the political distributional effects of the green energy transition in developing countries are likely to influence the success of any decarbonization policies (O'Brien-Udry, 2023). Power plants produce clear benefits for local communities from electricity provision and employment opportunities. Shutting down coal plants, therefore, may create anxieties about electricity availability, prices, and reliability.Plant employees face the most direct economic losses. In principle, they could be compensated, retrained, or reassigned to another facility. However, retraining programs have been relatively difficult to access and ineffective in other contexts (Kim & Pelc, 2021). Furthermore, Indonesia has an under-developed welfare state, which further limits the credibility of these initiatives (Gazmararian & Tingley, 2023). Fossil fuel energy companies may try to amplify these concerns to consolidate broad opposition to coal phaseouts (Mildenberger, 2020; Stokes, 2020).

Despite these concerns, shutting down coal-fired power plants also creates benefits for local communities through reduced air pollution. Globally, air pollution kills millions of people annually, and proximity to coal-fired power plants is a major risk factor (Millar *et al.*, 2021). Accordingly, communities living near coal-fired power plants may support shutting them down to reduce these health risks (Fatah, 2008).

These reactions may be observable in individuals' environmental, economic, and political attitudes. Coal-fired power crystallizes these opposing concerns, where individuals need to weigh the environmental benefits from reduced pollution against economic costs from reduced employment (Rafey & Sovacool, 2011). This is a demanding calculation because policy's effects are uncertain and complex (Gazmararian & Tingley, 2023). Pollution may not fall perceptibly from shutting down a coal plant if other major pollution sources persist;

employment levels may rise or fall for a variety of unrelated macroeconomic reasons; and health outcomes may not be evident for several years. When future benefits are uncertain but present costs are salient, the status quo can be difficult to overturn (Levy, 1992). This could tip the scales toward the high-pollution status quo, implying that local communities will oppose shutting down their coal plants, as has been the case in many developed countries (Bosetti *et al.*, 2025; Tvinnereim & Ivarsflaten, 2016), but not all (Bolet *et al.*, 2024; Rentier *et al.*, 2019; Millar *et al.*, 2021).

When policies can be clearly attributed to a politician or a political party, then citizen tie support for those actors to policy implementation (Cruz & Schneider, 2017). For example, the Cirebon-1 phaseout was announced by the Indonesian finance minister, other government officials, and representatives from the Asian Development Bank, so the incumbent Indonesian government is clearly responsible for the policy. Now, if the policy is unpopular for the reasons outlined above, then local support may fall. This reaction could be especially strong when local communities rank developmental or economic objectives above pollution and environmental ones (O'Brien-Udry, 2023).

The weight of existing theory, therefore, suggests that shutting down coal-fired power plants in developing countries may be broadly unpopular. This could be observable in citizens' political and environmental attitudes, especially their views of incumbents. Accordingly, we expect to find that political support for incumbents will fall in the areas most exposed to the power plant decommissioning. We also expect to find falling environmentalism in the areas most exposed to the power plant decommissioning. In other words, we expect a broad backlash to phasing out coal-fired power.

3 The political economy of Indonesian coal

As a developing country, Indonesia has relatively low historical greenhouse gas emissions and per capita emissions, but emissions have quadrupled since 1990 such that Indonesia is now the world's sixth largest polluter. Part of the reason for Indonesia's rapid emissions growth is its dependence on coal (Ordonez *et al.*, 2022). Indonesia is the world's third largest coal

producer and the world's largest coal exporter. Much of this coal production is used to run over 200 coal-fired power plants and many more plants are permitted or under construction to expand energy generation.

Indonesia is vulnerable to both the immediate and long-term effects of anthropogenic climate change. As a tropical, island-based country, it is vulnerable to both intense heat shocks and rising sea levels. Coal mining itself has increased pollution while also contributing to coastal erosion that triggers flooding and landslides (Fatah, 2008). Economically, coal production undermines local subsistence farming and fishing as well as export-oriented agricultural industries by generating poisonous water runoff. Coal-fired power plants are major contributors to local air pollution — which causes a range of respiratory and cardiovascular diseases — as well as, to global climate change (Dutu, 2016).

Phasing out coal power is likely the single highest leverage climate policy intervention available in Indonesia.To do so, policy makers need to navigate two important hurdles. First, since energy demand is growing, removing coal power requires adding even more power to the grid to offset production losses and ensure reliable supply (Bridle *et al.*, 2018). Second, coal-fired power plants are financed with long-term power purchasing agreements that create large revenue streams for owners. Phasing out coal-fired power will, therefore, entail some kind of accommodation or compensation for plant owners (Gao *et al.*, 2021). But the sums needed to buy out these agreements are very large — roughly $250-300 million per plant according to estimates from the Asian Development Bank — relative to the national government's fiscal capacity, especially for closing dozens or hundreds of plants.

Shutting coal-fired power plants intersects with three important topics within Indonesia's political economy of coal. First, Indonesia relies on coal for roughly two-thirds of its electricity generation, with gas being the next largest supplier. There are 227 power plants are active in Indonesia as of 2024, and dozens more are in the pipeline as currently permitted or under construction (GEM, 2025). Figure 2 shows the location of these plants, and highlights Cirebon-1. Indonesia's most populous islands — Sumatra and Java — have the highest number of coal-fired power plants, as these are mostly located near cities or industry.

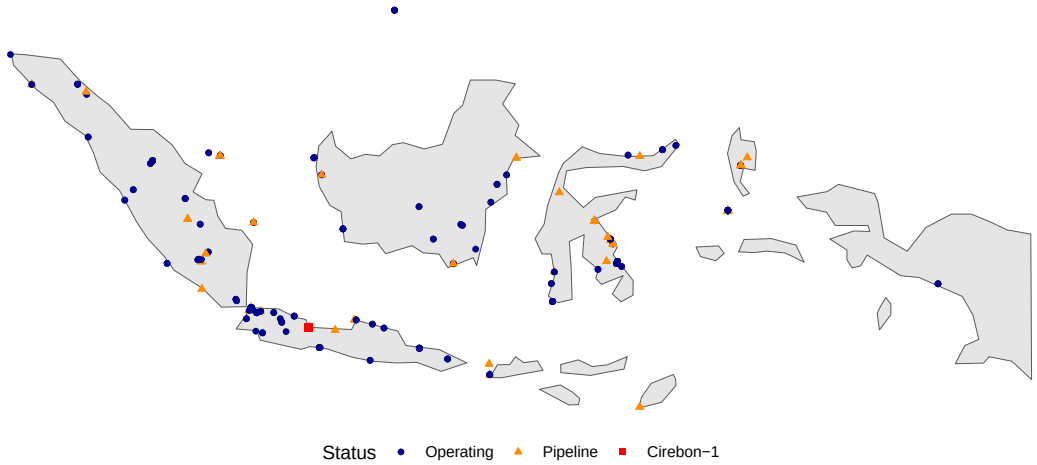

Figure 2: Indonesia's existing and proposed coal-fired power plants

Second, most of Indonesia's coal mining occurs on the island of Borneo, in particular in East and South Kalimantan provinces. The coal industry supplies domestic and global markets, meaning that phasing out coal-fired power in Indonesia may still leave a large domestic coal industry for export. Governmental policy restricts domestic coal prices, so producers are happy to sell to global markets. Given that coal mining and coal-fired electricity generation occur in somewhat different parts of the country, the impacts of phasing out coal for power may be different for coal miners versus electricity producers and consumers.

And finally, Indonesia is trying to move up in global value chains by processing more of its minerals domestically, which creates additional demand for electricity. Indonesia has the largest annual production and reserves of nickel, a crucial input in the battery industry, and the government is currently focused on upgrading domestic capacity to refine and process nickel to recover more of the mineral's value. Many new coal-fired power plants are not intended to be connected to public grids and are explicitly being built to serve these captive industrial sites (Kurniawan *et al.*, 2025).

Under international climate treaties, developed countries have an obligation to assist developing countries in the energy transition. Traditionally, this has taken the form of development aid targeted at climate-friendly projects. For example, under the Kyoto Protocol's Clean Development Mechanism, developed countries funded many projects to reduce

greenhouse gas pollution from chemical manufacturing in developing countries. Or, under the Green Climate Fund, donors fund the installation of solar or other clean energy projects in developing countries. Total funding for clean energy is well-below the levels to support the energy transition at the necessary speed and scale for reach global temperature goals (Toetzke *et al.*, 2022).

