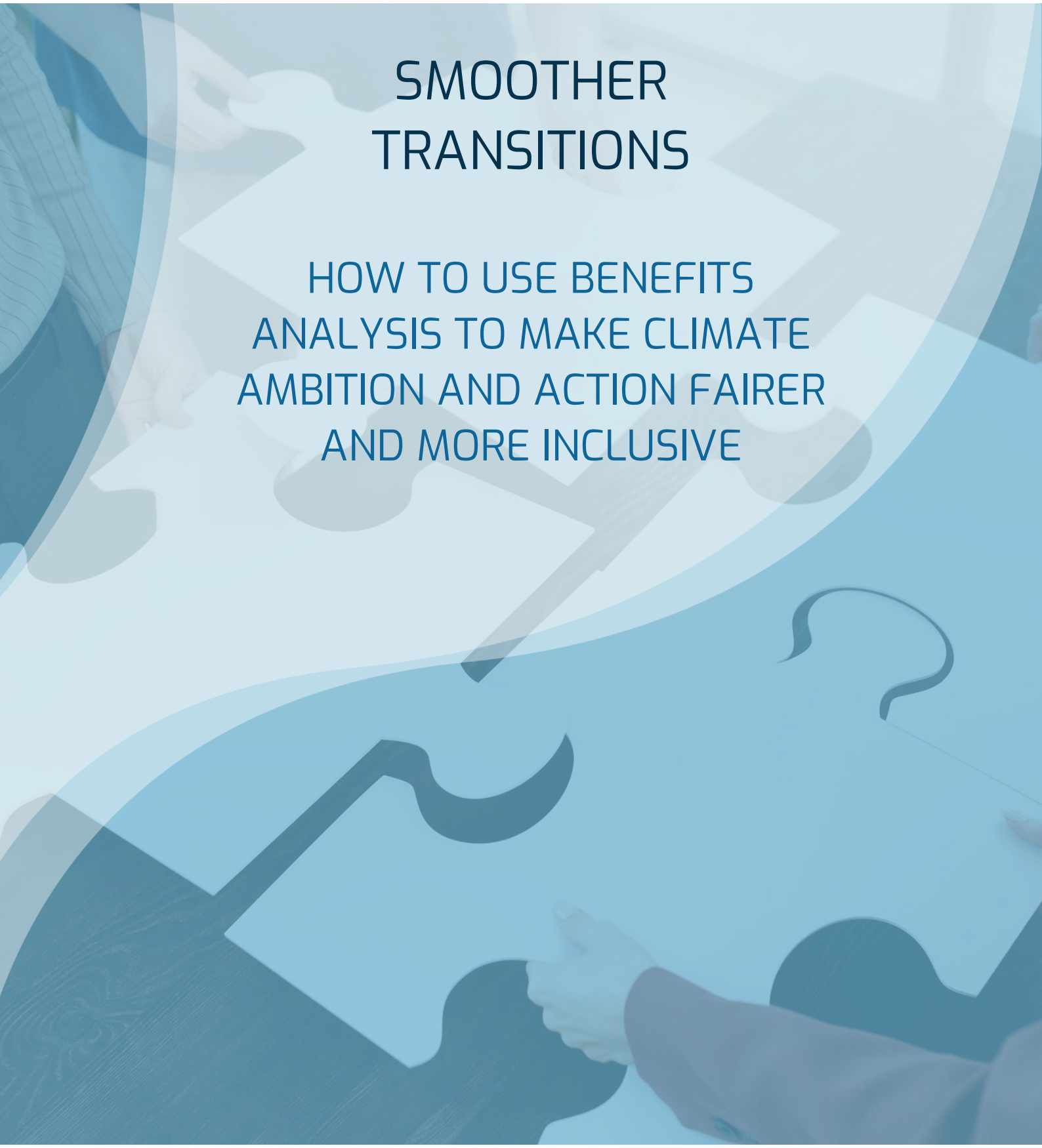
Ambition to Action

# SMOOTHER TRANSITIONS

## HOW TO USE BENEFITS ANALYSIS TO MAKE CLIMATE AMBITION AND ACTION FAIRER AND MORE INCLUSIVE



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## HOW TO USE BENEFITS ANALYSIS TO MAKE CLIMATE AMBITION AND ACTION FAIRER AND MORE INCLUSIVE

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This report is an output of the **Ambition to Action** project, which supports NDC implementation through technical assistance and thought leadership. The second phase of the project is implemented collaboratively by NewClimate Institute and Xander van Tilburg, over a two-year period until March 2022. Project funding is provided by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU). Ambition to Action’s technical assistance aims to support the mainstreaming of climate and development goals at the sector level, through the development of evidence on social, economic and environmental benefits of mitigation actions and pathways. This benefits evidence, for example detailing employment, energy security, and air pollution impacts, will show how sector planning decisions can support NDC implementation as well as national development priorities and can help reduce policy costs, identify trade-offs, and build stakeholder support for ambitious mitigation approaches at the sector level. Through a series of biannual reports (of which this is the seventh edition) and additional research papers, the project provides a platform for discussion, analysis, and sharing of lessons learned about NDC implementation in developing countries and emerging economies.



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# KEY FINDINGS

The world will need to end the use of fossil fuels by the middle of the 21st century in order curb global warming. The rapid clean energy transition that is needed to accomplish that, will have profound impacts on our social and economic activities. The speed and scope of change inevitably creates (and sustains) winners and losers on different aspects of the transition. Choices made by private and public actors can significantly impact energy security and other sustainable development objectives such as health, employment, industry and business opportunities, and the protection of ecosystems and biodiversity.

In light of this, it is critical to keep an eye on fairness and inclusiveness. While using models and tools can often give a good sense of the scale and direction of *net impacts* from transitioning energy systems, the real challenge is to unpack aggregate results and reveal which stakeholder groups stand to benefit, which may not, and who (disproportionately) bears the costs. To deliver the transition in a manner, that is sustainable and receives broad political and social buy-in, decision-makers will need to understand how different approaches and mechanisms can optimize fairness and inclusiveness.

This paper presents a practical approach that allows analysts to incorporate the notions of fairness and inclusiveness into their decarbonization strategies and climate action plans.

Covering different steps in the analytical process, we offer five concrete entry points for breaking down the assessment of benefits and trade-offs:

1. Choosing impacts, indicators, and scenarios
2. Detailing results per stakeholder category
3. Investigating relevant barriers and enablers
4. Identifying adequate policies and practices
5. Establishing the right narrative

The approach can be used to identify where current outcomes of the transition are not ideal, which policies and practices are available to facilitate positive change, and where the largest gains towards accelerating a fair and inclusive transition can be expected.

The starting point of the clean energy transition, the current energy system, is not necessarily fair and inclusive to begin with. The approach presented here is not only useful for efforts to avoid new injustices, but also in highlighting situations where the transition can present an opportunity to alleviate existing injustices.

In the context of greenhouse gas mitigation, a more granular analysis of the wider socioeconomic implications can reveal where high-impact actions are possible, and where climate ambition can be raised. Understanding who is empowered and joins the transition, and who is vulnerable, and risks being left behind, will be crucial to developing successful long-term strategies and ambitious updates to national climate targets.

