

Eßer, Jana; Frondel, Manuel; Holtz, Leander; Vance, Colin

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Green SÖP extended: The Social-Ecological Panel survey 2021

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Jana Eßer
Manuel Frondel
Leander Holtz
Colin Vance

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Hohenzollernstr. 1-3, 45128 Essen, Germany

Ruhr-Universität Bochum (RUB), Department of Economics

Universitätsstr. 150, 44801 Bochum, Germany

Technische Universität Dortmund, Department of Economic and Social Sciences

Vogelpothsweg 87, 44227 Dortmund, Germany

Universität Duisburg-Essen, Department of Economics

Universitätsstr. 12, 45117 Essen, Germany

Editors

Prof. Dr. Thomas K. Bauer

RUB, Department of Economics, Empirical Economics

Phone: +49 (0) 234/3 22 83 41, e-mail: thomas.bauer@rub.de

Prof. Dr. Ludger Linnemann

Technische Universität Dortmund, Department of Business and Economics

Economics – Applied Economics

Phone: +49 (0) 231/755-3102, e-mail: Ludger.Linnemann@tu-dortmund.de

Prof. Dr. Volker Clausen

University of Duisburg-Essen, Department of Economics

International Economics

Phone: +49 (0) 201/1 83 -3655, e-mail: vclausen@vwl.uni-due.de

Prof. Dr. Ronald Bachmann, Prof. Dr. Almut Balleer, Prof. Dr. Manuel Frondel,

Prof. Dr. Ansgar Wübker

RWI, Phone: +49 (0) 201/81 49-213, e-mail: presse@rwi-essen.de

Editorial Office

Niels Oelgart

RWI, Phone: +49 (0) 201/81 49-213, e-mail: niels.oelgart@rwi-essen.de

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Jana Eßer, Manuel Frondel, Leander Holtz, and Colin Vance*

Green SÖP Extended: The Social-Ecological Panel Survey 2021

Abstract

Germany has implemented a range of measures to mitigate climate change. The implementation of such measures results in the imposition of financial burdens and restrictions on residents. Consequently, individual attitudes toward the fairness and effectiveness of such measures are a critical factor in ensuring policy acceptance. In order to formulate effective and widely supported climate policy, continuous individual-level data is needed. Nevertheless, there is a shortage of high-quality data in this field in Germany. The Green SÖP represents a rare exception in this regard, providing individual data on climate policy measures since 2012. This data description outlines the recent extension of the Green SÖP, which received financial support from the E.ON Foundation. A newly recruited household panel was surveyed in 2021 on their attitudes toward climate change, energy costs and usage, energy and transport transition, and carbon pricing. In addition, experiments on sustainable shopping and emission allowances were included in the survey. This data description provides a comprehensive overview of the content and methodology of the first of four survey waves, conducted in 2021, along with empirical evidence regarding its representativeness for the German population.

JEL-Codes: D12, D63, D83, H23, Q48, Q58, R48

Keywords: Household panel; energy transition; transport transition; climate change; policy preferences; fairness; acceptance

May 2025

**Jana Eßer, RWI; Manuel Frondel, RWI and RUB; Leander Holtz, RWI; Colin Vance, RWI and Constructor University Bremen. – We gratefully acknowledge financial support by the E.ON Stiftung. – All correspondence to: Manuel Frondel, RWI – Leibniz Institute for Economic Research, Hohenzollernstr. 1-3, D-45128 Essen, Germany, e-mail: manuel.frondel@rwi-essen.de*

1 Introduction

Germany has established a broad mix of policy instruments to reduce its emissions of greenhouse gases, including carbon pricing. Introduced in 2021, this measure aims to curb the consumption of fossil fuels such as petrol, diesel, natural gas and heating oil in the transport and building sectors. Additional mitigation measures include the promotion of renewable energy technologies, energy efficiency investments, and subsidizing climate-friendly alternatives like electric vehicles (Fronzel et al. 2017). Prompted by the devastating floods of 2013 and 2021, Germany has also undertaken climate adaptation measures, such as developing early warning systems and the construction of dikes (Osberghaus 2017).

Inevitably, policy measures such as carbon pricing impose a financial burden for individuals, otherwise they would have little effect. Consequently, perceptions of fairness in the distribution of these costs are of critical importance. These perceptions differ across population groups and are influenced by a range of socio-economic characteristics, including household income and educational attainment, as well as attitudinal factors such as political orientation and environmental awareness. However, longitudinal individual-level data on these determinants remains scarce.

