



Faster or slower decarbonization? Policymaker and stakeholder expectations on the effect of the COVID-19 pandemic on the global energy transition

Silvia Pianta^{a,c,*}, Elina Brutschin^b, Bas van Ruijven^b, Valentina Bosetti^{a,c}

^a RFF-CMCC European Institute on Economics and the Environment, Italy

^b International Institute for Applied Systems Analysis (IIASA), Austria

^c Bocconi University, Italy

ARTICLE INFO

Keywords:

Climate policy
Decarbonization
COVID-19
Policymakers survey
Stakeholder elicitation

ABSTRACT

The COVID-19 pandemic might have tremendous consequences on decarbonization efforts across the globe. Understanding governments' policy action in the short and medium term is key to assess whether the response to the crisis will crowd out or fast-track decarbonization efforts. We surveyed over 200 policymakers and stakeholders from 55 different countries to collect climate policy expectations in various sectors and regions in the next five years. While support for high-emitting sectors is not expected to dissolve completely, commitment to policies supporting the transition to low-carbon energy and transport sectors is expected to increase substantially. This is true for OECD and Asian countries, representing approximately 90% of global emissions. Our results suggest that expectations that the COVID-19 pandemic will accelerate decarbonization efforts are widely shared.

1. Introduction

The COVID-19 crisis has produced a shock to economic activity, social interactions, work organization, and citizens' everyday lives in most countries in the world. China, the European Union, the United States, and other top emitters have been significantly affected by the crisis. The pandemic and the public health measures implemented to address it have produced an unprecedented fall in greenhouse gas emissions. More than half of the world population have been subject to lockdowns, which has impacted short-term mobility behavior, energy demand, and industrial production [1,2]. Based on Google and Apple mobility data, Forster et al. [3] estimate that during April 2020, more than half of the world's population reduced travel by more than 50 percent.

Le Quéré et al. [2] have estimated that in April 2020 daily global CO₂ emissions decreased by 17 percent compared to mean levels in 2019. Liu et al. [4] argue that CO₂ emissions drops during the first half of 2020 were higher than during the economic crisis or World War II. However, the crisis's and the lockdowns' effects on emissions reductions will be short-term and negligible in the absence of additional policies accelerating decarbonization [3]. In response to the crisis, governments are putting in place recovery packages that are often unprecedented in size

since the post-war period. Estimates range from \$9tn to \$15tn of pledged commitments, with the US and the European Union having by far the largest shares [5,6]. The opportunity for new investments could put the world on track to achieve the Paris Agreement goals [5], but the specific design of recovery packages will critically determine whether the crisis will be an accelerator of climate action or will further reinforce current socio-technical regimes and the carbon lock-in these regimes entail [7].

Albeit the 2008 economic crisis opened a short window of opportunity for a sustainability transition, the opportunity was not seized [8]. Today, there is a danger of politicians focusing on economic recovery at the expense of decarbonization action and countries simply not having enough financial capacity to support more expensive climate policies. However, changed social attitudes and governments' more proactive fiscal approach might produce a different outcome. Additionally, increased teleworking and changed mobility routines might make demand-driven emission reductions considerably easier [9,10].

Currently, the world is at a critical juncture to facilitate the low-carbon transition because several technological, economic, political, and social enabling conditions are present. A study by BloombergNEF estimates that solar PV and onshore wind are among the cheapest sources of new-build generation for two-thirds of the global population [11]. The number of climate laws and regulations is also increasing,

* Corresponding author at: RFF-CMCC European Institute on Economics and the Environment, Via Bergognone 34, Milan, Italy.

E-mail address: silvia.pianta@eiee.org (S. Pianta).

<https://doi.org/10.1016/j.erss.2021.102025>

Received 4 November 2020; Received in revised form 24 January 2021; Accepted 4 March 2021

Available online 24 April 2021

2214-6296/© 2021 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

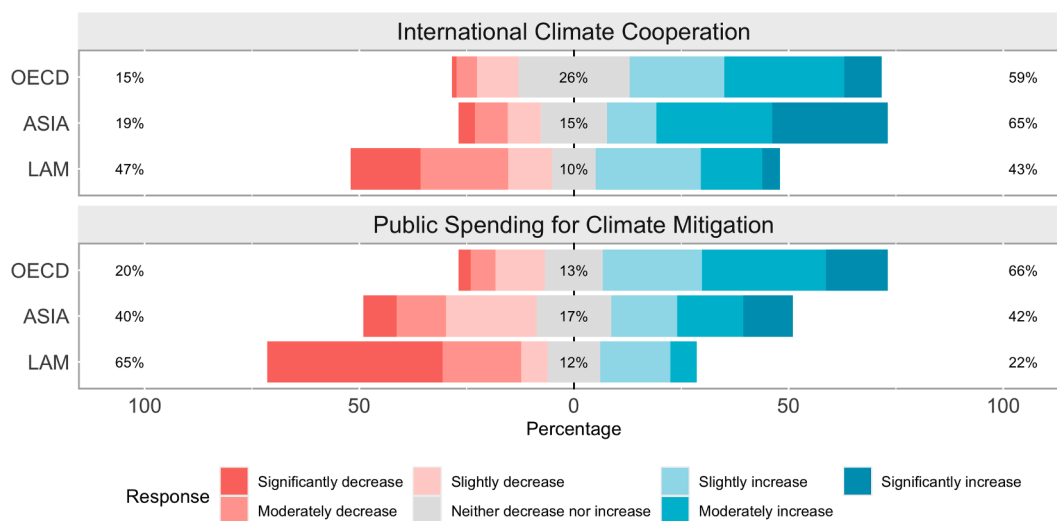


Fig. 1. International Climate Cooperation and Public Spending for Climate Mitigation - Likert scale plot of the answers to the questions on expected trends for International Climate Cooperation and Public Spending for Climate Mitigation in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

signaling greater political will to address climate change [12]. The strength of the global climate movement was unprecedented before the COVID-19 crisis struck, with Greta Thunberg and Fridays for Future leading a record social mobilization around the climate crisis. Before the pandemic, public attention on climate change soared in 2019, with media coverage of climate change and climate internet search activity reaching unmatched levels [13,14]. Changed public attitudes might now allow implementing more stringent decarbonization policies.

Hepburn et al. [15] have recently surveyed senior economists to identify the most promising policies in terms of both economic multiplier and positive climate potential. However, the overall climate impact of public policies implemented in response to the pandemic is to date unclear, as the COVID-19 crisis is still ongoing [6]. The decisions that will be taken by governments in the next few years, both on the design of recovery packages and on climate policy ambition, can determine whether the COVID-19 crisis will crowd out decarbonization efforts or create synergies, leading to a green recovery [3,5,15].

While there are significant efforts to collect and evaluate recovery packages, many governments are still defining their policies to address the economic consequences of the pandemic. Understanding emerging patterns and cross-national differences can provide essential insights to understand the medium-term effects of the COVID-19 crisis on global efforts to address climate change. The implications of the pandemic for the energy transition have already attracted considerable academic attention, producing focused special issues [6,17], and many prominent articles. Scholars call for data collection and evaluation efforts, as the COVID-19 crisis presents a unique opportunity to explore a “major landscape shock” to technological and societal systems [9].