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# 1 INTRODUCTION

The scientific consensus is that the world will need to end the use of fossil fuels by the middle of the 21st century in order curb global warming. The rapid clean energy transition that is needed to accomplish that, will have profound impacts on our social and economic activities: within a few decades we will need an overhaul of existing infrastructure, with entirely new systems established and large-scale upgrading of capital goods. This is likely to reshuffle business opportunities and the profitability of entire sectors, and requires fundamental changes in behaviour. The speed and scope of change inevitably creates (and sustains) winners and losers. In preparing for such change, it is critical to keep an eye on equity and fairness. The approach towards the transition adopted today, by public as well as private actors, will have a large bearing on the inclusivity and fairness of the transition and the new systems that emerge from it. Governments are expected to play an important guiding role and have a large suite of policy instruments at their disposal to influence outcomes across stakeholders.

In light of this, climate mitigation co-benefits – such as (local) employment opportunities; health improvements; energy security improvements; and the protection of ecosystems and biodiversity – receive increased attention in the analysis of decarbonisation pathways. In phase one of our Ambition to Action project we introduced tools that focus on sustainable development impacts, including both the benefits derived from climate action as well as the costs to certain groups of stakeholders. While models and tools can give a good sense of scale and direction, the real challenge is to 'unpack' aggregate results and reveal *which* stakeholder categories do (not) benefit and which do (disproportionately) bear the costs, through what mechanism, and what can be done to optimise transition inclusiveness and fair outcomes.

This working paper presents several entry points that allow analysts to incorporate the notions of inclusiveness and fairness in their emission reduction strategies and climate action plans. Covering different steps in the analytical process, we suggest practical approaches to disaggregating sustainable development impacts, showing which categories of stakeholders are empowered or vulnerable, who faces better or worse outcomes, and where governments have opportunities to influence inclusiveness and fairness. Recognition is the first step to improvement. The focus in this paper is on the energy transition, but the approaches presented are also relevant to non-energy emission reduction actions in sectors such as industry, transport, the built environment and city planning, agriculture and land use, food, and waste.

# 2 FAIR AND INCLUSIVE TRANSITIONS

This section looks at what is meant by fair and inclusive transitions and presents the background to the approach elaborated in the next section.

The clean energy transition is a significant shift from the existing system of production and consumption that depends on fossil-based energy, towards one that is based on technologies and behaviour without greenhouse gas emissions. Energy transitions have happened before, both on large and small scale, and at different speeds. Historically, we have seen the introduction of motorised cars replace horses and carts for transport, fossil and vegetable oils replace whale oil for lighting, and many households have shifted from wood-based cooking to using gas and electricity instead. Currently, we are experiencing the early phase of a transition in the way electricity and heat are generated, and the way transport is powered: away from fossil fuel-dominated supply towards supply based on renewable sources. Although the use of fossil fuels is still dominant in most countries, we see that global investments in wind and solar photovoltaics (PV) outpace investments in gas, oil, and coal-based electricity generation.[1]

A complete shift rarely happens fast, and it is more often the case that a transition starts with a new resource or technology having a small share in the energy mix, which then increases over time and overtakes the old resource or technology to become dominant. The introduction of electric mobility is a good example of this: rather than replacing all cars with internal combustion engines at once, the introduction is expected to happen more gradually: the global market share for electric vehicles is currently quite small and it is growing steadily and expected to become dominant in the coming decade(s). In the past, cost breakthroughs and sudden scarcity have been known to accelerate transitions but there is no simple and straightforward way to characterise how energy transitions unfold as they are “complex, and irreducible to a single cause, factor, or blueprint.” [2]

What makes the transition towards a zero-carbon economy particularly challenging is the short time period and the fact that it involves all sectors of economies around the world. According to the best scientific evidence available,[3] global greenhouse gas emissions will need to halve by 2030 and reach (net) zero around 2050 in order for the world to stay (well) below 2 degrees of global warming and avoid catastrophic impacts of climate change. While eventually all sectors will need to curb emissions, not all sectors and technologies will have to change at the same pace: power generation will need to decarbonise well before 2050 in order to allow other sectors to eliminate their emissions in time, since electrification is a key mitigation measure in other sectors.

There is a strong case for active government involvement in accelerating the transition(s) for a number of reasons. First, private actors depend on public support to accelerate technological development and innovation, and gain a considerable market share and growth momentum.[4] Second, it is up to the governments and regulators to put a price on environmental externalities such as local air pollution and greenhouse gas emissions, without which clean technologies face a cost disadvantage that makes it more difficult to compete with fossil-based technologies. Third, changes in economic structure are likely to affect the competitiveness of businesses and the welfare of communities, households, and individuals within and across countries and cities. Lastly, and this is well recognised in the United Nations Agenda 2030, addressing the climate crisis is not the only challenge countries face and there are many interactions between adaptation and mitigation actions on one hand, and development priorities on the other.

1 IEA (2021) World Energy Investment

2 Sovacool (2018) History and Politics of Energy Transitions

3 IPCC (2018) Global warming of 1.5°C, IPCC Special Report on the impacts of global warming of 1.5°C

4 See for example Mazzucato (2011) The Entrepreneurial State

## 2.1 WHO GETS WHAT?

The energy transition is unfair to those who do not have access to the opportunities the transition brings or to those who bear a disproportionate burden of the costs.

**Inclusion** (as opposed to exclusion), or more generally 'inclusiveness', is used to describe a situation where everyone has access to resources and opportunities, including underserved social groups, regardless of their background. UNDESA identify symptoms of exclusion as unequal access to resources and income generating prospects, unequal participation in political and economic life, and denial of opportunities (including services such as energy and internet).[5] Inclusiveness concerns access to services (such as secure and adequate energy supplies), to employment and skills, and to capital or entrepreneurship. In practice this can mean many things, for example: that communities are poorly involved in decisions to host clean infrastructure; that green employment is not available in places where fossil activities are phased out; or that only high-income households have access to the capital goods needed to enjoy the benefits of clean energy. Inclusiveness is embraced by international development agencies as an important guiding principle: the World Bank has inclusiveness as one of its six pillars, and it is firmly anchored in the 2030 Agenda for Sustainable Development: "As we embark on this great collective journey, we pledge that no one will be left behind…. for all nations and peoples and for all segments of society. And we will endeavor to reach the furthest behind first." (Agenda 2030, UN Resolution A/RES/70/1).

**Fairness** (or equitability) is generally used to describe aspects of distributive justice: the perceived appropriateness of how rewards and costs are distributed across society, groups, or organisations. Literature on energy justice is centred around the notion that all individuals should have access to energy that is affordable, safe, and sustainable, and able to maintain a decent lifestyle, as well as the opportunity to participate in and lead energy decision-making processes with the authority to make change. In their overview article on the justice and equity implications of the clean energy transition, Carley and Konsiky (2020) point out that in addition to matters of *distributional* justice, it also makes sense to look at *procedural* justice and justice in *recognition*. "Procedural justice focuses on who is included in energy decision-making processes and seeks to ensure that energy procedures are fair, equitable and inclusive of all who choose to participate. Recognition justice requires an understanding of historic and ongoing inequalities, and prescribes efforts that seek to reconcile these inequalities." [6]

The term **just transition** was introduced by the international trade union movement to emphasize the protection of workers' rights and livelihoods and is explicitly mentioned in the preamble of the Paris Agreement: "Taking into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities" (UNFCCC, 2015). Over time the use of the term just transition has broadened to include more than workers' protection, but there is still the connotation of protecting individuals, households, communities and businesses with historical and existing ties to fossil-based industries, who need to be offered a viable alternative. The European Union has established a Just Transition Mechanism (JTM) for that purpose, as one of the pillars of its European Green Deal.