A recent innovative financial arrangement is the Just Energy Transition Partnership (JETP) program, which focuses on the energy transition in coal-reliant developing countries, particularly South Africa, Vietnam, Senegal, and Indonesia. In 2022, Indonesia signed a JETP agreement with the United States and other developed countries that would mobilize up to $20 billion dollars from public and private actors with the aim of reducing emissions from Indonesia's power sector. JETP funds could be used to buy out long-term contracts for coal power and scale up renewable electricity. The current status of the JETP programs, including Indonesia's, is unclear given the role the US Biden Administration played in orchestrating these agreements, and the Trump Administration's reversals on climate and foreign aid policy.

Decommissioning Cirebon-1

Central to our study is a memorandum of understanding between the Asian Development Bank (ADB) and the Indonesia government to retire the Cirebon-1 power plant in Cirebon, West Java signed on December 3, 2023 at COP28 in Dubai. Cirebon-1 is a 660-megawatt coal-fired power plant, making it the fourth largest power plant operating in Indonesia (GEM, 2025). The plant is owned by a consortium of Asian investors, and Marubeni — a Japanese conglomerate is the largest shareholder. The plant was built in 2012 and has been operating under a power purchasing agreement (PPA) with Perusahaan Listrik Negara (PLN) — the Indonesian state electricity company — which was scheduled to run until 2042. The phase-out agreement will terminate the PPA in 2035 — seven years early — on the condition that the plant closes and stops burning coal. Given that coal-fired power plants can typically operate for 40–50 years, decommissioning Cirebon-1, which was built in 2012, could mitigate

roughly 30 million tonnes of CO_2 compared to the counterfactual.

While the details of the agreement are still being finalized, the ADB will compensate Cirebon-1's owners for lost revenue from the early termination of the PPA, but there have been no announcements about compensation, reassignment, or retraining opportunities for workers.[2] The ADB has announced a funding window of roughly $4 billion for these kinds of projects and JETP could expand this further in Indonesia and other countries. The Cirebon-1 phase out is a template in a much broader global effort to phase out coal power in developing countries. Some reporting suggests that Cirebon-1 was selected, at least in part, because it is a currently viable power plant, such that decommissioning it would be more informative about the feasibility of phasing out coal power more broadly. At the same time, the West Java grid has some over-capacity problems which costs the energy utility over 1 billion dollars per year through subsidies and capacity payments, funds which could be re-purposed to scaling up renewables.[3]

For the Indonesian government, shutting coal plants is consistent with its Nationally Determined Contributions under the Paris Agreement, where the government has pledged to peak power sector emissions by 2030 and scale up renewable energy in the meantime. Perhaps for this reason, the ADB and the Indonesian government staged the decommissioning announcement at COP28 — the annual conference supporting the implementation of UN climate treaties — where it could highlight concrete steps on climate mitigation. Furthermore, some local reporting suggested that Indonesian ministers were keen to conclude the agreement before the presidential election, especially given that the Widodo was not eligible for re-election.[4] Since then, the new Prabowo Administration has publicly supported the phaseout and gestured toward closing all fossil-fuel power plants by 2040.[5]

[2] https://www.eco-business.com/news/indonesias-first-early-coal-retirement-raises-concerns-over-labour-r

[3] https://www.eco-business.com/news/indonesias-first-early-coal-retirement-raises-concerns-over-labour-r

[4] https://www.reuters.com/sustainability/climate-energy/global-plan-early-ditch-coal-power-hits-indonesi

[5] https://setkab.go.id/en/g20-summit-president-prabowo-subianto-highlights-indonesias-green-energy-visio

4 Research design and data

4.1 Data

The ideal data to study the effect of decommissioning coal-fired power plants on political and environmental attitudes would be an individual-level panel study that includes interviews prior to and after the announcement. The nearest approximation to this data is the High-Frequency Surveys on Indonesians' Knowledge of and Attitudes on Politics (Hi-Res SIKAP) study (Kuipers & Sumaktoyo, 2025). Their study was timed to coincide with the 2024 Indonesian presidential election, but includes waves before and after the Cirebon-1 announcement. This is not a true panel, where the same respondent is interviewed multiple times. Instead, they use a rolling cross-sectional approach, interviewing approximately 1,650 respondents per wave and 18,000 respondents overall. We note that the SIKAP survey is not nationally representative, so respondents are unlikely to be representative of the underlying population, but the random sampling procedure increases confidence that the respondents are not correlated with underlying political or environmental preferences.

The survey captures extensive demographic data, geographic locations, and attitudes on various topics, including environmental, political, and economic issues. These attitudes are recorded in multiple formats useful for our study. Respondents rate the personal importance of nine issues—health, education, human rights, religious freedom, economic development, national unity, corruption, and crucially, pollution and climate change. They also assess whether politicians consider these issues important. Additionally, the survey includes two specialized modules: a political module asking about voting intentions, candidate preferences, and second-order beliefs on likely winners; and an environmental module with detailed questions on pollution, climate risks, and support for policies like carbon taxes and deforestation protections.

We leverage interview timing to create a group of respondents who are interviewed before the December 3, 2023 announcement decommissioning Cirebon-1 and another who were interviewed after. The earliest interview date is November 27, 2023, so only one wave

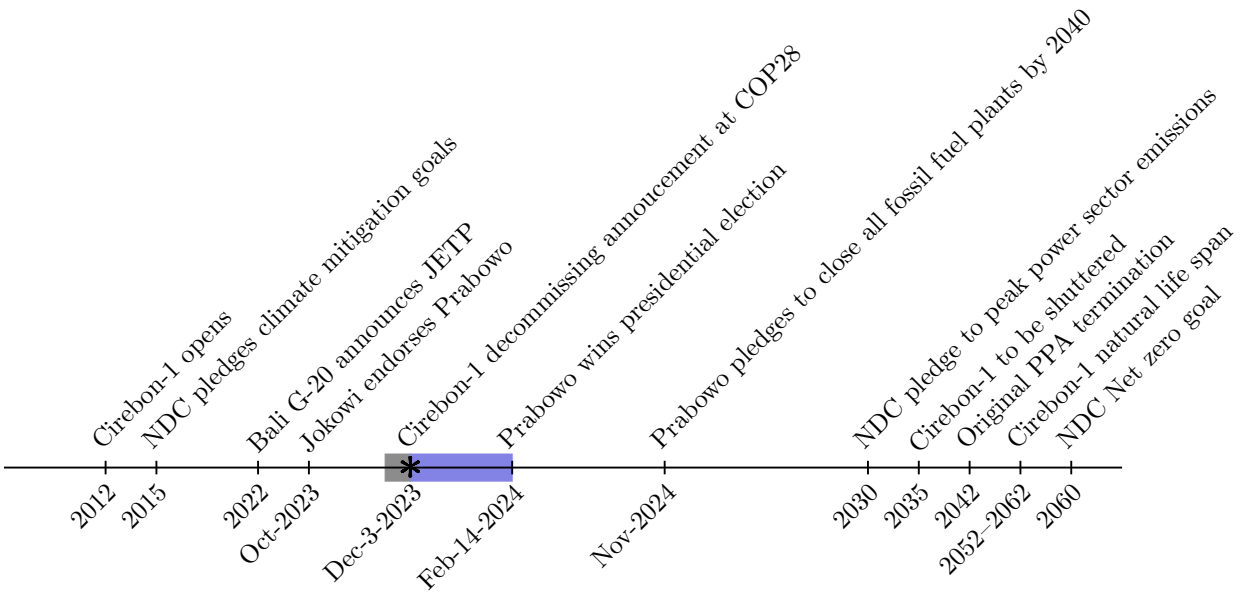

Figure 3: Cirebon-1 timeline. Shaded box indicates dates of survey in the field, with light gray indicating the pre-treatment period and light blue indicating the post-treatment period. Asterisk marks the decommissioning announcement. Intervals are illustrative, not to scale.

of respondents are interviewed early. Accordingly, we have a relatively small number of observations in the pre-treatment period compared to the post-period. We code interview timing as a binary variable for interviews prior or subsequent to the announcement. We use waves of the survey through February 10, 2024 — the most recent survey wave before the February 14, 2024 presidential election. Figure 3 illustrates the case timeline and variable construction.