Our Perspective answers these calls by presenting results from a survey of over 200 policymakers and stakeholders developed to collect insights on emerging trends in a wide range of countries and sectors. We focus mainly on policies pertaining to the decarbonization of the energy and transport sectors, which are responsible for over 70% of current carbon emissions. Surveys of decision-makers and experts are a powerful and reliable tool to assess policy positions [18-20], and are widely used in some political science sub-fields. Our contribution is an example of a data collection technique that might be of great use for energy transition research [21]. By presenting the results of this survey collecting highly informed policy expectations, we hope to contribute to shedding light on whether crucial policy decisions taken in the post-pandemic period are more likely to accelerate or postpone the energy transition.

2. Research design and data

The objective of this study is to provide insights on the expected impacts of the COVID-19 crisis on national decarbonization efforts by eliciting the expectations of highly informed policymakers and stakeholders. Policymaker and stakeholder surveys are a well-established tool to assess policy positions, preferences, and beliefs and are widely employed in several research domains to study policy networks, political parties [19,22,18], and future technology developments [23]. Their confidential nature makes survey responses less susceptible to public pressure or strategic behavior that could drive public statements [20,22]. By providing information on key societal stakeholders’ positions and beliefs or informed expectations on government policy, expert and stakeholder surveys can significantly contribute to ongoing research. For example, they may help focus quantitative and analytical studies on the energy transition and help analysts fruitfully direct their efforts.

Our survey aimed at collecting respondents’ expectations on national policy directions focusing on the energy and transport sector, which were expected to be most affected by the pandemic [15,3,24]. We formulated all questions asking about expected trends in the next five years. We included a set of questions to collect data on respondents’ backgrounds, general expectations about the crisis’s duration, and the overall assessment of the country’s climate ambition before the COVID-19 crisis. Details on the survey protocol and the complete survey questionnaire are provided in the Appendix.

We administered the survey to policymakers and stakeholders with country-specific expertise. We collected responses through a snowball sampling methodology from different seeds, intending to cover the most comprehensive set of countries, focusing on the highest emitters. We also administered the survey to invited participants to the IEA/OECD Climate Change Expert Group (CCXG) Global Forum on the Environment and Climate Change. Participants include government officials and delegates from inter-governmental organizations and other relevant institutions involved in international climate negotiations.

We reached policymakers and stakeholders working for national governments, international organizations, research institutions, non-governmental and private sector organizations. The data collection started on May 28, 2020 and lasted until October 12, 2020. We collected 223 complete responses from 55 different countries. Almost half of our respondents (104) declared that they are at least in part directly involved in the formulation of future climate, energy, or environmental

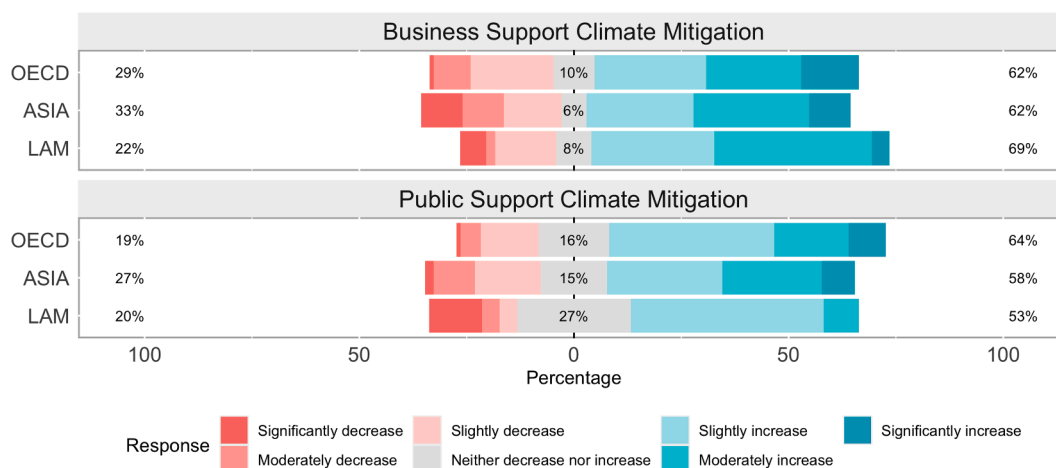


Fig. 2. Expected Public and Business Support for Mitigation. Likert scale plot of the answers to the questions on expected trends for Business Support for Climate Mitigation and Public Support for Climate Mitigation in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

policies. Details on respondents’ country of expertise and background are reported in [Tables A1 and A2](#) in the Appendix. The United States is underrepresented in our data; the US elections’ unknown outcome at the time of data collection made climate policy forecasts highly uncertain, resulting in fewer policymakers willing to take the survey.

3. Results

We present our results for three macro-regions: (1) OECD countries; (2) Asian countries - excluding the Middle East, Japan, Korea, and Former Soviet Union countries (ASIA); and (3) Latin America and Caribbean countries (LAM). We collected 104 responses on OECD countries, 52 on Asian countries, and 49 on Latin American and Caribbean countries. Shedding light on emerging trends in these regions, which together are responsible for approximately 90% of global emissions, provides a picture of the possible direction of global decarbonization efforts in the medium term. As we collected a minimal number of responses on Middle Eastern, African, Balkan, and former Soviet countries, we only present key results for these regions in the Appendix ([Fig. A1](#)).

3.1. General expectations

We first present results for items that allow us to have a general overview of expectations in different regions, focusing on expected public spending for climate mitigation, international climate cooperation efforts, and emission trends. We also present expectations on future support for climate mitigation among the general population and among businesses. We then focus on policies promoting the low-carbon transition in the energy and transport sector. We finally present expectations

on support to high-emitting companies and sectors.

When evaluating countries’ commitment to climate action, public spending for climate mitigation and international climate cooperation efforts are two key aspects to consider. [Fig. 1](#) shows that respondents in all three regions are divided on international climate cooperation expectations in the next five years. For OECD and Asian countries, respondents lean towards a moderate or significant increase in cooperation, while a slight to significant decrease is expected in Latin America. Similarly, public spending for climate mitigation is expected to increase in OECD and Asian countries. Overall, respondents from these regions expect that the pandemic and its economic effects will not impede governments’ commitment to climate action. The majority even see an opportunity for a green recovery. Conversely, in Latin American countries, different expectations on the crisis’s economic impacts and governments’ responses translate into looming expectations on public spending for climate mitigation (with 65% of responses expecting a moderate or significant decrease).

Interestingly, when looking at expected climate mitigation support among businesses and the general public, an increase is expected in all the regions under consideration (see [Fig. 2](#)). This mirrors a recent IPSOS study that finds that concern over climate change is still high globally. Seventy-one percent of this global survey’s respondents consider climate change as severe a crisis as COVID-19, and a similar proportion is feeling that their government will be failing them if it doesn’t act on climate change now [[25](#)].