5 UNDESA (2016) Leaving no one behind: the imperitive of inclusive development

6 Carley and Konisky (2020) The justice and equity implications of the clean energy transition

## 2.2 EQUAL OPPORTUNITIES AND FAIR OUTCOMES

Inclusiveness and fairness are not totally independent concepts, but they put the emphasis on a different aspect of distributive justice. Inclusiveness gravitates towards 'equality of opportunity' whereas fairness also includes the notion of 'equality of outcomes'. Equality of opportunity is the softer of the two[7] and easier to agree with. Equality of outcome is more contentious: while most people would agree that poverty is unacceptable, they would not necessarily agree on redistributive policies beyond addressing poverty. Some societies are more egalitarian than others and preferences are a matter of national historical structure and current political balance. The takeaway message is that there are two sides to fair and inclusive transitions: avoiding vulnerabilities and disproportionate burden; and maximising access to opportunities.

### 2.2.1 Alleviate existing injustices and avoid introducing new ones

To some the transition may be more inclusive and fairer than to others. But there is a minimum below which we deem the outcome inadequate: for example, energy poverty is the level below which services are no longer adequate, unemployment and sub-standard working conditions are inadequate, and, more generally, lack of access to capital or capital goods to participate in the transition is also inadequate.

The starting point of the clean energy transition, the current energy system, is not necessarily inclusive and fair to begin with. Energy systems have evolved historically, in response to political and economic needs and preferences, and some may benefit more from it than others. Energy related injustices, such as energy poverty, are often a symptom of broader disadvantages with the societal structure, and prevail under low-income populations, ethnic minorities, geographically isolated areas, etc. We are interested in situations where the clean energy transition can alleviate existing injustices, and situations where we can avoid injustices that occur as a result of the trajectory of the transition.

To analyse fairness and inclusiveness, which are inevitably subjective concepts, we should recognise that single measures to indicate distribution across and within groups have their limitations. Most importantly, there is a risk that exclusion and injustice go unnoticed at the aggregate level. To illustrate this point, consider a situation where reporting that only 1% of the nation experiences energy poverty hides the reality that minorities, regions, or demographics are much less fortunate: the 1% nationwide could actually correspond to 10% prevalence of energy poverty in the 10% minority group, while not affecting the remaining 90% at all.

To illustrate how the switch to clean technologies can affect stakeholders differently, consider the following two examples. First, there is the introduction of electric vehicles (EVs). One of the barriers to uptake of new EVs is that, despite the lower average costs per km and lifetime costs, they require an initial investment which is only available to those with access to capital. If, for example, a government decides to support the uptake of EVs by banning diesel cars in cities (as is the case in some European capitals) and increasing taxes on petrol, this can make vehicle use cheaper for new owners of EVs and reduce pollution for urban households, but at the same time it makes those who cannot replace their existing car less energy secure, and potentially excludes them from working or doing business in cities. The second example is related to residential heating. The use of heat pumps to replace natural gas-based domestic heating systems requires a considerable upfront investment in new equipment. If a government decides to increase tax on natural gas and lower tax on electricity to stimulate a shift from gas-based domestic heating to electric heat-pumps, this can offer improvements in energy security to those who make the switch, through lower and more predictable energy costs. However, such policy, which is currently being implemented in the Netherlands, will leave households who cannot invest in a heat pump with a higher energy bill and thus more vulnerable and less energy secure.

7 There is a rich and interesting history of thought and debate on the role of the state in ensuring justice and the distinction between supporting opportunities or guaranteeing outcomes. See for example A Theory of Justice, Walzer, 1974; Anarchy, State, and Utopia, Nozick, 1978; Development as Freedom, Sen 1999; and The Idea of Justice, Sen, 2009.

### 2.2.2 Communicating opportunities and outcomes

Rather than using a single indicator to show how the energy transition affects a certain group of stakeholders, we suggest using a scale of five discrete categories that are easy to understand and communicate (see Figure 1 below): negative outcomes, vulnerability, neutral or unaffected, empowerment, and positive outcomes. This distinction can be used to categorise individuals, households, and businesses, and it goes beyond simply labelling stakeholder as winners or losers. Instead, it encourages us to discuss what we mean by unfair outcomes, it shows the difference between potential (vulnerable, empowered) and actual (unfair, positive) outcomes, and it acknowledges that the transition may tend towards positive in some respects while negative in others. Practically, it helps to reveal where the highest impact can be achieved or avoided: minimising (risk of) negative outcomes and maximizing (empowerment to achieve) positive outcomes. As certain groups may fall into different categories at different stages of the energy transition, more sophisticated assessments could explore the potential emergence of opportunities and trade-offs for stakeholders over time.

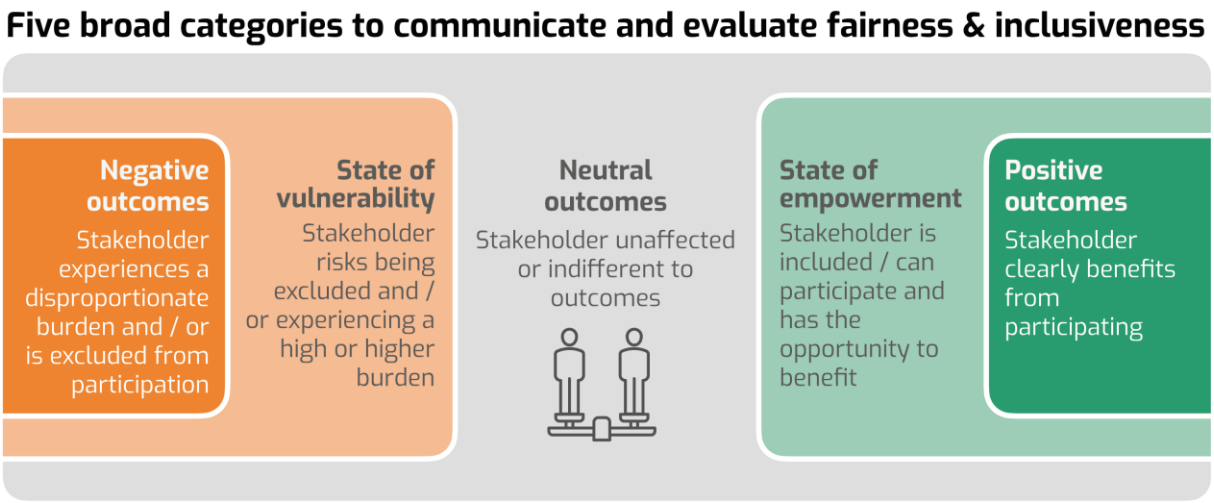


Figure 1: Five broad categories to communicate and evaluate fairness and inclusiveness. Source: authors.