We generate a treatment exposure variable using respodents' proximity to the Cirebon-1 plant. Since survey responses are geocoded, we pair survey responses to Indonesian coal plants to measure respondents' exposure to coal plant decommissioning. We take data from the Global Energy Monitor's Global Coal Plant Tracker on the location and status of 227 operating coal plants (GEM, 2025). Our treatment exposure variable is a binary for whether a respondent resides within 40 kilometres of Cirebon-1. We considered a three-level variable with an intermediate distance of 40–80 km, but rejected it since the regression results were similar without it.

We also calculate each respondent's distance to their nearest coal-fired power plant in or-

der to create two control groups. First, we define an untreated control group as those who are merely more than 40 kilometres from Cirebon-1. Second, we define another untreated control groups as those who reside more than 40 kilometres from any Indonesian coal plant. These two control groups allow us to disentangle, in principle, whether the Cirebon-1 shock's effects are concentrated near that plant in particular, or whether the announcement was interpreted as a signal about the long-term viability of coal-fired power plants across Indonesia. At the time, Cirebon-1 was clearly discussed as a pilot program, and the Indonesian government had not announced goals for retiring all coal-fired power plants. The median respondent is about 34km from their nearest coal plant, with an inter-quartile range from 20km to 74km, and a mean of 57km. The histogram in Figure APP-1 gives the distribution and shows that many respondents live very near to a coal-fired power plant.

4.2 Estimation

Armed with these measures, we then examine respondents' attitudes based on their exposure to coal-fired power. We define a vector of political and environmental outcomes $Y_{i,t}$ and predict these using treatment exposure, timing, and a set of respondent covariates. Our primary regression specification relies on the multiplicative interaction between exposure and timing:

$$Y_i = +\beta_1 \texttt{Cirebon}_i + \beta_2 \texttt{Post}_t + \beta_3 \texttt{Cirebon}_i \times \texttt{Post}_t + \gamma \mathbf{X}_i + \alpha_p + \delta_t$$

We use a binary treatment group defined based on distance from the coal-fired power plant $\texttt{Cirebon}_i$ and a binary measure of time periods prior to versus after the annoucement $\texttt{Post}_t$, we have a familiar difference-in-differences (DiD) style estimator with an unexpected event during survey (UESD) design. The two main deviations in our estimator for the canonical DiD design are that we do not actually observe the same unit repeatedly — we have a geolocated rolling cross-section with demographic covariates — and we have multiple time periods post-treatment. To address possible confounding across units — where some traits

or attitudes might covary between proximity to Cirebon-1 and political and environmental attitudes — we include demographic covariates $\mathbf{X_i}$ that capture observable differences between respondents. We also include province-specific intercepts α_p, which allows for baseline differences between parts of the country, and time dummies that adjust for survey waves (weeks) δ_t. We cluster standard errors by respondent province, which allows us to adjust for possibly correlated errors within each province.

We compare respondents close to Cirebon-1 to two control groups: 1) all respondents far from Cirebon-1 and 2) respondents far from Cirebon-1 *and* all other coal plants. If the early retirement announcement of Cirebon-1 signals a fundamental change in Indonesia's coal policy, we might expect respondents close to other coal plants to also respond to the news. We consider this population in Appendix APP-3; in our main models, we exclude this population to identify effects on a single treatment group.

5 The effect of Cirebon-1's decommissioning on political and environmental attitudes

What are the impacts of phasing out coal-fired power? We anticipate two countervailing effects on nearby communities because decommissioning the power plant could create local employment costs, but clean air benefits for local health. In both cases, geographic distance proximity is a clear indicator of exposure — which we measure as distance from the Cirebon-1 plant. Our estimator allows us to identify the average treatment effects between these two channels.

5.1 Political attitudes

We begin by examining political outcomes downstream from the Cirebon-1 phase out on the Indonesian presidential elections on February 14, 2024. Our political outcomes of interest are respondents' vote choices and their "prediction" for who they think will win the election. There were three main presidential candidates: (1) Prabowo Subianto, a former military

general, incumbent defence minister, and successor to president Joko Widodo whose administration negotiated the Cirebon-1 phaseout agreement; (2) Anies Baswedan, the governor of Jakarta, who criticized many of Joko Widodo's policies, campaigned on an economic equality platform, and built a coalition of progressive and educated voters alongside some conservative Islamic groups; and (3) Ganjar Pranowo, the governor of Central Java, who campaigned as an outsider, but was nonetheless associated with the status quo. Joko Widodo, the popular incumbent president who was ineligible to run for re-election given constitutional term limits, endorsed Prabowo in October 2023, once Prabowo named Widodo's son as his running mate. We take voting behaviour toward Prabowo as an indication of support for the status quo, and Anies as the main alternative candidate.

Climate change was not a particularly salient topic in the 2024 presidential campaign. Prabowo campaigned on Joko Widodo's existing policies, which included a ban on raw nickel exports intended to support a domestic battery industry — an energy-intensive industrial process that requires expanded electricity generation, much of which is allocated to new coal-fired power plants. A backlash to a coal phaseout could manifest as falling support for Prabowo and increasing support for Anies.

In Figure 4, we divide the outcomes by candidate and measure: one measure of voting intention and another a "prediction" for who the respondent believes will win the election. For Prabowo, we find negative coefficients on the interaction term (β_3), indicating falling support for Prabowo after the announcement. However, the result is only statistically significant when the control group is the full sample, not the smaller sample of respondents who are distant from all coal-fired power plants. We find a similar negative coefficient for Ganjar. For Anies, the main alternative candidate, we see rising support among respondents near Cirebon-1 in the post-announcement period. As for level effects, the coefficient on the interaction terms are roughly similar to those on the base Cirebon-1 term, implying that vote intentions for Prabowo were already relatively high among respondents near Cirebon-1 in the pre-treatment period, but fell back toward the survey average in the post-period.

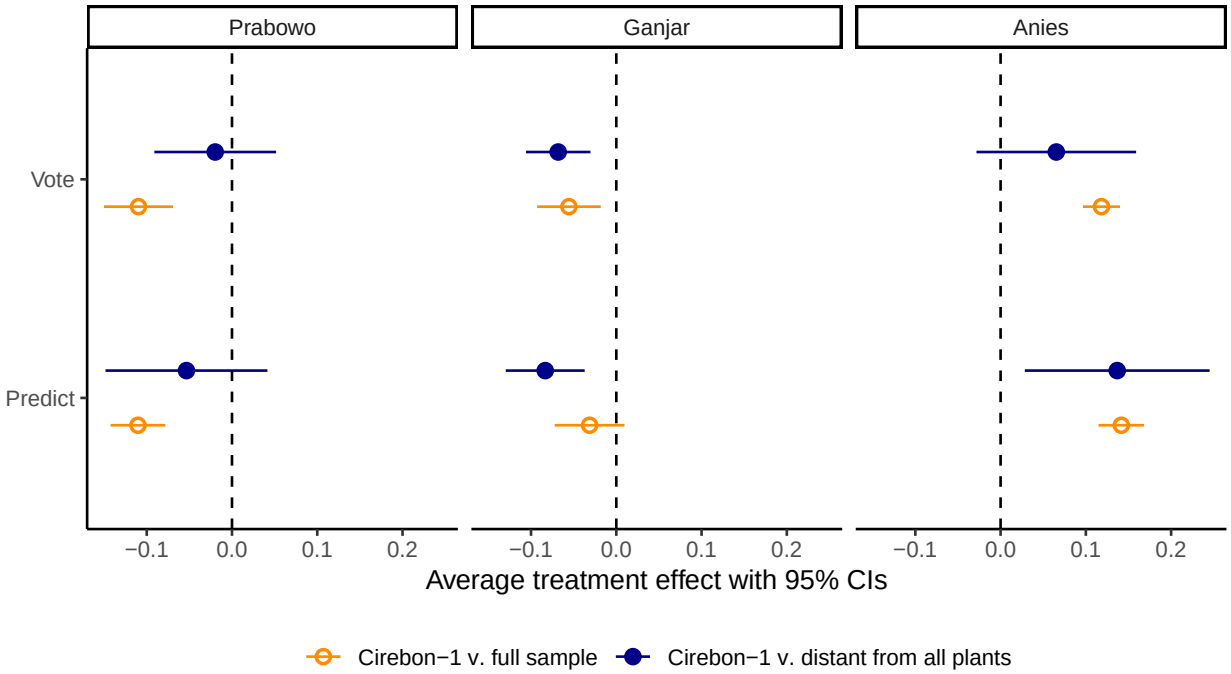

Figure 4: Electoral attitudes as a function of distance from Cirebon-1 plant and timing of phaseout

5.2 Environmental attitudes

Politically, we note declining support for the incumbent and increasing support for the main alternative candidate. To confirm this trend, we examine environmental attitudes. If climate and environmental policy support also drops, it strengthens our confidence that the reaction is truly due to Cirebon-1's decommissioning.