To have a more general look at expected decarbonization trends in the next five years, we can focus on emission trends (see [Fig. 3](#)). The majority of respondents expect emissions to decrease in the next five years compared to past trends, with 76% and 52% of responses on OECD and Asian countries respectively expecting a further decline in

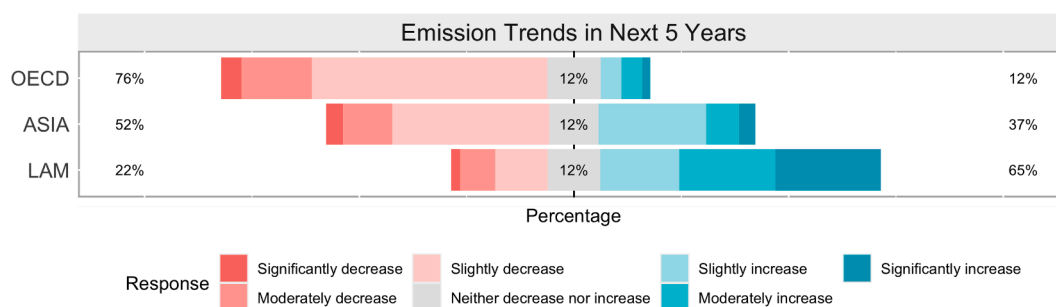


Fig. 3. Emission Trends. Likert scale plot of the answers to the question on expected Emission Trends in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

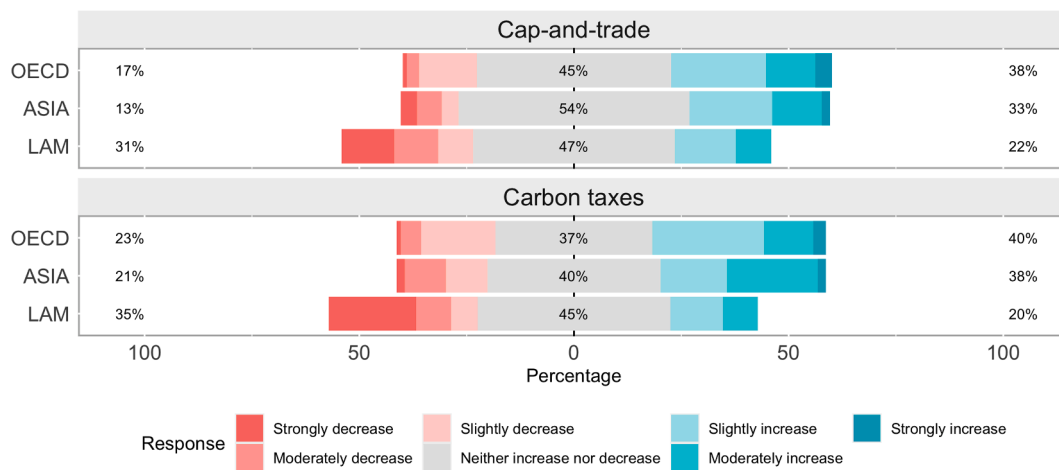


Fig. 4. Carbon Pricing. Likert scale plot of the answers to the questions on expected trends for the commitment to Cap-and-trade Systems and Carbon Taxes in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

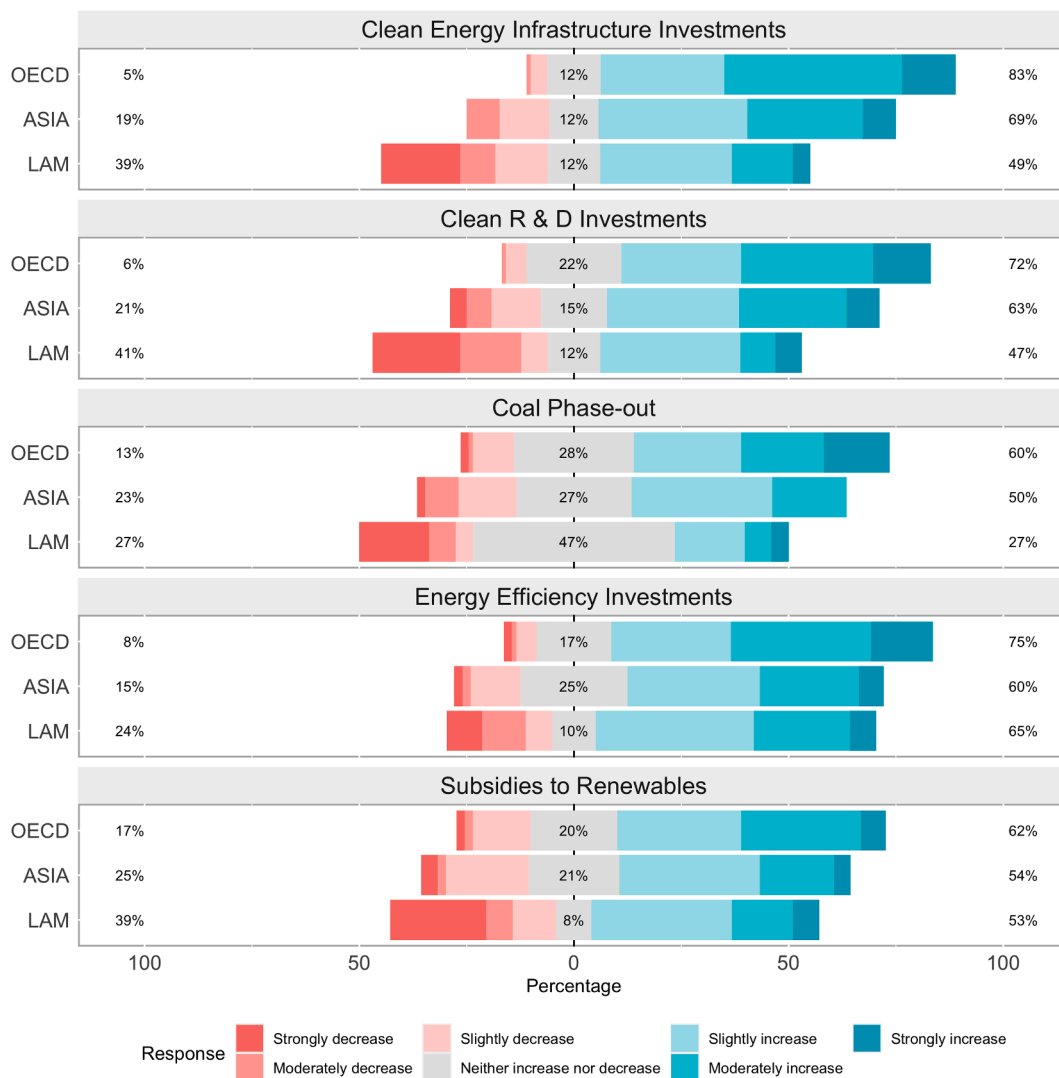


Fig. 5. Policies Promoting the Low-carbon Transition in the Energy Sector. Likert scale plot of the answers to the questions on expected trends for governments' commitment to Investments in Clean Energy Infrastructure, Investments in Clean Research & Development, Coal Phase-out Plans, Energy Efficiency Investments and Subsidies to Renewables in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