The categorisation set out in Figure 1 can serve to analyse and communicate the consequences of a variety of changes, including changes in technology as well as the introduction of policies and measures. And it can be used to show differences across, for example, geographical areas, socio-economic groups, gender, or age groups. The category in which a stakeholder finds itself, currently or as a result of change, is often not a function of a single decision, technology, or policy, but a complex combination of factors and mechanisms (see section 3.3 below). In many cases we see that access to capital plays an important role, but not always and not exclusively: car owners, for example, may not have access to the charging infrastructure needed to switch to electric vehicles, and households who rent their home rather than own it, depend on the owner to make large investments such as renovating the heating and ventilation system. Similarly, not everyone has equal access to policies and measures: Income tax rebates, for acquiring solar panels or implementing energy efficiency improvements, will disproportionately empower and benefit households with high incomes and access to capital. Offering soft loans and subsidies for building improvement or vehicle replacement are not useful for those who are not able to access a loan, for example due to a low credit rating or income.

## 2.3 SMOOTHER TRANSITIONS

The arguments in favour of 'inclusive' transitions are not only moral in nature, but also practical: a more inclusive transition contributes to the efficient functioning of energy systems and can facilitate broad support for the clean energy transition.

Changing energy systems takes time and a transition is more likely to span decades, rather than years. There are different reasons for inertia, including long lifetimes of generating infrastructure and capital goods that use energy, time it takes new technologies to achieve sufficient cost reductions to be economically competitive, slow diffusion and uptake of awareness, skills, and new behavioural patterns, as well as resistance from vested interests around existing modes of energy production and consumption. It is reasonable to expect that the more rapid the transition, the higher the likelihood frictions will occur – colloquially speaking, a rapid transition is likely to be a rocky ride.

Historically, there have been many instances where abrupt changes in energy security have led to direct and intense social disruptions. Examples include the fall of the Suharto regime in Indonesia which was accelerated by an increase of fuel prices by the government (1998), yellow vest protests in France, which emerged from rising crude oil and fuel prices (2018), unrest in Chile which was sparked by an increase in metro fares (2019), and recently protests in Kazakhstan which directly followed soaring energy prices (2022). In none of these examples price hikes or increased scarcity were the only reason for unrest, but in all cases they acted as a trigger for bringing existing social tensions and discontent to the surface.

Other effects of the transition are likely to be slower but have the potential to be equally disruptive. If there is too much focus on opportunities and front-runners, and too little on vulnerabilities and late adopters, there is a risk that household energy poverty increases, and business competitiveness suffers. Too little attention to distributional aspects can also lead to, and exacerbate, protests over infrastructure decisions (e.g. 'no wind turbines in my back yard' or 'why is our industry phased out') and generally stall transition progress.

As mentioned above, governments play an important role in managing and addressing the social implications of the energy transition and in many countries fairness and inclusiveness are – or will become – highly political topics. That said, it would be naïve to think that transitions can be fully controlled and smoothened: they are, by their very nature, processes of discovery, and (re)distribution of power and resources. It therefore makes sense to accept the fact that conflict and tension can arise, especially given the unprecedented scale and pace of transition in almost all countries that averting the most damaging impacts of climate change now demands. Policy makers need to be ready to identify potential unevenness of impacts if and when it occurs and strive for inclusion and fairness in order to smoothen transitions as much as possible.

# 3 PRACTICAL ENTRY POINTS

This section sets out a framework for incorporating fairness and inclusiveness considerations into the analysis of the socio-economic impacts of climate action, focusing on how impacts differ per stakeholder category. Such a distinction helps us recognise where differences in outcomes may occur, identify those for whom the transition is (not) inclusive and/or fair, who has an advantage and is favoured, and where targeted policy interventions can make a positive change towards accelerating the transition in a fair and inclusive way. The approach builds on the common steps taken when analysing impacts of climate action using one or more scenario projections and suggests five practical **entry points** for considering inclusiveness and fairness.

**Five practical entry points for climate action planners to help incorporate fairness and inclusiveness into scenario modelling**


Figure 2: Five practical entry points for climate action planners to help incorporate fairness and inclusiveness into scenario modelling

## THE PROCESS: LAYERING, ITERATING, AND TINKERING

Figure 2 gives a stylised and simplified representation of the steps involved in conducting an impact analysis. One of the strengths of a scenario study, is that it allows for analysis of many different changes at the same time, while preserving interactions and dependencies between technologies and policies. When taking a closer look at specific impacts and stakeholder groups, the analyst may want to keep the scenario calculations intact (i.e. preserve the interdependence) but take a layered approach and repeat the steps in Figure 2 for individual technologies or policies. For example, when replacing coal power by solar PV, it could be useful to investigate the incoming and outgoing technologies separately because impacts and policies to address fairness and inclusiveness could be very different and largely independent. This allows for better comparison between alternatives, and also shows how these alternatives impact (potentially different) stakeholders. For example, in the US it could turn out those that benefit from solar PV support policies mostly vote for the Democrats, while those that are impacted most by a coal power phase-out are more likely to vote Republican.

The process of creating scenarios and interpreting results is not a straightforward linear process and often involves iteration and refinement. This is also the case for looking at fairness and inclusiveness. Iteration can, for example, help more sharply define categories once you better understand the mechanism that causes positive or negative outcomes. For example, you may start looking at solar PV benefits by selecting households that live in a house with their own roof (and not an apartment). Upon studying the enablers and barriers, this might be narrowed down to include only those households that live in a house they actually own, whose roof has a favourable location, and who are eligible for net-metering or other specific policies and measures.

While 'tinkering' is probably too harsh a word to describe the creativity involved, we need to acknowledge that the approach presented here (and scenario analysis in general) does not offer a closed formula that always leads to a single true answer. Ultimately, if you want the analysis to produce useful output, you will need to consider the possibility that data is hard to obtain, or that assumptions about the effect of policy or uptake of technology are speculative and not robust, or that the categories become so small that they become too specific (and/or diverse) to design policy for. It makes sense to discuss the desired level of detail and focus with a wider group of analysts and policy-makers to share considerations and trade-offs. Sometimes vulnerabilities can arise from such a specific combination of features that it is impractical to pursue. In other cases, it may be very useful to show that impacts only affect a small and specific category, for example when a few privileged actors receive all the benefits, or disadvantaged actors bears all the costs, that is definitely relevant to know.

# 3.1 SCOPE AND FOCUS

ENTRY POINT 1

### Choosing impacts, indicators, and scenarios

**Barriers and enablers**
Which mechanisms determine whether change is feasible? Who is likely to benefit from opportunities and who becomes (more) vulnerable? Why?

One of the first actions in setting up a benefits analysis involves identifying which types of impacts are likely to be relevant. The **S**DG **C**limate **A**ction **N**exus tool (SCAN-tool), designed to provide high-level guidance on how climate actions can impact achievement of the Sustainable Development Goals (SDGs), provides a good starting point for a first 'scan' of the potential links (synergies and trade-offs) between mitigation actions and wider development impacts. For each of the impacts chosen, the analyst will need to identify which **indicators** are useful for measuring the impacts. These indicators do not need to correspond one-to-one with the indicators in the SDG framework. The use of tailored indicators can be considered, such as the number of people whose energy security or access to mobility improves; the number of households who are at risk of poor access to services or increased poverty; or a measure

for health impacts such as years of life lost (YLL) as a result of local air pollution. In parallel to identifying impacts and indicators, the analyst will need to select **tools** to use and decide whether customisation or additional tool development is necessary.

