

What makes people act climate-friendly? A decision-making path model for designing effective climate change policies

Pia Piroschka Otte

Introduction

Climate change presents the largest global challenge in human history. It will lead to more extreme weather patterns and creates significant risks to food security, biodiversity, human and ecosystem health, infrastructure and food systems [1]. In 2016, world leaders committed to reduce greenhouse gas (GHG) emissions significantly and keep global temperature rise below 2°C through the Paris Agreement [2]. However, renewable energy systems, a key component for achieving the climate targets, still face social, political, and financial constraints limiting their climate mitigation potential [3]. Despite the severe consequences of climate change, designing and implementing effective policies to address these constraints has been slow [4**]. One reason is that the decarbonization of our economies is socially and culturally complex, making climate change a ‘social dilemma’ because the reduction of GHG emissions requires, in many cases, deep changes in social practices [5] – defined as everyday practices such as for example driving and heating buildings [6].

Thus, governments’ attempts to reduce energy consumption often fail if they are incompatible with social values and the physical setting [5]. For example, previous research suggests that people are more willing to recycle than to change their travel habits [5,7]. Car ownership and international travel often contribute to shaping our social identities and values [8]. Consequently, traveling is much more deeply anchored in socio-cultural practices than recycling. Thus, the shift towards more sustainable practices collides with these identities and requires the establishment of new social identities that build on more sustainable practices.

In order to achieve a large-scale transition towards a low-emission society, Byrka et al. [9] argue for an interplay of consumer acceptance of green products and an enabling policy environment. However, low-carbon transitions are often viewed as a “techno-economic implementation challenge,” [10] failing to consider the social context and people’s agency as citizens and consumers, who overall determine the market uptake of climate-friendly technologies and practices. Hence, there is a need for connecting individual and collective change to foster a low-carbon transition [11]. Furthermore, Geels et al. [10] argue that “many policy-oriented energy and climate researchers and models remain wedded to disciplinary approaches that focus on a single piece of the low-carbon transition puzzle, yet avoid many crucial real-world elements for accelerated transitions.”

This article addresses this gap by developing a combined decision-making path model for climate change action. The framework builds on an integrative review of climate change literature from different disciplines including psychology, sociology, economics and political science. It identifies a wide range of factors that determine people’s decisions towards climate action. The new contribution of this article is to combine these factors into a novel integrated framework and then to connect them to different climate policies that can be implemented to address these factors. To achieve the transition towards a low-carbon society a variety of practical climate policies must address different stages of the decision-making path model. Policymakers are therefore faced with the challenge of identifying the relevancy and occurrence of each dimension in their own context and design relevant policies accordingly.

Reviewing barriers to engage with climate change to develop a holistic decision-making path model enabling climate action

Previous research has identified a wide range of psychological and structural barriers implicated in constraining action on climate change [12]. This section presents a five-stage path model developed from the literature review. The review followed an integrative review approach, a method that usually does not include every published article in the field under review, but that provides an overview of the knowledge base and can help to reconceptualize, and expand on the theoretical foundation of the specific topic that is investigated [13]. Since the purpose of the review was to combine different perspectives on climate policy and climate decision-making to create a new theoretical model, an integrated literature review was the most suitable. The search was undertaken on Scopus using the search terms “climate policy” and “climate decision making”. Articles from the field of psychology, political science, sociology, economics and political science were included. Although the principle focus was to identify recently published literature between 2018-2020 key references from previous years were also included. Notably, most of the reviewed literature focuses on a Western context. This reflects the domination of the literature by scholars from the Global North and raises questions regarding the geo-political scope of the framework and for future research, which the article will return to in the concluding comments.

Through reviewing this literature, we have identified five different stages, *framing*, *socio-cultural factors*, *affordability*, *availability* and *infrastructure* that needed to be holistically addressed to design relevant and effective policies. We elaborate these stages in more detail below by using the electric car as an illustrative example to contextualize the decision-path framework. Decarbonization of the transport sector is an important challenge for achieving the climate targets [14] and hence presents a highly relevant case.