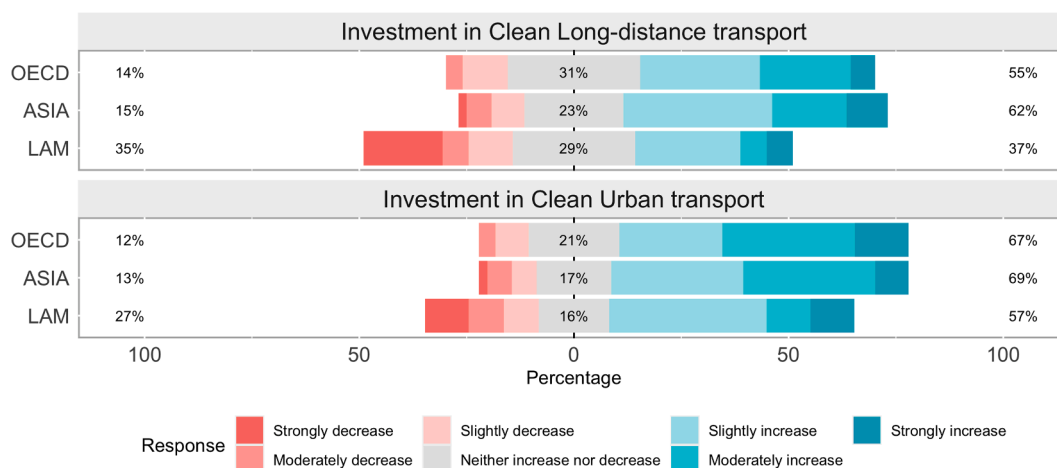


Fig. 6. Policies Promoting the Low-carbon Transition in the Transport Sector. Likert scale plot of the answers to the questions on expected trends for the Investments in Clean Long-distance and Urban Transport in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

emissions. In Latin American countries, emissions are instead expected to increase, possibly driven by the low commitment to climate mitigation in Brazil, the primary emitter in the region. However, this should not significantly affect global decarbonization efforts, as Latin American and Caribbean countries are responsible for a relatively small share of global CO₂ emissions [26].

3.2. Expectations on policies promoting the low-carbon transition

To better understand the future trends in CO₂ emissions, it is essential to compare expectations concerning “green” policies supporting decarbonization efforts versus policies supporting or bailing out “brown” companies. Evaluations of stimulus packages available when this paper was written depict a relatively gloomy picture, suggesting that these packages have failed, so far, to harness the opportunity towards more climate-friendly policies [16]. Our analysis, however, suggests relatively optimistic expectations for the next five years.

3.3. Carbon pricing systems

Expectations on carbon pricing systems, including cap-and-trade

mechanisms and carbon taxes, are unclear, with slightly less optimistic expectations for Latin American countries than for OECD and Asian countries (see Fig. 4).

3.4. Energy sector

During the first wave of the pandemic, the energy sector has experienced a fall in energy demand, producing a steep decline in energy-related emissions [2,3]. However, the longer-term impact of the crisis is uncertain and will depend on energy investments and government decisions to support low-carbon energy production. The current relative economic performance of fossil and renewable energy suggests that further carbon lock-in might be less likely than in the past [24]. In our survey, we assessed expected commitment to a series of policies promoting the transition to a low-carbon energy sector, including investments in clean energy infrastructure, investment in clean Research & Development, coal phase-out plans, energy efficiency investments, and subsidies to renewables. We find that expectations are overall rather positive (see Fig. 5). Moving to the examination of cross-regional differences, OECD countries are expected to be more ambitious, followed by Asian and Latin American countries. Even for Latin American

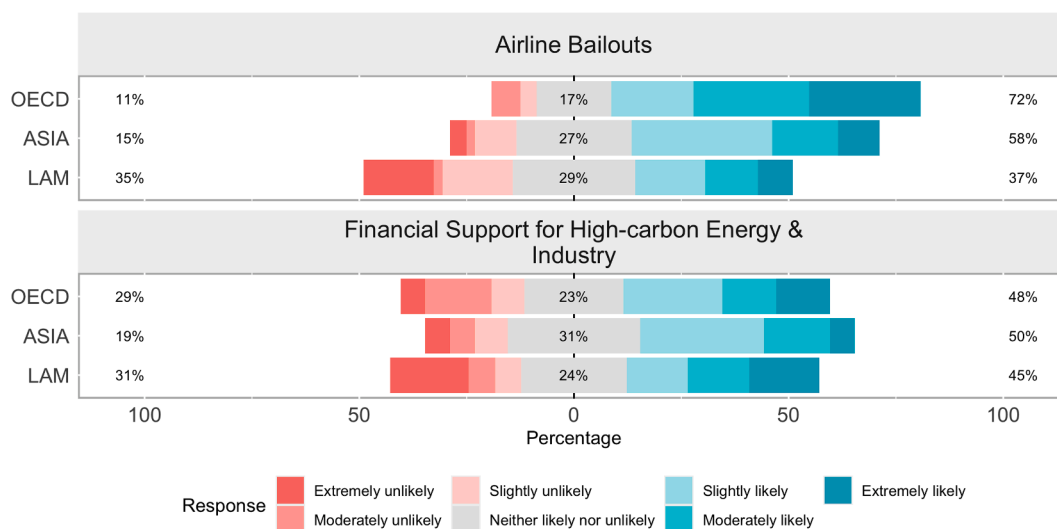


Fig. 7. Policies Hampering the Low-carbon Transition. Likert scale plot of the answers to the questions on expectations on Airline Bailouts and Financial Support for High-carbon Energy & Industry Sectors in the next five years for OECD, Asian, and Latin American and Caribbean countries. Answers are based on a 7-point Likert scale ranging from significantly unlikely to significantly likely.

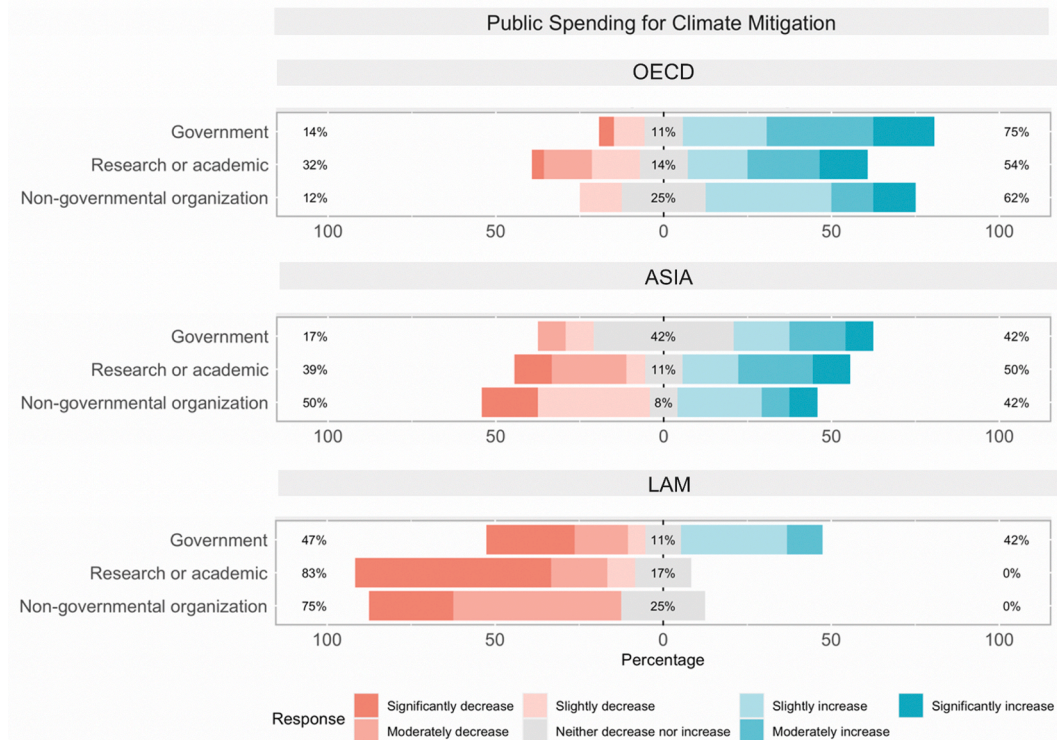


Fig. 8. Expectations on Public Spending for Climate Mitigation among respondents working for different organizations - Likert scale plot of the answers to the question on expected trends for Public Spending for Climate Mitigation in the next five years for OECD, Asian, and Latin American and Caribbean countries, and for respondents working for governments, research or academic institutions, and non-governmental organizations. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

