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# Understanding the effects of response measures on intergenerational equity, gender, local communities, indigenous peoples, youth and people in other vulnerable situations

Draft technical paper

## I. Background

1. The Conference of the Parties (COP) at its twenty-fifth session, the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) at its fifteenth session, and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) at its second session agreed on workplan of the forum on impacts of the implementation of response measure (the forum) and its Katowice Committee on the Impacts of the Implementation of Response Measures (KCI).

2. As per activity 9 of the workplan for the forum and its KCI[1], the KCI is to prepare a technical paper on identifying and assessing the impacts of the implementation of response measures taking into account intergenerational equity, gender considerations and the needs of local communities, indigenous peoples, youth and other people in vulnerable situations. KCI 8 considered version 3 of the draft technical paper and provided comments and guidance for improvement.

3. The open-ended working group led by the task lead, with the support of the secretariat, revised the draft technical paper in response to the comments received at KCI8.

## II. Scope of note

4. This background note provides in its annex the revised draft technical paper.

[1] Decision 4/CP.25, Decision 4/ CMP.15, Decision 4/CMA.2

# III. Expected action by the Katowice Committee on Impacts

5. The KCI will be invited to consider the revised draft technical paper with a view to finalise the technical paper

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## Annex

# Impacts of the implementation of response measures on intergenerational equity, gender, local communities, indigenous peoples, youth and people in other vulnerable situations

Draft technical paper, version 4

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**Executive Summary**

1. The reviewed studies and stakeholder inputs on impacts of response measures confirm that the effects of response measures can have amplified impacts on people in vulnerable situations, and show that the negative impacts of response measures exacerbate the vulnerabilities of people in vulnerable situation by further exacerbating inequalities, for example, across generations and genders.
2. There are limited studies on quantifying and assessing the economic and social impacts of response measures on people in vulnerable situations including coverage of women, the poor and indigenous people. The literature examined in this paper reveals that where this research exists it mainly focusses on policy making process and participation, is largely adaptation-centric, that is, emphasizing these groups' vulnerability and capacity to adapt.
3. The NDC Synthesis Report from 2021[2] notes that gender and youth related activities are most common in NDCs followed by the role of local communities and indigenous peoples.
4. The main messages from the existing literature and stakeholder impacts and co-benefits of the implementation of response measures on people in vulnerable situations can be summarized as following
    a. People in vulnerable situations are often marginalised in the process of planning and implementing response measures.
    b. Women are generally more negatively impacted by mitigation policies than men when the impacts of these policies are erroneously viewed by policymakers as gender neutral Women can reap positive impacts, for example, from mitigation policies that reduce their domestic burden and fuel gathering activities, but negative impacts from policies that give them unequal land tenure rights or marginalise them in participation of workforce.
    c. Local communities and Indigenous Peoples can be most impacted by mitigation measures, such as renewable energy and forestry projects that affect their land rights. and result in environmental degradation and possible displacement and loss of land. Positive impacts include socioeconomic and energy access benefits.
    d. The youth is the group that is likely to be one of the most impacted in the future by both climate change and implementation of response measures.
    e. The elderly and children are currently in many cases the most impacted by climate change, especially by increased heat and pollution from burning fossil fuels. Climate policies, for example involving energy transition and energy efficiency, can improve air quality and in-door temperature.
    f. Disabled people are almost absent from the assessments of impacts of response measures on people in vulnerable situations. Climate policies that, for example increase electrification and automation, can reduce risks for the disabled and improve energy and transportion accessibility as well as reduce climate change impacts on health .
    g. The poor feature in various studies of impacts of response , possibly because also the impacts of climate change fall to a large extent on them. Positive impacts include improved energy access, and negative impacts include exacerbation of poverty, losses of job and in well-being , especially among rural households.
5. In order to reduce the impacts of the implementation of response measures on vulnerable communicates and people, it requires active engagement of people in vulnerable situations throughout the design and execution of climate policies. To optimize the outcome, it is crucial to employ targeted strategies that minimize the negative effects and maximise the positive impacts onthem..
6. There is an urgent need for further research for measuring impacts of response measures on the people in vulnerable situations, Stakeholder engagement at the national level and wider engagement are necessary to better understand the impacts of response measures on vulnerable peoples. Where quantitative data are missing, it should be based on qualitative analysis such as primary research based on direct input and engagement from the vulnerable groups based on their experiences and knowledge.

## I. Introduction

[2] FCCC/PA/CMA/2021/8/Rev.1, see Annex I.

1. Assessing and analysing the impacts of the implementation of response measures is one of the four work areas of the response measures forum and its KCI. The technical paper contributes to the KCI 6-year workplan, activity number 9 (UNFCCC, 2020) by providing information about identifying and assessing the impacts of the implementation of response measures taking into account intergenerational equity, gender considerations and the needs of local communities, Indigenous Peoples, youth and other people in vulnerable situations. This technical paper is prepared in accordance with the strategy and agreed outline for the technical paper set out in Annex VI of the Fifth Meeting of the KCI.

## II. Objective

2. The objective of the paper is to identify and assess the impacts of the implementation of response measures taking into account intergenerational equity, gender considerations and the needs of local communities, Indigenous Peoples, youth and other people in vulnerable situations. It considers a selected set of mitigation policies consistent with 2°C pathways for holding the increase in the global average temperature to well below 2°C above pre-industrial levels, and with 1.5°C pathways to limit the temperature increase to 1.5°C above pre-industrial levels, taking into consideration intergenerational equity, gender considerations, local communities, Indigenous Peoples, youth, and other people in vulnerable situations. The paper includes a brief summary of studies that include concrete cases on people in vulnerable situations (including assessment methods used and description of possible socioeconomic impacts), references to relevant work in previous KCI technical papers and inputs received from stakeholders, and process and reasons of selecting particular policies and measures.
3. The approach of this technical paper includes:
    (a) Identifying impacts of response measures through examining existing generic and case-specific qualitative and quantitative literature on effects of various selected policies consistent with 2°C pathways and 1.5°C pathways based on existing literature that is publicly available;
    (b) Identifying methodologies used in existing research to assess impacts of response measures, where relevant;
    (c) Reviewing inputs from the stakeholders and experts (including relevant UNFCCC constituencies and Constituted Bodies) to identify description of policies or measure consistent with 2°C pathways and 1.5°C pathways and to identify socioeconomic impacts of implementing strategies on different countries or groups identified through different forms of engagement;
    (d) Inferring, where relevant and appropriate, effects and impacts on people in vulnerable situations from effects on a larger (sub)sets of the population which include them; and
    (e) Reflecting comments from KCI Members and observers during the KCI Sixth Meeting.

## III. Background

### A. Context

4. Achieving the long-term temperature goal of the Paris Agreement requires reaching global peaking of greenhouse gas (GHG) emissions as soon as possible, followed by a rapid reduction in net GHG, most notably anthropogenic carbon dioxide (CO2), emissions, reaching net zero early 2050s (IPCC, 2022).
5. Achieving climate change targets requires enhanced ambition and effective implementation of GHG mitigation policies and actions (IPCC, 2022; UNFCCC, 2022). Response measures are understood as policies, actions, and measures taken in response to climate change, such as mitigation policies and actions, taken by Parties to the UNFCCC, the Kyoto Protocol and the Paris Agreement. Under the Convention, the term “response measure” is usually associated with social, economic and environmental impacts of implementing climate change mitigation policies. Such impacts can be direct and/or indirect, intended and/or unintended, short, medium and/or long term. They can occur in the implementing and/or in other countries, also known as cross-border impacts (KCI, 2021a). The various potential inequality impacts of selected climate change mitigation policies are summarized in Markkanen & Anger-Kraavi (2019), emphasizing outcomes on health, wealth/income, gender, and ethnic equalities. Additional details on response measures and on analysis of the impacts of their implementation are found in Technical Paper KCI/2021/5/4 (KCI, 2021a). Additional details on tools and methodologies for modelling and assessing these impacts are found in Technical Paper KCI/2021/5/5 (KCI, 2021b).