The first stage of the path model is *framing*. Frames are “interpretative storylines” that emphasize certain aspects in a story that are more important than others to people [15]. They identify the problem, who is responsible, and what can be done to change the situation. A frame itself cannot cause a behavior change as such, but it can change people’s emotional response to it [16,17]. Framing can make climate change more tangible and personally relevant, which will ultimately foster climate action [18]. Frames that can trigger feelings of worry and hope may positively influence climate change action [17]. In the same way, frames that communicate climate change as uncertain and based on divergent opinions can reinforce uncertainty among the public and skepticism towards climate change [19,20]. It might also reduce levels of trust in climate scientists, which can lower the uptake of climate-friendly technologies [21**].

There is no universal frame that can mobilize the general public per se, since different social groups¹ have different social values and priorities. Previous research on public support for renewable energy suggests that different frames can become relevant depending on people’s socio-economic backgrounds, personal identities, and geographical factors such as gender, place of residence, and political ideology [22,23]. Promotional messages with strong moral priming can activate civic engagement [24]. For example, Goldberg et al. [25*] argue that

¹ Social group is defined in this article as a group that consists of two or more people who regularly interact and share common values and a common identity [37]. This can be for example a group of friends or family.

climate change beliefs can be increased among Christian Americans if they are presented as a moral religious issue that other Christians consider. Whether a frame resonates with a social group also depends on its perceived credibility [26].

Hence, tailored information needs to reflect the diversity of different social groups and address their interests in non-climate related co-benefits [27**]. The climate change literature has identified several relevant frames, such as emphasizing the health aspects of climate change, national security, enhanced employment, and improved air quality [27**,28,29**]. Highlighting these co-benefits can remove the distant feeling of climate change and make it more personally relevant [27**]. Non-climate related frames can be particularly effective for climate change sceptics [27**].

Once policymakers have identified appropriate frames for different social groups and produce feelings of hope and worry, they have initiated a general basis for climate action. In the case of the electric car, it means that people might be interested in it not because of its potential to reduce emissions but on account of its lower level of air pollution that can significantly improve air quality in urban areas. However, people's interest in purchasing an electric car due to its positive health impacts might not solely determine whether they actually decide to buy one.

The second stage in the decision-model is *socio-cultural factors* such as conformity to dominant social norms, social identity and peer effects. Previous research suggests that people's energy decisions are influenced by the behavior of others and thus have a strong social component [30,31]. Part of people's social identity is shaped through belonging to different social groups that distinguish their group (in-group) from other groups (out-groups) [32]. Individual values and attachments are also significant, for instance levels of green self-identity [34], and how attached people are to the place that they live in [35] can influence adoption. Thus, whether individuals support certain climate change mitigation technologies and policies can be influenced by their memberships in certain groups and their underlying values and norms [4**]. In addition, interest might also be influenced by the images or analogues these technologies entail [33].

One might want to buy an electric car but decide not to due to the fact that no one else in one's peer group has bought one. This might be exacerbated if one does not want to stand out in one's social peer group and be uninterested in the attention it would bring with it, especially if something fails and goes wrong. Also, the bad reputation or the values that it represents might not align with our social norms (see also [36]). In uncertain situations, the opinions of the social group to which we belong can shape our decision-making process [9]. Contrarily, one might be more inclined to buy an electric car if one perceives it as a joy to drive [38], and neighbors, family or co-workers have adopted the technology [39]. Hence, if a climate technology aligns with people's individual and collective social norms and values, and the frame in which it is presented is appealing to individuals, purchasing an electric car becomes a stronger possibility. Policymakers can work together with local communities to identify contextually relevant values that align with prominent social values and thus are likely to positively influence collective and individual decisions to the adoption of climate-friendly technologies (such as electric cars) when they are developing policies.