The SIKAP survey records a large number of environmental attitudes, which are measured in different modules of the survey. In the first instance, respondents are asked to rate the relative importance of nine issues (pollution, climate change, corruption, economic development, education, health care, national unity, and religious freedom) to themselves and to politicians. Respondents also report whether they believe pollution is important, will worsen, and whether the government should do more to address it. These questions are asked alongside similar questions about the importance and risks from extreme weather and natural disasters, such as hot temperatures, flooding, and sea level rise. We focus on

	Comp. 1	Comp. 2	Comp. 3
Rankings relative to other political issues			
Pollution imp. pol. prob. (self)	0.322	0.077	-0.087
Climate change imp. pol. prob. (self)	0.324	0.137	-0.142
Beliefs on politicians' importance rankings relative to other political issues			
Climate change imp. pol. prob. (to politicians)	0.386	0.284	-0.357
Pollution imp. pol. prob. (to politicians)	0.377	0.251	-0.298
Pollution ratings among environmental issues			
Pollution important (among env. issues)	0.316	-0.002	0.037
Pollution will worsen	0.231	-0.895	-0.371
Gov. should do more effort	0.369	-0.176	0.734
Policy attitudes			
Support CO2 tax	0.339	0.009	0.232
Support deforestation protection	0.309	-0.014	0.157
Fit statistics			
Proportion of variance explained	0.349	0.166	0.125
Cumulative proportion of variance explained	0.349	0.515	0.639

Table 1: Principal component analysis of environmental attitudes.

pollution attitudes, since they are most proximately related to Cirebon-1's fate.Finally, the survey asks about support for two specific environmental policies: a carbon tax ("Impose a tax on emissions so that companies that pollute have to pay") and protection against deforestation ("Protecting forests so that companies and farmers cannot burn or cut down forests"). These are all measured with a 4-point Likert rating.

Since we have multiple plausibly related measures of environmental attitudes, we standardize these variables and aggregate them to extract the principal components by varimax. Table 1 gives the variable loadings for the first three components in the data. Along the first component, all environmental attitudes scale positively and have similar magnitudes. We treat this as a general pro-environment disposition. The second component isolates remaining variation and distinguishes a cleavage between respondents who do not think pollution will worsen, but believe climate change and pollution are important political issues to

politicians, even though those respondents would prefer that governments exert less effort to address it. Accordingly, we interpret this component as capturing underlying environmental skepticism. The first component explains roughly 35% of the variation across individuals' environmental attitudes and the second component explains roughly 17% of the remaining variation. We report the third component, but do not interpret it.

Next, we estimate the effect of Cirebon-1's decommissioning on these environmental attitudes using the same estimator as above. We report these results in Figure 5. First, we see declining environmentalism, as measured in the first principal component. The effect is large compared to the other coefficients, but relatively imprecisely estimated, such that it is only statistically significant when comparing respondents near Cirebon-1 to respondents who are distant from all coal-fired power plants. For environmental skepticism along the second dimension, we see the reverse — a positive effect that is statistically significant in the full sample. Therefore, we see broadly falling pro-environmentalism and rising environmental skepticism after the announcement. This is consistent with the electoral backlash findings in Figure 4, where support for Prabowo falls.

We also report the results for each environmental attitude in separate regressions in Figure 5. After the annoucment, we find that respondents near Cirebon-1 believe pollution is less important, will not worsen, and that government should not exert additional effort to address it. These respondents also become less supportive of carbon taxation. Nonetheless, we find positive coefficients on beliefs that pollution and climate change are important issues, which could reflect a higher salience of environmental issues following the announcement. Recall that the announcement coincided with COP28 in Dubai, but our estimator would capture national swings in the time fixed effects, and the interpretation of the coefficient is an increase in concern among respondents near Cirebon-1 after the announcement.

When paired with the political results in the previous section, we interpret these results as showing that the decision to close Cirebon-1 triggered dissatisfaction amongst local residents with governmental climate and energy policy. This manifest as decreasing support for Prabowo — the candidate most closely associated with the status quo — as well as

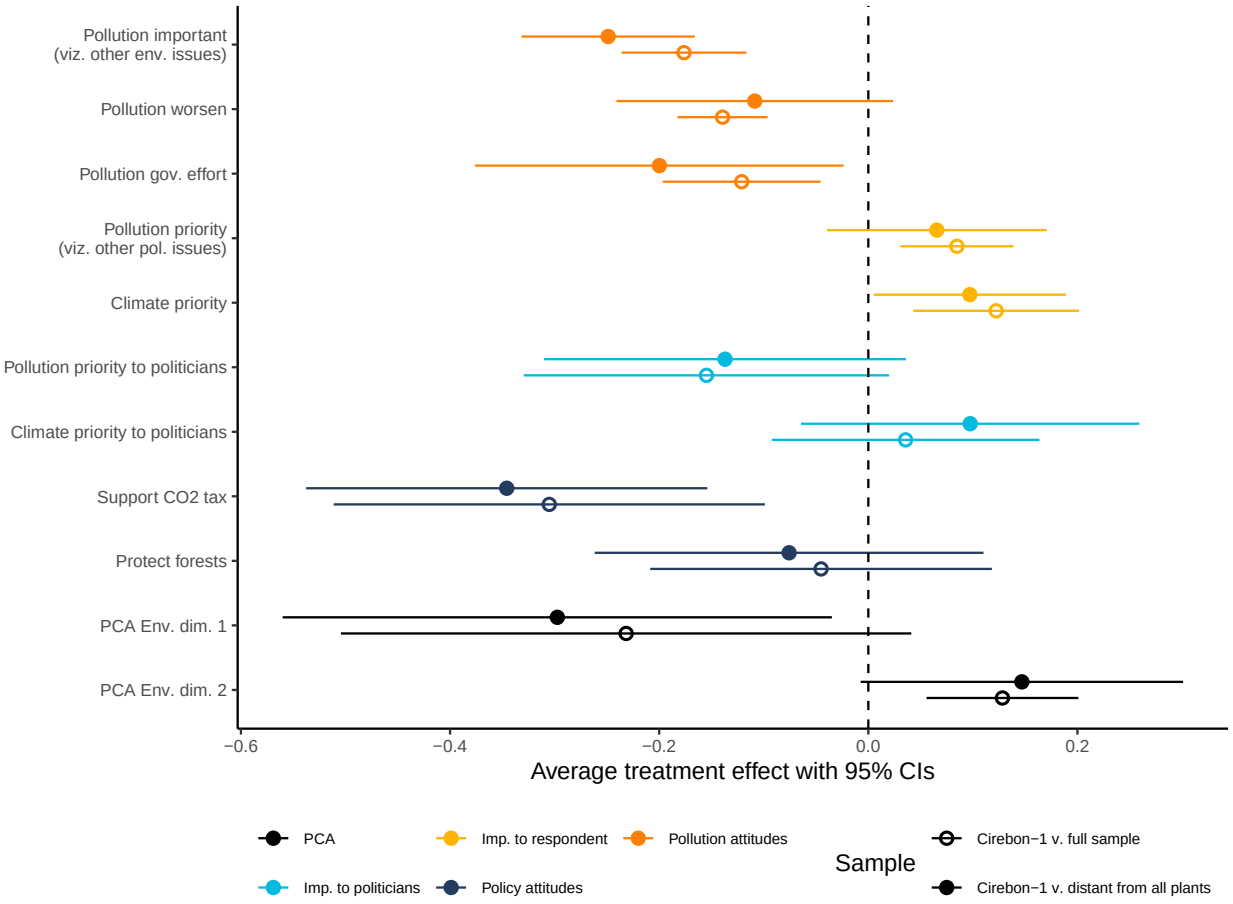

Figure 5: Environmental attitudes as a function of distance from Cirebon-1 plant and timing of phaseout

decreasing support for environmental policies and decreasing concerns about pollution and climate change as political problems. The goal of climate policy is to reduce emissions over the long-term — as the Cirebon-1 closure will accomplish — but if decommissioning fossil fuel infrastructure undermines support for the politicians enacting these policies, then officials will face a difficult political calculus. If these policies crater politicians' popularity and motivate anti-environmentalism, then decarbonization will stall out.