countries, approximately half of respondents expect an increased commitment to green energy policies (except for coal phase-out plans, on which expectations are unclear). For OECD countries, 83% of responses expect an increased commitment to investments in clean energy

infrastructure. Similarly, expectations concerning energy efficiency investments and clean Research & Development are very optimistic (with 75% and 72% of respondents expecting an increase in the commitment of national governments). Expectations on subsidies to renewables are

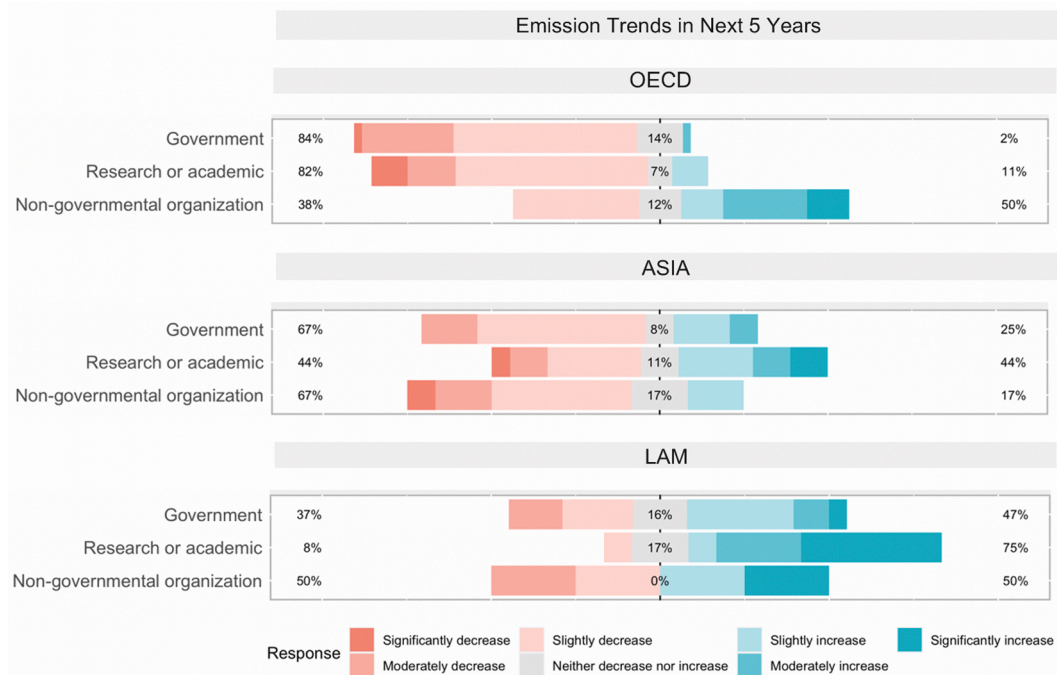


Fig. 9. Expectations on Emission Trends among respondents working for different organizations - Likert scale plot of the answers to the question on expected Emission Trends in the next five years for OECD, Asian, and Latin American and Caribbean countries, and for respondents working for governments, research or academic institutions, and non-governmental organizations. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

slightly less optimistic, but more than half of responses predict an increased commitment in the next five years for all regions. When we turn to policies to phase out coal, respondents in OECD and Asian countries expect governments to push this process forward, while governments in Latin American countries are expected to be timider. Given the economic, political, and social costs associated with phase-out policies, it is not surprising that expectations are much less optimistic than those concerning policies promoting the growth of renewable energy production and use.

3.5. Transport sector

The transport sector's transformation will crucially depend on governments' infrastructure investment decisions, through the investment in rail networks and infrastructure, the construction of bike lanes, and the development of electric vehicle charging station networks. Our survey data suggest that investments in clean transport infrastructure, especially at the urban level, are expected to experience a substantial increase. As evident in Fig. 6, increased investments in clean urban transport infrastructure are considered likely in all three regions under consideration. Interestingly, expectations are slightly more optimistic in Asian countries than in OECD countries. Investments in long-distance transport infrastructure are expected to increase in OECD and Asian countries, while Latin American countries' expectations are less clear. However, expectations of long-distance transport infrastructure are slightly less favorable compared to those for clean urban transport. While not providing a complete picture of overall decarbonization trends in the transport sector, these results suggest that this sector might experience a transition faster than expected in the post-pandemic period.

3.6. Expectations on policies hampering the low-carbon transition

The amount of financial support provided by governments to high-carbon energy and industrial sectors as a response to the COVID-19 crisis is another key aspect to consider to determine whether an acceleration of decarbonization efforts is possible in the next five years. Bailing out fossil sectors hit by the crisis might significantly postpone the low-carbon transition.

Our survey data suggests that financial support to high-carbon energy and industrial sectors in the next five years is considered moderately likely in OECD, Asian, and Latin American countries. Fig. 7 shows that airline bailouts, which are highly likely to slow down decarbonization, are considered extremely likely in OECD countries and are very likely in Asian countries. This result is in line with what has been found by the Airline Bailout Tracker developed by Transport & Environment, Carbon Market Watch, and Greenpeace. Their analysis estimates that since the beginning of the COVID-19 crisis the major European airlines have received roughly 29 billion euro without any binding environmental conditions [27]. Overall, respondents are unsure whether the post-crisis period will end government support to high-emitting sectors over the coming years.

3.7. Comparing expectations of respondents working for different organizations

Respondents working in different organizations can have different expectations due to different backgrounds and expertise. We compare expectations on emission trends and public spending for climate mitigation of respondents working for (1) governments, (2) research or academic institutions, and (3) non-governmental organizations (see Figs. 8 and 9). Interestingly, respondents working for governments have more optimistic expectations on future trends of public spending for climate mitigation than respondents working for other organizations. In Latin American and Caribbean countries, the expectations of respondents working for research institutions and non-governmental organizations

are very pessimistic. In OECD and Asian countries, these categories of respondents are only slightly more pessimistic than those working for governments.

Expectations of future emission trends in OECD countries are more optimistic among respondents working for governments and research institutions. Respondents working for non-governmental organizations are overall less sure that emissions will significantly decrease in the next five years. In Asian and Latin American countries, respondents working for governments and non-governmental organizations have moderate expectations on emission reductions, while researchers and academics are more pessimistic.