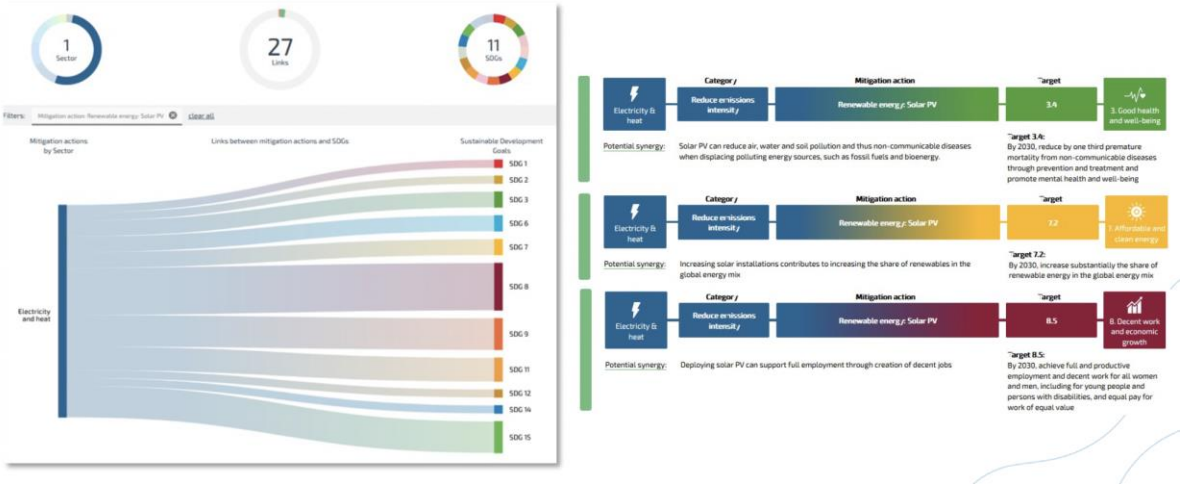


Figure 3: SCAN tool linking climate actions to development impacts (source A2A Indonesia)

Based on the tools and the impacts of interest, the next step is to make an inventory of assumptions, input data requirements, and a plan for data collection. Data can be taken from a combination of sources, including literature, new information gathered through field work (surveys, interviews, etc.), and expert estimates. In most cases, the tools used will lay out a first set of minimum requirements which can then be expanded based on what is needed or what is available; in most cases more detailed results require more granular input data and additional assumptions. Related to this, it is useful to make an inventory of **additional restrictions** that should be imposed on the model, such as targets to meet, pricing mechanisms, or limitations on the domestic share of labour or production. Caution is needed, because restrictions can lead to direct and indirect impacts, the latter of which may not be visible unless explicitly considered in the modelling. For example, local content requirements on renewable energy equipment can *directly* boost domestic employment opportunities and domestic investment but may *indirectly* raise energy costs for users and reduce affordable access for some. It would therefore be useful to clarify where these sorts of trade-offs due to additional restrictions occur, and how significant they are.

Most benefits analyses involve scenarios and projections of data into the future. These scenarios are not predictions, but rather simplified descriptions that form plausible and internally consistent storylines. Scenarios show how input data and modelling assumptions will lead to future pathways for a range of selected indicators such as investments in specific technologies, production, jobs, and greenhouse gas emissions. It is recommendable to include a **baseline scenario** that shows what would happen in the absence of change to the current technology pathway or policy framework. Such a baseline scenario can reveal how many jobs and investments are lost or need to be redirected compared to the mitigation scenarios. For example, in the case of replacing coal with renewable energy we are not only interested in the number of new renewable energy jobs, but also to understand the jobs related to coal value chains that are no longer needed.

Scenarios can extend beyond considerations of only the most feasible or likely future pathway. By creating **contrasting scenarios**, it is possible to show how choices in technologies, infrastructure planning, or policies can lead to different outcomes across stakeholders. For example, in the case of energy, we can design one scenario with large, centralised utility scale solar PV deployment and another with decentralised household rooftop solar PV rollout. For mobility we can use one scenario that assumes high penetration of affordable public transport while another scenario relies on private vehicles and pollution pricing.

## 3.2 DETAIL AND DISAGGREGATION

ENTRY POINT 2 **Detailing results per stakeholder category**

**Detail and disaggregation**
Which indicators are likely to reveal variation across stakeholder groups? Is it practically possible to differentiate?

As discussed in the previous chapter, aggregate measures of impacts can hide variation and differences in impact within and among stakeholder groups. To investigate how much variation exists and whether it is concentrated in specific groups of stakeholders, it makes sense to break down results into categories of stakeholders. There are many ways of doing this and the breakdown may be different per type of impact, or even per indicator.

Often, the expert analyst will have initial ideas about who might be affected differently, where disaggregation is likely to show variations, how practically feasible it is to obtain sufficient data and make credible assumptions, whether the tools can handle the level of detail, and whether the categories have a useful match with barriers and enablers. These considerations provide a good starting point. It is quite common to revise categories in subsequent iterations of the analysis: if no variation is observed or collecting distinct input data turns out to be difficult, it could be that categories are merged again, or discarded altogether.

The first step in identifying which categories to distinguish is to make a **long list** based on general features and aspects that can be associated with vulnerability or empowerment, and positive or negative outcomes. When considering which groups are empowered and/or likely to end up with better outcomes, it makes sense to start by looking at who currently enjoys (a combinations of) privileges in terms of socio-economic status, health, and access to capital and decision making. The following list of aspects merit consideration when identifying those who may be vulnerable as a result of the energy transition:

- Livelihood indicators such as housing quality, income and credit status, access to services;
- Employment indicators such as skill levels, literacy, type of participation in the workforce (informal economy, casual/gig/seasonal workers), commute time and mobility;
- Household composition such as single occupancy or communal living, but also pressure due to family care tasks;
- Housing conditions including poor energy access, inefficient heating and cooking, remoteness;
- Social and cultural aspects such as gender, ethnic or political background (including migrants, displaced, and refugees);
- Health and demographics: people with disabilities or illnesses, youth and children, elderly.

This list is not exhaustive, and individuals may fall into several of these groups (e.g. rural women; or low-skilled workers belonging to low-income households with limited energy access) and indeed there are clear correlations between certain categories. In particular poverty and health problems are known to be both a cause as well as a consequence of vulnerability.