6 Attitudes near coal plants

Broadly, in the event study models, we find declining support for incumbents, a general decline in environmental concern, and a similar decline in support for environmental policy. One consideration with these findings relates to the generalizability of these findings beyond Cirebon-1. Phasing out coal-fired power plants is a key policy tool for decarbonization in Indonesia and in other large developing countries. In Figure APP-2, we showed that proximity to Cirebon-1 is not predicted by political attitudes after adjusting for demographics. Now, we examine the inverse, whether proximity to particular coal plants predicts political attitudes. If respondents near Cirebon-1 are typical of respondents near other Indonesian power plants, then the insights above can be used to inform phaseout plans. But if respondents near other power plants differ — particularly if they rank another mix of problems as the key priorities — then other phaseouts should be designed to reflect these local contexts.

We analyze this by matching each respondent to their nearest coal-fired power plant to create binary measures of proximity to each Indonesian plant.[6] Then we predict respondents' ratings of the importance of the nine political problems — pollution, climate change, corruption, economic development, etc. (see Figure APP-2) — as a function of a respondent's proximity to a coal-fired power plant. Where previously we compared respondents within 40km of Cirebon-1 to all other respondents, as well as to other respondents who live over 100km away from any power plant, now we take respondents who are distant from Cirebon-1 but proximate to another coal-fired power plant and compare them to respondents who are distant from all plants. We estimate separate regressions for the nine outcome variables and 71 coal-fired power plants using the same specification as above. Our analysis returns the association between proximity to a particular coal plant and importance ratings for each power plant and political issue.

Figure 6 shows the distribution of these plant-level coefficients. We highlight the esti-

[6]While the Global Energy Monitor lists 255 active coal-fired power plants Indonesia in our study period, some of these are multiple power plants on the same site (i.e., with the same geographic coordinates) and others are remote with very few respondents living nearby. We retain only non-overlapping power plants with at least 10 nearby respondents for this analysis, leaving 71 plants.

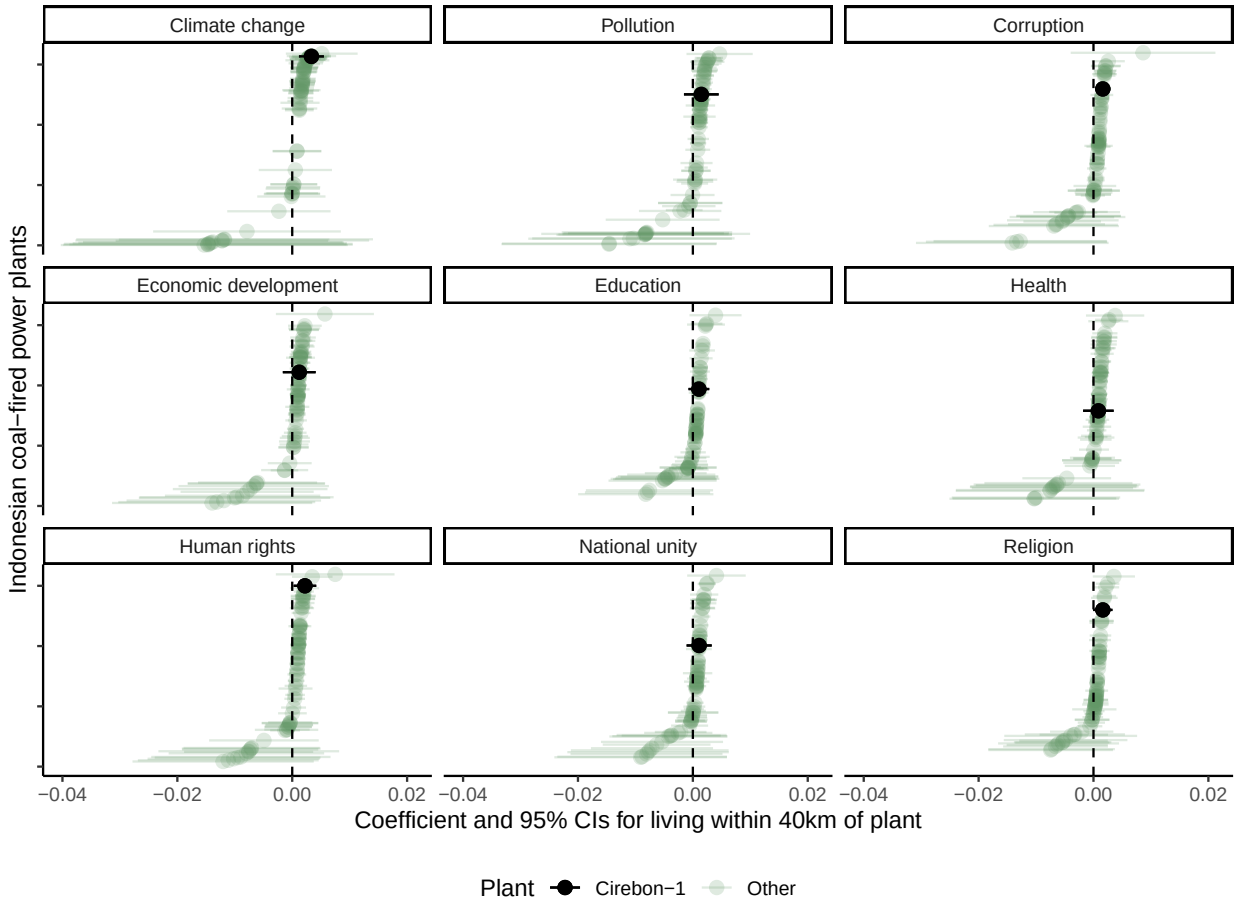

Figure 6: Importance of climate and pollution versus other problems for respondents within 40km of each coal plant

mates for Cirebon-1 in black. We see that respondents near Cirebon-1 believe that several issues are more important than respondents who are distant from all plants. Specifically, they prioritize a subset of environmental and political issues — climate change, corruption, and human rights, which stand out as positive coefficients that are statistically distinguishable from zero at the 95% confidence level. By contrast, respondents near Cirebon-1 are not more likely to prioritize other social or developmental issues, as the coefficients on economic development, education, and health all overlap with zero.

In Appendix APP-6, we use k-means cluster analysis to group power plants based on their estimates. If respondents near some power plants tend to prioritize certain issues but not others, cluster analysis can partition the estimates in a latent space that groups power plants

based on the issues they prioritize.The Cirebon-1 plants stand out as distinctive. First, it has the highest rating for the importance of climate change Second, it places relatively low importance on economic development and places high importance on human rights. Taken together, this suggests a very supportive context for decommissioning a coal-fired power plant: respondents are highly sensitive to climate change and human rights, while also being less sensitive to economic and developmental concerns. Given that the economy and the environment are often framed in tension to one another, Cirebon-1's residents seem to side with the environment. Respondents near other power plants prioritize different mixes of issues, with some in the third cluster, for example, placing much greater relative weight on economic development over climate change. There is a similar relationship for health and education, where residents near Cirebon-1 also rate climate change as more important than these issues.

We interpret this as support for the conjecture that communities residing near different coal-fired power plants prioritize different issues. Cirebon-1 may have been a relatively easy plant to decommission because local residents are more concerned about climate change than other development or social issues. And yet, we observed a backlash against the incumbent and environmentalism after the announcement that Cirebon-1 would be closing. Decommissioning coal-fired power plants in other areas — where climate change is less salient and other issues, such as economic development, education, and health care, take its place — may face even greater challenges. We believe this should be taken into account when designing compensation packages for shutting down fossil fuel infrastructure. Namely, the types of compensation or accommodation that may be appropriate will vary across contexts.

7 Conclusion

As developing countries face increasing pressure to reduce emissions in response to climate change, it is crucial to comprehend the political ramifications—both costs and benefits—associated with these efforts. The unexpected announcement of the early retirement of the Cirebon-1 coal plant in Indonesia, made just weeks before the 2024 general election,

provides a unique opportunity to examine how citizens residing near coal plants react to such decommissioning initiatives. Our study reveals that, for those living close to the Cirebon-1 plant, the economic advantages of employment and local development appear to outweigh environmental concerns. Consequently, following the announcement, residents near the plant were notably less inclined to support the incumbent candidate and more inclined to back the challenger. Additionally, these individuals expressed heightened dissatisfaction with the government's climate and energy policies in general.