4. Conclusion

The 2018 IPCC Special Report has highlighted how rapid decarbonization action is required to reach the Paris Agreement's long-term goal and limit global average temperature increase to well below two degrees above pre-industrial levels [28]. Postponing the decarbonization of the economy today leads to more abrupt changes being required in the future. The next few years might provide the last opportunity to put in place decarbonization strategies that allow reaching the Paris Agreement goal and avoid the most adverse impacts and irreversible damages of climate change [29]. The exogenous shock produced by the COVID-19 pandemic and the proactive economic policy approach taken by many governments to address the crisis has opened a window of opportunity for fast-tracking decarbonization through increased government spending and green sectors' investments, to decouple economic recovery and greenhouse gas emissions.

We present the results of a survey of policymakers and stakeholders developed to collect informed expectations on the likely direction of government policies in the next five years in OECD, Asian, and Latin American countries. Overall, survey respondents expect that the COVID-19 crisis will not necessarily crowd out decarbonization efforts, slowing down the global energy transition. Still, some critical factors may water down the recovery phase's transformative potential. On the one hand, commitment to policies supporting decarbonization may increase in OECD and Asian countries, which are today responsible for most global emissions. This represents an opportunity to reduce emissions across various sectors. The power sector will be at the core of this transformation, given the expected surge in green infrastructure and renewable power production investments. Notably, there are positive expectations on several policies with high potential on economic multiplier and climate impact, including energy efficiency investments, clean Research & Development, and investments in clean energy infrastructure [15]. On the other hand, some results are less promising. Latin American respondents tend to be overall more pessimistic. Support for incumbent, high-emitting sectors is also likely to continue in most regions, with airline companies' bailouts deemed extremely likely. Interestingly, respondents working for governments have more optimistic expectations compared to respondents from non-governmental organizations and research institutions.

In general, expectations are more optimistic in countries with higher per capita income and higher past climate performance. Significant decarbonization action taking place only in a subset of highly emitting advanced and developing economies might be sufficient to accelerate global decarbonization and kick-start the required technological change. The European Union's commitment to net-zero emissions by 2050 and the renewed climate commitment of the new US administration, together with the recent announcement of China's pledge to achieve carbon neutrality by 2060, shed new light on the future policy direction of three of the world's largest emitters.

An explicit limitation of our study is related to its geographical coverage. We could not reach a sizable number of respondents from Middle East, African, and Former Soviet Union countries, and a broader set of responses on the United States and China would have strengthened our results. Moreover, given our focus on national policies, our results

do not cover local and regional policies, which might also considerably contribute to global decarbonization efforts. As the situation is continually evolving, and national policy decisions will ultimately depend on country-specific social, economic, and political economy factors, our results have to be interpreted as a collection of highly informed expectations. These results can provide useful insights to researchers in particular when data on policy decisions are not available yet.

The main contribution of this Perspective is a snapshot of policymakers' and stakeholders' expectations regarding the trajectory of climate policies in the wake of the COVID-19 crisis. In the future, with the increased availability of data on COVID-19-related policies, the results of this survey can be compared with more systematic assessments of the implemented policies. Our results suggest that there are key differences across regions and countries. Future research should also explore the determinants of countries' decisions on whether to reinforce the status quo by supporting incumbent sectors or take the current crisis as an opportunity to fast-track decarbonization action.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This study was funded by the European Union's Horizon 2020 research and innovation programme under grant agreement 821471 (ENGAGE). The authors would like to thank Anique-Marie Cabardos and the organizers of the June 2020 IEA/OECD Climate Change Expert Group (CCXG) Global Forum on the Environment and Climate Change for their precious support in the collection of the data for this study. We also thank colleagues from the ENGAGE project for providing useful comments on the earlier versions of the questionnaire.

Appendix

Survey development procedure

Our target population included policymakers and stakeholders, ideally directly involved in policymaking affecting future trajectories of climate policies. This requirement made limiting the survey length crucial to collect a good number of complete responses. The data collection phase of surveys of these populations requires a major effort and having a long survey significantly reduces the response rate [30]. This constrains the number of questions we could include in our survey. To ensure that the selection of questions was systematic and relied on available evidence, we first carefully analyzed emerging insights on the effects of the COVID-19 pandemic on decarbonization efforts and tried to identify the sectors that were expected to be most affected [15,3,24]. As drastic changes in energy demand were being observed, we decided to focus our survey on the decarbonization of the electricity and transport sectors.

We first produced an extended version of the survey with a broader set of questions, including both multiple choice and open questions, all focused on national policies that can contribute to decarbonization. This first set of questions built on the emerging literature on the pandemic's potential impacts on climate policies and on past work surveying expert populations on climate policies. Second, we pre-tested our survey with a small sample of experts and researchers who provided feedback and comments on the questions, including information on the questions that they deemed more important. We then produced the final and shorter version of the survey, which included 33 questions and was estimated to take 7–10 min.

Survey data and descriptive statistics

We developed an online survey using the software Qualtrics, and we administered it to a selection of policymakers and stakeholders with

country-specific climate policy expertise. We collected a total of 223 complete responses. We collected 104 responses on OECD countries (OECD), 52 on Asian countries - excluding Middle East, Japan, Korea and Former Soviet Union countries (ASIA); and 49 on Latin America and Caribbean countries (LAM). In the main text we present results for these three regions (total N = 205). We also collected 9 responses on Former Soviet Union countries (REF), 3 responses on Middle East and African countries (MAF), and 6 on Balkan countries. Table A1 presents the number of responses per region and per country. Table A2 presents descriptive statistics on the type of organization respondents work for.

Results for the regions not included in the main analyses

As we were able to collect only 9 responses on Former Soviet Union countries (REF), 3 responses on Middle East and African countries (MAF), and 6 on Balkan countries, and these countries do not significantly contribute to global emissions, we do not present data on them in the main text. in Fig. A1 Fig. A2 we present key results for these three regions, focusing on expected emission trends, financial support for high-carbon energy and industry sectors, and public spending for climate mitigation.

Results on expectations on emission reduction policies in different sectors.

Table A1
Number of responses per region and per country.

OECD		ASIA		LAM	
Country	N	Country	N	Country	N
Australia	2	Afghanistan	1	Antigua and Barbuda	1
Austria	1	China	5	Argentina	1
Canada	6	India	23	Belize	1
Czech Republic	1	Indonesia	2	Brazil	23
European Union	20	Myanmar	1	Chile	2
France	4	Nepal	1	Colombia	1
Germany	10	Philippines	1	Costa Rica	1
Israel	1	Singapore	1	Dominica	1
Italy	3	Taiwan	1	Jamaica	1
Japan	21	Thailand	10	Mexico	13
Netherlands	3	Viet Nam	6	Panama	1
New Zealand	1			Peru	3
Norway	1				
Poland	1				
Portugal	1				
Slovakia	1				
South Korea	14				
Spain	1				
Sweden	1				
Switzerland	1				
Turkey	1				
United Kingdom	6				
United States of America	3				
Total	104		52		49
REF		MAF		BALKANS	
Country	N	Country	N	Country	N
Armenia	2	Lebanon	1	Albania	1
Russia	6	Malawi	1	Bosnia and Herzegovina	2
				Macedonia	2
Ukraine	1	South Africa	1	Serbia	1
Total	9		3		6

Table A2
Respondents' organization type.