6. The nature and scale of the potential negative and positive impacts arising from the implementation of response measures vary across and between regions and countries but can be particularly pronounced for developing countries (UNFCCC, 2008; KCI, 2021a). Further, there is recognition that "[t]he risk of negative outcomes is greater in contexts characterized by high levels of poverty, corruption and economic and social inequalities, and where limited action is taken to identify and mitigate potentially adverse side-effects" (Markkanen & Anger-Kraavi, 2019), implying that the effects of response measures are more amplified in people in vulnerable situations. Climate change raises serious problems of justice between current and future generations in general, as well as current and future generations within people in vulnerable situations specifically (Government of Ghana, 2022). Vulnerability to climate change appears most likely to negatively affect poor people, particularly women, and to widen existing inequalities, both at the socioeconomic and energy access levels. Widening inequality in energy access has severe negative implications, because energy poverty remains a critical challenge facing a large subsection of people in vulnerable situations (notably women, children, elderly, and the poor), with over 770 million people living without access to electricity, mostly in Africa and Asia (IEA, 2020) and around 2.6 billion people lack access to clean cooking fuel (WHO, 2022).
7. To that end, it is important to identify the impacts of response measures on people in vulnerable situations, as these impacts, both direct and indirect, can exacerbate their vulnerability; and as alleviating the negative ones requires the implementation of targeted measures commensurate with the specific impacts.
8. The impacts of climate change on people in vulnerable situations are well documented in the literature on social science, and the examination of impacts of climate change mitigation is growing rapidly (IPCC, 2018, 2022; ILO, 2022b). Nevertheless, compared to the general population, there is limited research on quantifying the social and economic impacts of response measures on people in vulnerable situations who are subject of this paper—namely women, local communities, Indigenous Peoples, youth, other people in vulnerable situations including the elderly, disabled, and poor. Further, and as far as can be established, among existing research on impacts of response measures on people in vulnerable situations, there are more assessments concerning women and the poor than any other category of people in vulnerable situations. As climate change mitigation policies are particularly concerned with balancing environmental protection with economic efficiency (Schuppert, 2011), the largest body of existing qualitative and quantitative studies on effects of response measures tends to more generic, examining country-wide economic impacts or effects on households.
9. Climate change has implications for intergenerational equity because its effects are temporally delayed, and, similarly, climate change mitigation policies have implications for intergenerational equity (Aldy et al., 2016; Liu et al., 2016; Vrontisi et al., 2018; IPCC, 2022b). Intergenerational equity is an important element in the literature on impacts of response measures given the widening disparity in which benefits and burdens of climate change are and will be distributed among present and future generations (Page, 1999; Yang & Suh, 2021). It has been established in the literature that effects of and attitudes towards climate change vary intergenerationally. Such disparity reflects the fact that more than half of the world's current populations are from older generations, while climate change effects will be felt most likely by the youth and children of today who will be elderly by mid-century and beyond. It is important to examine intergenerational implications of response measures as they impact people's incomes, energy access, and well-being, which in turn affects their behaviours and consumption patterns, welfare, health, political actions, and climate engagement (Albrecht et al., 2007; Clayton et al., 2015; Fritze et al., 2008; IPCC, 2022b). In the literature addressing impacts of these policies on the youth and elderly, there is a general focus on risk of job losses and livelihoods.
10. The rapid rise of youth climate mobilizations across the globe has succeeded in framing global climate inaction and inertia as a problem and in framing climate change in the perspective of justice and intergenerational equity (Han & Ahn, 2020). While the youth has taken various actions to combat climate change, they have constrained power due to limited effective participation in climate change governance and policymaking (UNDP, 2015; Sanson et al., 2019; Han & Ahn, 2020).
11. Women and girls can be vulnerable because, for example, they face high rates of child marriage, domestic violence, sexual violence, human trafficking, labour displacement— vulnerabilities that climate change can aggravate at social, economic and cultural levels (Osman-Elasha, 2020; CBCGDF, 2022; IPCC, 2022b).
12. At the intersection between gender and climate change policy, gender equality is mainly addressed through the Gender Justice lens (Wilson & Chu, 2020)., However, research on mitigation policies is "preoccupied with techno-economic transformations" that are perceived to be gender neutral (Michael et al., 2020).

a. A study examining impacts on women economic empowerment shows that including superficially gender issues in green economy perspectives perpetuates gender differences and inequality among climate policymakers (Wilson & Chu, 2020).
b. There is also a growing consensus that impacts of climate change and non-inclusive climate action have gendered effects and exacerbate gender inequalities in the workplace. These effects consequently harm women, who are the agents of change in building a just transition that can promote inclusive opportunities in a low-carbon economy (ILO, 2022b).
c. In qualitative assessments, there is evidence that climate change action that uses a gender lens to inform analysis and priorities can create rapid improvements in gender equality and women's empowerment, and that better climate and environmental outcomes can be achieved through addressing gender-specific barriers and enablers to women's empowerment and decent work (WOW, 2021, Di Persio, 2019).

13. Indigenous Peoples and local communities are connected to nature and possess deep traditional knowledge and historical practices that contribute to the protection of biodiversity and natural resources and that to the design of better climate change mitigation and adaptation policies (Bonilla-Moheno & García-Frapolli, 2012; Larsen, 2016; Iocca & Fidélis, 2021; IPCC, 2022b).. Only a residual number of research on climate change considers traditional communities, and that there is an uneven distribution of case studies across different regions (Iocca & Fidélis, 2021).
14. Studies tend to focus more on these communities' vulnerability to climate change and on how traditional practices can inform policy and practice, rather than on the impacts of response measures on them. Engaging with these communities is critical for the protection of traditional communities from climate change impacts and for the integration of their knowledge into resilient policymaking (Iocca & Fidélis, 2021; IPCC, 2022a, 2022b). Reducing negative effects of mitigation policies requires increased involvement of Indigenous Peoples and local communities as they can play a leading role in the global response to climate change, especially indigenous women who play a vital role as stewards of natural resources (UN Permanent Forum on Indigenous Issues Seventh session, 2008).
15. Other groups of people in vulnerable situations namely the elderly, disabled, and poor are also largely affected by climate change and the effects of climate measures. Among studies on impacts of response measures on those identified as people in vulnerable situations, the poor are more represented than the other groups (examples available in KCI/2021/5/5), possibly because the largest share of climate impacts would fall on the poor (Muttitt & Kartha, 2020).
16. There is objection to accelerated mitigation policies that cause risk of job losses, increased inequality and gender inequality, diminish competitiveness, or have negative impacts on people in vulnerable situations as well as on vested interests (IPCC, 2022). In response, across all groups of people in vulnerable situations, there is evidence from the literature that there is increased climate activism among the people in vulnerable situations—especially the youth, women, leaders of local communities and Indigenous Peoples—to influence response measures and exert political influence (Claeys & Delgado Pugley, 2017; Grady-Benson & Sarathy, 2016; Helferty & Clarke, 2009; IPCC, 2022). These efforts contribute to raising awareness, strengthening climate leadership in many countries, changing broad social norms by raising knowledge of Indigenous governance systems which supported sustainable lifeways over thousands of years (Temper et al., 2020; IPCC, 2022b). In the context of climate policy making, there is a need for aligning the targets of NDCs with the needs for peoples in vulnerable situations, such as through the NDC Support Program which aims to harness gender equality during the NDC development and implementation process (UNDP, n.d.). As a large part of response measures and supporting just transition policies are implemented through the private sector, businesses are an important vehicle in implementing climate change mitigation as well as in the transmission of impacts, both positive and negative, on people in vulnerable situations. The UN Guiding Principles on Business and Human Rights that can give some guidance here was unanimously endorsed in 2011.[3]
17. In some cases where there no specific literature on impacts of response measures on people in vulnerable situations was identified, this paper infers, to the extent possible, the effects on them with reference to studies on

[3] The UN Guiding Principles on Business and Human Rights : UN Guiding Principles Reporting Framework (ungpreporting.org)

impacts of response measures on larger groups that include them. Such inference is possible if the people in vulnerable situations are included in the labour market, sectoral employments, gender, or larger populations.

18. Although people in vulnerable situations are impacted by both adaptation and mitigation policies to climate change, this paper focuses mainly on examining impacts of mitigation policies on people in vulnerable situations given limited data on impacts of adaptation policies on them.

## B. Definitions

19. **Gender equity**: Equity between women and men with regard to their rights, resources and opportunities. In the case of climate change, gender equity recognises that women are often more vulnerable to the impacts of climate change and may be disadvantaged in the process and outcomes of climate policy (IPCC, 2022b).
20. **Intergenerational equity**: Intergenerational equity articulates the concept of fairness amongst all generations in the use and conservation of the environment and its natural resources. In the context of climate change, it acknowledges that the effects of past and present emissions, vulnerabilities and policies impose costs and benefits for people in the future and of different age groups (IPCC, 2022b). The UNFCCC embeds intergenerational equity as a founding principle within the international climate change regime (Venn, 2019), framed as the need to "protect the climate system for the benefit of present and future generations of humankind" (UNFCCC, 1992, Article 3), which is further reinforced by the inclusion of sustainable development as a core principle within the UNFCCC framework and the Paris Agreement Preamble.
21. **Local communities**: There is no universally accepted definition for local communities, and they are at times defined in conjunction with Indigenous Peoples as vital custodians of the world's remaining natural landscapes (ICCA Consortium, 2020). More specifically, local communities represent a heterogenous group of people living in the same country, have a common interest or passion and include communities that hold collective knowledge, and whose livelihoods are tightly connected to a common ecosystem or a natural resources (Athaydea et al., 2021). They might or might not have formal recognition of specific rights over their lands, territories, and cultural identity.
22. **Indigenous Peoples**: Indigenous Peoples are inheritors and practitioners of unique cultures and ways of relating to people and the environment. They have retained social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live. Despite their cultural differences, Indigenous Peoples from around the world share common problems related to the protection of their rights as distinct people (UN, n.d.a). They are usually rights holders with special rights formally recognized under some jurisdictions' constitutions or other laws. The Indigenous Peoples' rights are protected under of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP, 2007).
23. **Youth**: There is no universally agreed international definition of the youth age group (UN, n.d.b); however, youth is best understood as a period of transition from the dependence of childhood to adulthood's independence. The UN defines youth as those persons between the ages of 15 and 24 years, as was endorsed by the General Assembly in Resolution 36/28 of 1981 (UN, n.d.b).
24. **People in vulnerable situations**: Groups and communities that have adversely been affected by climate hazards and having limited ability to recover by themselves. This definition would include vulnerable groups and communities that have severely been affected by droughts, floods, coastal inundation, and extreme temperatures (UNFCCC, 2018). According to a resource guide by the State of California (2018) for public agencies, there are various indicators used in vulnerability assessment tools under each of the following factors: existing inequities, institutionalized racism, or exclusion; physical states or conditions that increase vulnerability; poor environmental conditions, access to services, or living conditions; and lack of investment and opportunities. The guide further sets an additional set of indicators for analysing and defining vulnerable communities, including demographics, housing security, mobility, health services, environmental hazards, business/jobs, available public and private utilities, social services, governance, community, fiscal health, culture, and geography (which may include arid or semi-arid lands, mountain regions, or remote areas).
25. **Groups of people in vulnerable situations.** For purposes of this paper, people in vulnerable situations denote the collective set of the groups on whom the impact of response measures is examined in this paper, namely

women, local communities, Indigenous Peoples, and other people in vulnerable situations. For purposes of this paper, other people in vulnerable situations are the following

a. **Elderly people**: There is no one universally accepted definition for elderly people. Traditionally, the UN (2019), policymakers and researchers have most commonly used measures and indicators of population ageing that are mostly or entirely based on people's chronological age, defining older persons as those aged 60 or 65 years or over (UN, 2019).
b. **Disabled people**: Disabled people are persons with disability**.** According to the UN Convention of the Rights of Persons with Disabilities (UNCRPD, 2006), persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.
c. **Poor people**: While definitions vary across states and within countries, it is generally acceptable that poor peoples are members of groups, populations, households, or countries that suffer poverty. The UN Administrative Committee on Coordination defines, fundamentally, poverty as a denial of choices and opportunities, a violation of human dignity (UNACC, 1998), and means the following. It means lack of basic capacity to participate effectively in society. Poverty means not having enough to feed and clothe a family, not having a school or clinic to go to, not having the land on which to grow one's food or a job to earn one's living, not having access to credit. Poverty also means insecurity, powerlessness and exclusion of individuals, households and communities. It also means susceptibility to violence, and often implies living on marginal or fragile environments, without access to clean water or sanitation (UNACC, 1998). For purposes of this paper, unless otherwise specified, poor refers to low-income groups.