A notable exception is the Socio-Ecological Panel (Green SÖP), a panel data set established within the project Eval-MAP and funded by the German Ministry of Education and Research (BMBF). In this project, household data were collected by the survey institute forsa over four years spanning 2012 – 2015 (Kussel and Larysch 2017). The panel was extended by a fifth wave conducted under the BMBF-funded project AKZEPTANZ, described by Klick, Kussel and Sommer (2021), and it was extended again by two additional waves in 2020 and 2022 under the BMBF-funded project Eval-MAP 2, covering both mitigation and adaptation behavior. Eval-MAP 2 recruited as many respondents as possible from the earlier waves to establish a longer timeline of behavioral changes. The result of this endeavor is the extended panel data set described by Fronzel et al. (2023), which is available for download via FDZ Ruhr (DOI: 10.7807/greensoep:en:v7).

The present paper describes the latest extension to the Green SÖP, which was made possible thanks to the funding by the E.ON Foundation. We specifically focus on data collected from a new cohort of households that were first surveyed in 2021, which can be downloaded from FDZ Ruhr. These households were surveyed in three subsequent waves in 2022, 2023, and 2024, forming a four-year panel. The data from these surveys is currently being assembled and will be available for download soon.

The following section outlines the data collection process. Subsequent sections provide information on the survey sample, literature utilizing the dataset, and additional details regarding data access. The survey and codebook are available as supplemental material.

2 Data Collection

The questionnaire was designed by RWI in collaboration with the E.ON Foundation. The survey was administered in June 2021 by the survey institute forsa to approximately 8,000 members of the forsa.omninet household panel. forsa.omninet comprises around 150,000 households and is representative of the German-speaking online population over the age of 14 in Germany. The individual panel members were contacted for the survey by means of computer-assisted random telephone contact. One household member over the age of 18 was recruited per household. They were then given the opportunity to participate in the survey online from June 11 to June 30. Among the 12,652 individuals who were contacted, 8,026 completed the survey, representing a response rate of 63.4%.

The data was pseudonymized by forsa, whereby all participants were assigned an individual identification number. In addition, postal and municipality codes are presented in a shortened, censored form. Questions answered in open-ended text fields can be provided separately upon request.

Missing answers from participants are coded as -1. This is the case if participants were not asked a certain question as it was not applicable due to a prior response or their non-assignment to a certain experimental group. The answer “Don't know/no answer” was coded as -2. In case of questions where several answers can be given, the answer option “Don't know/no response” is a separate variable like all other answer options. The names of some variables were adapted to ensure compatibility with subsequent waves of the Green-SÖP data, which are scheduled for publication at future dates.

The data set contains two weighting factors that can be employed to approximate the representativeness of the sample with respect to the German population as a whole or the German internet-using population with respect to federal state, age, and gender.

3 Description of the Experiments

The survey comprised two experiments (see Table 1), with the sample divided into two almost equally sized groups. The first experiment, A, examined the impact of information treatments on shopping behavior, whereby respondents were given the option to choose between sustainable and

conventional consumption. These options were represented by a choice of vouchers from either Amazon or memolife. Participants were selected at random to receive the selected voucher.

In Experiment B, participants had the option of receiving a 5-euro voucher for Amazon or alternatively setting aside an emission allowance. For this purpose, the respondents are randomly divided into five groups with varying probabilities. The groups differ in terms of whether information is provided in advance of the decision and how complex it is. In addition, some groups could only choose between the voucher and decommissioning, while others could also choose between immediate decommissioning and decommissioning in a year or at a future date.

Table 1: Survey Contents

Section	Contents
A	General questions
Experiment A	Sustainable shopping
Experiment B	Decommissioning of emission allowances
E	Questions about energy costs and usage
Climate	Attitudes and assessments of climate change and environmental issues
Carbon pricing	Questions on the acceptance of the German carbon price and forms of redistribution
U	Questions on the implementation and financing of the energy transition
PV	Psychological control variables
SOE	Socio-demographic questions

Furthermore, all participants were asked which financing option for the expansion of renewable energies they felt to be more equitable. They could choose financing via levies included on household electricity bills, as was the prevailing practice in Germany in the survey year 2021, or via tax revenues collected by the federal government. The selection of these options was preceded by different informational treatments that focused on aspects such as the polluter-pays principle and the regressivity of financing through electricity levies.