Organization type	N
Government	83
International organization	22
Non-governmental organization	25
Private sector	18
Research or academic	61
Think tank	14
Total	223

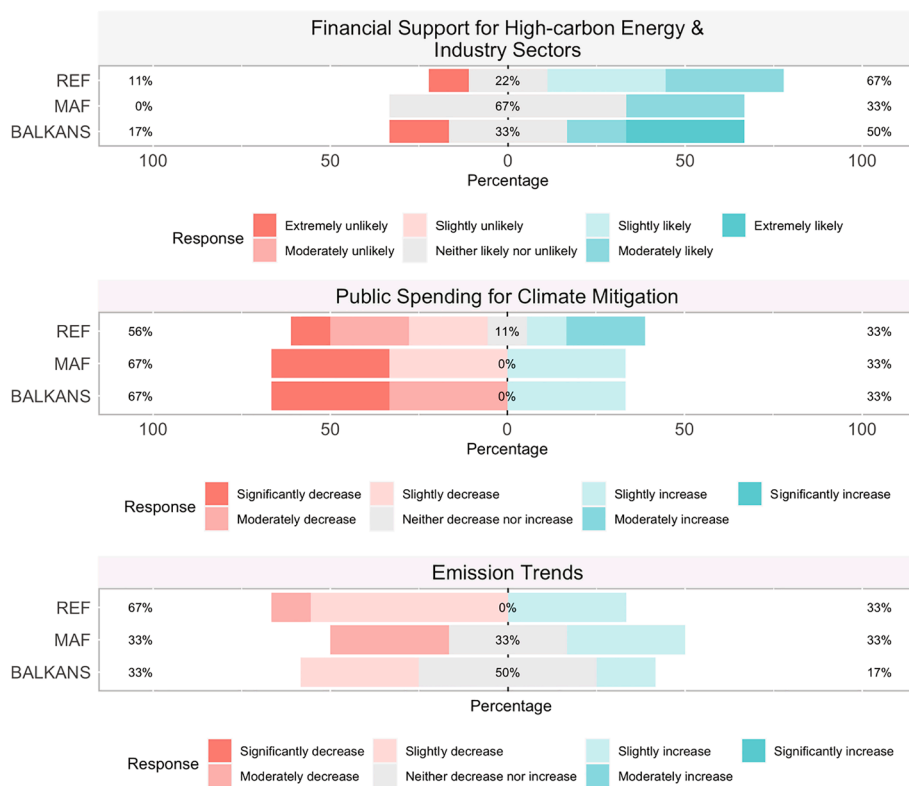


Fig. A1. Likert scale plot of the answers to the questions on expectations Financial Support for High-Carbon Energy and Industry Sectors, Public Spending for Climate Mitigation, and Emission Trends, in Former Soviet Union countries (REF), Middle East and African countries (MAF), and Balkan countries. Answers based on a 7-point Likert scale ranging from significantly unlikely to significantly likely for the first item and from significantly decrease to significantly increase for the last two items.

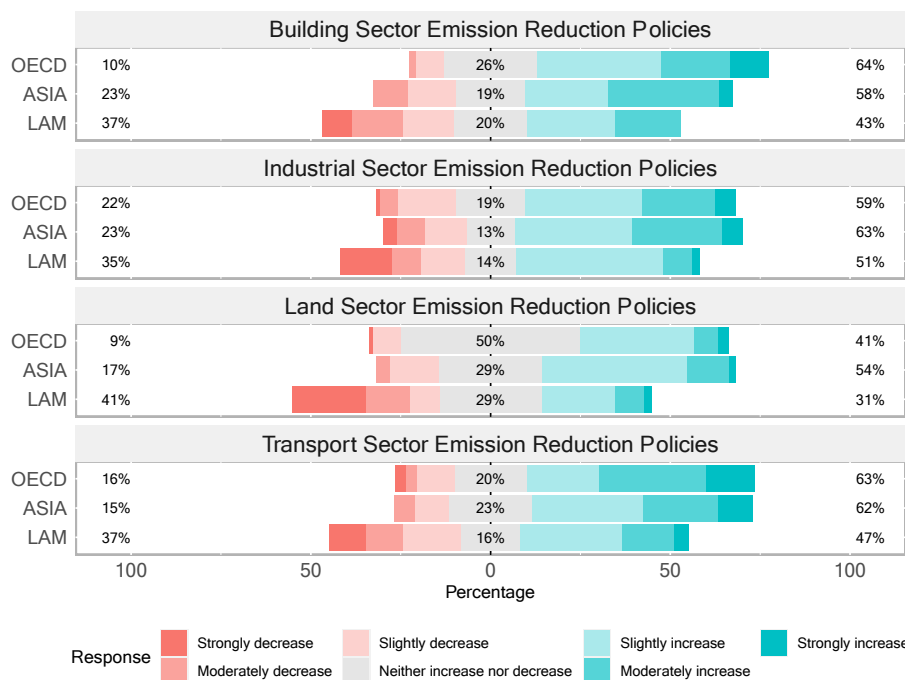


Fig. A2. Likert scale plot of the answers to the questions on expectations on Commitment to Policies to Reduce Emissions in the Building, Industrial, Land, and Transport sector in OECD, Asian and Latina American countries. Answers based on a 7-point Likert scale ranging from significantly decrease to significantly increase.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.erss.2021.102025>.