## IV. Selected policies and their impacts

26. Achieving the long-term temperature goal of the Paris Agreement requires the implementation of mitigation policies and response measures that help reduce and limit GHG emissions over the next decades to reach net zero by 2050. Policies consistent with 2°C pathways refer to pathways of policies and technologies that can reduce and limit GHG emissions to a level sufficient for holding the increase in the global average temperature to well below 2°C above pre-industrial levels. Policies consistent with 1.5°C pathways refer to those that can help reduce emissions to a sufficient level to pursue to limit the increase in the global temperature to 1.5°C above pre-industrial levels by 2050. Lower GHG emissions in 2030 can lead to a higher chance of keeping peak warming to 1.5°C (IPCC, 2022a; IPCC, 2022b). Measures consistent with 2°C and 1.5°C pathways include economic and fiscal instruments (such as taxes and subsidies), regulation, , research and development of technologies, government provision of public goods or services, and nature-based solutions including forestry (IPCC, 2022b; Government of Ghana, 2022) (see IPCC (2022b) for a detailed list of policies).
27. In assessing the literature on impacts of response measures on people in vulnerable situations, this paper selects the following response measures as key policies consistent with the 2°C and 1.5°C pathways:
    a. General emissions reductions policies, such as carbon trading and energy efficiency;
    b. Phasing down of coal and the removal of inefficient fossil fuel subsidies;
    c. The adoption of renewable energy;
    d. Increasing forestry.
28. The following sections describe each of the above policies and summarize their impacts on the people in vulnerable situations. Table 1 provides a summary of the impacts on each identified category of people in vulnerable situations as detailed in the following section.

### A. Emissions reduction policies

29. Within the wide range of emissions reduction policies, this technical paper selects as the first policy option the imposition of carbon taxes, or carbon prices generated as a result of the emissions cap associated with introduction of carbon trading scheme. It is selected because economic frameworks have generally accepted that carbon pricing (based on economic principles which extend to other GHG emissions) is the most cost-effective way to reduce emissions, notwithstanding various market failures which could limit its effectiveness (Stern, 2015). Subsequently, the paper covers impacts of other emissions reduction policies..

30. Carbon taxes along with fossil fuel taxes are more prevalent among developed countries. (IPCC, 2022b). The implementation of carbon taxes on countries based on the emissions of products they produce does not account for where these products are consumed. Thus, it exacerbates inequalities among nations and their "carbon equity"– a concept proposed by the CBCGDF denoting people's equal carbon emission rights (CBCGDF, 2022).
31. Cap-and-trade schemes, carbon taxes, and personal ecological space quotas are shown to not be compatible with principles of intra- and intergenerational justice (Schuppert, 2011). This result suggests that existing proposals for the distribution of emission rights and climate change-related costs need to be supported by additional evidence for intergenerational justice.
32. Carbon pricing and taxes can have direct negative socioeconomic impacts on the poor and may exacerbate socioeconomic pressures on poorer households (Jakob et al., 2014 Maestre-Andrés et al., 2019). As carbon pricing may be regressive and perceived as additional costs by both households and industries, it could increase household energy expenses, especially for the poor which, in turn, reduce policy acceptability (Martinez & Viegas, 2017; McDonald et al., 2020; IPCC, 2022b), and would render green infrastructure investments politically unfeasible (Copland, 2020; Douenne & Fabre, 2020).
33. These distributional effects can be addressed by combining redistribution of revenues with support for low carbon innovation. Therefore, carbon pricing policies could receive higher acceptance if they explicitly reflect fairness and distributive consideration in revenue distribution. To that end, it is important to couple the implementation of carbon taxes with other fiscal instruments (such as the reduction of other taxes) to compensate people in vulnerable situations for the resulting negative impacts (IPCC, 2022b)
34. Beyond the aforementioned impacts on intergenerational equity and the poor, there are limited studies that quantifying effects of carbon pricing and carbon markets on the other groups of people in vulnerable situations. Therefore, this paper summarizes other studies that quantify household, economic, labour, or welfare effects of carbon-related policies in populations general. Given that, by definition, general populations include people in vulnerable situations, the results of these studies imply the expected minimum impacts on people in vulnerable situations, given that the impact on the latter is expected to be amplified by their vulnerabilities (per paragraph 6). Examples of the key literature on general populations follow.
    a. A study quantifying the gains/costs and welfare implications of a 2°C pathways climate scenario with emissions trading in India and China finds that negative economic impacts of international climate policy are generally larger in China than in India, (Johansson et al., 2015).
    b. A study of the cross-border impacts of the implementation of carbon pricing response measures (namely a carbon tax, an energy input tax, and a quantity restriction instrument) on Senegal and Kenya uses a global CGE model that is soft-linked to a single-country CGE model. It finds that impacts depend greatly on the type of response measure implemented, with more muted effects under a carbon tax (McDonald et al., 2020). Impacts on rural households are likely to be greater than in their urban counterparts because the latter are systematically poorer. These results suggest an important conclusion that the cross-border effects of people in vulnerable situations vary depending on whether they form part of poorer households.
    c. Another study on different options for transferring carbon taxes revenue in India, using a general equilibrium assessment, finds that welfare effects of an international climate regime vary by different household type and are affected by international price repercussions (Weitzel et al., 2015).
35. The implementation of carbon taxes or carbon trading mechanisms can result in unmeasured or inaccurately measured impacts on the industries employing people in vulnerable situations (Shehabi et al, 2021). This result is due to existing variations and regional and/or in-country inconsistencies in measuring carbon emissions per industry or product and, therefore, by country and per capita (ibid.). These inconsistencies can unintentionally exacerbate existing inequalities and negative effects of carbon reduction policies on people in vulnerable situations.
36. As part of mitigating this problem, CBCGDF (2022) proposes the use of alternative methods of calculating emissions and apportioning corresponding responsibility to all nations based on their emissions through tracking each person's consumed carbon emissions.
37. Women, as other people in vulnerable situations, are negatively impacted by some mitigation policies, so various programs can be implemented to minimise negative gender impacts. Examples include programs specifically targeting underdeveloped areas with abundant carbon emissions, such as the Chinese Rural Revitalization program (CBCGD, 2022). Another example is the introduction of various indicators to measure and raise women's participation in skilled and management positions to a given level (15%) (Bonsucro Production

Standard, 2022). Such indicators promote gender inclusion in management and skilled positions in Mill and Agriculture operations and offer community-based women's empowerment training and recruitment operations. Women, as well as racialised and marginalised groups, largely benefit from policies that increase their political access and participation which, in turn, increase their climate action and render climate mitigation policies more effective (IPCC, 2022b).