The framing experiment on socially undesirable behavior was conducted with two groups of nearly equal size. In the first group, higher costs or bans were proposed as a means of preventing the behavior in question. In the second group, regulation or subsidization were described as possibilities of increasing socially desired behavior. The respondents in both groups were then asked to indicate whether they agree or disagree with these proposals.

In addition to the experiments, the participants were asked to provide information regarding their household and living conditions, their attitudes and perceptions of energy costs, climate change, the German carbon price, and the implementation of the energy transition. They were also asked to respond to a series of psychological and socio-demographic questions.

4 Sample Description

In the following, the socio-demographic characteristics of the sample are analyzed. In addition, the sample households are compared with data from the German Mikrozensus 2020 published by the Federal Statistical Office (2022) to assess the representativity of the sample. Only the responses of those participants who completed the entire survey and did not answer the respective question with “no answer” are shown. This means that the number of observations varies depending on the question due to sample drop-outs or incomplete responses to the questionnaire. In the following, all percentages refer to the people who selected a meaningful answer option.

4.1 Distribution of Individuals across Federal States

With a few exceptions, the distribution of the sample households across federal states is largely consistent with the regional distribution from the 2020 Mikrozensus (Federal Statistical Office 2022) (Table 2). Deviations of greater than one percentage point between the sample and the population shares are seen for the federal states of Baden-Württemberg, North Rhine-Westphalia and Brandenburg. Most of the households surveyed came from Germany’s most populous state, North Rhine-Westphalia, with a share of 20.0%, followed by Bavaria and Baden-Württemberg.

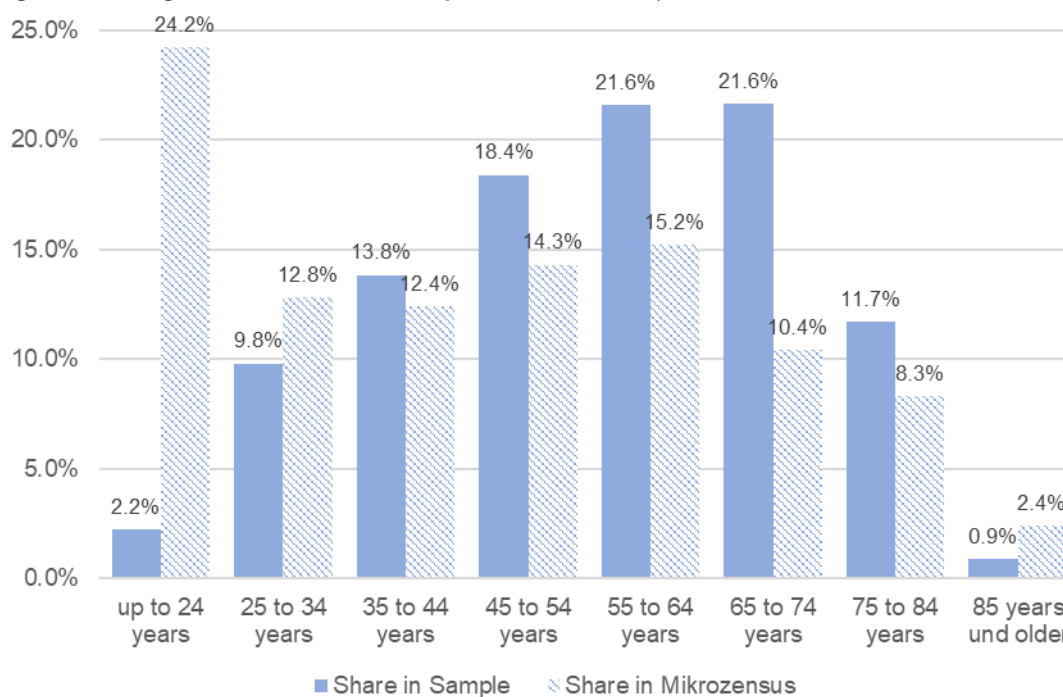
4.2 Age

The age range of the surveyed household members is between 18 and 99 years. The mean age is 56, with a median age of 57. The two largest age groups are those comprising individuals between the ages of 55 and 64, and those between the ages of 65 and 74, with a share of 21.6% each (Figure 1). A comparison with the Mikrozensus from 2020 (Federal Statistical Office 2022) reveals a clear overrepresentation of the over-35 age groups in the sample, while the under-35 age groups are underrepresented. The overrepresentation is particularly pronounced among individuals aged 55 to 74 years, whereas the under-25s are very strongly under-represented. However, this is mainly because the respondent pool was limited to people 18 and older.