References

- [1] A. Bahmanyar, A. Estebansari, D. Ernst, The impact of different COVID-19 containment measures on electricity consumption in Europe, *Energy Res. Social Sci.* 68 (2020) 101683, <https://doi.org/10.1016/j.erss.2020.101683>.
- [2] C. Le Quéré, R.B. Jackson, M.W. Jones, A.J.P. Smith, S. Abernethy, R.M. Andrew, A.J. De-Gol, D.R. Willis, Y. Shan, J.G. Canadell, P. Friedlingstein, F. Creutzig, G. P. Peters, Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement, *Nat. Clim. Chang.* 10 (7) (2020) 647–653, <https://doi.org/10.1038/s41558-020-0797-x>.
- [3] P.M. Forster, H.I. Forster, M.J. Evans, M.J. Gidden, C.D. Jones, C.A. Keller, R. D. Lamboll, C.L. Quéré, J. Rogelj, D. Rosen, C.-F. Schleussner, T.B. Richardson, C. J. Smith, S.T. Turnock, Current and future global climate impacts resulting from COVID-19, *Nat. Clim. Chang.* 10 (10) (2020) 913–919, <https://doi.org/10.1038/s41558-020-0883-0>.
- [4] Z. Liu, P. Ciais, Z. Deng, R. Lei, S.J. Davis, S. Feng, B.o. Zheng, D. Cui, X. Dou, B. Zhu, R. Guo, P. Ke, T. Sun, C. Lu, P. He, Y. Wang, X.u. Yue, Y. Wang, Y. Lei, H. Zhou, Z. Cai, Y. Wu, R. Guo, T. Han, J. Xue, O. Boucher, E. Boucher, F. Chevallier, K. Tanaka, Y. Wei, H. Zhong, C. Kang, N. Zhang, B. Chen, F. Xi, M. Liu, F.-M. Bréon, Y. Lu, Q. Zhang, D. Guan, P. Gong, D.M. Kammen, K. He, H. J. Schellnhuber, Near-real-time monitoring of global CO₂ emissions reveals the effects of the COVID-19 pandemic, *Nat. Commun.* 11 (1) (2020), <https://doi.org/10.1038/s41467-020-18922-7>.
- [5] M. Andrijevic, C.-F. Schleussner, M.J. Gidden, D.L. McCollum, J. Rogelj, COVID-19 recovery funds dwarf clean energy investment needs, *Science* 370 (6514) (2020) 298–300, <https://doi.org/10.1126/science.abc9697>.
- [6] B.K. Sovacool, D. Furszyfer Del Rio, S. Griffiths, Contextualizing the Covid-19 pandemic for a carbon-constrained world: Insights for sustainability transitions, energy justice, and research methodology, *Energy Res. Social Sci.* 68 (2020) 101701, <https://doi.org/10.1016/j.erss.2020.101701>.
- [7] G.C. Unruh, Understanding carbon lock-in, *Energy Policy* 28 (12) (2000) 817–830, [https://doi.org/10.1016/S0301-4215\(00\)00070-7](https://doi.org/10.1016/S0301-4215(00)00070-7).
- [8] F.W. Geels, The impact of the financial–economic crisis on sustainability transitions: Financial investment, governance and public discourse, *Environ. Innovat. Soc. Trans.* 6 (2013) 67–95, <https://doi.org/10.1016/j.eist.2012.11.004>.
- [9] W. Kanda, P. Kivimaa, What opportunities could the COVID-19 outbreak offer for sustainability transitions research on electricity and mobility? *Energy Res. Social Sci.* 68 (2020) 101666, <https://doi.org/10.1016/j.erss.2020.101666>.
- [10] Y. Shan, J. Ou, D. Wang, Z. Zeng, S. Zhang, D. Guan, K. Hubacek, Impacts of COVID-19 and fiscal stimuli on global emissions and the Paris Agreement, *Nat. Clim. Chang.* 11 (3) (2021) 200–206, <https://doi.org/10.1038/s41558-020-00977-5>.
- [11] Bloomberg NEF, “New Energy Outlook 2019,” 2020. Accessed: Oct. 19, 2020. [Online]. Available: <https://about.bnef.com/new-energy-outlook/>.
- [12] S.M.S.U. Eskander, S. Fankhauser, Reduction in greenhouse gas emissions from national climate legislation, *Nat. Clim. Chang.* 10 (8) (2020) 750–756, <https://doi.org/10.1038/s41558-020-0831-z>.
- [13] S. Pianta, M. R. Sisco, “A hot topic in hot times: how media coverage of climate change is affected by temperature abnormalities,” *Environ. Res. Lett.*, 2020, doi: 10.1088/1748-9326/abb732.
- [14] M.R. Sisco, S. Pianta, E.U. Weber, V. Bosetti, Global climate strikes sharply raise attention to climate change: Analysis of climate search behavior in 46 countries, *Pap. Rev.* (2020).
- [15] C. Hepburn, B. O’Callaghan, N. Stern, J. Stiglitz, and D. Zenghelis, “Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?,” *Oxf. Rev. Econ. Policy*, vol. 36, 2020.
- [16] Vivideconomics, “Greenness of Stimulus Index,” 2020. [Online]. Available: https://www.vivideconomics.com/wp-content/uploads/2020/10/201028-GSI-report_October-release.pdf.
- [17] “Perspectives on the Economics of the Environment in the Shadow of Coronavirus,” *Environ. Resour. Econ.*, vol. 76, no. 4, pp. 447–517, Aug. 2020, doi: 10.1007/s10640-020-00493-2.
- [18] K. Benoit, M. Laver, Estimating party policy positions: Comparing expert surveys and hand-coded content analysis, *Electoral Studies* 26 (1) (2007) 90–107, <https://doi.org/10.1016/j.electstud.2006.04.008>.
- [19] K. Ingold, M. Fischer, Drivers of collaboration to mitigate climate change: An illustration of Swiss climate policy over 15 years, *Global Environ. Change* 24 (2014) 88–98, <https://doi.org/10.1016/j.gloenvcha.2013.11.021>.
- [20] K. Ingold, F. Varone, M. Kammerer, F. Metz, L. Kammermann, C. Strotz, Are responses to official consultations and stakeholder surveys reliable guides to policy actors’ positions? *policy polit* 48 (2) (2020) 193–222, <https://doi.org/10.1332/030557319X15613699478503>.
- [21] B.K. Sovacool, J. Axsen, S. Sorrell, Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design, *Energy Res. Social Sci.* 45 (2018) 12–42, <https://doi.org/10.1016/j.erss.2018.07.007>.
- [22] S. Schaub, F. Metz, Comparing Discourse and Policy Network Approaches: Evidence from Water Policy on Micropollutants, *Polit. Gov.* 8 (2) (Jun. 2020) 184–199, <https://doi.org/10.17645/pag.v8i2.2597>.
- [23] E. Verdolini, L.D. Anadón, E. Baker, V. Bosetti, L. Aleluia Reis, Future Prospects for Energy Technologies: Insights from Expert Elicitations, *Rev. Environ. Econ. Policy* 12 (1) (2018) 133–153, <https://doi.org/10.1093/reep/txe028>.
- [24] C. Kuzemko, M. Bradshaw, G. Bridge, A. Goldthau, J. Jewell, I. Overland, D. Scholten, T. Van de Graaf, K. Westphal, Covid-19 and the politics of sustainable energy transitions, *Energy Res. Social Sci.* 68 (2020) 101685, <https://doi.org/10.1016/j.erss.2020.101685>.
- [25] “Ipsos MORI Earth Day Results,” 2020. [Online]. Available: <https://www.ipsos.com/sites/default/files/ct/news/documents/2020-04/earth-day-2020-ipsos.pdf>.
- [26] Rocío Román-Collado, Any Viviana Morales-Carrión, Towards a sustainable growth in Latin America: A multiregional spatial decomposition analysis of the driving forces behind CO₂ emissions changes, *Energy Policy* 115 (2018) 273–280, <https://doi.org/10.1016/j.enpol.2018.01.019>.
- [27] “Bailout Tracker,” 2020. <https://www.transportenvironment.org/what-we-do/flying-and-climate-change/bailout-tracker> (accessed Feb. 11, 2020).
- [28] I. P. on C. C. IPCC, Global Warming of 1.5° C: An IPCC Special Report on the Impacts of Global Warming of 1.5° C Above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. Intergovernmental Panel on Climate Change, 2018.
- [29] P. D. Lund and J. Byrne, “Little time left to reverse emissions—Growing hope despite disappointing CO₂ trend,” *WIREs Energy Environ.*, vol. 9, no. 1, p. e369, 2020, doi: 10.1002/wene.369.
- [30] Weimiao Fan, Zheng Yan, Factors affecting response rates of the web survey: A systematic review, *Comput. Hum. Behav.* 26 (2) (2010) 132–139, <https://doi.org/10.1016/j.chb.2009.10.015>.