38. A positive correlation exists between the effective climate change policy and gender equality as well as between effective climate policy and the participation of Indigenous Peoples and women in decision making (IPCC, 2022b). Indigenous Peoples and women have, in general, lower carbon-footprints than other groups, and their increased participation can increase their influence on grassroots change (IPCC, 2022b).
39. Mitigation measures generally are shown to result in a disparity in the economic impacts (costs and benefits) across generations (Yang & Suh, 2021). The elderly generally experiences a net reduction in lifetime gross domestic product per capita, while youth will gain net benefits from climate change mitigation in most lower (lower-middle- and low-) income countries (Yang & Suh, 2021). By contrast, in many higher income countries, none of the age cohorts enjoys net benefits. The rise of the youth in climate movements across the World cannot be explained by economic self-interests in the short-term, although the youth benefit from climate change mitigation in the long-term.
40. Carbon sequestration and GHG emission reduction options have both co-benefits and risks pertaining to biodiversity and ecosystem conservation, food and water security, wood supply, livelihoods and land tenure and land-use rights of local communities, Indigenous Peoples, as well as small landowners (IPCC, 2022b). To increase carbon and economic equality and to minimise negative effects of response measures, projects like the UN-REDD (Reducing Emissions from Deforestation and Forest Degradation) can aid in carbon data collection systems to identify and minimise effects on Indigenous Peoples and local communities (CBCGDF, 2022).
41. Other emissions-reducing mitigation policies include bottom-up industrial initiatives, such as building clean cookstoves with clay construction techniques to reduce solid fuel use. These clean cookstoves reduce firewood toxic fumes by 75%, improving the health and livelihood of women (Women Engage for a Common Future, 2022; IPCC, 2022b) and children (IPCC, 2022b). Such positive health improvements are likely to extend to other categories of people in vulnerable situations, especially the youth, children, elderly, and disabled. Beyond the health improvements, clean cookstoves also allow women and children to spend less time collecting firewood and cooking, thus increasing time available for rest, communication, education, and other productive activities (IPCC, 2022b), and empowering women to engage in local advocacy, gain technical skills, and join income generating activities (Women Engage for a Common Future, 2022; IPCC, 2022b).
42. Energy efficiency measures, especially in buildings, have positive effects on the elderly through alleviating energy poverty as well as reducing fuel consumption and, therefore, associated financial stress. Many elderly live in fuel poverty, especially in cold and damp houses, they suffer various health effects including excess winter mortality, increased morbidity rates (due to respiratory, cardiovascular, and arthritic and rheumatic diseases) (Camprubí et al., 2016; Lacroix & Chaton, 2015; Ormandy & Ezratty, 2016; Payne & Weatherall, 2015; Thema et al., 2017). Further, economic pressures associated with high energy bills exacerbate negative mental health outcomes, and high temperatures especially during summer can also be dangerous for those living in buildings with inadequate thermal insulation and inappropriate ventilation (Ormandy & Ezratty, 2016; Sanchez-Guevara et al., 2019; Thomson et al., 2019). As such, by reducing energy expenditures and increasing productive time for women and children, sufficiency and efficiency measures lead to poverty reduction especially in developing countries (IPCC, 2022b). They also improve health conditions for the elderly through reducing effects to high temperature and improved indoor temperatures and comfort (IPCC, 2022b).
43. Downsizing dwelling through cohousing strategies is another policy which gives mitigation benefits along with positive impacts on the elderly and intergenerational equity (IPCC, 2022b). In contrast to typical residential developments, cohousing communities are purposefully created to foster and promote multi-generational living arrangements. It helps elderly individuals to overcome range of housing obstacles, which include concerns related to housing supply, access, cost, stability, and social isolation. Simultaneously, these policies facilitate the establishment of senior cooperative housing and eco-villages by repurposing both existing and new buildings into multifamily structures instead of single-family dwellings, integrating shared spaces such as communal areas for laundry, dining, and various other purposes. These strategies reduce demand for materials in constructions and

energy demand for heating (IPCC, 2022b), and can encourage inter-generational cohousing and interactions among people of different backgrounds (Lietaert, 2010; IPCC, 2022b).

44. Mitigation policies relating to urban planning, infrastructure, transport, and the automation of vehicles have positive effects on the disabled as well as the elderly. There is increased pressure to engage disabled individuals in the consultation and decision-making process of urban governance to create a more inclusive and effective urban development that avoids negative impacts on the disabled (Colenbrander et al., 2019; IPCC, 2022b). Improving the transport sector and road accessibility will enhance the welfare of disabled users by offering them a more inclusive, affordable, safe, and clean passenger and freight mobility (IPCC, 2022b). The automation of vehicles to become driverless could improve vehicle efficiency and reduce congestion and, consequently, emissions (Massar et al., 2021; Vahidi & Sciarretta, 2018), which could increase travel demand for the elderly (Harper et al., 2016) and make transit for the disabled and elderly more accessible and less risky (Auld et al., 2017; Sonnleitner et al., 2021). Similarly, pro-climate physical infrastructure designed to reduce carbon emissions and facilitate low-carbon mobility and energy can have positive impacts on children by making low-carbon mobility such as walking and cycling safer for them (IPCC, 2022b).
45. Increasing electrification can support and reduce costs of key elements of human development, such as education, health, and employment (IPCC, 2022b), which will largely affect women, the youth, and children. For example, increasing electrification offers greater access to irrigation opportunities for agricultural communities which in turn increases their incomes (Peters & Sievert, 2016). Coordinated electrification policies can improve enrolment for all forms of education (Kumar & Rauniyar 2018; López- González, et al. 2020) including for children through reducing time they spend on biomass collection and expanding time available for schooling (Khandker, et al. 2014).
46. Demand-side mitigation measures, such as energy efficiency, can also have multiple interacting and positive benefits on the poor (IPCC, 2022a; IPCC, 2022b). Improving energy services to meet energy and other needs can provide the poor and citizens of less-developed countries much needed access to safe and low-emissions energy sources necessary for decent living, as well as increase energy savings from service improvements by 20-25% (IPCC, 2022b).
47. Minimising impacts of response measures on people in vulnerable situations requires, first, incorporating actions on gender and people in vulnerable situations to enhance their resilience into climate actions and NDCs and to create national gender-responsive climate action (Government of Ghana, 2022; ILO, 2022b), and second, incorporating just transition concepts into climate policies and/or NDCs for their implementation (Climate Strategies, 2022). A just transition is key in minimising impacts of mitigation measures on people in vulnerable situations and can reduce occupational gender stereotypes that prevent women from benefiting from the economy (ILO, 2022b). A report from the ILO (2022b) that includes inputs from stakeholders finds that there is a significant risk that without a just transition, it will not be possible to achieve a low-carbon, environmentally sustainable economies with decent work and social justice. These goals are essential to the wellbeing of current and future generations as well as gender equality and inclusiveness in the workplace (ILO, 2022b).
48. Such incorporation actions on gender and just transition policies is a key to ensuring a well-planned and equitable just transition aligned with a country's development frameworks and priorities and the Paris Agreement and addressing key effects on vulnerable groups (Climate Strategies, 2022; Government of Ghana, 2022). Just transition policies need to also be accompanied by skills development and social protection policies to ensure women's safety and well-being as well as provide adequate conditions for women's engagement in the labour market (ILO, 2022b).
49. Some efforts have been implemented, to increase stakeholder engagement with government officials and different social groups such as gender, local communities and Indigenous Peoples, to aid in mainstreaming these groups into climate actions (ILO, 2022b; Climate Strategies, 2022; Government of Ghana, 2022; World Bank, 2022; Women Engage for a Common Future, 2022). Efforts also include specified programs of actions expected to build the resilience of nationals, the majority of whom are the youth and women, while reducing GHG emissions and creating jobs, as well as targeted training to various institutions to better understand the social and employment implications of climate policies and the NDCs (Government of Ghana, 2022).
50. As businesses are the engine for job creating and the channel by which any mitigation measures are implemented, governments can develop industrial, sectoral, enterprise development and rights at work policies as channels within the just transition framework to facilitate optimal business environment that is consistent with the UN

Guiding Principles on Business and Human Rights (UN OHCHR, 2012), ensure decent work and quality jobs that encompass healthy working conditions, and offer equal opportunity and treatment (OHCHR, 2022; ILO, 2022b). Just transition policies need to be based on statistical information grounded in international statistical standards and include information on vulnerability, including but not limited to gender, disability, age, and others (ILO, 2022b).

## B. Phasedown of coal and the removal of inefficient fossil fuel subsidies

51. The phasing down of coal and the removal of inefficient fossil fuels subsidies are key response measures but poses challenges for public policy due to social and economic consequences. The fossil fuel industry offers business and rent-seeking opportunities along its value chain such as mining/ extraction, transport, distribution, and power generation. Closing or repurposing of mines and plants cause major economic and social impacts in the region as these areas are closely tied to these industries, impacting local identity and economy. Coal phase down or fossil fuel subsidies removal policies demand careful planning for worker and community impacts, as well as land repurposing, engagement from multiple government sectors and local businesses. Subsidies on fossil fuels are used in both developed and developing countries. Despite the commitment to Paris Agreement and continuous urge to phase down of coal, use of coal remains attractive for most of the economies, especially for fast growing economies, due to its contribution to economic growth, energy-system stability, and low electricity costs for consumers (Michael Jakob, Jan C. Steckel 2022).[4] Scenario is not different on subsidies for other fossil fuels as well. A study showed that if a subsidy on coal is reduced too quickly, it have consequences on sectoral and macroeconomic structures with minimal impact on GDP and CO2 emissions, as domestic coal is expected to be replaced with imports (Heinz Welsch, 1998)[5].
52. Fossil fuel subsidies are most commonly prevalent in developing countries, implemented for socioeconomic and development purposes to increase energy access and reduce energy poverty by reducing the cost of energy inputs, or as rent distributive mechanisms in countries that rely heavily on rents from fossil fuel exports (Shehabi, 2017). Fossil fuel subsidies incentivise increased use of fossil fuels, and they are regressive benefiting the rich more than the poor, distortionary, and inefficient (Lockwood, 2015). Nonetheless, they also provide access to modern energy sources to the poor (Kimemia & Annegarn, 2016).
53. . The impacts of climate change and low carbon transition are experienced differently by different countries and social actors and vary across mitigation options (Sovacool, 2021). Within the social actors, indigenous communities face multiple threats and are subjected to unequal power dynamics (Sovacool, 2021) because the energy transition is dominated by interests of fossil fuel producers and investors who belong to powerful groups or companies that could be vocal if their interests are at risk (Lazarus & van Asselt, 2018). This reality implies that people in vulnerable situations, especially indigenous communities who are subject to unequal power relations, are at risk in the transition process. Social equality is thus at the heart of the transition process in general and in fossil fuel dependent economies in particular (IPCC, 2022b).
54. Within this context, studies on impacts on women are limited. Women and migrants tend to be over-represented in indirect or supportive roles to the energy sector, including lower-paid and unpaid services and care work. As such, they often do not access worker compensation and re-training policies that are proposed to mitigate negative effects of coal phaseout and fossil fuel subsidy reform (Bacchiocchi et al., 2022; Piggot et al., 2019).
55. Like other general energy transition projects, the phasing out of coal will cause job losses for those working in the coal sectors, rendering the expansion of jobs and support for the transition to low-carbon energy a key priority (IPCC, 2022b).
56. As far as can be established, there are no studies that measure directly impacts of phasing out of coal and inefficient fossil fuel subsidies on intergenerational equity, the youth, the elderly, and the disabled. Effects on their health are inferred from studies on general populations. For example, the phasing out of fossil fuels is likely to improve air quality and reduce emissions (IPCC, 2022a; IPCC, 2022b), which will improve health conditions of the people in vulnerable situations, especially those dealing with respiratory illnesses often common among the elderly and children.