Table 1: Distribution across Federal States

Federal State	Number of households	Sample shares	Share according to Mikrozensus
Baden-Württemberg	950	11.9 %	13.4 %
Bavaria	1.209	15.1 %	15.8 %
Berlin	370	4.6 %	4.4 %
Brandenburg	356	4.4 %	3.0 %
Bremen	58	0.7 %	0.8 %
Hamburg	184	2.3 %	2.2 %
Hesse	682	8.5 %	7.6 %
Mecklenburg-Western Pomerania	169	2.1 %	1.9 %
Lower Saxony	764	9.5 %	9.6 %
North Rhine-Westphalia	1.603	20.0 %	21.5 %
Rhineland-Palatinate	388	4.8 %	4.9 %
Saarland	92	1.2 %	1.2 %
Saxony	446	5.6 %	4.9 %
Saxony-Anhalt	188	2.3 %	2.6 %
Schleswig-Holstein	344	4.3 %	3.5 %
Thuringia	223	2.8 %	2.6 %
Total	7058	100.0%	100.0%

Source: Own calculations and Federal Statistical Office, 2022.

Figure 1: Age Distribution of Participants in the Survey

Source: Own Calculations and Federal Statistical Office, 2022.

4.3 Gender and Education

The gender distribution of the participants is 55.2% men to 44.8% women. Given the ratio of 49.5% men to 50.5% women in the 2020 Mikrozensus (Federal Statistical Office 2022), the survey is not representative of the actual gender distribution in the German population. The same applies to the share with higher education: The Mikrozensus reports that 35.5% of the population have a school-leaving qualification that allows them to study at a (technical) university or college, compared with 52.9% of the respondents in the Green SÖP (Table 3). At 35.0%, the sample proportion of those with a university degree is also significantly higher than 19.2% of academics in the population.

Table 3: Highest level of education in the sample (n=7,979) compared to Mikrozensus 2020

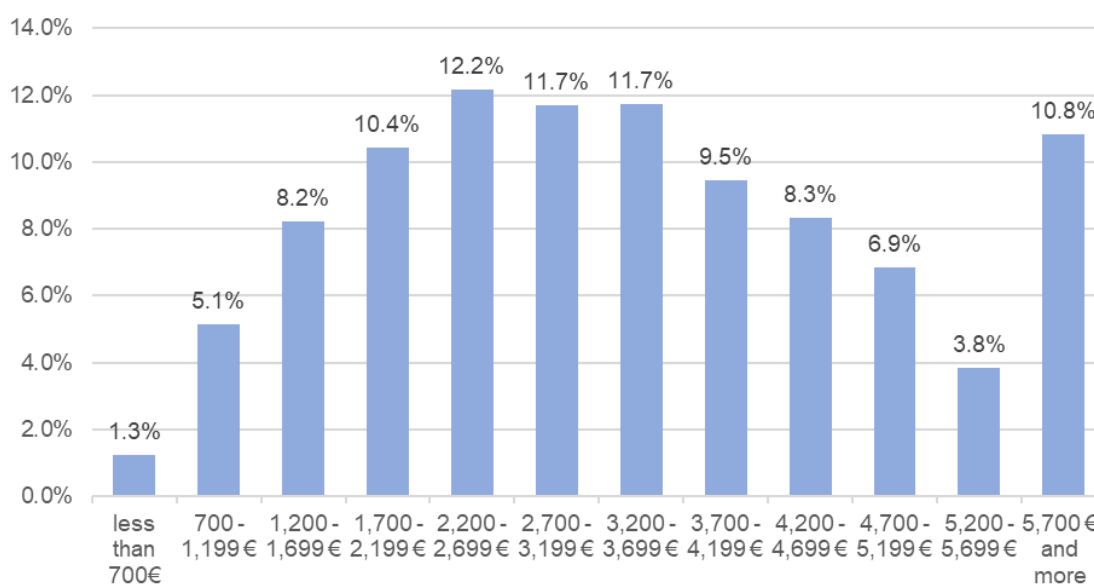
Highest school leaving education	Share in sample	Share according to Mikrozensus 2020
Without qualification	0.16 %	7.3 %
Secondary School Certificate (Hauptschule)	13.5 %	26.0 %
Intermediate Secondary School Certificate (Realschule)	33.5 %	30.8 %
University/College entrance certificate ((Fach-)Abitur)	52.9 %	35.5 %
University graduates	35.0 %	19.2 %

Source: Own Calculations and Federal Statistical Office, 2022.