While the potential for resistance against the green energy transition has been well-established in affluent, industrialized nations, our research adds to the growing body of evidence indicating similar dynamics in developing countries. The early retirement of the Cirebon-1 plant enhances our understanding of how voters in developing nations respond to such transitions. Given the prevalence of coal plants in Indonesia, our findings offer insights into the broader applicability of these observations. Interestingly, the community surrounding the Cirebon-1 plant demonstrates a higher level of concern regarding climate change compared to those near other coal plants. This suggests that the backlash triggered by the early retirement of the Cirebon-1 plant might be relatively muted compared to the potential reactions to the closure of other plants.

The political ramifications of the Cirebon-1 decommissioning highlight the importance of strategic timing and attribution in policy implementation. When such policies are closely linked to incumbent administrations, they can become politically contentious, potentially undermining broader climate goals. Policymakers should consider strategies to insulate climate actions from short-term political cycles and ensure that the benefits of these policies are clearly attributed to the government's long-term vision for sustainable development.

Our research underscores the importance for policymakers to address the specific concerns of communities impacted by energy transitions, recognizing that these preferences can vary significantly across different regions and countries. If the response to the Cirebon-1 plant's early retirement serves as a baseline for potential reactions, policymakers may need to devise more comprehensive compensation plans to mitigate adverse public sentiment. The diversity

of attitudes surrounding various coal plants also highlights the challenges of adopting a one-size-fits-all approach to the energy transition. For instance, while communities near coal plants in West Java may exhibit certain characteristics, those in Sumatra could have vastly different needs and expectations. Therefore, financial packages aimed at phasing out coal-fired power plants in these areas may require additional social and developmental co-benefits to secure local support.

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Appendix to:

Phasing out coal-fired power in Indonesia

October 8, 2025

APP-1 Summary statistics

APP-2 Distance to power plants

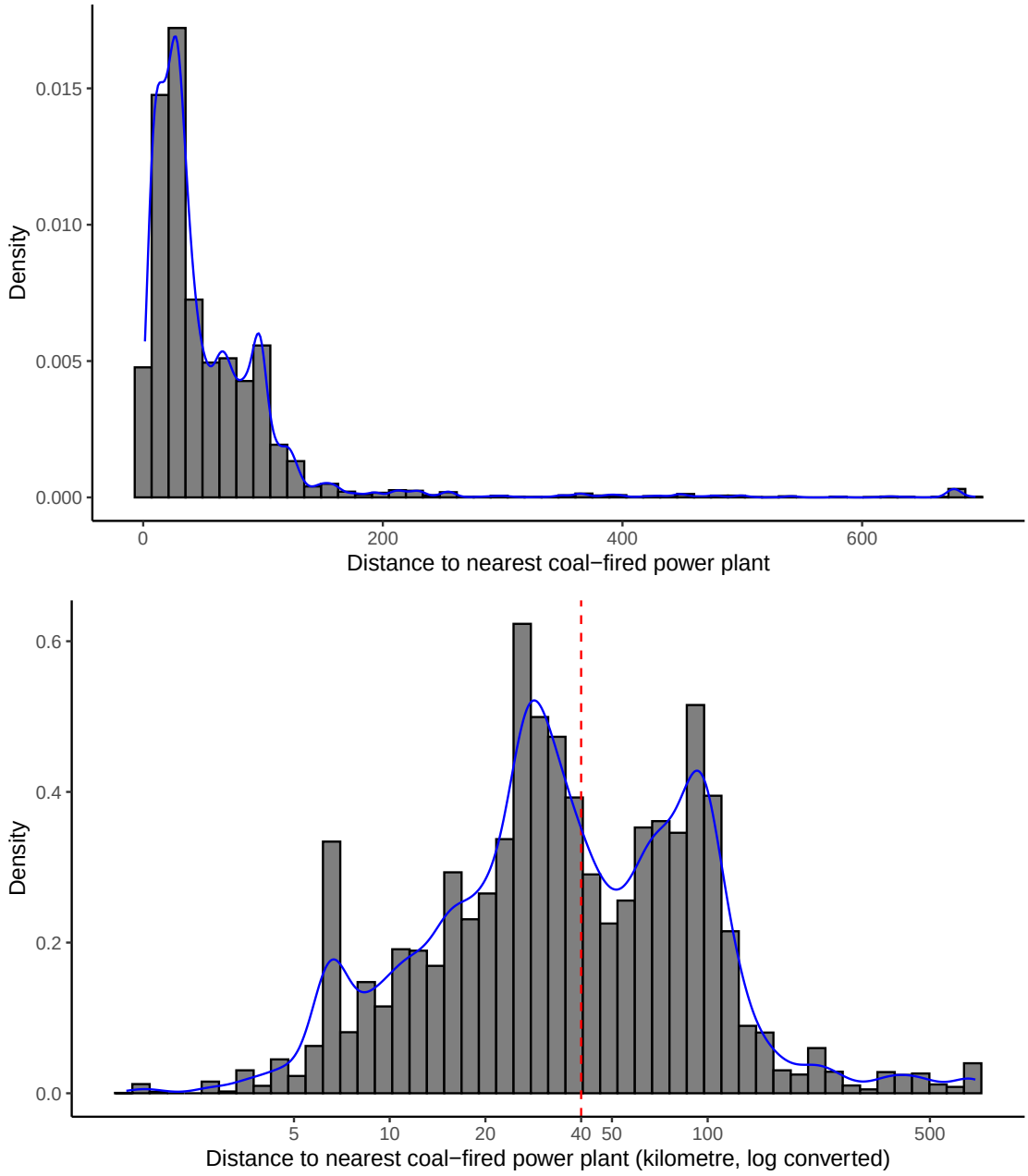

Figure APP-1: Respondent distance (km) to nearest coal-fired power plant

Measure	Obs.	Mean	S.D.	Min.	Pctl(25)	Pctl(75)	Max.
Age	17013	37.71	12.61	18.00	27.00	47.00	80.00
Income	17013	6.68	3.35	1.00	4.00	10.00	11.00
Sex	17013	0.50	0.50	0.00	0.00	1.00	2.00
Distance to Cirebon-1	17013	640.31	583.38	3.64	204.32	1106.12	3589.21
Support for deforestation protections	10882	3.60	0.59	1.00	3.00	4.00	4.00
Support for carbon tax	10880	3.47	0.67	1.00	3.00	4.00	4.00
Gov. should enact more effort on pollution	10870	3.32	0.78	1.00	3.00	4.00	4.00
Pollution is important	10878	3.57	0.59	1.00	3.00	4.00	4.00
Pollution will worsen	10870	2.94	0.83	1.00	2.00	4.00	4.00
Nearest coal-fired power plant	17013	56.91	75.15	1.49	19.60	73.85	694.68
Predict Anies to win	16975	0.24	0.43	0.00	0.00	0.00	1.00
Predict Ganjar to win	16975	0.19	0.40	0.00	0.00	0.00	1.00
Predict Prabowo to win	16975	0.56	0.50	0.00	0.00	1.00	1.00
Climate change is important problem	16987	3.41	0.63	1.00	3.00	4.00	4.00
Corruption is important problem	16983	3.76	0.51	1.00	4.00	4.00	4.00
Economic development is important problem	16986	3.57	0.58	1.00	3.00	4.00	4.00
Education is important problem	16982	3.70	0.53	1.00	3.00	4.00	4.00
Health is important problem	16978	3.68	0.54	1.00	3.00	4.00	4.00
Human rights is important problem	16987	3.62	0.57	1.00	3.00	4.00	4.00
Pollution is important problem	16991	3.53	0.60	1.00	3.00	4.00	4.00
Religion is important problem	16990	3.58	0.61	1.00	3.00	4.00	4.00
National unity is important problem	16984	3.66	0.56	1.00	3.00	4.00	4.00
Climate change is important to politicians	16991	3.39	0.68	1.00	3.00	4.00	4.00
Corruption is important to politicians	16977	3.66	0.64	1.00	3.00	4.00	4.00
Economic development is important to politicians	16986	3.55	0.59	1.00	3.00	4.00	4.00
Education is important to politicians	16981	3.63	0.59	1.00	3.00	4.00	4.00
Health is important to politicians	16988	3.62	0.59	1.00	3.00	4.00	4.00
Human rights is important to politicians	16982	3.56	0.63	1.00	3.00	4.00	4.00
Pollution is important to politicians	16981	3.46	0.66	1.00	3.00	4.00	4.00
Religion is important to politicians	16988	3.51	0.65	1.00	3.00	4.00	4.00
National unity is important to politicians	16983	3.61	0.60	1.00	3.00	4.00	4.00
Vote for Anies	17011	0.22	0.42	0.00	0.00	0.00	1.00
Vote for Ganjar	17011	0.18	0.38	0.00	0.00	0.00	1.00
Vote for Prabowo	17011	0.45	0.50	0.00	0.00	1.00	1.00