[4] https://www.taylorfrancis.com/books/oa-edit/10.4324/9781003044543/political-economy-coal-michael-jakob-jan-steckel

[5] https://www.sciencedirect.com/science/article/abs/pii/S0140988397000182

57. A study on impacts of phasing out coal plants focusing on labour and economy-wide effects in general shows that phasing out of coal-powered plants in Chile would result in significative negative impact on the overall labour market, including the progressive disappearance of 4 thousand jobs in coal power plants by 2030 or 2050 (depending on the scenario), but that such effects are not significant when compared to Chile's labour markets and GDP (Vogt-Schilb & Feng, 2019).
58. The phasing out of coal and other fossil fuels and of their subsidies raises questions pertaining to climate justice. Poor households and poor people in vulnerable situations tend to allocate a larger share of their incomes to energy and to basic needs. Coal can also be a more affordable energy source than renewable energy. Implementing these response measures will have a larger impact on the livelihoods of poorer, guest workers, and vulnerable populations (Shehabi, 2017; Timperley, 2021; Zimmer et al, 2021; KCI, 2021b, IPCC, 2022b) and, therefore, exacerbate their vulnerability. Therefore, a transition must respect and uphold the rights of groups harmed by the loss of affordable (and/or subsidized) coal and fossil fuels, including consumers and workers in extractive industries (Muttitt & Kartha, 2020).
59. Negative impacts of eliminating fossil fuel subsidies can be alleviated if a subsidy reduction is accompanied with income transfers aimed at poor households or domestic production of petroleum products (Siddig et al., 2014; Vogt-Schilb et al., 2019). A study on options for mitigating adverse effects using a general equilibrium model suggests that removing subsidies on fossil fuels would create opportunities if done in tandem with complementary policies, such as agricultural productivity improvement and a reduction in trade transaction costs (Wesseh & Lin, 2017). Cash transfer programs which have been implemented in almost all countries (Beegle et al. 2018) are found central to the success of energy subsidy reforms (Rentschler & Bazilian, 2017).
60. In addition to mitigating climate change, the introduction of biofuels coupled with a careful selection of bioenergy feedstocks can also reduce negative impacts of response measures on people in vulnerable situations, especially those facing the risk of hunger (FAO, WFP, WHO, & UNICEF, 2017). Managing tradeoffs from balancing bioenergy demands with food and biodiversity, and with competition for land and water, will require targeted policies that stimulate changes in food systems in ways that reduce food poverty (Henry et al., 2018; Xu et al., 2019). Such ways include agricultural intensification, open trade, less consumption of animal-products, reduced food losses, advanced biotechnologies (Henry et al., 2018; Xu et al., 2019).
61. In summary, examining the literature related to the phasedown of coal and the removal of inefficient fossil fuel subsidies shows these studies tend to focus on general populations or effects on poor households. Studies examining in-country effects focus largely on impacts on household income, livelihoods, and job losses, and poverty and, to a lesser degree, women. The scope of these studies reveals a gap in assessments on impacts of response measures on people in vulnerable situations.

## C. Renewable energy

62. The implementation of renewable energy technologies (e.g. solar (photovoltaic or concentrating solar power), wind, hydropower, but also from geothermal and biomass) is an integral component of mitigation policies consistent with 2°C and 1.5°C pathways (KCI, 2021a; IPCC, 2022b; ILO, 2022a). The energy transition away from fossil fuels has accelerated by the rapid rise in adopting renewable energy technology over the past decade partly due to the reduction of their production costs to levels competitive with those of fossil fuels in many jurisdictions (IPCC, 2022b). Models on future emissions pathways show the net-zero emissions target cannot be achieved without integrating renewable energy solutions along with other solutions (such as energy storage, energy efficiency, and others) (IEA, 2021; IPCC, 2022b). As such, international and local policymakers attempt to accelerate the transition to renewable energy through policies such as increasing renewable energy investments, implementing subsidies towards green jobs (re)training programmes; improving energy technology standards and emission regulations; and others (ILO, 2022a).
63. Expanding renewable energy can be a critical solution for reducing energy poverty and access to energy in various countries. Further, implementing renewable energy technologies as well as subsidies that encourage their production and adoption can result in various positive social and economic impacts, such as boosting jobs in the renewable energy sector and green jobs (OECD, 2011; ILO, 2022a; IPCC, 2022b), increasing imports of renewable energy products (if imported), reducing electricity blackouts (KCI, 2022a), improved health, energy

independence, innovation and technological advancements in the clean energy sector. The application of a robust renewable energy sector can diversify economies that are heavily reliant on fossil fuels, reducing vulnerability to commodity price fluctuationsNevertheless, the higher initial capital expenses associated with renewable energy sources, despite the significant cost reductions, remain a drawback due to economic and political considerations.

64. Simultaneously, the expansion of renewables has negative effects. Hydroelectric power plants can have significant environmental impacts, particularly on local ecosystems and aquatic habitats due to dam construction and alteration of water flow such as habitat alteration, displacement of communities, and changes in water availability downstream, which can have economic repercussions on agriculture, fisheries, and other water-dependent industries. They also cause job losses in the industries they replace (KCI, 2022a), the displacement of communities out of land used for renewable energy production, and gender inequality (IRENA, 2019). Expanding renewables through hydropower and ground-based solar parks can cause dam-induced displacement (Kirchherr et al., 2019) and enclosure of lands designated as degraded, displacing pastoral use by communities in vulnerable situations (Yenneti et al., 2016). These impacts constitute forms of spatial injustice (Yenneti et al., 2016). Similar, though recognised environment friendly, large-scale installation of solar photovoltaics may also result in habitat disruption, land degradation, agricultural land loss, changes in land use, environmental pollution from toxic materials, and stress on local water resources in arid regions.
65. Strategic and integrative spatial planning is thus required to ensure that land use for renewable energy does not displace households in vulnerable situations and address trade offs between using land for renewable energy and food production. Examples of such strategic special planning solutions include co-locating agriculture with solar photovoltaics (Barron-Gafford et al., 2019) or with wind power (Miller & Keith 2018a) and integrating renewable energy with mobility and housing (Hurlbert et al., 2019).
66. In developing countries, various studies show that access to renewable energy sources, such as small-scale biofuel production, can aid Indigenous Peoples and other remote rural populations in securing greater energy security and higher standards of living standards, thereby reducing regional economic inequalities and even ethnic conflict (such Bhattacharyya, 2013; Gomez et al., 2015; da Silveira Bezerra et al., 2017; Renewable Energy Policy Network for the 21st Century, 2017).
67. Renewable energy transitions in rural and impoverished locations can simultaneously reinforce and disrupt local power structures and inequalities (IPCC, 2022b), directly impacting local communities and Indigenous Peoples. Indigenous Peoples are often marginalised in development decisions on renewable energy because the burdens and risks placed on them are not properly integrated in the those decisions, while risk assessments fail to differentiate the burdens and risks of different groups, thereby reinforcing existing power imbalances (Healy et al. 2019; Kojola 2019).
68. The expansion of large-scale renewable energy projects (including wind and marine) can harm Indigenous Peoples and local communities because these projects are land intensive and often require access to tribal land. Also because these projects lack consultation in the set-up process (from planning to implementation stages) including on effects of women; and engage complex legal frameworks surrounding stakeholder consultation and involvement, tribal autonomy, and self-determination (Unger, 2009; Bacchiocchi et al., 2022; Kerr et al., 2015; QUNO-AIDA-GI ESCR-FWCC, 2022) that are complex for many members of local communities and Indigenous Peoples.
69. In a statement by the UN OHCHR (2017), indigenous communities whose lands are often used for these projects have no possibility to actively share their concerns or be heard in formal processes and often have not given their free, prior, and informed consent to the construction of projects on their lands (OHCHR, 2017; QUNO-AIDA-GI ESCR-FWCC, 2022). There are also findings that indigenous concerns are being co-opted or side-lined through formal and legal decision-making processes (Bacchiocchi et al., 2022), indicating that the formal consultation processes for assessing mitigation policies can fail to meet standards of energy justice by inadvertently giving outsize voice to lesser impacted communities because of the lack of "inclusive" processes and decision making.
70. Expanding large-scale renewable projects can also hurt women as they tend to have highly unequal land tenure rights and are commonly marginalized from processes of negotiation, consultation and compensation between project developers and local communities (GI-ESCR, 2020; QUNO-AIDA-GI ESCR-FWCC, 2022).
71. The expansion of off-grid, small-scale, decentralized, and community-based energy models can also enable households, and individuals to collectively meet their local energy needs at lower emissions levels while encouraging democratic control of new renewable energy systems. A study of impacts of small-scale solar power

deployment from a gender-lens shows significant socioeconomic benefits resulting from improving access to renewable energy (Gray et al. 2019). Off-grid small-scale renewable energy also empowers women through lifting their domestic care burden and providing them leadership opportunities to learn how to install, use, and repair off-grid energy solutions (QUNO-AIDA-GI ESCR-FWCC, 2022).