4.4 Income

53.2% of respondents are employed, 77.1% of whom are in full-time employment. Figure 2 shows the distribution of net monthly household income. The median income falls in the €3,200 to €3,700 range. Households with a net income of €2,200 to €2,700 account for the largest share of the sample (12.2%), followed by households with incomes of €2,700 to €3,200 and between €3,200 and €3,700 (11.7% each). Although a different classification of the various income groups makes the comparison between the sample and the results of the Mikrozensus difficult, it is clear that low-income households tend to be underrepresented in the sample and high-income households overrepresented (Table 4). While around 15.5% of the households in the German population have less than €1,250 per month at their disposal, the proportion of sample households with a net income of less than €1,200 is just 6.4%. One possible reason for the overrepresentation of households in higher income groups can be found in the disproportionately high level of education of the respondents, which is usually associated with higher earnings.

Figure 2: Net Monthly Household Income of the Sample Households (Number of observations: 7.183)



Source: Own Calculations.

Table 4: Comparison of the household income distribution of the sample (n=7,183) and the German population

Share in sample		Share in Mikrozensus 2020	
Less than 700 Euro	1.3%	Less than 500 Euro	1.8%
700 to less than 1,200 Euro	5.1%	500 to less than 1,250 Euro	13.7%
1,200 to less than 2,700 Euro	30.9%	1,250 to less than 2,500 Euro	33.4%
2,700 to less than 5,200 Euro	48.1%	2,500 to less than 5,000 Euro	36.7%
More than 5,200 Euro	14.7%	More than 5,000 Euro	13.6%

Source: Own calculations and Federal Statistical Office, 2022.

4.5 Household Size and Ownership

The ratio of homeowners to renting households is another measure for which the sample is not representative. 39.4 % of respondents are renters, 58.6 % are homeowners, and around 2 % live in places provided to them free of charge. In contrast, the home ownership rate in Germany is lower at 46.5% according to the supplementary survey to the Mikrozensus 2018 (Federal Statistical Office 2020). In addition, one-person households are underrepresented in the survey, while the proportion of two-person households is overrepresented. The proportions in the sample are 26.5% and 47.4% respectively, whereas in the German population one- and two-person households make up 40.6% and 34.0% of the population (Federal Statistical Office 2022). At 12.7% and 13.4%, the proportions of three-person and four-person households are comparable to the results of the Mikrozensus (Table 5). Furthermore, 61.5% of respondents stated that they had children.

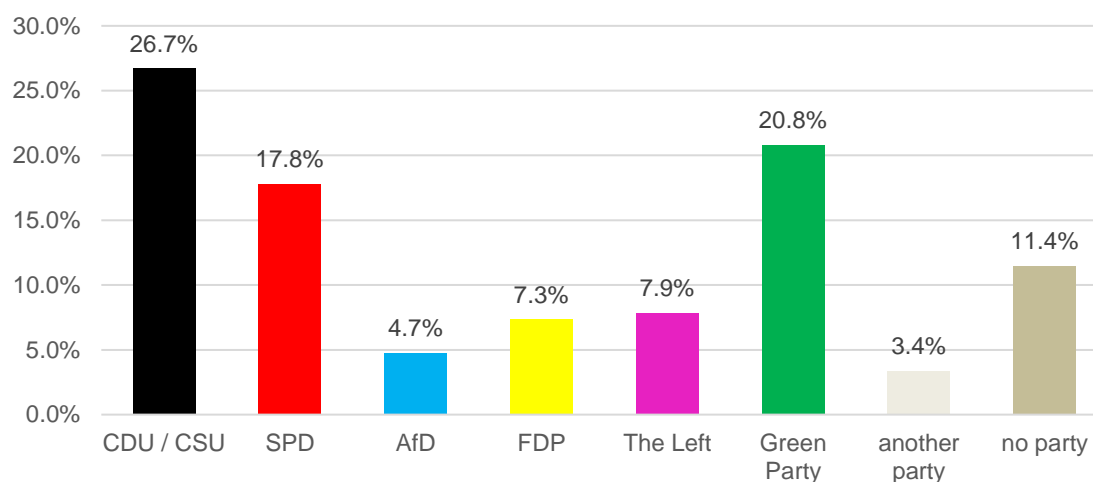
Table 5: Share of household sizes in the sample (n=8,006) and according to Mikrozensus