Nevertheless, one might still not purchase an electric car if the costs are too high and the electric car is difficult to obtain. This brings us to stage 3 *affordability* and stage 4 *availability*. The electric car needs to be easily accessible on the market. Individuals should not have to consult

specialized car stores to buy an electric car, but the car should be available at a nearby dealer. People would otherwise have to go the extra mile, which would only be done by those who are deeply committed. This leads into stage 5, the appropriate *infrastructure* needs to be in place to make it easy for people to use the technology. Only by providing the enabling infrastructure around the technology will it be possible to undertake climate action as part of social identity [8]. For electric cars, one such example would be the implementation of public charging stations along major travel corridors which will increase people's willingness to purchase an electric car [40*,41].

The fulfilment of all five stages offers an ideal point of departure for undertaking climate action. However, the stages in the path model are not linear but rather interrelated. For example, an available climate-friendly technology can enable an initial interest, which then again can relate to the other four stages in the path model. In case of the electric car, previous research suggests that experience with electric cars in the form of short-term access can change people's preferences and make them more interested [39]. Thus, an individual who has not heard of an electric car might get interested if there is a good price (affordability); if the appropriate infrastructure is in place (infrastructure); if it shows up at her/his local car dealer (availability); if they see the relevant personal benefits (framing); or if they see it first with friends or neighbors (socio-cultural factors).

Designing effective climate policies addressing the different stages in the decision-making path model

Most climate policies implemented today address the later stages in the model, contributing to an externally induced short-term societal shift. Incentives are a typical example for this type of climate policy. Providing incentives to people for purchasing climate-friendly technologies can make these technologies more affordable and can help to accelerate the construction of green infrastructure. However, it is questionable how far they contribute to real long-term social change. What will happen when these incentives are taken away? Will people still make climate-friendly choices, or will they return to conventional practices? Support for electric cars still entrenches the private vehicle as the preferred means of personal transport versus collective solutions that might have greater long term climate change mitigation potential. Thus, regulations and economic measures do not necessarily change the underlying values that cause certain behavior patterns [12], which makes it necessary to combine these with more long-term societal change policies that address deeply embedded socio-cultural values.

Climate policy recommendations addressing framing

In order to identify and to design appropriate frames that encompass the complex values of a wide range of social groups, a cross-sectoral approach is needed in policymaking where different sectors work together to identify and to establish these frames (e.g. a close collaboration of the ministries of labor/employment, health, and environment). By working together, government agencies are better able to address climate change in a socially targeted way that delivers the broader goals that the public values [43]. In addition, policymakers should frame climate change as a local issue by emphasizing its potential social, economic and environmental benefits, since this can also enhance climate policy adoption in these local communities [44]. Furthermore, it is important to frame climate change mitigation technologies in a way that does not trigger partisanship, since this can be a barrier to climate action [45,4]. In addition, frames can be communicated more effectively through visualizations in form of

images and metaphors that relate to concrete locally relevant issues that connect to people's everyday concerns and emotions [26].

Climate policy recommendations addressing socio-cultural values

Previous studies have shown that a carbon tax has higher support when it is implemented by elite members of a person's own political party (in-group messengers) and when in-party communication demonstrated that members support this policy [4, 46]. Furthermore, climate change data communicated by climate scientists from the same area (shared regional identity), and messages that convey that the majority of neighbors have adopted climate-friendly technologies, can foster climate action [4**]. Policymakers should follow a bottom-up approach that addresses local identities and values by working together with local communities [47] and tapping into social identities.

Climate policies also need to address and account for generational differences. Previous research suggests that children are more receptive to climate change education, since they still need to form their worldviews and are therefore more open to climate change education, while adults have more established ideologies [48]. In addition, policies addressing the millennial generation (born 1981–1996) can be effective, since this generation is known to believe more in the anthropogenic causes of climate change than older generations [49].