72. Relating to impacts on women and gender equality, a study by IRENA (2019) estimates that the number of jobs in renewables could increase from 10.3 million in 2017 to nearly 29 million by 2050. Engaging women in consultation processes of renewable energy projects render them more prone to gain awareness, advocate for socioeconomic advancement (such as investments in schools, healthcare, and infrastructure) as part of compensation plans of large-scale development projects (QUNO-AIDA-GI ESCR-FWCC, 2022; IPCC, 2022b). Although the share of women in renewable energy labour (32%) is higher than their share in the total energy sector labour (22%), women might not occupy a substantial share of the new jobs in renewable energy because their participation in science, technology, engineering and mathematics (STEM) jobs is far lower than in administrative jobs (IRENA, 2021) and the new job opportunities will thus be male-dominated (QUNO-AIDA-GI ESCR-FWCC, 2022). Measures that ensure equitable access to new technologies (such as financial support through subsidies or microcredit for poorer households) benefit women and the general population by improving access to overall energy in remote communities (Markanen & Anger-Kraavi, 2019),
73. Communication with local and indigenous communities is important to evaluate positive socioeconomic impacts of energy transition on them while mitigating negative impacts of on-grid energy as an imposition on self-determination (Fitzgerald & Lovekin, 2018; Mercer et al., 2020). Primary energy system concerns relate to heat insecurity, and energy systems' dependence on external control, support, and imports. Privileging voices of indigenous community members enables the identification of community strengths associated with local energy systems while shifting focus to what issues considered most pressing energy-related challenges in their communities (Mercer et al., 2020, IPCC, 2022b). Opportunities for Indigenous inclusion reduce power imbalances between utilities and Indigenous power proponents caused by the lack of transparent information sharing and the utilities' authoritative advance (Fitzgerald & Lovekin, 2018). Motivations related to sustainable energy projects among some indigenous communities are linked to autonomy and self-determination and exerting sovereignty (Hasegawa et al., 2018; Jaffar, 2015).
74. Renewable energy technology is likely to reduce health risks of the elderly (IPCC, 2022b), particularly in buildings. The implementation of renewable energy-based electrification of the energy system reduces outdoor air pollution, improves indoor air quality through reducing smoke from heating and cooking (Kjellstrom & McMichael, 2013).
75. At a general level, it is likely that the expansion of renewable energy can increase energy access in energy-poor areas. At the same time, it can increase poverty in countries that depend on fossil fuel subsidies (Shehabi, 2022), for the following reasons.

76. Energy poverty is defined as the inability to attain a socially and materially necessitated level of domestic energy services[6]. This is caused by the interplay of three main factors, namely (a) no access (a) low affordability (low incomes and high energy prices); (b) high energy need (due to inefficient housing).
77. Energy poverty has been studied across EU and consider adequate levels of domestic energy services, such as space heating and cooling, water heating, lighting, cooking, usage of home appliances, and even ICT usage, are considered as essential for guaranteeing a decent standard of living for the citizens[7] Unlike in the EU, energy poverty studies in Asia and Africa have been limited in terms of availability, quality and quantity.
78. About 770 million people worldwide still live without access to electricity, mostly in developing countries in Africa and in Asia.[8] Energy poverty can be also a problem in developed countries, for example energy poor citizens in EU varies between 50 and 125 million people.[9]

[6] https://www.sciencedirect.com/science/article/abs/pii/S0378778818324307

[7] See 'What is energy poverty?' in Ref. [2] (https://www.energypoverty.eu/about/what-energy-poverty).

[8] https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity

[9] https://www.tandfonline.com/doi/full/10.1080/15567249.2020.1756689

79. Energy access issues are traditionally considered as the problem associated with access to fossil fuels , particularly where there is a lack of infrastructural development. A new form of energy access issue is now emerging in the case of low-carbon energy transition: access to low-carbon energy and low carbon systems or technology.[10],[11]
80. Addressing energy poverty and climate change is critical specially to achieve SDG 7 — ensuring access to affordable, reliable, sustainable and modern energy for all. However, the relationship between energy access and climate actions is often overlooked in policy and practice. It is also important foreffective implementation of NDCs.[12] According to IRENA, to reach the sustainable development goal (SDG7) of 100% energy access by 2030, Africa would need to connect around 85 million people every year. Further, it is estimated that to address energy poverty in African countries, with increasing role of mini-grids, there is a need of about 210,000 mini-grids by 2030.[13]
81. It is estimated that in case of existing and planned climate policy measures are implemented (Stated Policy Scenario (STEP)), there will be about 670 million people remaining without access to electricity in 2030 and 2.1 billion without access to clean cooking.[14] IEA's landmark Net Zero Emissions by 2050 Scenario (NZE), charts a narrow but achievable roadmap to a 1.5 °C stabilisation in rising global temperatures and the achievement of other energy-related sustainable development goals.[15]
82. Emerging debates linked to energy poverty include good governance, citizens' agency, new energy services, and new threats from the energy transition. Elevated electricity prices create barriers for citizens, particularly low-income earners, in accessing affordable energy, consequently impacting their energy accessibility (United Nations, 2021)[16]. To mitigate this, nations have implemented redistributive measures, including energy poverty alleviation policies. In addition, there is also evidence that linked policies are helpful. For example, countries with a long tradition of addressing energy poverty, France and the UK integrate energy poverty to a greater extent in linked policies. Policy integration is reflected in EU efforts to include energy poverty in climate and energy policies.[17] Yet, studies suggest that these policies have limitations in their effectiveness, with countries in the EU still facing considerable rates of energy poverty, impacting anywhere from 5% to 40% of their populations (Belaïd, 2022)[18]. In contrast,in sub-Saharan African countries, energy access rates are the lowest globally, approximately 600 million individuals lack access to electricity, and about 890 million people rely on traditional fuels for cooking (IEA, 2018). It's crucial to consider the relationship between climate actions and energy affordability, especially for developing countries with limited resources and infrastructure. This emphasizes the need to integrate energy poverty themes like affordability and access into climate policies and strategies. Success in tackling climate change and energy poverty depends on factors like political will, international cooperation, institutional capacity, and financial resources. An integrated approach that considers various factors and stakeholders is essential to achieve both equity and climate goals (KAPSARC, 2023, Jessel et.al 2019)[19], [20].
83. There is also a debate that new technologies are not always properly designed to cover the required needs of the most vulnerable people. As energy demand increases with age[21,22], elderly people are likely to retain outdated and energy-inefficient home appliances because of their familiarity, even if they can afford to buy new and efficient

[10] https://www.sciencedirect.com/science/article/pii/S0305750X20302436?via%3Dihub
[11] https://www.sciencedirect.com/science/article/pii/S2214629620303492?via%3Dihub
[12] https://irena.org/publications/2021/Aug/Bracing-for-climate-impact-2021
[13] https://www.e3g.org/news/clean-energy-access-at-scale-an-action-plan-for-governments-and-development-finance-institutions/
[14] World Energy outlook, IEA 2021
[15] https://www.iea.org/reports/global-energy-and-climate-model/net-zero-emissions-by-2050-scenario-nze
[16] United Nations. (2021). Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.
[17] https://www.sciencedirect.com/science/article/abs/pii/S0301421522004025
[18] https://www.sciencedirect.com/science/article/pii/S2214629622002936
[19] https://www.kapsarc.org/research/publications/implications-of-climate-policy-on-energy-poverty/
[20] https://www.frontiersin.org/articles/10.3389/fpubh.2019.00357/full
[21] https://link.springer.com/article/10.1007/s42495-021-00069-y
[22] https://www.sciencedirect.com/science/article/pii/S2214629618309629

ones.[23] Thus, in addition to technological focus, there is also a need to promote human-centric transition.[24]. Further, if an affordability-based definition of energy poverty is applied, many climate policy proposalsrisk raising the number of energy poor if not accompanied with complementary measures. [25,26,27] Income-targeted revenue recycling schemes are necessary as the alternative climate policy designs, to benefit households in bringing them out of energy poverty.[28,29,30] . A study in Japan concluded that promoting the use of 'solar energy' among those households in energy poverty, regardless of their own capacity of solar deployment, could considerably help alleviate energy poverty, when policies are designed adequately.[31]

## D. Increasing forestry

84. Increasing forestry is a part of nature-based mitigation policies aimed at increasing forests to develop and preserve carbon sinks. These policies have become important solutions to the high rate of build-up of carbon dioxide in the atmosphere because land use, land-use change, and forestry (LULUCF) activities increase forests and trees which are natural carbon "sinks." They absorb atmospheric carbon dioxide from the atmosphere, then accumulate it as carbon in trees, vegetation, and soils in terrestrial ecosystems, then release oxygen into the atmosphere (UNFCCC, 2017; IPCC, 2022b). This carbon sequestration ability of forests has attracted much interest as a relatively inexpensive means of addressing climate change with immediate solutions. Policies to increase forestry include Reducing Emissions from Deforestation and Forest Degradation (REDD), Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+), and payments for ecosystem services (PES) schemes which promote biodiversity conservation in forests.
85. Although a very important and effective mitigation measure, forestry requires access to land often inhabited and/or used by populations, particularly local communities and Indigenous Peoples, especially women. The effects of forestry of these groups have been documented in existing literature and inputs from stakeholders, as follows.
86. At a general level, increasing forestry schemes such as REDD and REDD+ can exacerbate income inequalities and increase risks of conflict when their ensuing financial benefits are not equally distributed, property rights are not granted to selective local beneficiaries, and people in vulnerable situations or distant forest users[32] are not provided opportunities to engage in the decision making pertaining to these schemes (Khatun et al., 2015; Nhantumbo & Camargo, 2015; Bee, 2017; Duker et al., 2018; IPCC, 2022b).
87. Valuing, managing, and minimising these tradeoffs and maximizing synergies can be done through specific practices, such as increased involvement of local communities and Indigenous Peoples and through benefit sharing, as well as emphasizing capacity building, finance, governance, technology transfer, investments, and development and social equity considerations with meaningful participation of Indigenous Peoples and vulnerable populations (IPCC, 2022b).
88. Mitigation programs such as the UN-REDD and Agriculture, Forestry and Other Land Use (AFOLU) can respond to the needs and perspectives of multiple stakeholders to maximize co-benefits while limiting tradeoffs (IPCC, 2022b). Further, beyond reducing emissions, the regeneration of millions of trees through agroforestry systems has significant other positive impacts. It decreases erosion, provides animal fodder, recharges groundwater, generates nutrition and income benefits, thereby serving as safety nets for rural households in vulnerable situations during climate (or other) shocks (Bayala et al., 2014, 2015; Binam et al., 2015; Sinare & Gordon, 2015; Ilstedt et al., 2016). Ensuring co-benefits from land-based mitigation and other policies that reduce emissions from food systems requires greater planning and coordination among policymakers (IPCC, 2022b).