Based on a long list, the analyst will then need to compile a **short list** of categories to include in the actual study. Here it is more practical to start from the impacts and indicators, and chose categories based on expected differentiation of impact, overall relevance to the transition, and feasibility of data collection and description. For example, the EIM-ES model is able to look at employment per subsector in the technology value chain, which allows for differentiation by skill level and whether the jobs will be short- or long-term.[8] The AIRPOLIM-ES model is able to differentiate health impacts by proximity to pollution source, age, and cause of illness, which allows for differentiation between geographical location

8 A2A (2018) SCAN Tool Methodology paper

but also youth and elderly, and people with pre-existing health vulnerabilities such as bronchitis or heart conditions.[9,10]

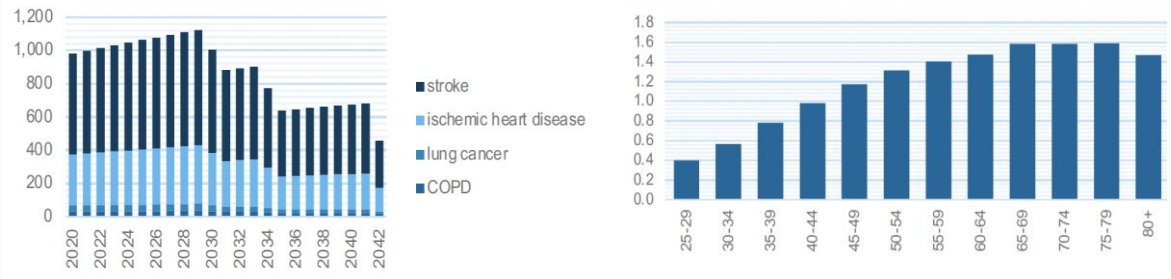


Figure 4: AIRPOLIM differentiating health impacts by disease and age group (source A2A Indonesia)

There is no ideal choice size and delineation of categories because it involves a trade-off: from a fairness and inclusiveness perspective it is important to be as specific as possible when identifying the vulnerable, underserved, and excluded. From a more solution-oriented perspective however, granularity beyond a certain level may not be all that useful for the analysis if it does not materially influence the overall conclusions, or turns out to be impractical for policy makers. So here again it is up to the analyst to make choices.

Disaggregation of sustainable development impacts can be straightforward, but more often it is not. The breakdown of results per category can sometimes be done as an integral part of the scenario calculations, in which case input data and assumptions are differentiated by category, but it is also possible to do the breakdown afterwards using logical inference and additional datasets.

When input data and assumptions are differentiated **before the calculation** of scenario projections, a key challenge is to collect data at a sufficient level of detail– either through using existing datasets or by conducting interviews or surveys. There are a number of practical challenges with collecting input data per category, such as the labour intensity of acquiring a large enough sample and the extent to which differences in input are actually representative for the group under investigation.

An alternative is to break down the impacts per category **after the calculation** of scenario projections, using complementary datasets and/or informed assumptions. Combining public data sources and logical inference can be very helpful in narrowing down and articulating categories. Consider banning polluting cars from the cities; then public records can tell how many households own a vehicle. Further combination and exclusion can yield estimates for more specific groups, such as those owners who drive an old diesel vehicle, have a low income, and live in an urban area.

The risk of choosing categories based on easily available data and modelling logic is that certain excluded or otherwise vulnerable groups are overlooked. Or that the impacts are attributed to a large group, while in reality only a few privileged or powerful actors benefit significantly. One way to address this **bias**, is to pay special attention to groups that are known to be marginalised, at higher risk of inadequate participation, or ending up being underserved. Depending on the country context these could include, for example, women, ethnic minorities, low-income single-parent families, those with lower educational or skill attainment, disabled and elderly, informal or ‘gig’-based employees, etc. Another way to address the bias in category selection is to reason backwards from the barrier that leads to exclusion or unfairness. For example, those who have no official employment or registered income may not be eligible for fiscal support since tax breaks do not reach workers outside of the formal economy.

9 A2A (2019a) AIRPOLIM-ES short methodology note

10 These are examples of publicly available tools developed under the Ambition to Action project, which are accessible via the project website (https://ambitiontoaction.net/methodologies-and-tools/) and as part of the COMPASS toolbox (https://newclimate.org/expertise/compass-toolbox/).

## 3.3 BARRIERS AND ENABLERS

ENTRY POINT 3 **Investigating the right barriers and enablers**

**Barriers and enablers**
Which mechanisms determine whether change is feasible? Who is likely to benefit from opportunities and who becomes (more) vulnerable? Why?

Scenarios and models are simplifications of reality and although very useful tools of analysis, they do not do justice to all of the many complexities of what is really going on. What is assumed feasible in the scenarios may not be straightforward to realise for all stakeholders. For example, not everyone may have access to the means to make investments or have the ability to change. It is therefore important for analysts to consider which **enablers** need to be in place to realise the projected results and identify which **barriers** could prevent change from happening. It is common in policy design to identify barriers and enablers, and design policies that address these in a way that most effectively influence change. In this step, the analysis should not only focus on which mechanisms could block or facilitate change and how, but also *for whom* they are most realistic and applicable.

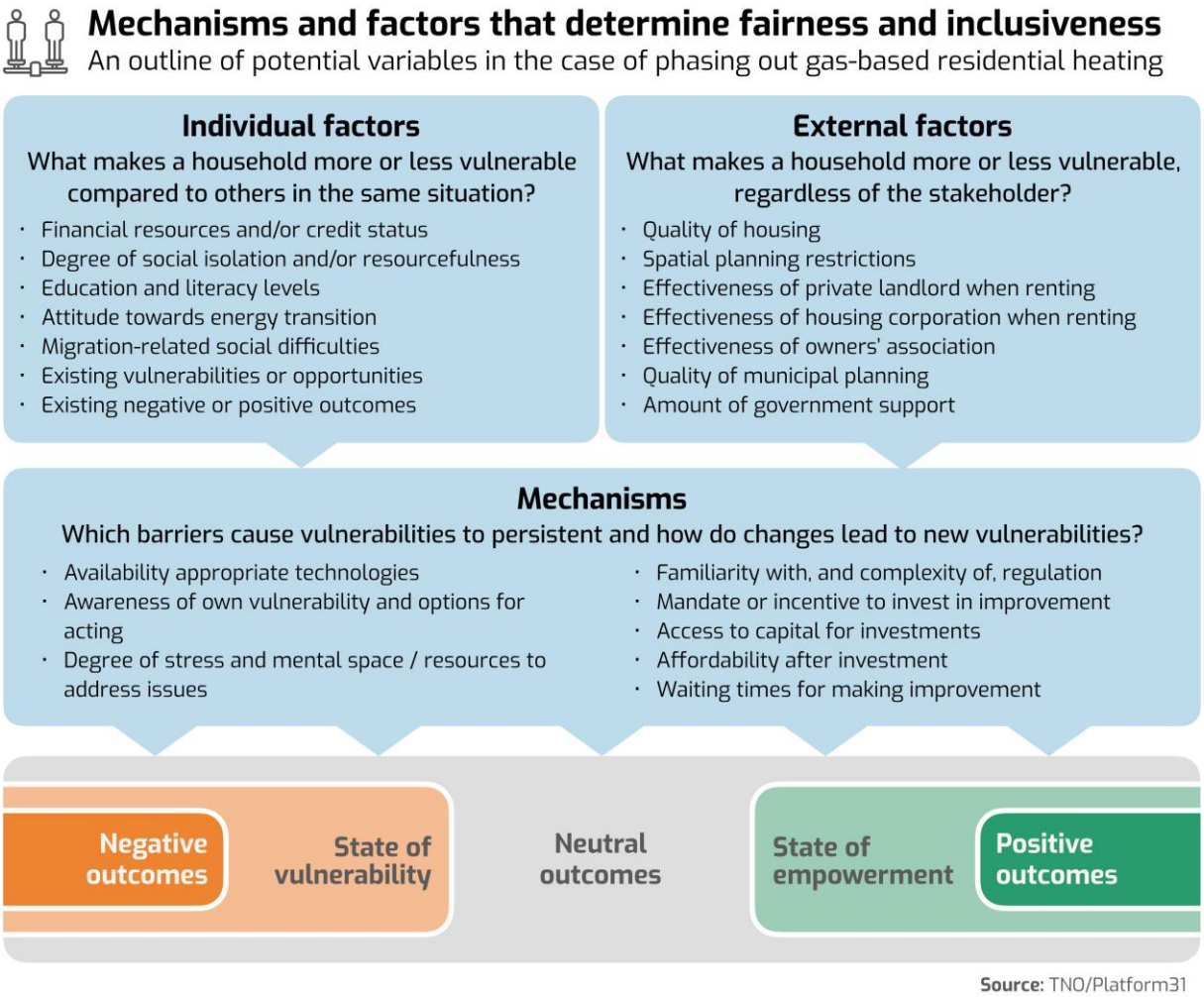


Figure 5: Mechanisms and factors that determine fairness and inclusiveness in the case of phasing out gas-based residential heating. Source: TNO/Platform31.