Table APP-1: Summary statistics

APP-3 Treatment group balance

Covariate	Full sample	Distant sub-sample
Age	-0.000 (0.000)	0.000 (0.000)
Female	-0.007 (0.005)	-0.051 (0.041)
Education	-0.005 (0.004)	-0.028 (0.029)
Income	-0.001 (0.001)	-0.001 (0.002)
Muslim	0.008 (0.006)	0.079 (0.072)
Observations	17013	2039

Table APP-2: Models predict a binary measure for whether a respondent lives within 40km of Cirebon-1 using each demographic variable in a separate regression. Distant sample are repsondents who live more than 100km from any coal-fired power plant in Indonesia. OLS regressions with standard errors in parentheses.

APP-4 Balance tests: Characteristics of respondents near coal plants

One assumption in this estimation framework is that treatment exposure is as-if randomly assigned such that treatment status is uncorrelated with the outcome. Yet, respondents who live near a coal-fired power plant are likely to differ from respondents who live further away. We assess the balance between treated and untreated units along demographic and attitudinal dimensions.

We start by looking at the demographic profiles of respondents near Cirebon-1 compared to those of the full sample and the subsample of respondents who are distant from all coal-fired power plants. We consider respondent age, gender, education, and income as possible demographic confounders. We regress these demographic variables on a binary measure from whether a respondent is within 40km of Cirebon-1 plus week dummies and cluster standard errors by province.

We report these results in the appendix (see Table APP-2). We do not find any baseline demographic differences between respondents who live near Cirebon-1 and those who live

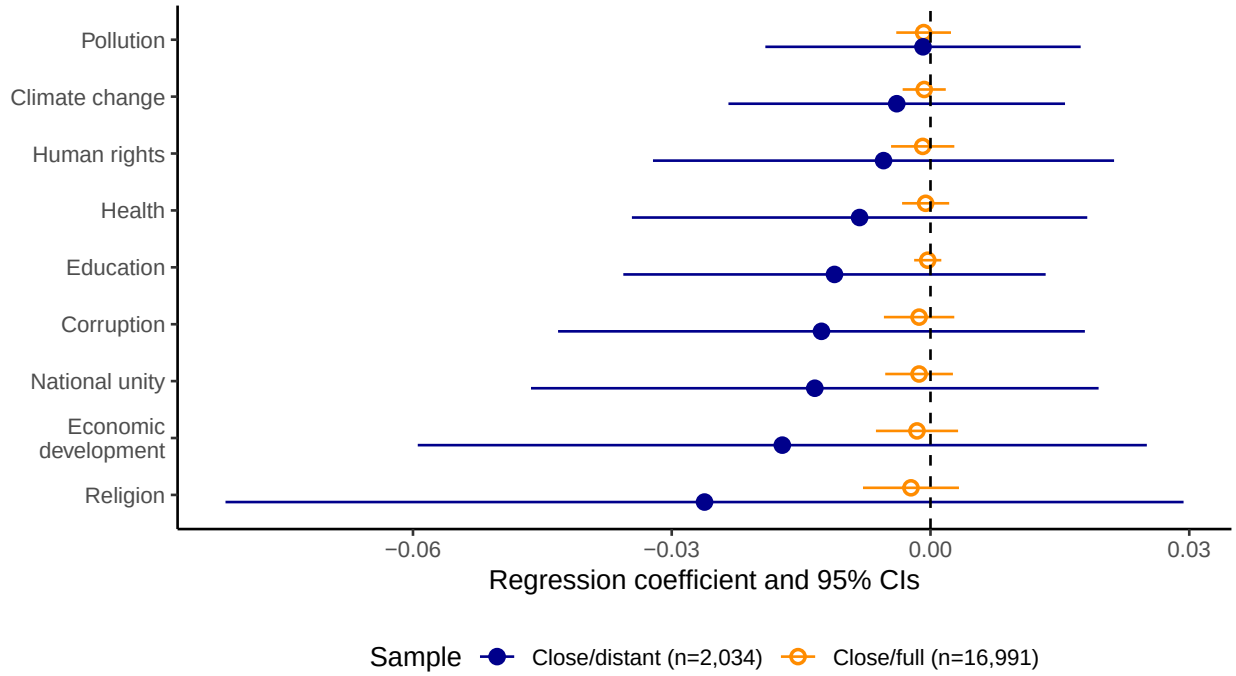

Figure APP-2: Attitudinal balance of respondents near Cirebon versus full sample and those distant from all coal-fired power plants

elsewhere. Next we look at political attitudes to see whether respondents near Cirebon-1 have the same political priorities as respondents in other parts of the country. SIKAP asks respondents to rank nine political issues on a four-point Likert scale from very unimportant to very important. We regress respondents' scores for these nine variables on their proximity to Cirebon-1, controlling for age, sex, education, income, and religion, including week dummies and clustering standard errors by province. We find small coefficients that are not statistically significant from zero. In Figure APP-2, we see that the 95% confidence interval on the estimate for proximity to Cirebon-1 overlaps with zero in every model. Taken together, we take this as strong evidence that proximity to Cirebon-1 is conditionally independent of political and environmental attitudes once we adjust for demographics, which supports our selection of estimator.

APP-5 Other coal plants

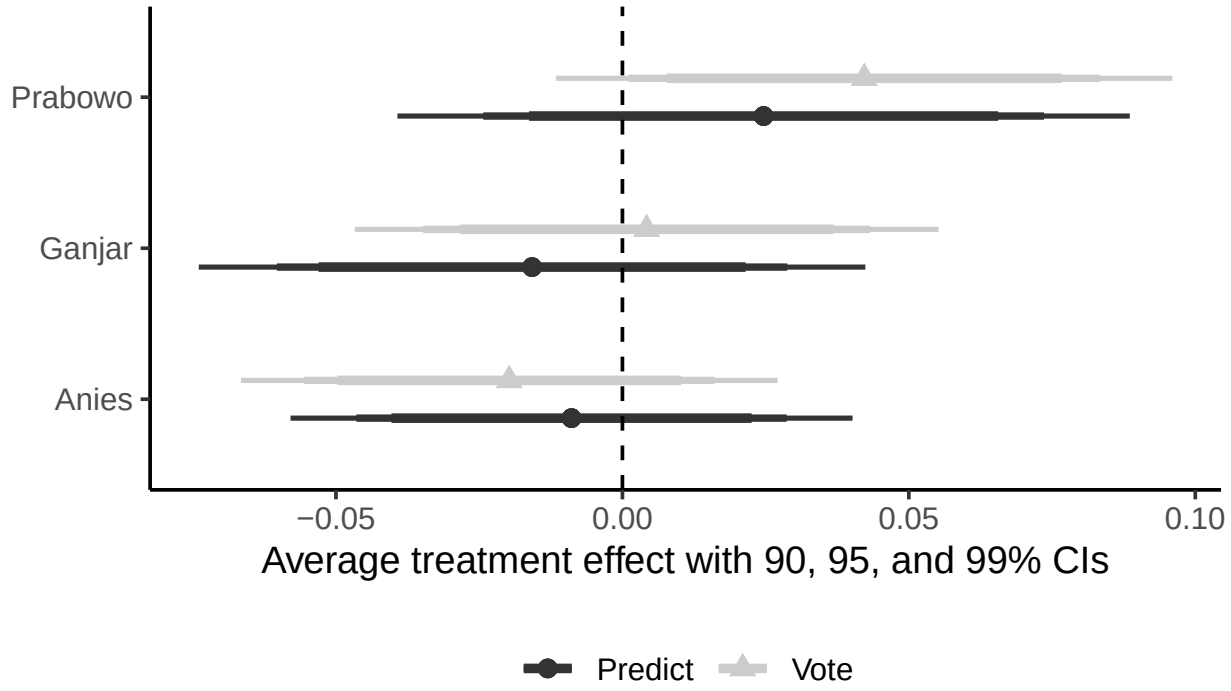

Figure APP-3: Electoral attitudes as a function of distance from any coal plant (excluding Cirebon-1) and timing of phaseout