[23] Proceedings of the 35th Conference on Energy, Economy, and Environment, 292-, 2019
[24] https://www.frontiersin.org/articles/10.3389/frsc.2021.691236/full
[25] https://www.nature.com/articles/s41598-023-32705-2
[26] https://www.mdpi.com/1996-1073/13/13/3389
[27] https://www.mdpi.com/1996-1073/14/4/858
[28] https://www.nature.com/articles/s41598-023-32705-2
[29] https://www.tandfonline.com/doi/full/10.1080/13549839.2022.2104829
[30] https://www.sciencedirect.com/science/article/abs/pii/S0301421522004025
[31] https://www.sciencedirect.com/science/article/pii/S1364032121002963#fn1

[32] Distant foreign users are those whose participation may be constrained by informal rules, customary laws, social norms, and bias.

89. The effects on women of policies that promote increasing forestry feature in different studies. Women routinely experience discrimination and harmful outcomes in their use of land and natural resources and in gaining rights to them (World Bank, 2022). In some instances, building REDD+ strategy upon the operational framework of existing schemes and programmes (such as the Joint Forestry Management Program (JFM)) emphasizes compulsory representation of women yet lack recognition of gendered forms of injustices manifested in the way men and women access forest resources and participate in decision making processes (Michael et al., 2020). Field assessments for countering deforestation can contribute to local decisions on water technologies and develop a gender-responsive emergency preparedness program targeted at women (Women Engage for a Common Future, 2022).
90. The implementation of a waste recovery organic materials (such as cassava peelings and other household waste instead of firewood) to produce biogas contributes to reforestation and reduction in burn pollutions, thereby reducing respiratory and skin diseases for women and the elderly (NGO Africa Hope, 2022; IPCC, 2022b).
91. Afforestation or production of biomass crops, when poorly implemented, can result in negative socioeconomic and environmental impacts, and can harm local livelihoods and the rights of Indigenous Peoples if implemented at large scales and where land tenure is insecure (IPCC, 2022b).
92. Literature on REDD+ and increasing forestation and conservation suggests that there is little attention to the well-being of populations in rural and agricultural areas (Kongsager & Corbera, 2015), and that there are ensuing negative impacts on indigenous communities and indigenous women, as follows.
    a. Indigenous and/or local rural communities and indigenous women are found at risk of deprivation of rights (Larson et al., 2013). In many cases, authorities are being empowered to arrest and prosecute people for illegal logging and encroachment of land, and confiscate land and destroy crops (Larson et al., 2013). In countries examined in the available literature, forests are primarily public land and usually formally administered by the state, which increases potential risks of land grabbing by outsiders and loss of local user rights to forests and forest land for indigenous and local rural communities (Larson et al., 2013). Within the indigenous groups, women's voices are often marginalised due to a common tendency to view members of local communities undifferentiated (Larson et al., 2013; IPCC, 2022b). Failures to recognise gender differences connected to social structures of forest communities and forest resource distribution and uses result in greater hardships for women (Killian & Hyle, 2020; Larson et al., 2015).
    b. At a general level, initiatives for forest conservation can harm socioeconomic equality among different local communities and ethnicities, as the use of land can displace these communities' members and cause loss in their livelihoods (Bhattacharya et al., 2010; Jindal et al., 2012; Khatun et al., 2015; Robinson, Holland, & Naughton-Treves, 2014; Smith et al., 2014). Yet, these effects can be mitigated, and equality increased if communal land rights are formally acknowledged and the financial and other benefits from project participation exceed any negative impacts.
    c. Efforts to manage and increase forestry have prevented some Indigenous Peoples and local communities from carrying out traditional environmental management practices, including rotational agriculture and animal grazing, (Haenssgen et al., 2022). Some local regulations under forestry plans continue to deprive Indigenous Peoples of their rights by empowering authorities to confiscate their land and destroy their crops or even arrest and prosecute them for "illegal logging and encroachment of land" (UPR, 2016; Phongchiewboon et al., 2020).
    d. Policies to halt deforestation can force forest-dwelling communities and some Indigenous Peoples into a precarious existence, and undermined forest conservation goals (Henssgen et al., 2022). These impacts are due to misunderstanding Indigenous Peoples' land-tenure rights, governance autonomy, human dignity, material livelihood and cultural production (Henssgen et al., 2022). Policies of reforestation and conservation in South America, Asia and Africa have worked to legitimise state control of ancestral lands and interfere with local (often sustainable) forest management practices, thereby creating artificial pressures on land that accelerate deforestation and land degradation (Phongchiewboon et al., 2020).
    e. Some forestry and forest policies have been very successful in generating economic benefits, for example in Chile, but to the detriment of local and traditional communities (Reyes & Nelson, 2014). Creation of some exotic plantation or monocrop forests have had negative socioeconomic and environmental impacts on local communities and Indigenous Peoples, and consequently raised inequalities and conflicts at local levels (Reyes & Nelson, 2014).

93. The literature offers various ways in which negative impacts on local communities and Indigenous Peoples and women can be reduced. For example, the documentation of rights to land and the processes for titling or certifying rights should be accessible to men and women and should address specific barriers facing women in minority ethnic groups (World Bank, 2022c). Increasing indigenous women's access to land tenure rights allows women farmers to develop agroforestry activities while promoting ancestral knowledge, and empowers indigenous women by increasing their food security and incomes which promote gender equality (Women Engage for a Common Future, 2022). Institutionalizing payments on carbon sequestration and biodiversity conservation values of ecosystems services from global to local indigenous communities has been conceptualized as a 'win-win-win' for climate mitigation, the protection of biodiversity, and conserving indigenous culture (IPCC, 2022b). Such institutionalization occurred through the UNFCCC and UN-REDD focus on REDD+ and the UNEP program focusing on TEEB (a global initiative concerning the economics of ecosystems and biodiversity).
94. A study examining effects on youth and migration in the Global South shows that community forestry largely increases migration among the youth out of these areas (Brown, 2021). Those who remain are often highly dependent on forests for goods and services for their livelihood. As such, community forestry to be an effective strategy for sustainable forest management and livelihoods. However, youth have often been marginalised in benefiting from or participating in decision-making about community forests due to local, cultural, and traditional norms that give priority to older generations in decision-making (Brown, 2021).
95. Polices that expand urban forestry green infrastructure are likely to have positive health impacts on all people in vulnerable situations, especially the elderly. Forests and green infrastructure reduce heat stress (Kim & Coseo, 2018; IPCC, 2022b), and improve air quality by absorbing pollutants and sequestering carbon emissions (De la Sota et al., 2019; Scholz et al., 2018). In turn, these effects improve health conditions aggravated by climate change of people in vulnerable situations, particularly the elderly.

**Table 1: Examples of impacts of response measures on people in vulnerable situations and intergenerational equity and gender considerations (Arrows indicate positive or negative effects)**

| Policy or measure | Intergeneration equity | Women and gender | Local Communities & Indigenous Peoples | Youth | Elderly | Disabled | Poor |
|---|---|---|---|---|---|---|---|
| **Emissions reduction mitigation policies** | ↓ Carbon taxes exacerbate vulnerabilities and inequalities.<br>↓ Carbon taxes lead to higher welfare and socioeconomic losses in rural households than in urban counterparts. | | | | | | |
| | ↓ Increased disparity in the economic impacts (costs and benefits) across generations.<br><br>↑ Downsizing dwelling through cohousing projects improves intergenerational equity. | ↑ Building clean cookstoves empowers women as it frees them from collecting firewood and cooking and other domestic activities and enables their learning of technical skills and improves health. | ↓ Losses in land tenure and land-use rights and livelihood from these lands.<br><br>↓ Increases power imbalances. | ↑ Building clean cookstoves improves air quality and will have health benefits that extend to the youth.<br><br>↑ Downsizing dwelling through cohousing projects increases interactions of the youth with the elderly and peoples of other backgrounds. | ↑ Energy efficiency alleviates energy poverty, reduces fuel consumption and associated financial stress, improves health resulting from health and in-door pollution.<br><br>↑ Automation of vehicles reduces risk of travel and increases demand for travel. | ↑ Building clean cookstoves improves air quality and will have health benefits that extend to the elderly.<br><br>↑ Urban planning, transport infrastructure, and automation reduce risk of travel for disabled and increases their inclusion. | ↓ Exacerbates poverty.<br><br>↑ Urban planning, transport infrastructure, and automation reduce risk of travel and increases demand for travel. |
| **Phasedown of coal and removal of inefficient subsidies** | ↓ Decreases jobs and employments in fossil fuel industries.<br>↑ Increases jobs in renewable energy and green jobs.<br>↓ Social equality.<br>↓ reduced energy accessibility, affordability due to increased energy prices | | | | | | |
| | | | ↑ Small-scale biofuel production can aid in securing greater energy security, higher standards of living, reducing regional economic inequalities and ethnic conflict. | | | | ↓ Decreases socioeconomic welfare, raises prices of goods, reduces energy access, exacerbates inequality |
| | ↓Decreases jobs and employments in fossil fuel industries. | | | | | | |