Moreover, climate policies that redefine socio-cultural values and question existing societal values, particularly the underlying assumption that economic growth is an unquestioned condition for human well-being [50], become relevant in this stage. These can be cross-sectoral policies that enable a new definition of the good life and prosperity, one that is not entirely based on economic indicators but instead moves towards a community-centered society “where prosperity is found in relations with others, and where status and well-being are derived from our skills and efforts to contribute positively to those communities” [29**]. Some governments have adopted new measures for well-being such as the Bhutan Gross National Happiness Index (an index that aims to balance four pillars including economic, social, environment and governance [51]) and New Zealand's Living Standards Framework (a Dashboard that goes beyond GDP to include well-being and sustainable development [52]). Such policies have the potential for a much more lasting climate impact but are also more difficult and slower to implement, since changing social and cultural values is not a quick fix.

Carrot-and stick-policies can also become relevant in this stage, but it is important to find the right balance between rewards and punishments so that they ideally enable self-interest in the service of promoting long-term collective values [53]. Policymakers can also consider non-monetary rewards in form of public recognition or certain privileges for showing climate-friendly behavior. Opinion leaders in groups can assist in embracing climate change mitigation technologies by refining group norms towards more climate action [53]. Furthermore, climate policies that foster the startup of hybrid organizations – defined as entities including non-profit and profit models, which address social and environmental values – can enable a faster transition. Hybrid organizations serve a growing demand of a certain group(s) of consumers who look for ecologically sustainable, healthy, environmentally, and socially just products and services [54].

Climate policy recommendations fostering affordability and availability

Measures promoting the implementation of low-carbon technologies consist of a mix of “niche support” (incentives) and “creative destruction” (phase out) policies to overcome societal and structural lock-ins that otherwise create path dependencies preventing socio-technical transitions for more sustainable development [55]².

This can include incentives for climate-friendly technologies to reduce the high upfront costs [57] such as in the case of electric cars in Norway, where electric cars are sold with reduced or exempted value added tax (VAT). Electric car buyers do not have to pay a vehicle purchase tax or road tolls [41]. This stage also includes phase-out or decarbonization policies such as bans or regulations that require specific technologies or sectors to reduce GHG emissions in form of the polluter paying the principle [58]; incentives promoting green technologies; and the removal of subsidies for high-carbon technologies [10] as part of the green growth movement [58]. It is crucial that phase-out policies include transitional strategies in form of financial compensation or retraining of personnel to increase social acceptance and reduce resistance to a low-carbon transition [10].

Climate policy recommendations fostering infrastructure

Investments in sustainable or green infrastructures are crucial to meet the set climate targets [60, 61] and to enable people to make climate-friendly choices. To deliver this infrastructure there is a need to strengthen and reorient investment strategies [60]. Local politicians can make climate resilient infrastructures more attractive for investment by emphasizing their external co-benefits that provide benefits to their communities [62]. Furthermore, carbon pricing can supply revenue for public infrastructure investments for decarbonization [2]. Previous research has shown that among the different forms of carbon pricing, carbon cap and trade is a more durable policy than carbon [63]. In addition, carbon pricing has higher social acceptance if the revenues are used for tangible easily recognized benefits [63].

Climate policies must also take into account questions of social and environmental justice. Low-carbon energy technologies can have negative consequences for certain populations. For example, electricity produced from wind energy can lead to noise disruptions and ‘shadow flicker’ for communities living in proximity to the facilities [64]. Policy makers can limit these disruptions by developing appropriate planning and licensing processes through a participatory involvement of all relevant stakeholders [65].

Furthermore, renewable energy support scheme policies, such as the green certificate program [55], can foster green infrastructure development. Green certificates are tradeable commodities. Qualified renewable energy producers receive green certificates from the government per MWh produced. Utility companies are obliged by law to purchase these certificates corresponding to a certain percentage of their annual energy consumption [66]. However, reducing the costs for new climate-friendly infrastructures and achieving a system-wide transition is not just a problem of designing incentivization schemes, but may also require new political coalitions that nurture and enable a full societal shift [67].