To understand *why* vulnerability and negative outcomes persist or emerge, it is important to know through what mechanisms barriers and enablers function: what is actually going on and which factors determine whether or not change is feasible. That way, the analyst can get a closer understanding of who might (not) be able to benefit. The same is true for how opportunities emerge, stakeholders are empowered, and positive transition outcomes are realised.

One can think of barriers and enablers as *recipes*, with external circumstances and household- or business-specific factors as *ingredients*. Some factors are individual such as credit score, or income, or business reputation, while other factors are external such as building quality or proximity to district heating. Focusing the analysis on certain ingredients or recipes and not on others, allows analysts and policy makers to influence who is considered in the outcomes.

Recall from the previous section that justice in procedure is one of the three pillars. In this step, through tracking the mechanisms behind distribution, the analyst can identify who is (not) represented in the decision-making behind the mechanisms, and who is excluded. For example, if a climate action plan is predominantly decided on by businesses, then there is a reasonable chance that the barriers and enablers on the agenda will suit business interests (e.g. Dutch Climate Accord). Whereas if a climate strategy or action is developed by a civil society interest group, then the mechanisms under investigation and solutions proposed will likely reflect their priorities (e.g. Greenpeace 100% renewable energy).

## 3.4 POLICIES AND PRACTICES

ENTRY POINT 4

**Identifying adequate policies and practices**

**Policies and practices**
Which government interventions are available to influence outcomes in terms of fairness and inclusiveness?

Not all barriers are easy to address through policy interventions (poverty and illness cannot be outlawed) and not all enablers are equally feasible (credit scores and skills cannot be handed out). The choice of climate action and government policy support are ultimately political and subject to limited public resources and active lobbying from incumbents and interest groups. Nevertheless, there are many ways in which inclusiveness and fairness can be promoted. Most of these policies address common barriers and challenges, and they mainly focus on the two positive categories in step 3. Carley and Konisky (2020) review literature and come up with five groups of policies to address injustices:

- Workforce and economic diversification programmes: workforce training, job development, and regional economic transition for communities that relied on high-carbon industries. These can involve budget allocated in support funds, and could call for special economic zones.
- Energy assistance and weatherization: assistance improves affordability of energy services, through bills or subsidies. Weatherisation programmes increase energy efficiency in buildings, and are often part of public housing refurbishing schemes.
- Expansion of energy technology access: build energy efficient and renewable energy infrastructure and extend these resources to marginalised communities.
- Collective action initiatives: community education and awareness, and engagement in decision making processes.
- New business development: energy innovations and business models that appeal to the profitability of clean energy investments. Typically focus on extending access to technologies, jobs, and energy services.

It is also important to highlight that other social assistance programmes, though not explicitly designed to address issues of energy, are connected to energy justice through their efforts to improve general social welfare. Just as impacts are related to other areas, so are solutions. Energy poverty and

vulnerability are closely related to more general forms of poverty, and social and economic vulnerability. Inclusive and fair solutions may require a radical reorientation of policy (such as schemes for pricing or subsidies) but in other cases it is just a matter of fine tuning or adding some packages without the need to overhaul the entire policy direction.

## 3.5 NARRATIVE AND FRAMING

| ENTRY POINT 5 | Establishing the right narrative | **Narrative and framing**<br>Is the GHG impact significant? Does a fairer and more inclusive approach accelerate the transition? Unlock potential? Create room for higher NDC ambition? |
|---|---|---|

Whereas the previous four entry points focus on identifying those stakeholders who are (under)privileged, and what it would take to make the energy transition more inclusive and fairer to them, here we zoom out to assess the relevance of distinguishing impacts for the energy transition. This can be progress in terms of cumulative absolute emissions or emissions intensity, but also the relevance of improving the groups position for the medium-term transformation. Ideally all actions have a very significant contribution to reducing GHG emissions *and* unequivocally increase the fairness and inclusiveness of the transition. In practice however, not all actions are able to do both equally well and we might find that there is a balance to strike. In these situations, it is likely that trade-offs and choices need to be presented to a broader group of (political) decision makers and cannot be left solely to analysts that build scenario and quantify impacts.

### Consider the right perspective and narrative


Figure 6: Four perspectives for establishing the right narrative

In order to articulate the (in)significance of specific actions, it is useful to present climate actions across four different perspectives:

1. How many people does it concern?
2. What is the likely emission reduction?
3. To what extent does the action contribute to fairness and inclusiveness?
4. To what extent does it accelerate the transition?

With such an approach, analysts and decision makers can avoid putting too much attention on optimizing fairness for actions that do not materially contribute to the transition. It helps to answer relevant questions such as “is the GHG impact of the action significant?”; “does an increase in fairness and inclusiveness accelerate the transition?”; or “does it unlock potential or create room for higher NDC ambition?”.

A few examples might be useful to clarify this point and show how narratives can be told.

## Case A

**Actions that involves a large number of stakeholders**

Example: inexpensive efficiency improvements in residential building efficiency, such as draft guards for doors


Case A describes an action that involves a large number of people (i.e. the shaded area) and accelerates the transition, but the overall emissions reduction (i.e. the size of the circle) is relatively small. This can, for example, happen when inexpensive efficiency improvements in residential heating such as draft guards for doors, reduce end user costs - making a real difference to consumers and individuals but with little direct effect on national emissions. We still depict the transition acceleration potential as positive, because we assume that such interventions raise awareness around conscious energy consumption.

## Case B

**Actions that involves a large amount of emissions reductions**

Example: phasing out old equipment in industrial firms that cause emissions leakage, such as methane


Case B stands out because it involves a small number of people and a large amount of emissions, and although it accelerates the transition it does not change the fact that it is unfair and/or exclusive. This could occur when industrial firms are forced to phase out old equipment that causes methane leakage. Such interventions have a large emissions impact and could accelerate the transition, but do not necessarily make the transition more (or less) inclusive or fair.

## Case C

**Actions that improves overall fairness and/or inclusiveness**

Example: a pilot scheme for a few people providing favourable access to capital for buying an electric vehicle


Case C describes an intervention that involves a small number of people and the total emission reduction is not all that large, but it does significantly accelerate the transition and improves overall fairness and/or inclusiveness. This can occur, for example, when a small group of people participate in a pilot scheme that gives them favourable access to capital for buying an electric vehicle and through that enjoy greater mobility at reduced costs per kilometre.