| Policy or measure | Intergeneration equity | Women and gender | Local Communities & Indigenous Peoples | Youth | Elderly | Disabled | Poor |
|---|---|---|---|---|---|---|---|
| **Renewable energy** | ↓ Causes displacement of communities.<br>↑ Boosts jobs in renewable energy and green jobs.<br>↑ Increases imports of renewable energy which in turn, can have positive economic impacts.<br>↓ Habitat disruption, land degradation, agricultural land loss, changes in land use, environmental pollution from toxic materials, and stress on local water resources in arid regions due to large-scale solar photovoltaics<br>↑ Health benefits due to better air quality<br>↓ Reduced energy accessibility, affordability due to increased energy prices | | | | | | |
| | | ↑ Reduces domestic burden and empowers women in leadership and political opportunities.<br><br>↓ Large-scale renewable projects impact land tenure rights | ↓ Large-scale renewable impact land tenure rights if marginalised marginalized from decision processes.<br><br>↑ Some socioeconomic contributions such as employment, reliability, and community-resilience.<br><br>↑ Reduced environmental degradation and the risk of fuel spills affecting livelihoods. | | ↑ Renewable energy-based electrification reduces air pollution and quality and improves health. | ↑ Renewable energy-based electrification reduces air pollution and quality and improves health. | ↑ Off-grid, small-scale, decentralized, and community-based energy projects improve energy access and have significant socioeconomic benefits. |
| **Increasing forestry** | ↑ Improves health conditions, especially for the elderly.<br>↓ Forest conservation harms socioeconomic equality among different local communities and ethnicities and the use of land displaces communities and causes loss in their livelihoods.<br>↑ Reduces poverty and welfare losses in countries that depend on exports of fossil fuels. | | | | | | |
| | | ↑ Engagement in the consultation process offers socioeconomic advancements. | ↓ Land losses<br>↓ Not engaged in the consultation process.<br><br>↓ Unbalanced power<br>↑ Engagement in the consultation process | ↑/↓ Increases migration among the youth.<br><br>↓Socioeconomic impacts, especially if | | | |

| Policy or measure | Intergeneration equity | Women and gender | Local Communities & Indigenous Peoples | Youth | Elderly | Disabled | Poor |
|---|---|---|---|---|---|---|---|
| | | | reduce power imbalances and utilities authoritative advances | implemented at large scales and where land tenure is insecure. | | | |

## V. Conclusions

97. This technical paper reiterates previous conclusions of KCI technical papers on the impacts of response measures, recognising the importance of evaluating both the positive and negative socioeconomic impacts of climate change response measures on people in vulnerable situations.
98. There is relatively limited research on assessing and quantifying the social and economic impacts of response measures on people in vulnerable situations. Where the literature exists, there is more focus on policy making processes and participation rather than on assessing impacts of the implementation of existing policies on people in vulnerable situations. There is also a dearth in the literature that examines impacts of pro-climate actions of enterprises and business on people in vulnerable situations.
99. In the literature reviewed there is an evident variation and unequal coverage across and within the groups of people in vulnerable situations. The literature that engages with social identities, like gender and other identities of people in vulnerable situations, is largely adaptation-centric, with limited focus on mitigation. The reviewed literature can be summarized as follows.
    a. Across all selected mitigation policies and for all identified groups of people in vulnerable situations, there are various positive as well as negative impacts and co-benefits of the implementation of response measures on them, yet there is general agreement in the literature that response measures exacerbate these groups' vulnerability.
    b. People in vulnerable situations are consistently marginalised from the process of planning and implementing response measures.
    c. Among the groups of people in vulnerable situations identified, women and the poor are groups most examined in assessments of response measures.
    d. Climate change mitigation policies have implications for intergenerational equity, and attitudes towards them vary intergenerationally as well. For example, carbon-related mitigation policies—such as cap-and-trade schemes, carbon taxes, and personal ecological space quotas—are shown to be incompatible with principles of intra- and intergenerational justice. Another example is that policies that support downsizing dwellings through cohousing strategies can improve intergenerational equity.
    e. Women are generally more negatively impacted by mitigation policies than men when the impacts of these policies are erroneously viewed by policymakers as gender neutral, because that results in ignoring negative impacts on women and therefore exacerbating them. Response measures that require land use, such as the expansion of renewable energy, negatively impact women as they tend to have highly unequal land tenure rights and are commonly marginalized from decision making processes. Energy transition policies that generate new job opportunities disproportionately benefit more men than women, given that women are less represented in these industries or hold low paid or unpaid work. By contrast, women reap empowerment and socioeconomic benefits from energy transition policies that reduce their domestic burden and fuel gathering activities, as implementing these policies enables them to participate in revenue-generating activities and increase their power and political participation. Just transition policies are necessary to reduce occupational gender stereotypes, especially in the emerging green economy, and to ensure women can benefit from the created new jobs.
    f. Local communities and Indigenous Peoples are also examined in the context of impacts of mitigation measures that affect usage and rights of their land, such as for renewable energy projects and forestry. There can be a imbalance of power in the policies impacting local communities and Indigenous Peoples, which renders their needs often ignored or represented by individuals who are not members of their communities. They can reap some socioeconomic benefits from mitigation policies that expand energy access and security but also suffer environmental degradation and possible displacement and loss of land. Indigenous knowledge can play a critical role in the success of response measures implementation.
    g. The youth is the group that will be most impacted in the future by both climate change and implementation of response measures. The rapid rise of youth climate mobilizations globally has succeeded in showing global climate inaction as a problem change framed in the perspective of justice and intergenerational equity. Yet the youth remain marginalised from participating in decision-making pertaining to mitigation policies.

h. The elderly and children are currently the most impacted by climate change, especially by increased heat and pollution. Mitigation policies involving energy transition and energy efficiency can improve air quality and in-door pollutions, thereby improving climate-related health condition affecting the elderly and children.

i. Disabled people are almost absent from the assessments of impacts of response measures on people in vulnerable situations or larger populations. Mitigation policies that increase electrification and automation can reduce risks for the disabled and improve energy and transport accessibility as well as health conditions.

j. The poor feature in various studies of impacts of response measures on them, possibly because the largest impacts of climate change would fall on them. The implementation of response measures such as carbon taxes, phasing out of coal and reduction of fossil fuel subsidies can affect poor households and particularly rural ones (which tend to be poorer than their urban counterparts), by raising energy and non-energy prices and exacerbating their poverty and welfare losses. Labour working in those industries will also be negatively affected through job and welfare losses, although some would benefit from retraining and opportunities in new clean energy sectors.

100. Two common themes emerge in the studies and inputs from stakeholders reviewed in this technical paper. First, that stakeholder engagement at the national level and wider engagement are necessary to better understand the impacts of response measures on vulnerable peoples. Second, that the effectiveness of implementation of response measures requires engaging people in vulnerable situations throughout the design and execution of climate policies. For optimal results, focused strategies, informed by both pre- and post-assessment of policies, that minimize negative effects and maximize positive impacts are crucial .

101. The analysis and conclusions of this technical paper point to an urgent need for further research for measuring potential and actual impacts of response measures on the people in vulnerable situations, for incorporating the ensuing research results in the design of response measures, and for designing policies that reduce negative impacts of response measures on people in vulnerable situations.

102. Response measures need to be framed, understood, and implemented from a lens that prioritises concepts of gender justice and equality, intergenerational equity, energy democracy, energy affordability and energy poverty, as well as the rights of local communities and Indigenous Peoples and of the youth, elderly, and disabled.

103. As data on people in vulnerable situations are not always readily available in economic and labour force data, the research needs to also include qualitative analysis as well as primary research based on direct input and engagement from the vulnerable groups on their experiences and knowledge.

104. The private sector can also be a channel for such meaningful engagement and for creating jobs that benefit people in vulnerable situations, government policies on enterprise and business development play a critical role in successful climate action These policies can support businesses to implement mitigation policies in a manner that extends meaningful engagement to actions that minimise the negative and maximise the positive impacts of these measures on people in vulnerable situations.

105. Although gender, educational activities related to youth and the role of indigenous peoples are included into a number of NDCs the other groups in vulnerable groups still need attention while updating NDCs.

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## Annex I. Relevant information in the NDC synthesis report (FCCC/PA/CMA/2021/8/Rev.1), dated 25 October 2021

** The synthesis report synthesizes information from the 165 latest available NDCs recorded in the interim NDC registry as at 12 October 2021. Paragraphs 20-23 are relevant for this Technical Paper*

20. Many Parties referred to formal arrangements in place for **domestic stakeholder consultation**. Most of them indicated that they conducted consultations and engagement in an inclusive and participatory manner, with some Parties specifically referencing **gender sensitive consultations**.

21. **Parties are increasingly recognizing gender integration as a means to enhance the ambition and effectiveness of their climate action**. Most Parties provided information related to gender in their NDCs and many affirmed that they will take gender into account in implementing them. 10 Of the Parties that referenced gender in their previous NDCs, most elaborated more on the topic in their new or updated NDCs. Some included information on how gender had been or was planned to be mainstreamed in NDC implementation.

22. Some Parties described the role of **local communities and the role, situation and rights of indigenous peoples** in the context of their NDCs, describing the specific vulnerabilities of indigenous peoples that are particular to their circumstances, the importance of drawing on indigenous and local knowledge to strengthen climate efforts, and arrangements to enable greater participation in and contributions to climate action by indigenous peoples.

23. Almost all Parties provided information on using one or more **ACE elements to promote implementation of mitigation and adaptation activities**, and in their new or updated NDCs Parties generally communicated more clearly and in more detail on general principles, past achievements, future commitments, and needs and gaps in relation to ACE.

*(ACE denotes work under Article 12 of the Paris Agreement; its objective is to empower all members of society to engage in climate action through **education, training, public awareness, public participation, public access to information, and international cooperation** on these issues (the six ACE elements).)*