² Niches and creative destruction are terms related to the Multi-Level Perspective (MLP), a framework for analysing socio-technical transitions for sustainability developed by Geels [56]. Niches are “protected spaces” such as R&D laboratories or subsidized demonstration projects” (Geels, [56]).

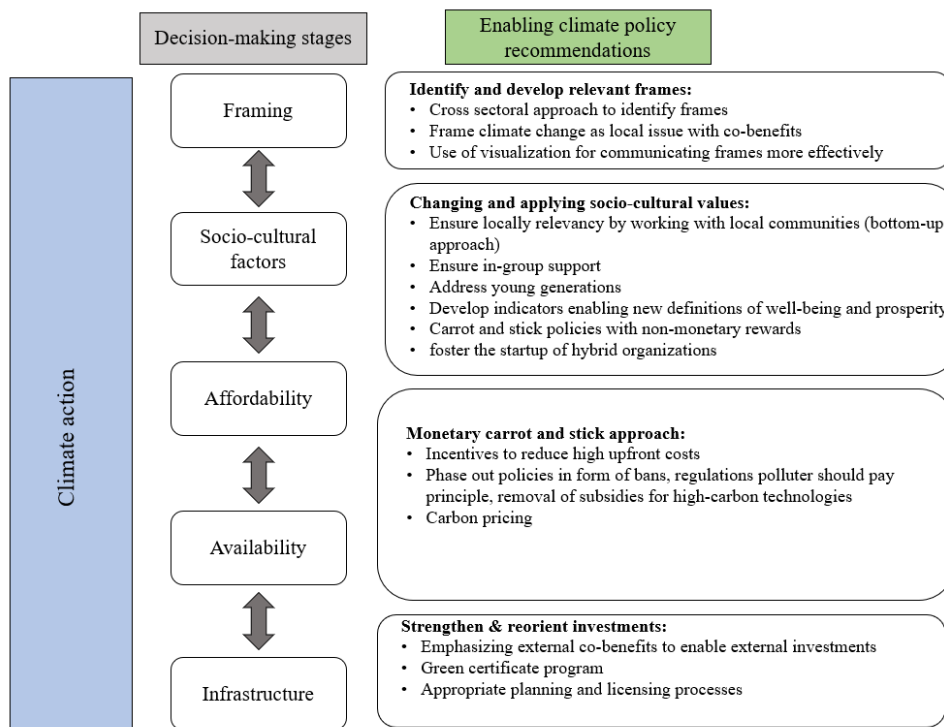


Figure 1 Integrated climate decision-making path model

Concluding remarks

This article presented an integrative review of recent climate change literature examining factors that influence climate action and current climate policies enabling a transition towards a low-emission society. The paper has practical and theoretical implications. Concerning the theoretical implications, it outlined a novel integrated climate decision-making path model consisting of five stages influencing climate action and, combining a wide range of structural and psychological barriers to climate-friendly behavior. Furthermore, the framework argues that a mix of short-term externally induced and long-term social change policies need to address these different stages if they are to be effective (see Figure 1). Whereas its practical implications include first and foremost the model's ability to guide holistic policy making so as to develop effective interventions and policies for reducing GHG emissions and achieving climate goals. The implementation of the climate decision-making path model can assist in accelerating the transition towards a low-emission society.

The resulting model and its five stages are based on a concise and thus exploratory literature review. However, it presents a first step towards developing an integrated holistic climate action path model on which future research can build. Notable, there is a need for more research that examines cultural contexts outside of the Global North. The presented decision-making path model is based on literature focused on North American and European contexts which raises questions as to its applicability in other cultural, political and economic contexts, for example in the Global South. Furthermore, although only used to contextualize the framework the electric car emphasizes community-oriented climate mitigation policies in industrialized democracies, it remains to investigate further how this framework can be applied to other areas

of climate policies related to for example policy status (e.g., adoption versus implementation), and policy type (e.g., mitigation versus adaptation), to name just a few.

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