APP-6 $k-$means cluster analysis

As our input matrix, we use the t-statistics for the power plant indicators — recall the $t-$statistic divides the regression coefficient by its standard error with an adjustment for the degrees of freedom, such that larger absolute values indicate larger effects that are increasingly distinguishable from zero. We assume a relatively low dimensional space and set the number of clusters to $k = 3$. Then, the k-means algorithm assign each power plant to one of three mutually exclusive groups, such that the sum of squared distances from each point to its assigned cluster center is minimized. We then examine the cluster characteristics with particular attention to Cirebon-1 in Figure APP-4. Recall from Figure 6 that respondents

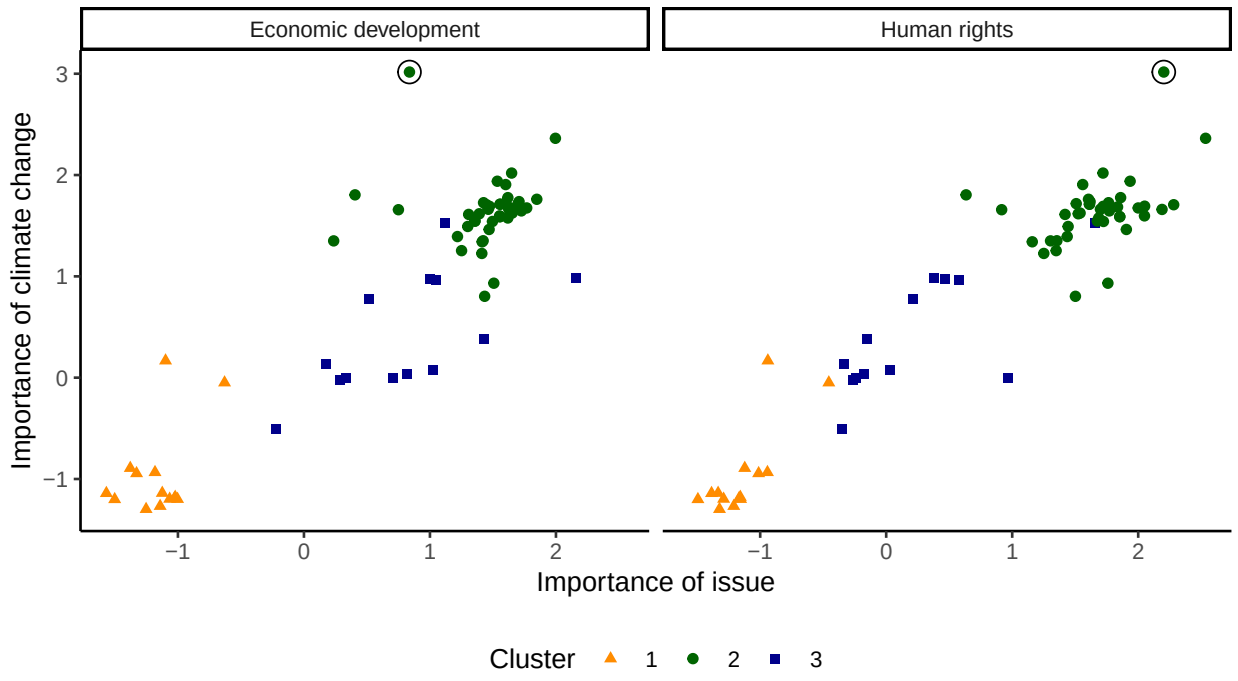

Figure APP-4: Relative importance of climate change versus economic development and human rights according to respondents near different coal-fired power plants. Black circle highlights the Cirebon-1 plant.

near Cirebon-1 were demonstrated to place high emphasis on climate change relative to respondents near other plants. We plot the $t-$statistics for the importance of climate change on the vertical axis and the importance of economic development (left panel) and human rights (right panel). We highlight Cirebon-1 with an additional black circle. We can see that respondents near Cirebon-1 are assigned to the second cluster (in green circles).

APP-7 Placebo tests

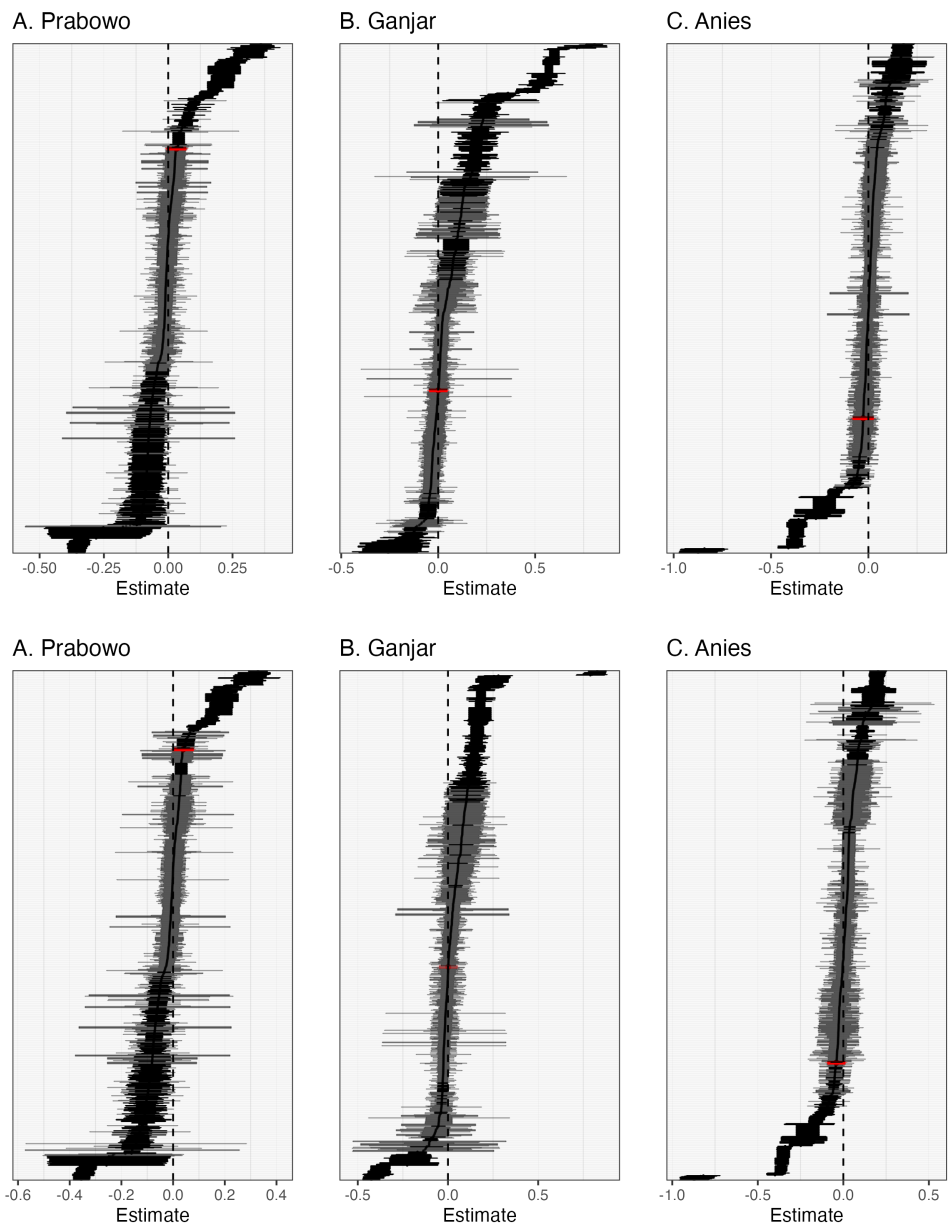

Figure APP-5: Placebo locations for Cirebon-1 plant: Electoral attitudes as a function of distance from placebo plant locations and timing of phaseout. Panel A shows voting intentions; Panel B predictions for voting outcomes. Red estimates indicate true outcomes.