## Case D

**Actions that stagnate the clean energy transition**

Example: replacing an oil-based power station with a power plant running on natural gas


Case D involves a large number of stakeholders, significantly reduces emissions, and possibly makes electricity more affordable, but it is not helpful for a rapid transition towards a clean energy system. This could, for example, happen when an oil- (or coal-) based power station is replaced by a power plant using natural gas. While natural gas is sometimes pitched as 'bridge technology' towards a full phase-out of fossil fuels, we should be very critical to avoid an infrastructure lock-in; therefore we classify this oil-to-gas switch as having a (very) low potential to accelerate the transition.

The important point is not to follow any prescribed format but rather to be aware of, and consider, these 4 perspectives as they can help clarify how actions contribute to a fair and inclusive transition and weigh up a number of different factors that can inform (political) decision making. It is good practice for analysts to ask themselves 'so what' when they observe variations in results, and a visualisation such as this one can be useful to think through that 'so what' question. Note that we distinguish between direct emission impacts and contribution to accelerated transition; there are many examples where early adopters of technologies have an important role in support of the transition even though their direct GHG impacts are relatively small. In general, it is useful to not only select the actions with the largest direct emissions impact, but also to consider whether the stakeholders involved are important enablers for the transition (i.e. their participation and buy-in is critical).

# 4 DISCUSSION

## 4.1 POTENTIAL AND LIMITATIONS

The approach presented here is intended as a practical stepwise way of looking closer at impact distribution and inclusivity, by disaggregating and zooming in on *who* gets the benefits and who bears the costs, or faces trade-offs, potentially becoming more vulnerable through the process of transitioning energy systems (and more broadly our economic and social activities). By going through the exercises of identifying what 'poor outcomes' and 'vulnerabilities' are, and what mechanisms and factors are driving this, policy-makers can more distinctly recognise which categories require additional attention. In the context of greenhouse gas mitigation, a more granular analysis of the wider socio-economic impacts can reveal where high-impact actions are possible, and where climate ambition can be raised.

The approach is not without its limitations. In cases where detailed data is not available, or where the mechanisms that cause vulnerability and poor outcomes are complex and go beyond the energy sector, the analyst needs to rely on assumptions and logic. Needless to say, this can lead to oversimplification and/or misunderstanding, particularly where influenced by prevailing biases. For example, information on the activities of more vulnerable groups may be harder to identify and can be a factor in excluding full and proper consideration of their interests. While the approach presented here may be useful for revealing 'the devil in the details', in other cases the findings in terms of categories, impacts, and policy options may be obvious and straightforward (and a full analysis may not merit the effort). Lastly, while more granular information can provide insight into who receives which outcomes, it does not explain the political economy factors of why these patterns persist.

## 4.2 RELEVANCE IN TIMES OF COVID-19 AND 'BUILDING BACK BETTER'

At the time of writing, the COVID-19 pandemic is still ongoing and posing limitations on public life across the globe. It has a profound and uneven impact on economic activities, depending on how much these activities are (in)directly affected by social distancing measures and the sudden setbacks in demands for certain goods and services. It shows economic hardship and loss of income of groups of people and businesses that were not traditionally considered vulnerable, such as the tourism and hospitality industries, the transport sector, or the cultural sector.

In response to the economic hardship caused by the COVID-19 lockdowns and restrictions, many countries have responded with policies to buffer the impacts and use short-term crisis responses to protect capital and labour. These are gradually being followed up by recovery measures, to get economies back on track as quickly as possible and with minimal structural damage. Many countries recognized an overwhelmingly strong case for a green recovery, and in April 2020, G20 Finance Ministers committed to "support an environmentally sustainable and inclusive recovery." [11] This ambition is increasingly referred to as *building back better*. To date, this green recovery has not materialised to the scale that was called for, but the case for accelerating a transition away from fossil fuels remains strong nevertheless.

The pandemic has exposed weaknesses and injustices in existing energy systems and revealed where increased inclusiveness and fairness is needed. Especially in the months after the start of the pandemic, many households experienced stark loss of income while they were not able to reduce their energy demand accordingly – a situation which leads to increased energy poverty for many. Sudden drops in energy demand have also caused acute financial problems for many utilities and operators, who consequently received large capital injections to compensate for losses. The pandemic revealed that

11 G20 (2020) Communiqué G20 Finance Ministers and Central Bank Governors Meeting 15 April 2020

several state-owned utilities are in poor financial shape and are facing increased pressure to accept the prospect of accelerated restructuring, phase-out of fossil fuels, and reorientation towards clean energy. Building back better will therefore also need to include transforming utilities into healthy and future-proof organisations and creating more intelligent energy safety nets.[12]

Since green recovery investments will move forward several urgent decisions with long-term effects and set the contours of the energy system for the years and decades to come, this is the right time to explicitly include inclusiveness and fairness as priority considerations.

## 4.3 RELATION TO NDC AMBITION RAISING

The ratcheting mechanism in the Paris Agreement requires countries to commit to increasingly ambitious action over time and regularly submit updated Nationally Determined Contributions (NDCs) that represent a progression compared to their previous NDC and reflect their 'highest possible ambition'. COP26 in Glasgow has re-emphasised the importance of this mechanism, because as most governments submitted their updated pledges for the first time since the Paris Agreement came into effect, the collective efforts still fall way short of what is needed.[13]

Despite serious concerns that the time window to limit global warming to 1.5 degrees is closing fast, COP26 also brought some high-level positive outcomes that are especially relevant to the analysis of fair and inclusive transitions. First, fast and full decarbonisation has become the norm for strategizing climate action. Since renewables costs are coming down and carbon capture and storage (CCS) technologies are not going to extend the lifetime of fossil power production, exit-strategies for fossil industries are necessary and these will need to go hand-in-hand with social plans and economic restructuring. Second, countries are expected to present NDC updates more often and there will be increased attention for long-term strategies. As a result, there will be pressure to include the full breadth of national economic activities in climate strategies and action plans, and no longer only focus on good-news-stories of opportunities and winners. Third, COP26 saw a reaffirmation of the need to scale-up both international collaboration and climate finance. There are early signs that climate support to some countries will take the form of comprehensive energy sector packages which include stimulating renewable energy, but also accelerated phase outs of fossil fuels, and possibly restructuring of state-owned energy utilities and operators. Two examples are the Energy Transition Mechanism (ETM) presented by the Asian Development Bank (ADB) and the 'Just Energy Transition Partnership' that was announced between South Africa and a consortium of the UK, US, France, Germany, and the EU. Such comprehensive climate support deals will call for attention to social aspects and this makes an analysis of inclusiveness and fairness even more relevant.

Governments will be able to smoothen their energy transitions (at least somewhat) if they position fairness and inclusiveness as one of their guiding principles, but it is neither a static, nor a one-off task. Guiding the energy transition is a process of discovery and frequent adjustment of action plans and priorities along the way. There is no need to overthink every eventuality, but it is good to establish general principles and response strategies. A first and important step in making the transition fairer and more inclusive is to acknowledge and actively monitor who is empowered and has access to benefits, and who is, or may become, vulnerable and risks being left behind.

12 See also A2A (2021) The Energy Transition after COVID-19

13 Analysis by the Climate Action Tracker showed that the collective updated commitments – if implemented in full – would still put the world on track for 2.4 degrees of warming above pre-industrial levels. See https://climateactiontracker.org/publications/glasgows-2030-credibility-gap-net-zeros-lip-service-to-climate-action/

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