Household size	Sample	Mikrozensus 2020
1 person	26.5 %	40.6 %
2 persons	47.4 %	34.0 %
3 persons	12.7 %	12.1 %
4 or more persons	13.4 %	13.3 %
Total	100.0 %	100.0 %

Source: Own calculations and Federal Statistical Office, 2022.

4.6 Political Alignment

In addition to questions about socio-economic characteristics, participants were asked to rate their political position as left, right or center using an 11-point scale. Of these, 24.1% see themselves exactly in the political center. 49.7% rate their political orientation as left of center, while only 26.2% classify themselves as right of center. In addition, 88.6% of respondents stated that they tend to vote for a particular party in the long term. Among these participants, CDU/CSU voters make up the largest group with 26.7%, followed by the Green Party and SPD voters, with 20.8% and 17.8%. 11.4% said they have no inclination for a particular party (Figure 3).

Figure 3: Political Preferences of the Sample (Number of observations: 7,700)

Source: Own Calculations.

A comparison with the DeutschlandTrend survey published by infratest dimap (2021) suggests that FDP and AfD voters are underrepresented in the Green SÖP. These voters comprise 7.3% and 4.7% of the sample, respectively, compared with 12% each in DeutschlandTrend. Conversely, 17.8% of respondents in the current survey expressed an inclination toward the SPD, exceeding the 14% reported in the DeutschlandTrend. The shares of respondents favoring the CDU/CSU, the Greens, and the Left Party are largely consistent across both datasets. It is important to note, however, that differences in the phrasing of survey questions may influence comparability.

5 Empirical Articles Based on the Survey Wave of 2021

Several articles report results from the Green SÖP. For example, Eßer et al. (2024) use the shopping experiment to investigate cognitive dissonance. Results indicate that individuals adapt their behavior after having received the reminder of their stated attitudes and the criticism about conventional online shopping. Yet, participants do not deceive themselves by aligning their attitudes with their behavior or by denying having been aware of the criticism.

Eßer et al. (2022) investigate the approval of various climate protection measures. Interestingly, respondents consider bans to be more effective than financial incentives. Nevertheless, respondents prefer financial incentives to bans for the transport and heating sector. Last, in a study of financing mechanisms for renewable energy, Eßer et al. (2022) find that the preferred option is tax revenues, rather than levies on electricity prices.

There are many other ways of analyzing this data set given the broad range of questions on climate change, energy and transition measures. The data described here is the first of a series of annual surveys with largely the same sample and numerous repeated questions. For example, the perception of climate change, opinions on energy supply, the energy transition and Germany's carbon pricing were recorded in surveys conducted in 2022, 2023, and 2024, which will be published soon.

6 Data Access

The data sets are available as a Scientific Use File at the FDZ Ruhr, the research data center at RWI – Leibniz Institute for Economic Research. The data access is only granted for scientific, noncommercial studies and to affiliate researchers of scientific institutions. It requires a signed data usage agreement which can be applied for on the FDZ website. The data can be obtained as a Stata[®] dataset (.dta) or csv. file. Users are requested to cite the source and to inform FDZ Ruhr about publications with the data. When using this and following waves of the Socio-Ecological Panel, please cite each wave individually. Please cite this wave as:

Eßer, J., Flörchinger, D., Frondel, M., Holtz, L., Sommer, S.; RWI, E.ON Stiftung, forsa (2025). *Socio-Ecological Panel [Green SÖP], 8th Survey Wave* (Version 1) [Data set]. RWI – Leibniz Institute for Economic Research. <https://doi.org/10.7807/GREENSOEP:FW:V1>

In addition to citing the dataset, we kindly ask that you also cite this data report.

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